

**PSYCHOPATHOLOGICAL SYMPTOMS OF PERSONS UNDER  
OPIOID SUBSTITUTION THERAPY: AN OBSERVATIONAL  
STUDY**

**A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF DOCTOR OF  
PHILOSOPHY**

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SUBSTITUTION THERAPY: AN OBSERVATIONAL STUDY**

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**MIZORAM UNIVERSITY**  
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**CERTIFICATE**

This is to certify that the thesis entitled “*Psychopathological Symptoms of Persons Under Opioid Substitution Therapy: An Observational Study*” submitted by Ms Sangila Dorjee for the award of Doctor of Philosophy in Clinical Psychology, is carried out under my guidance and incorporates the student’s bona fide research, and this has not been submitted for the award of any degree in this or any other university or institute of learning.

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**DECLARATION**  
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**NOVEMBER, 2025**

I **SANGILA DORJEE**, hereby declare that the subject matter of this thesis is the record of work done by me, that the contents of this thesis did not form basis of the award of any previous degree to me or to the best of my knowledge to anybody else, and that the thesis has not been submitted by me for any research degree in any other University/Institute.

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## TABLE OF CONTENTS

|                                       |                |
|---------------------------------------|----------------|
| Certificate                           | <i>i</i>       |
| Declaration                           | <i>ii</i>      |
| Acknowledgement                       | <i>iii-iv</i>  |
| List of Tables                        | <i>vi-vii</i>  |
| List of Figures                       | <i>viii-ix</i> |
| List of Abbreviations                 | <i>x-xi</i>    |
| List of Appendices                    | <i>xii</i>     |
| <br>                                  |                |
| Chapter I: Introduction               | 1 – 28         |
| Chapter II: Review of Literature      | 29-49          |
| Chapter III: Statement of the Problem | 50-57          |
| Chapter IV: Methods and Procedure     | 58-67          |
| Chapter V: Result and Discussion      | 68-125         |
| Chapter VI: Summary and Conclusion    | 126-140        |
| <b>APPENDICES</b>                     | 141-160        |
| <b>REFERENCES</b>                     | 161-222        |
| <br>                                  |                |
| <b>BIODATA OF THE CANDIDATE</b>       |                |
| <br>                                  |                |
| <b>PARTICULARS OF THE CANDIDATE</b>   |                |

## LIST OF TABLES

| <b>Table No.</b> | <b>Content</b>                                                                                                                                                                | <b>Page No</b> |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| <b>Table 1</b>   | Table showing the Mean, SD, Variance, and Cronbach's Alpha of the subscales of Psychopathological symptoms of SCL 90-R                                                        | 68             |
| <b>Table 2</b>   | Table showing the Mean, SD, Variance, and Cronbach's Alpha of the selected ASI-5 parameters                                                                                   | 71             |
| <b>Table 3</b>   | Table Showing the Kolmogorov-Smirnov Test and p value of the sample on Symptom Checklist 90-R and Addiction Severity Index-5 according to the onset age of substance use      | 72             |
| <b>Table 4</b>   | Table Showing the Kolmogorov-Smirnov Test and p value of the sample on Symptom Checklist 90-R and Addiction Severity Index-5 according to the severity level of substance use | 74             |
| <b>Table 5</b>   | Table showing the Chi-Square ( $\chi^2$ ) Test of Independence Between Onset Age and Socio-Demographic Details                                                                | 83             |
| <b>Table 6</b>   | Table showing the Chi-Square ( $\chi^2$ ) Test of Independence Between Severity Level and Socio-Demographic Details                                                           | 84             |
| <b>Table 7</b>   | Results showing the Mann-Whitney U test between adolescent-onset and adult-onset groups on psychopathological symptoms and functional domains of progress in OST              | 90             |
| <b>Table 8</b>   | Results showing the Mann-Whitney U test between high severity and low severity groups on psychopathological symptoms and functional domains of progress in OST                | 99             |
| <b>Table 9</b>   | Showing Spearman rho correlation between the variables                                                                                                                        | 111            |

---

|                 |                                                                                                                                                                                     |     |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Table 10</b> | Mean Ranks and Kruskal–Wallis H Test Results Between Onset Age (Adolescent & Adult) and Severity Level (High & Low) on Psychopathological and Functional Domains of Progress in OST | 118 |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|

---

## LIST OF FIGURES

| <b>Figure No.</b> | <b>Content</b>                                                                                                                          | <b>Page no</b> |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------|----------------|
| <b>Figure 1</b>   | Diagram showing the 2 X 2 between-group comparative design                                                                              | 55             |
| <b>Figure: 2</b>  | Pie chart showing the distribution of age groups of the sample                                                                          | 77             |
| <b>Figure 3</b>   | Pie chart showing the employment history of the sample                                                                                  | 78             |
| <b>Figure 4</b>   | Pie chart showing the distribution of religion in the sample                                                                            | 78             |
| <b>Figure 5</b>   | Pie chart showing the distribution of family discord of the sample                                                                      | 79             |
| <b>Figure 6</b>   | Graph showing the distribution of marital status of the sample                                                                          | 79             |
| <b>Figure 7</b>   | Graph showing the legal status of the sample                                                                                            | 80             |
| <b>Figure 8</b>   | Pie chart showing the educational level of the sample                                                                                   | 80             |
| <b>Figure 9</b>   | Pie chart showing the employment status of the sample                                                                                   | 81             |
| <b>Figure 10</b>  | Pie chart showing the monthly salary according to the minimum wage of Rs 20358/- for unskilled labour (Minimum Wage Act of India, 1948) | 81             |
| <b>Figure 11</b>  | Graph showing the duration of treatment of the sample                                                                                   | 82             |
| <b>Figure 12</b>  | Pie chart showing the buprenorphine doses of the sample                                                                                 | 82             |

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|                  |                                                                                                                                                                                                  |     |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Figure 13</b> | Bar graph showing the significant findings from the Mann–Whitney U Test between adolescent-onset and adult-onset groups on psychopathological symptoms and functional domains of progress in OST | 93  |
| <b>Figure 14</b> | Bar graph showing the significant findings from the Mann–Whitney U Test between low-severity and high-severity groups on psychopathology parameters and functional domains of progress in OST    | 103 |
| <b>Figure 15</b> | Significant correlations between psychopathological symptoms and Onset Age/Severity Level                                                                                                        | 112 |
| <b>Figure 16</b> | Significant correlations between functional domains in progress of OST with Onset Age/Severity Level.                                                                                            | 113 |
| <b>Figure 17</b> | Graph displaying the significant results of the Kruskal Wallis H test between onset-age and severity-level on psychopathological symptoms and functional domains of progress in OST              | 120 |

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## LIST OF ABBREVIATIONS

|        |   |                                                           |
|--------|---|-----------------------------------------------------------|
| ACEs   | : | Adverse Childhood Experiences                             |
| ADHD   | : | Attention Deficit and Hyperactivity Disorder              |
| AIDS   | : | Acquired Immune Deficiency Syndrome                       |
| APA    | : | American Psychiatric Association                          |
| ART    | : | Antiretroviral treatment                                  |
| ART    | : | Antiretroviral Therapy                                    |
| ASI    | : | Addiction Severity Index                                  |
| AUDIT  | : | Alcohol Use Disorder Identification Test                  |
| CS     | : | Composite Score                                           |
| DCGI   | : | Drug Controller General India                             |
| DSM    | : | The Diagnostic and Statistical Manual of Mental Disorders |
| ECA    | : | Epidemiologic Catchment Area                              |
| EMCDDA | : | European Monitoring Centre on Drugs and Drug Addiction    |
| GSI    | : | Global Severity Index                                     |
| HBV    | : | Hepatitis B virus                                         |
| HCV    | : | Hepatitis C virus                                         |
| HIV    | : | Human Immunodeficiency Virus                              |
| ICD-10 | : | The International Classification of Diseases              |
| IDU    | : | Injecting Drugs Users                                     |
| ISCED  | : | International Standard Classification of Education        |
| ISR    | : | Interviewer Severity Rating                               |
| MDD    | : | Major Depressive Disorder                                 |
| MMT    | : | Methadone Maintenance Therapy                             |
| NACO   | : | National AIDS Control Organisation                        |
| NACP   | : | National AIDS Control Program                             |
| NDPS   | : | Narcotic Drugs and Psychotropic Substances                |
| NGO    | : | Non- Governmental Organisation                            |

|          |   |                                             |
|----------|---|---------------------------------------------|
| OCD      | : | Obsessive Compulsive Disorder               |
| OST      | : | Opioid Substitution Therapy                 |
| ODU      | : | Opioid Use Disorder                         |
| PCL-R    | : | Psychopathy Checklist-Revised               |
| PDSI     | : | Positive Symptom Distress Index             |
| PSR      | : | Patient Severity Rating                     |
| PST      | : | Positive Symptom Total                      |
| PTSD     | : | Post Traumatic Stress Disorder              |
| SADA     | : | Sikkim Anti-Drug Act                        |
| SCID     | : | Structured Clinical Interview for DSM-IV-TR |
| SCL-90 R | : | Symptom Checklist 90-Revised                |
| SP       | : | Spasmoproxyvon                              |
| SPSS     | : | Statistical Package for Social Science      |
| SROM     | : | Slow-Release Oral Morphine                  |
| WHO      | : | World Health Organization                   |

## **LIST OF APPENDICES**

**Appendix I:** Informed Consent Form (English)

**Appendix II:** Socio-Demographic Profile of the Sample (English)

**Appendix III:** The Symptom Checklist 90- Revised (Derogatis et al., 1994)

**Appendix IV:** The Addiction Severity Index 5<sup>th</sup> Edition (McLellan et al., 1992)

**Appendix V:** MZU Human Ethics Committee Approval

**CHAPTER – I**  
**INTRODUCTION**

## 1.1 Introduction

The history of addiction began around the end of the third millennium B.C. in Mesopotamia, where opium was first used for its medicinal and pain-relieving effects (Brownstein, 1995). The chemical form of opium, such as morphine, is used as an analgesic (Thakkar et al., 2006). Addiction is a medical and psychiatric condition that involves compulsive use even after catastrophic consequences. According to Fischer (2022), “Addiction is a brain disease, a spiritual malady, the romantic mark of artistic sensibility, a badge of revolution against sick society, and all of these things at once”.

Opioids are psychoactive substances that interact with opioid receptors in the central and peripheral nervous systems (Zhang et al., 2008). An opioid agonist binds to these receptors, triggering a cellular response, while an opioid antagonist binds without activating the receptor, blocking the action of agonists. Some substances act as both agonists and antagonists, depending on the receptor subtype and are called mixed agonist-antagonists (Johnson, 2000). These natural substances produce psychoactive effects. On the other hand, endogenous opioid peptides such as enkephalins, endorphins, endomorphins, and dynorphins bind to opioid receptors, influencing mood and stress regulation in individuals (Contet et al., 2004; Zhang et al., 2008; Bilkei-Gorzo et al., 2008). In India, common opioids include heroin, smack, buprenorphine, dextropropoxyphene, and pentazocine (Rao et al., 2014). These drugs are typically used through oral ingestion, injecting directly into the bloodstream, or smoking.

According to research (Fornasari, 2012; Rao et al., 2014; Hoffman et al., 2019; Arora et al., 2021), opioids can be classified into different categories, such as

- (i) **Natural opioids:** Opium is processed into two commonly utilised natural opiates, crude opium locally called “afeem” or “amal”, and the leftover husk or barn locally known as “bhukki” or “doda”. Others include morphine and Codeine.
- (ii) **Semi-synthetic opioids:** Smack or purer form called heroin, locally called “white” or “chitta”; others include buprenorphine.

(iii) **Synthetic opioids:** They are synthetic drugs that mimic the effects of natural opioids, also known as “medical nasha,” including methadone, dextropropoxyphene, and pentazocine.

The global HIV/AIDS crisis has been significantly fueled by the intravenous use of drugs, especially through sharing needles (Thakkar et al., 2006). There are nine key interventions for HIV prevention, care, and treatment among IDUs, collectively known as the comprehensive package, recommended by WHO, UNAIDS, and UNODC. These include the Needle Syringe Program, Opioid Substitution Therapy, Anti-Retroviral Therapy, HIV counselling and testing, prevention and treatment of sexually transmitted infections, condom distribution for IDUs, targeted information, education, and communication efforts, TB prevention and diagnosis, and hepatitis prevention and treatment (Rao et al., 2014). The National AIDS Control Program describes an Injecting Drug User (IDU) as anyone who has used a psychoactive substance via injection for non-medical purposes at least once in the past three months. Opioids are the primary substances used by IDUs. However, substance use through injection alone is not sufficient for a formal diagnosis.

The International Classification of Diseases (ICD-10) describes a harmful use episode as when a person experiences physical or psychological harm from substance use and continues using the substance despite these effects. This pattern is determined by the individual's behavior. Dependence involves regular substance use, where this behavior dominates other activities, accompanied by multiple physical, psychological, and social symptoms, leading to a diagnosis of dependence.

The criteria for substance dependence should be met for at least three months within a year: (i) needing to use the substance in large amounts over an extended period; (ii) increasing the amount to achieve the same effect; (iii) experiencing physical or psychological symptoms when stopping or reducing use; (iv) having a strong desire to consume the substance; (v) continuing use despite harm; (vi) significant impairment in social or occupational functioning due to substance use; (vii) spending considerable time obtaining, using, or recovering from the substance. The DSM-5 includes withdrawal and tolerance as criteria. Tolerance and withdrawal are

normal responses to opioid use, especially after long-term consumption or sudden cessation (Webster, 2017).

Opiates are an effective medication for moderate to severe pain. It provides analgesic effects and a corresponding level of sedation, depending on the dosage. Lower doses of opiates can cause side effects like itching, pupil constriction, and constipation. At higher doses, side effects may include confusion, slurred speech, clammy skin, reduced blood pressure, slowed heartbeat, and shallow breathing (Thakkar et al., 2006). Opiates, along with their analgesic effect, cause sedation, alter temperature regulation, cause seizures, and changes in sensorium. All opioids affect respiration to a certain extent, depending on person to person. It suppresses the normal breathing drive, resulting in hypoxia and hypercarbia. Synthetic opioids like fentanyl can cause significant muscle rigidity and chest wall stiffness; they also pose a risk of hypotension due to peripheral vasodilation caused by histamine release and interference with catecholamine activity (Murray et al., 1995). Starting use at an early age has been linked to developing dependence on alcohol, cannabis, cocaine, or psychostimulants, often resulting in repeated treatment admissions and serving as early signs of potential psychiatric disorders (Strashny, 2016).

Studies have shown that starting substance use at an early age is associated with a higher risk of developing a substance use disorder later on. Many of these individuals also have dual diagnoses involving untreated psychiatric conditions and tend to seek treatment less frequently. This combination results in a prolonged illness duration spanning decades and contributes to poorer treatment outcomes (Borges et al., 2007; McGorry et al., 2011; Carra et al., 2015).

A higher rate of prevalence of psychotic disorder was established in the early age of initiation, and affective disorder in the later age of initiation. An increased risk of sexual behaviour in terms of unprotected sexual encounters and multiple sexual partners (Subodh et al., 2019).

Early initiation of opioid use is linked to a later development of opioid use disorder, although the progression is slower. This pattern is comparable to early onset

of alcohol or other drug use. Starting substance use early increases the risk of quickly experiencing negative consequences, such as psychiatric disorders and worse psychosocial outcomes (Schepis et al., 2017).

## **1.2 Opioid Use Disorder (OUD)**

Opioid Use Disorder is a chronic, relapsing condition marked by periods of remission, characterised by a loss of control over compulsive use and ongoing consumption despite negative consequences (Taylor et al., 2022). This complex disorder causes significant physical, psychological, and social impairments. It encompasses dependency and addiction to opioids, with addiction reaching a severe level (McLellan et al., 2000). Individuals with opioid use disorder face an increased risk of early death due to overdose, violence, and the spread of infectious diseases through sharing contaminated injections (Anthony et al., 1995).

OUD presents symptoms such as acute withdrawal, including (i) physical signs like lacrimation (tearing), rhinorrhea (runny nose), yawning, diarrhea, sweating, muscle cramps, aches, and pains; and (ii) psychological signs like restlessness, anxiety, insomnia, irritability, reduced interest in pleasurable activities, premature ejaculation, sleep issues, and strong cravings for opioids. These symptoms typically last two to three weeks or longer (Rao et al., 2014).

Risk factors for adolescents encompass early antisocial behaviors, depression, anxiety, academic struggles, socioeconomic background, delinquency, experiences of physical or sexual abuse, hyperactivity, and a family history of substance use (Kilpatrick et al., 2000). Early childhood experiences are associated with early onset of use (Evans et al., 2019), as negative experiences are related to impaired cognition, emotional dysregulation and maladaptive coping mechanisms (Stein et al., 2017). The long-term impact of childhood maltreatment on cognitive beliefs about opioid use is significant. There is strong evidence linking childhood maltreatment to externalizing disorders that influence the frequency of opioid use (Santo et al., 2021).

Gender differences influence the outcomes of these negative experiences. Males typically begin substance use early, often using injectables and experiencing

lifetime overdoses. In contrast, females are four times more likely to report negative childhood experiences and are more susceptible to opioid-related issues. The transition from first use to dependency happens quickly (Evans et al., 2019). Women tend to get into treatment earlier; hence, they tend to stay in treatment for longer than in a detoxification setting, which lowers the mortality risk for females (Evans et al., 2015).

In the international platform, the United States is going through an opioid crisis as drug overdose-related deaths have increased to 93,331 in 2020 (Zhang et al., 2023). These deaths have been attributed to the use of prescription opioids, but the mortality increased via the use of heroin in 2010/11 to increase in death related use of an illicitly manufactured opioid such as fentanyl from 2014/15 (Rudd et al., 2016). Opiate withdrawal often leads users to increase their doses because of intense symptoms such as sharp pain, anxiety, flu-like signs, vomiting, diarrhea, rapid heartbeat, high blood pressure, dilated pupils, coughing, and severe muscle cramps (Thakkar et al., 2006).

In India, the prevalence of opioid use is 2.06%, with heroin use at 1.14%, followed by pharmaceutical opioids at 0.96% and opium use at 0.52%. In terms of the percentage of the population, the northeast states are most affected by opioid use, including Mizoram, Nagaland, Arunachal Pradesh, Sikkim, and Manipur, along with other states such as Punjab, Haryana, and Delhi (Ambedkar et al., 2019).

### **1.3 Theories of Addiction**

The biopsychosocial model by Engel (1977) explains addiction by incorporating biological, psychological and social factors contributing to substance use disorder. It is the general model of illness. It views addiction as a multi-causal condition where addiction is a complex mixture of various causes. The biological perspective involves. Genetic vulnerabilities include the inherited risk of addiction, neurochemistry, where the imbalances of neurotransmitters affect the reward pathways, Brain structural changes in the prefrontal cortex and limbic system and medical conditions, where increased neurological illness can cause the risk of use of opioids or sedatives. Psychological factors encompass personality traits like impulsivity, sensation seeking, and low self-esteem. They also include using

substances as coping mechanisms, mental health disorders that can heighten addiction risk, and learning and cognition aspects, such as beliefs about drug use and reinforcement patterns. Social factors include family dynamics, peer pressure, cultural norms and socioeconomic disadvantages. This is a holistic approach that enables an integrated treatment strategy.

Brickman et al. (1982) proposed four models of attribution of responsibility that explain how societies blame and take responsibility for health and social issues, including addiction. The moral model attributes responsibility for both causing and addressing the problem to the individual. For example, drinking is viewed as a sign of weak character, suggesting that drinkers must exercise willpower and regain control to achieve sobriety. The Medical Model views the problem as a disease. The individual is not responsible for their condition, so it should be viewed as a disease requiring expert treatment. It removes the blame from the individual. The enlightenment model holds individuals responsible for causing their problems but not for solving them. It comes with a view of accepting authority or outside help, common with the Alcoholics Anonymous 12-step program. The compensatory model sees the individual as not responsible for causing the problem, but holds them accountable for solving it. The model encourages empowerment and self-directed recovery.

These models help in shaping how society views treatment and help make policies related to health and behavior issues.

#### **1.4 Psychopathology:**

Psychopathology is a process and not a fixed condition; psychopathology emerges as a result of the development process rather than being biologically predetermined. It encompasses mental disorders as an outcome of the interaction between genetics, environment and experiential factors across time. Early life stress, insecure attachment and trauma contribute to the development of psychopathology. The role of early attachment and relationships plays an integral part in secure attachments in childhood and provides emotional regulation skills, reducing the likelihood of later psychopathology. Negative early experiences such as stressful

environment, neglect and adverse childhood experiences can later lead to behavioural and emotional problems manifesting as mental disorders (Sroufe,1997).

Psychopathology should be understood as a state in which a person is significantly impaired in their ability to engage in social and personal roles like relationships, work and self-care (Bergner, 1997).

Psychopathology emerges from complex interactions between genetic, biological, psychological and environmental factors over time. Mental disorders are viewed as deviations from normal developmental pathways rather than static conditions. Some disorders show continuity, while others change or resolve over time. Early experiences do not determine the outcome fully as there is potential for change and adaptation. Psychopathology results from reciprocal interactions between individuals and their environment, accounting for differences in response to adversity. emphasis on interventions that adapt to developmental stages rather than applying one-size-fits-all treatment (Rutter et al., 2000).

### **Duration and co-occurring psychopathology with substance use:**

Substance use dependence in itself is a chronic psychiatric condition recognised by frequent relapses, requiring longer care to reach a sustained state of abstinence (McLellan et al., 2000). There are many studies establishing a psychopathology with addiction. Anxiety disorder in general is twice as high, and generalised anxiety disorder is four times higher (Conway et al., 2016). Anxiety diminishes in abstinence, and when present, it doubles the risk of relapse (Rounsaville et al., 1997). The prevalence of compulsive behaviour and its role in the affective process is associated with addictive behaviour (Den Ouden et al., 2020). Evidence indicates that individuals with depressive symptoms tend to consume substances at significantly higher levels than those without such symptoms (Crum et al., 2001). Recovery rates differ based on factors such as gender, race, age at first use, time to initial treatment, prior treatment history, patterns of substance use, and the presence of co-occurring psychiatric disorders. Most research has focused on outcomes related to the primary episode of care and considered only one or two of these factors.

Unfortunately, few studies have assessed the duration of addiction- from first use to one year of abstinence- or the length of treatment careers- from first admission to at least one year of abstinence- and have not examined the combined effects of these variables.

### **Somatisation:**

Somatisation is characterised by unexplained symptoms and is reported as a set of physical symptoms that cannot be accounted for by any medical condition. It cannot be any direct substance-related effect or psychiatric disorder (Hasin et al., 2007; Yavuz, 2018). Somatisation is the expression of mental phenomena as physical symptoms characterised by “physio-somatic” symptoms that result in significant distress and problems functioning (Regier et al., 2013). Somatisation is defined as distress arising from the perception of bodily dysfunction. The main component of this includes complaints regarding the gastrointestinal functioning, cardiovascular functioning, respiratory functioning, muscular functioning and symptoms of anxiety (Derogatis, 1994).

### **Obsessive & Compulsive:**

Obsessive-Compulsive Disorder (OCD) is a common clinical condition related to mental health. It is characterized by obsessions and compulsions that are time-consuming and impair social, occupational, and other functioning areas. Obsessions are recurrent, persistent thoughts, urges, or images that are intrusive and unwanted, often causing distress. Compulsions involve repetitive behaviours or mental acts performed in response to these obsessions to reduce distress (DSM-5-TR).

Behaviours and experiences include motor, cognitive, affective, and motivational processes (Derogatis, 1994). Various models have explored the key question of how drug use shifts from casual to compulsive during addiction development. The initial theory suggested that addiction begins with pleasure-seeking, followed by a later stage focused on avoiding withdrawal symptoms (Koob et al., 2001). Later stages of alcohol use disorder are characterised by compulsive features such as stimulus-driven habit and non-flexibility, leading to persistent use despite

negative consequences (Fontenelle et al., 2011). A recent study by Elisabetta et al. (2019) highlights the role of compulsivity in the development of resistance to alcohol use disorder. It emphasises the importance of identifying compulsivity as a promising but often overlooked target domain. The prevalence of compulsive behaviour and its influence on affective processes are linked to addictive behaviours (Den Ouden et al., 2020).

### **Interpersonal sensitivity:**

Interpersonal sensitivity is described as "an undue and excessive awareness of, and sensitivity to, the behaviour and feelings of others" (Boyce et al., 1989). Interpersonal sensitivity is characterised by feelings of uneasiness or inferiority in social situations, self-consciousness, and a tendency to perceive others as critical or disapproving. It involves excessive awareness of and concern for how one appears to others, including fears of potential criticism, embarrassment, or rejection. It is an obsession rooted in feelings of inadequacy, inferiority to others, and discomfort during interactions, especially when interpersonal evaluation occurs. In psychological measures such as the Symptom Checklist-90-Revised (SCL-90-R), interpersonal sensitivity is defined as a cluster of symptoms characterised by self-devaluation, feelings of inferiority and personal failure, such as feeling that one does not fit in compared to others, and hypersensitivity to social interactions (Derogatis, 1994).

Interpersonal sensitivity is a personality trait marked by ongoing worry about negative social judgments (Lin et al., 2021). People with this trait tend to perceive social situations as highly threatening and are constantly on the alert for others' evaluations. To avoid potential criticism, they often engage in proactively defensive behaviours, such as obedience or inhibition (Marin et al., 2013). This trait encompasses a general heightened sensitivity to social feedback, increased concern about others, fear of personal inadequacy and criticism, and frequent misunderstandings of others' interpersonal actions (Boyce et al., 1993).

Personality traits, family relationships, lifestyle, and beliefs differ significantly between substance users and healthy individuals (Zeynali et al., 2007). Interpersonal skills, including sensitivity in relationships and assertiveness, may be closely linked to

the tendency to abuse drugs (Vojudi et al., 2014). Interpersonal sensitivity has been identified as an important factor contributing to the prevalence of anxiety, depression, and drug dependence (Harb et al., 2002; Wilhelm et al., 2004).

### **Anxiety:**

Anxiety is defined as a future-oriented affective state characterised by sustained apprehension or worry about the actuality of a future threat or negative event. It has three interrelated parts: i) Subjective experience - anxiety as an emotional state of mind; ii) Cognitive aspect - Repeated patterns of anxious thoughts, including worrying, expecting bad things to happen, or thinking about problems excessively; iii) Physiological response - a state of bodily arousal activated by the autonomic nervous system (e.g. accelerated heart rate, muscular constriction, clenching of teeth, upset stomach) that mobilises the individual for a fight-or-flight response (APA, 2018).

The American Psychiatric Association (2022) identifies several anxiety disorder types, including generalised anxiety disorder, panic disorder, agoraphobia, specific phobias, social anxiety disorder, separation anxiety disorder, and selective mutism. Additional anxiety-related conditions include OCD and PTSD. Anxiety disorders are the most common psychiatric conditions, impacting about one-third of people over their lifetime, with higher rates in women and particularly prevalent during middle age (Bandelow et al., 2015).

Anxiety as an emotion is not a pathology in itself but an adaptive response that can enhance vigilance and problem-solving in threatening situations. The intensity and overreaction to perceived or actual danger led to "clinically significant distress or impairment in social, occupational, or other important areas of functioning" (First, 2024). Anxiety disorder involves fear, excessive worry, and behavioural changes. Fear is an emotional reaction to an immediate, real or imagined threat, while anxiety is a response anticipating a future threat, whether real or imagined. Fear usually triggers autonomic responses necessary for defence and flight, and fearful thoughts associated with immediate danger often led to fleeing behaviour (Gimeno et al., 2017).

Anxiety involves muscular tension, heightened awareness of potential threats, and cautious, avoidant behaviour (Regier et al., 2013). Substance dependence significantly increases the risk of anxiety disorders, generally doubling the likelihood, with generalised anxiety disorder being four times more common (Conway et al., 2016). Additionally, alcohol use disorder and anxiety can mutually reinforce each other (Gimeno et al., 2017).

Cloninger et al. (1996) identified that anxious personality traits, along with age of onset and inheritance patterns, are linked to the rapid development of tolerance and dependence on alcohol's anti-anxiety effects. Anxiety disorders combined with SUD are strongly associated with treatment outcomes (Klimkiewicz et al., 2015). Additionally, in individuals with both conditions, the age at which substance use begins tends to be earlier than when Generalised Anxiety Disorder is diagnosed (Kessler et al., 2002).

Anxiety decreases during abstinence, and when it does occur, it doubles the chance of relapse. Baseline alcohol issues are linked to higher anxiety levels (Rounsaville et al., 1997). Smith (2012) described three different pathways explaining the development of comorbidity between anxiety and substance use.

- (i) The common factor model, which assumes that anxiety and substance use do not have a direct causal relationship but rather share a third variable responsible for both.
- (ii) The self-medication pathways, where substance use is initiated to cope with anxiety.
- (iii) The substance-induced pathways, in which the use of a substance precedes the development of anxiety.

### **Depression:**

Depression is characterized as a negative emotional state that spans from feelings of unhappiness and discontent to severe sadness, pessimism, and hopelessness, which can disrupt daily life. It causes physical, cognitive, and social changes, often accompanied by changes in eating and sleeping habits, low energy or

motivation, trouble concentrating or making decisions, and withdrawal from social activities (APA, 2018).

Depressive disorders are complex and varied syndromes. "These disorders are characterised by disrupted mood (such as feeling low, numb, or irritable), combined with cognitive symptoms (like feelings of worthlessness and difficulty concentrating) and physical symptoms (such as fatigue and low energy)" (Regier et al., 2013). Depression is classified into several categories: major depressive disorder, persistent depressive disorder, disruptive mood dysregulation disorder, premenstrual dysphoric disorder, substance-induced depressive disorder, and depressive disorder due to medical conditions (First, 2024). Drinking behaviour is linked to depression, especially a depressed mood, with higher consumption levels (Schuckit, 1983). Evidence indicates that individuals with depressive symptoms tend to consume significantly more alcohol than those without (Crum et al., 2001). Various factors, including genetic, developmental, sociodemographic, psychosocial, and relationship characteristics as well as physical and mental health status, influence a person's susceptibility to depression (Maier et al., 2021). One of the studies by Foulds et al (2015) focuses on the response to treatment of the patient with independent depression or substance-induced depression and emphasises the reverse causality, indicating that substance-induced depression and substance use disorder are a result of independent depression. Alcohol consumption leads to depression due to its impact on mental health and also the psycho-social factors (Lange et al., 2019). Alcohol consumption increases the risk of depression as the consumption intensity, rather than frequency, was associated with self-reported depression (Churchill et al., 2017).

### **Anger-Hostility:**

Anger is an emotional state characterised by varying levels of intensity, duration, and frequency, leading to cognitive shifts and physical reactions. These physical responses can include verbal, nonverbal, or motor activities (Keiley et al., 2009). Anger-Hostility is an emotion marked by tension and hostility stemming from frustration or perceived injustice, whether real or imagined. It may manifest through behaviours aimed at removing the source of anger or expressing the emotion itself

(APA, 2018). Aggression has a significant role in the structure of addiction disorder, contributing to family and interpersonal conflict (Vojudi et al., 2014).

Aggression is part of a wide range of human behaviour, exhibited to adapt to one's situation or circumstances, deeming aggression as practical and creative; it can also be seen as harmful, destructive and socially deplorable behaviour (Maremanni et al., 2020). Aggression is correlated with biological factors (genetic, hormonal, gender), but is not definitive. Psychological and social factors have more prominence (Iiyuk et al., 2012).

Hostility represents the thoughts, feelings, and behaviours associated with a negative emotional state of anger (Derogatis, 1994). High hostility leads to more interpersonal conflict and less recognition of positive feedback from others, resulting in less social support (Siegler et al., 2003). Hostility is more common in men than in women; it has been linked to stress reactivity (Sandrini et al., 2020).

Numerous studies have associated substance use and anger and hostility. Substances like alcohol, cocaine, amphetamine, opioid and cannabis (Beck et al., 2014; Boles et al., 2003). Substance use influences aggressive behaviour through the disinhibitory effect of intoxication (McCloskey et al., 2009). The presence of anger-hostility increases the risk of lifetime substance use by threefold (Caccaro et al., 2016). High aggression and hostility also facilitate the early onset of substance use (Dawkins et al., 1997). Many studies have substantiated that opioid users undergoing treatment have a high level of anger-hostility at the initiation of the treatment (Gerra et al., 2001; Maremanni et al., 2020). Substance users cannot inhibit aggressive responses due to a complex relationship of substance facilitating aggressive responses, and childhood aggression is seen as a precursor to substance use in adolescents (Pruitt et al., 1992). This inability to inhibit behaviour is manifested in various substance use or impulsive behaviours (McCormick et al., 1993). There is a high correlation between hostility and aggression and the tendency to use avoidance coping style, distancing from positive reappraisal to detach from the problem confronting them. Individuals with high anger and hostility tend to ignore the problem, ultimately affecting their recovery process as they tend to get triggered easily, with high relapse potential. This leads them into a

vicious cycle of hostility, interpersonal conflict, and rejection, which in turn leads to relapse (McCormick et al., 1995).

### **Phobic Anxiety:**

Phobic anxiety is characterised by a persistent, irrational fear of a specific person, place, object, or situation that is disproportionate to the actual threat and results in avoidance or escape behaviours (Derogatis, 1994). It involves anxiety centred on or directed toward objects or situations that symbolise the real fear but generally pose little to no actual danger (APA, 2018).

Phobic anxiety encompasses several conditions:

- (i) **Specific Phobias:** An intense and persistent fear or anxiety about a particular object or situation that causes substantial distress or impairment in social and occupational functioning.
- (ii) **Social Anxiety Disorder (Social Phobia):** A pronounced fear or anxiety concerning one or more social situations, driven by concerns about humiliation or negative evaluation by others. This often results in significant distress or avoidance behaviours.
- (iii) **Agoraphobia:** An intense fear of being in open or enclosed spaces, driven by thoughts that escaping might be difficult or help might not be accessible (First, 2024).

Epidemiological studies show that social phobia is associated with a greater risk of substance dependence than general substance use (Grant et al., 2005). Usually, panic symptoms appear after the onset of substance dependence (Zvolensky et al., 2006). Moreover, social phobia is identified as a key risk factor for substance dependence and plays a role in the development of substance use disorders (Kendall et al., 2002).

### **Paranoid ideation:**

Paranoid ideation occurs when thinking is dominated by suspicion, persecutory or grandiose ideas that do not reach delusional intensity (Sadock et al., 2015). It characterizes paranoid behaviour as a disordered thought process, involving projective

thoughts, hostility, suspicion, grandiosity, a sense of centrality, fear of losing autonomy, and delusions. These are considered core features of this disorder (Deragotis et al., 1994).

Paranoid ideation resembles psychotic experiences linked to various psychotic symptoms. It occurs in disorders such as schizophrenia, schizoaffective disorder, and delusional disorder (Verdoux et al., 2002). People experiencing paranoid delusions without a full psychotic diagnosis have had at least one episode of paranoid ideation but do not meet the criteria for psychosis. Additionally, paranoid delusions are connected to a higher risk of violence, even when accounting for socio-demographic factors and other mental health conditions adjusted. Substance use exacerbates the likelihood of violence in individuals with paranoid ideation. Men and younger individuals with paranoid ideation are at higher risk of violent outbursts (Coid et al., 2016). Lack of sleep can contribute to the development and increase in paranoid ideation as sleep deprivation affects cognitive processing, leading to misinterpretation of social interaction and suspiciousness (Eilbeck et al., 2013). Adolescents who use high-potency cannabis are linked to psychotic-like experiences, and heavy cannabis use, especially with high THC levels, is associated with severe psychotic symptoms. Early initiation during adolescence further increases the risk (Markie et al., 2021). Cannabis and opioid use affect cognitive functioning, emphasising the role of cognitive errors (Orum et al., 2020).

### **Psychoticism:**

Psychotic symptoms encompass delusional beliefs, hallucinations, psychosocial impairments such as withdrawal and isolation, along with first-rank symptoms. The dimension of psychoticism offers a spectrum ranging from mild interpersonal separation to severe psychosis (Deragotis et al., 1994). Individuals with psychotic symptoms like paranoia, hallucinations, and disorganised thoughts are much more likely to have a substance use disorder. The severity of psychosis correlates with a higher risk of substance misuse. Specific substances are closely linked to acute psychotic episodes (Lachner et al., 2013).

When compared to all the other substances like cocaine, amphetamines or hallucinogens, opioids are not traditionally associated with psychosis. Some opioid users have psychotic symptoms when the dosage is high. Opioids contribute to individuals having a psychotic like state when the use is for a longer period and if the individual is going through withdrawal (Maremmani et al., 2014).

### **1.5 The Connection between SUD and Psychotic Disorder through the lens of ASI-5**

Individuals with substance use disorder and psychotic disorder have worse clinical outcomes with a higher relapse rate and greater social and functional impairment. Substance use can exacerbate psychotic symptoms (Mueser et al., 2013). A significant proportion of individuals experiencing their first episode of psychosis have a history of substance use, with cannabis use notably associated with earlier onset of psychosis. Patients who heavily use substances tend to show psychotic symptoms at a younger age. Those with comorbid substance use often exhibit more severe psychotic symptoms, such as hallucinations and delusions. Additionally, these patients are linked to higher rates of relapse and frequent hospital admissions (Ribinowitz et al., 1998). ASI was created to evaluate the outcome of treatment for alcohol and drug use (McLellan et al., 1982). ASI has been significant in many large treatment outcome studies for opioid use disorder (Kadden et al., 1990). It has been used on varied populations such as patients with psychiatric comorbidity with addiction, pregnant mothers with addiction, and drug-abusing prisoners (Lehman et al., 1989; Coles, 1989).

#### **Medical Status:**

Medical status is a key factor in evaluating the severity of addiction. It includes health issues beyond substance use disorder (SUD), as substance use has a complex, bidirectional relationship with medical conditions - affecting their development and progression. Chronic and acute substance use can cause various health problems, such as liver disease from alcohol, cardiovascular disease from stimulants, respiratory issues from inhaled substances, and infectious diseases like HIV and hepatitis C, often linked to injection drug use. Conversely, individuals with chronic illnesses such as cancer or chronic pain may develop SUD through prescription opioid use or self-

medication (Compton et al., 2007). To effectively integrate treatment, it is essential to consider a person's medical status (McLellan et al., 1992).

**Employment status:**

Employment status is defined as a state where an individual is able and willing to work but is not currently employed, despite actively seeking employment (APA, 2024). Employment status and substance use disorder are intricately connected in a two-way relationship. Unemployment increases the risk of substance use, while those with substance use disorder frequently lack daily routines, which can result in absenteeism and behavioural problems, thereby increasing the risk of unemployment (Henkel, 2011). The unemployment caused by dismissal or involuntary job loss was seen have more substance use disorder and reduction in physical and mental health due to substance use effected work performance, increase in absence from work which also posed as permanent issue for employment (Nolte-Toha et al.,2023). Employment is one of the bases for successful treatment outcomes, as employed individuals have a lower level of SUD, and many individuals who opt for treatment are unemployed or underemployed; hence, the need for vocational training as a treatment option is an important area (Magura et al., 2004).

**Alcohol /Drug Use Status:**

The evaluation of alcohol and drug use helps to see the current severity of substance use. It provides insights into treatment goals by detailing the types of substances used, how often and for how long, the administration routes, the age at first use, and recent usage details. This information aids in monitoring changes over time and helps distinguish the primary substance problem (McLellan et al., 1992). This information can give direction to a clinically appropriate estimate of treatment need (McLellan et al.,1997).

**Legal Status:**

The legal status and substance use have a bidirectional relationship, with substance use often leading to criminal behaviour ranging from drug peddling, drinking under the influence and stealing. Individuals with more severe conditions

have a higher risk of legal involvement (McLellan et al., 1992). The ASI-5 legal status captures the individual's perception of legal difficulties; many incarcerated individuals have unmet treatment needs for substance use (Belenko et al., 2005).

### **Family/Social Status:**

SUD have a significant role as a causal factor for family and social dysfunction in an individual, contributing to conflict, neglect, abuse and social isolation. The dysfunctional family and social life of an individual have an impact on the level of severity in addiction, or lead to relapse (Lander et al., 2013). Family problems include domestic arguments, physical and emotional abuse. Social problems include stigma and rejection from social integration (McCrady et al., 2013).

### **Psychiatric Status:**

Psychiatric or mental health status reflects an individual's cognitive, affective, and behavioural conditions (APA, 2018). SUD often occurs alongside mental health issues such as anxiety, depression, and PTSD. Many studies have documented this comorbidity (Kessler et al., 2005; Swendsen et al., 2010). The relationship between substance use disorder and mental health problems is bidirectional: SUD can lead to psychiatric issues, and individuals might self-medicate their psychiatric symptoms with substances (Mueser et al., 1998).

## **1.6 Psychopathology associated with OUD:**

Opioids alter the natural state of the brain depending upon the reward pathway response to the environment or internal cues, which contribute to addiction and relapse. Addiction is often accompanied by a co-occurring disorder where a pre-existing mental health condition is contributing to another mental illness. While common side effects of opioid use include sedation, dizziness, nausea, vomiting, constipation, physical dependence, tolerance, and respiratory depression (Benyamin et al., 2008), the impact of opioid use disorder varies depending on the duration and severity of addiction. Mental health conditions like Post Traumatic Stress Disorder (PTSD), depression, and anxiety can contribute to substance use as individuals often struggle

with poor coping strategies (Harris et al., 2022; Carra et al., 2015). The repeated use of heroin increased symptoms of dysphoria, irritability, and anxiety (Weiss et al., 1986). Major depressive disorder was common among opioid users, with women more prone to affective disorders and anxiety, while men were more susceptible to antisocial personality disorder (Kosten et al., 1986). Evidence suggests that individuals with PTSD, borderline personality disorder, and other dissociative disorders use and abuse opioids even as their conditions worsen after use (Sullivan et al., 2006).

A recent study has emphasized early-life adversity as a factor linked to poor neuropsychiatric health, associating it with dysfunction of the reward circuits and increasing the risk of later-life substance addiction (Levis et al., 2021). The striatum is connected with decreased reward reactivity, and the ventral striatum links early life adversity with anhedonia and substance-related coping behavior (Herberg et al., 2020).

Psychiatric disorders like schizophrenia, bipolar disorder, and depression are linked to opioid use disorder. However, the direction of the association is unclear, as the research indicates a higher prevalence of these illnesses in individuals with opioid use disorder than without (Prince et al., 2019). This is backed by the finding that adults with opioid use disorder have more comorbidities (Davis et al., 2017).

Prescription opioids, such as analgesics, are mostly prescribed for pain management for cancer patients as well as for chronic pain, and this has increased the risk of dependency and addiction (Oh et al., 2024). Clinical diagnoses linked to prescription opioids encompass musculoskeletal disorders, poorly defined conditions, or cases with missing diagnoses (Davis et al., 2017).

There is strong evidence that the majority of individuals under opioid substitution therapy have one or more comorbidities or dual diagnoses (Lieb et al., 2010). Depression, anxiety, and PTSD are among the common ones (Carra et al., 2015). To understand the complexities of psychopathology concerning individuals under treatment, there is a need to differentiate between the psychopathological symptoms for diagnostic clarification, as many individuals under treatment exhibit non-psychotic psychopathological symptoms mimicking neurotic psychopathology,

making diagnosis difficult. The symptomology of in-treatment individuals having a typical psychiatric disorder or its symptomology being a manifestation of addiction is difficult to distinguish (Pani et al., 2010). A study was done to analyse the correlation between psychopathological symptoms in individuals undergoing treatment to simplify the symptomology for diagnostic purposes, and the symptomology was grouped into three classes of disorder: Firstly, psycho-affective, which includes depression and anxiety symptoms; Secondly, pseudo-neurotic, which provides for obsessive-compulsive, psycho-vegetative symptoms and self-perception violation; and lastly, psycho-organic includes associative violations, paranoia and hostility (Chugunov et al., 2018).

Dependence on opioid use, especially regarding how it begins, persists, and occurs alongside psychiatric issues, is increasingly recognized as a chronic, relapsing condition that may require prolonged treatment to maintain abstinence. It was suggested that 58% enter sustained recovery, significantly higher than the 39% average recovery rate among people with psychiatric disorders (McLellan et al., 2000). Most individuals admitted for treatment have experienced relapse and needed multiple interventions. Specifically, 60% re-entered treatment, with 23% doing so a second time, 13% a third time, 7% a fourth, 4% a fifth, and 13% six or more times (Dennis et al., 2005). This pattern continues until they reach a stable state of abstinence (Anglin et al., 1997; Grella & Joshi, 1999; Dennis et al., 2005).

There are many dimensions of psychopathy quantified by symptoms that are associated with addiction (Derogatis et al., 1977). Somatisation focuses on psychological distress due to perceptions of bodily dysfunction (Derogatis et al., 1977). Research indicates that patients experiencing various distressing physical complaints may have a lower tolerance for uncomfortable bodily sensations (Hiller et al., 2001). Their varied complaints, which vary in severity, often lead individuals to seek help. Somatisation symptoms often overlap with those of many other conditions, complicating diagnosis. Symptoms like abdominal pain, insomnia, restlessness, and withdrawal are common in somatisation but can also appear in patients with addiction or those using pain medication (Hasin et al., 2007). Somatisation correlates with

decreased underuse, whereas more severe somatisation is associated with increased overuse (Trafton et al., 2011).

Diagnosing the condition can be challenging even after thorough physical exams and testing (Yazuv et al., 2019). In primary care, it is common to encounter patients troubled by numerous physical sensations (Kronke et al., 2001). Somatisation appears to mediate the link between depressive symptoms and patterns of opioid use, as well as medication side effects (Trafton et al., 2011). Additionally, individuals with anxiety or depression are more prone to starting opioid therapy (Kronke et al., 2001). Research indicates that patients with a wide range of distressing physical complaints may have lower tolerance for uncomfortable physical experiences (Hiller et al., 2001). Somatisation was linked to reduced use of prescription opioids, whereas more severe somatisation correlated with overuse. These physical symptoms, which may not be associated with any diagnosed medical condition, are considered medically unexplained (Anderson, 2014). The prevalence of at-risk drinkers was 17.8% for somatoform disorders (Bott et al., 2005).

Unlike the previous findings, data from the US Epidemiologic Catchment Area (ECA) study, a large-scale investigation across five US sites, showed that somatisation symptoms had the weakest correlation with substance abuse symptoms. Somatisation was strongly linked to depressive and anxiety symptoms, moderately connected to schizophrenia and mania symptoms, and had the weakest association with substance use and antisocial personality disorder (Juul et al., 2012). Additionally, a study comparing 119 primary care patients with somatisation disorder to a community sample found that the patients exhibited a higher rate of alcohol abuse and dependence, but not of drug abuse (Juul et al., 1990). On average, 23.9% of teenagers, variants of nicotine, alcohol and drug abuse were observed to have somatoform (Chernyshov et al., 2020). A Canadian study found no significant link between somatisation and dependence. Instead, higher somatisation levels increased the risk of depression and panic attacks over four years (Zwaigenbaum et al., 1999).

Depression, along with medication side effects and its interaction with somatisation, decreases adherence to prescribed opioids. (Trafton et al., 2011).

Somatisation in patients with pain disorder was more prone to be manifested by magnification, catastrophising and rumination, which were all associated with opioid misuse. (Lee et al., 2020). Low severity of addiction with high symptoms of somatisation is found in heroin users. Anxiety and alexithymia are predictors of somatisation, as alexithymia makes it difficult to identify feelings (Aksu et al., 2020), leading to increased psychological distress (Trafton et al., 2011). An increase in the consumption level of substances increases the number of symptoms for somatisation; hence the importance of screening for comorbidities needs to be considered (Aksu et al., 2020).

### **1.7 Treatment approaches for OUD**

The common treatment for Opioid Use disorder involves methadone or buprenorphine maintenance therapy, which helps reduce heroin cravings and is effective in managing psychopathology (Maremmani et al., 2008). Slow-release oral Morphine (SROM) is recognised as a treatment option. It offers advantages over methadone, including fewer side effects and improved patient adherence in treating Opioid Use Disorder (OUD), particularly among patients with prevalent fentanyl use (Socias et al., 2020). A population-based retrospective cohort study conducted in Ontario found lower treatment retention rates with this method compared to buprenorphine (Elnagdi et al., 2023). A form of treatment for OUD using Dihydrocodeine remains uncertain, as no strong evidence was found to support the outcome of abstinence when compared to buprenorphine and methadone (Carney et al., 2020).

### **Opioid Substitution Therapy (OST):**

Opioid Substitution Therapy (OST) is the most effective pharmacological approach for treating OUD. It outperforms non-pharmacological methods in retaining patients and supporting abstinence from illicit opioids, thanks to its anti-craving effects, decreased overdose risk, and improvement of related health problems (Kouvounis et al., 2016). It is a treatment approach for OUD aiming at reducing the use and combating the adverse effects of the illicit use of opioids. The commonly used medications for this therapy are methadone and buprenorphine. (Bala et al., 2023). In

Europe, this is the most common treatment for OUD, with over half of opioid users undergoing this therapy. The term ‘OST’, used by WHO and others, oversimplifies the neurobiological and pharmacological aspects of treatment. A more accurate term is opioid agonist treatment, as it describes the pharmacological classification of the medication used and eliminates the negative connotation of replacing one drug with another (Samet et al., 2015).

Opioid agonist therapy using methadone and buprenorphine, commonly called opioid substitution therapy, is the primary treatment for opioid use disorder. It effectively decreases both illicit and prescription opioid consumption (Nielsen et al., 2017). Methadone stands out as the most evidence-supported option for treating this disorder. It involves agonist maintenance combined with psychosocial interventions, which improve treatment outcomes and lower mobility issues and mortality rates (EMCDDA, 2015).

Opioid Substitution Therapy refers to treatment involving more than 30 days with an approved opioid substitute, prescribed to patients diagnosed with OUD. For Methadone Maintenance Treatment (MMT), the starting dose is 20-30 mg daily taken orally, which can be increased by 10 mg each day until withdrawal symptoms lessen. The typical maintenance dose ranges from 80 to 120 mg per day. Doses at the higher end of 60-120 mg are associated with better outcomes, including reduced illicit drug use, higher retention rates in treatment, and improved social functioning. Buprenorphine, as a partial opioid agonist, is considered safer than methadone. Its initial dose is 4 mg daily, combined with 1 mg of naloxone. The maintenance dosage is 12-16mg/day. To transition from methadone to buprenorphine, the dosage of methadone should be reduced to 30mg/day and maintained at this level for at least 1-2 weeks. Before switching, wait for 24-48 hours after the last methadone dose and start with buprenorphine when mild withdrawal symptoms appear (Bell et al., 2012).

A primary challenge in treating OUD is the high rate of relapse. The higher relapse rate is attributed to physical and psychological dependence associated with opioid use, various factors such as negative emotional states, social pressure and interpersonal conflicts. Physical factors contributing to relapse include insomnia,

craving, and availability of opioids. Psychological factors include mental health issues, active alcohol use and family conflict (Bala et al.,2023). Limited access to OST is linked to the spread of HIV, thus lending importance to improving accessibility to OST as a public health measure (Kourounis et al.,2016). OST has been associated with a reduction in IDUs and unsafe behaviors, thereby decreasing the risk of HIV transmission in communities with high infection rates. The longer patients remain in OST, the more favourable the treatment outcomes (Lawrinson et al., 2008).

### **1.8 History of OST**

This global treatment for Opioid Use Disorder began with Dole and Nyswander's 1965 use of methadone to address opioid dependence in New York. Evidence-based treatment in America is methadone, and this treatment was first approved in 1972 by the Narcotic Addict Treatment Act. The admission criteria are long-term opiate use, multiple relapses, and a clear diagnosis of OUD with an assessment of duration and severity (Yarmolinsky et al.,1995). Pharmacological treatment, hence the need to rename it as opioid agonist treatment. The global expansion of OST has been significant. According to the 2016 report on the Global Status of Harm Reduction, 80 countries have implemented OST (Stone, 2016).

In India during the time of British occupation, regular opium users were required to be registered for a fixed opium quota by licensed shops, making opium registries equivalent to common-day OST. Hence, it is assumed that OST existed in India before America (Ray et al., 2006). The OST journey in India has been divided into three phases, beginning with the contemplation phase from 1989 to 2004. During this time, the use of buprenorphine started in a few government-run hospitals and de-addiction centers. The second phase, also known as the preparation phase, lasted from 2005 to 2007. Many developmental changes in the pharmacological agents were made, where buprenorphine could easily be misused as an injectable. For more efficiency, buprenorphine is used with naloxone to prevent its use through injectables. In 2007, OST was included as a harm reduction program for HIV prevention under the National AIDS Planning Program (NACP III), which provided a kick-start to OST. In the final phase, called the action phase, starting from 2007, methadone was introduced as an

OST medication. Numerous OST centers were established, and in 2010, the Drug Controller General of India approved the license for domestic sales of methadone, with its use beginning that year. Although the OST center initially used buprenorphine because methadone was not available in India at that time, the new Narcotic Drugs and Psychotropic Substances (NDPS) Act 2014 classifies methadone, an opioid agonist, as an essential narcotic drug. This classification makes methadone easier to use as part of OST treatment. In contrast, buprenorphine, a partial agonist, faces more legal restrictions. Initially, the law was lenient, but later, conditions for using higher doses of buprenorphine were limited to select deaddiction centers. Consequently, private psychiatrists find it challenging to use buprenorphine, which hampers treatment efforts (Rao et al., 2017). The pilot program in Punjab makes the distribution of buprenorphine for OST readily and freely available in the OST center. This program identified government hospitals and NGOs as centers for distribution. The criteria for admission for OST were a diagnosis of OUD and a thorough pattern of opioid use by the client is to be considered (Rao et al., 2012; Singh et al., 2012). In Sikkim, the OST program started in 2011 at STNM Hospital under National Aids Control Organisation (Rasaily et al., 2018). The model followed in India has the Low threshold approach, meaning that the OST can be administered on an outpatient basis, and the individuals using other opioids when OST is not punished rather, their dosage is optimised. Even after relapse, their entry into the program is hassle-free (Rao et al., 2017).

### **1.9 Benefits of Opioid Substitution Therapy (OST):**

OST is substantiated as more effective than non-pharmacological treatment in retaining patients undergoing treatment for opioid addiction (Mattick et al., 2009). The European Monitoring Centre on Drugs and Drug Addiction (EMCDDA) states that OST combined with psychosocial care is effective in reducing injecting behaviours, increasing adherence to treatments for HIV, tuberculosis, and viral hepatitis, decreasing opioid use, lowering overdose deaths, reducing criminal activity, enhancing childcare and family relationships, and boosting productivity individual. OST increased the prevention effectiveness of Antiretroviral Therapy (ART), along with ART coverage discontinuation of ART while on OST was

low, improving the HIV prevention benefits (Mukandavire et al., 2017). OST significantly lowers various mortality risks, including overdose-related deaths and deaths related to HIV and hepatitis C among People who inject drugs, highlighting the need to expand access to OST (Stone et al., 2021).

There was an increase in the impact of OST on viral suppression. Patients on OST at 12 months or later showed greater immune restoration than those without (Low et al., 2016). Longer retention in the treatment program is linked to a lower mortality rate, while discontinuing treatment raises the risk of death, particularly in the first two weeks after discharge from medication treatment (Ma et al., 2017). OST is used as a mid- or long-term approach for relapse prevention. Bell et al. (2012) found that OST reduces the illicit use of opioids, along with a reduction in the mortality rate and a decrease in criminal activity. There was a decrease in the transmission of infectious diseases. The individuals under OST had improved social functioning and employment rates.

There was an improvement in the quality of life among OUD patients on Buprenorphine maintenance treatment, evidenced by a reduction in illicit opioid use and enhancements in physical, psychological, and social well-being. Additionally, there was progress in employment status and interpersonal relationships, along with decreases in anxiety, depression, and craving symptoms (Dhawan et al., 2013).

In a study to examine the impact of opioid agonist treatment on the mental health outcomes of individuals with OUD. The findings report improvement in mental health conditions. Methadone and Buprenorphine were associated with reducing the symptoms of depression and anxiety when compared to the no-treatment group. Longer duration of treatment was correlated with greater improvements in mental health and reduced psychological distress. The improvement in mental health is linked to the pharmacological and stabilising effects of opioid agonist treatment. Buprenorphine had a milder impact on sedation and cognitive function as compared to methadone (Moazen-Zadeh et al., 2021).

### **1.10 Possible Adverse Effects of OST**

There is no doubt about the benefit of OST, the use of methadone and buprenorphine in treating patients with opioid use disorder and its risk-reducing outcome, along with a decrease in the rate of death by opioid overdose and reduction in blood-borne diseases. However, OST has its shortcomings, with its high potential of being misused, potential relapse and the use of gabapentin (anti-convulsant) along with the use of opioids increasing the risk of opioid-related death (Gomes et al., 2017). Although retention rates increased and the total number of patients under treatment tripled over ten years, the rise in buprenorphine availability paralleled this growth. As a result, the percentage of OST patients grew from 16% to 50% of the total (Riksheim et al., 2014).

There is a significant increase in the risk of fatal respiratory depression with methadone use, as it is linked to cardiac dysrhythmia; however, its role in causing cardiac arrest remains unproven (Chou et al., 2014). Many side effects of OST include fatigue, decreased cognitive performance, and sexual dysfunction in men (Noble et al., 2017). Sexual dysfunction in patients taking opioids shows that 83% of those maintained on buprenorphine report experiencing at least one sexual problem during their lifetime. However, there is no conclusive evidence to determine whether these issues are caused by buprenorphine's side effects or by a comorbid condition related to opioid dependence (Ramdurg et al., 2012).

Opioids can lead to nausea, vomiting, and constipation, which may hinder effective pain management due to underdosing or early discontinuation of therapy. These bowel issues and constipation arise from mu-opioid receptor activation in the gastrointestinal tract and can continue throughout opioid treatment (Camilleri, 2016).

### **1.11 Concluding Remark**

Many researchers have emphasized the link between psychopathy and opioid use disorder (Harris et al., 2022; Santo et al., 2022; Carra et al., 2015; Sullivan et al., 2006) and the increased psychiatric disorders with the use of opioid medication for long-term or short-term use (Oh et al., 2024). Most of the individuals under treatment are not getting the required treatment for their mental health condition (Davis et al.,

2017). Attention to a person's mental health condition must be considered while opting for OST (Sullivan et al., 2006). Hence, a clear subtyping is necessary for patients before enrolment (Maremmanni et al., 2010).

The use of opioids has been on the rise in the Indian population (Rao et al., 2019). The need for holistic treatment is warranted as opioid use disorder is associated with many psychopathologies, which may defeat the purpose of the treatment if it goes unnoticed, hampering the areas of treatment progress. The treatment made available to the general population in the form of OST as a national program may not be enough if the outlook for the treatment is harm reduction, but bringing OST as a mainstream of addiction treatment (Ambekar et al., 2017).

In Sikkim, the implementation of OST started in 2012, and although OST is successful for harm reduction, the psychopathology associated with OUD plays a crucial role in the formulation of the treatment module. Hence, it is crucial to delve deeper into the psychopathology associated with the OUD according to the psychological and social variability of an individual.

**CHAPTER – II**  
**REVIEW OF LITERATURE**

## **2.1 Overview**

The phenomenon of psychopathology associated with individuals undergoing OST has been gaining attention for the last decade due to its implementation as a harm reduction program under NACP in India since 2006, and has been largely implemented throughout the country since 2012. The present review aims to critically examine existing literature on the severity of addiction and the onset age of substance use on the current psychopathology and functional domains of progress in OST by integrating empirical studies and theoretical models. This section explains that the early developmental exposure to substances and escalating pattern of use contribute to the manifestation of diverse psychopathologies as assessed by SCL-90 R, and how these patterns relate to recovery indices as measured by ASI-5.

Previous studies (Aksu et al., 2020; Tilson et al., 2019; Potil et al., 2019; Naji et al., 2017) have examined the psychopathology linked to OST, focusing on how the initiation and severity of substance use affect the mental health of opioid users and those undergoing Opioid Substitution Therapy. The literature demonstrates a strong link between psychopathology and both the severity of addiction and the onset of substance use. The role of opioid agonists used as a pharmacological treatment for OUD has a complex association with different psychopathologies; also, the pre-existing psychopathologies have a consistent role in the development of OUD.

The interplay between psychopathology, development and progress of opioid use disorder (OUD) is a complex and multifaceted area of research garnering significant attention in the context of the ongoing opioid epidemic worldwide. The report by the US Department of Health and Human Services states an increase in opioid-related deaths from 3 to 15.8 per 1,00,000 from 2000 to 2018, indicating an “opioid crisis” (Wilson et al., 2021). This crisis was mainly attributed to the misuse of prescription opioids such as oxycodone, fentanyl, hydrocodone, morphine, codeine, etc. The other significant factor addressed in this study was the misuse of synthetic opioids from the illegal market (Degenhardt et al., 2018).

Globally, opioid use disorder has a prevalence rate of 353 per 1,00,000, which is the second highest after cannabis. Therefore, there was a prominent burden of

psychopathology with addiction. The lifetime prevalence of heroin in young adults in 2018 was 1.3%, and the prevalence rate of heroin use after 12 months of initiation was 30.9%. Thus, the need for preventive measures, early intervention, and detection was heightened (Volkow et al., 2021). The association of Opioid use disorder with psychopathology is explored in limited studies due to the heterogeneity of the disorder. Numerous studies associate affective disorders, with depressive disorder being the most common symptom, along with personality disorders, especially antisocial personality (Dhinsa et al., 2023).

Marmmanni et al. (2017) propose four explanations for the relationship between addiction and psychopathology: 1) Addiction as the attribution of psychopathology; 2) Addiction as the cause of psychopathology; 3) Shared underlying cause for both addiction and psychopathology; 4) Inadequate estimation due to comorbidity, diagnosis, or sampling error. Studies research on psychopathology often group addiction with substance use disorder since OUD frequently co-occurs with other substance use issues like alcohol, cannabis, stimulants, and benzodiazepines (Black et al., 2014).

Numerous epidemiological studies and surveys on different populations have addressed psychopathology in other substance use disorders. A study examined nine mental health communities across eight regions in three European countries - the UK, Germany, and France - and found that the lifetime prevalence of substance use among patients diagnosed with schizophrenia was 35% in the UK, 21% in Germany, and 19% in France. Regarding alcohol dependence, the rates were 26% in the UK, 16% in Germany, and 14% in France. For drug dependence, the UK had a prevalence of 18%, Germany 8%, and France 7% (Carra et al., 1997). In Europe, the prevalence rate of mood disorders with major depression was 30.7%, and the lifetime prevalence of anxiety disorder was 76.8% among individuals in the treatment group for substance abuse (De Wilde et al., 2007). A French survey of the general population found that 21.6% experienced anxiety, and among them, 3.7% also had a substance use disorder (Leray et al., 2011).

Studies have been conducted on different populations estimating the prevalence of comorbidity of psychopathology associated with substance use disorder. The assessment of comorbidity by various epidemiological studies found prevalence to be high at 50%, with the most common comorbidities being major depression, anxiety disorder, and personality disorder, respectively (EMCDDA, 2015).

The diagnostic guidelines for substance use disorder no longer link psychopathological symptoms in ICD with addiction and do not require mood, anxiety, or impulse control symptoms to be part of the substance use disorder classification. This change aims to improve the reliability and validity of diagnostic assessments and support an integrated treatment approach. However, they still have a long way to go before establishing comprehensive diagnostic guidelines for psychopathological symptoms (Pani et al., 2010).

## **2.2 Substance use disorder and psychopathology:**

Understanding the relationship between psychopathology and substance use disorders (SUDs) is essential for developing effective prevention strategies. SUDs frequently coexist with various mental health conditions, a phenomenon known as "dual diagnosis" or "comorbidity" (Brennan et al., 2017; Parmar & Kaloiya, 2018; Maremmanni et al., 2017; Saban & Flisher, 2010). An earlier longitudinal study examined psychopathology as both a precursor to and consequence of SUD in adolescents. The researchers found a significant relationship between psychopathology and substance use, with psychiatric symptoms contributing to increased drug use tendencies and raising the likelihood of experiencing psychiatric issues.

Research has consistently demonstrated a strong association between substance use disorders and various forms of psychopathology, highlighting the complex and interrelated nature of these conditions. Marmmani et al. (2017) identified specific psychopathology of substance use disorder. They compared psychological traits across multiple types of substances such as alcohol, opioids and stimulants. The study found a high prevalence of psychological traits such as high levels of impulsivity

and emotional dysregulation among SUDs. A Chinese study in a nationwide population-based cohort study to understand the temporal relationship between selected mental disorders and SUDs. The finding states that individuals suffering from mental health disorders such as affective psychosis, neurotic disorder, personality disorder, and adjustment reaction had significantly higher chances of developing SUDs. The duration between the onset of the mental disorder and the development of skills was approximately 2 years (Chiu et al., 2008).

A notable finding in the literature is the high rate of co-occurring psychiatric disorders among individuals with substance use disorders (Langås et al., 2011; Morisano et al., 2014). Research indicates that clients with both disorders often experience more severe illness progression, greater health and social challenges, more treatment difficulties, and poorer outcomes compared to those with only one disorder.

The connection between substance use disorders and mental health issues is complex and affected by many factors. Research indicates that conditions like depression and anxiety might elevate the likelihood of developing a substance use disorder (Saban & Flisher, 2010). The use of substances can also exacerbate or even induce the onset of mental health problems, such as psychosis or mood disorders (Pereiro et al., 2013). Furthermore, shared genetic, neurobiological, environmental, and social factors may play a role in the development and persistence of both substance use disorders and co-occurring mental health issues.

Regarding specific psychiatric conditions, research shows strong links between substance use disorders and various disorders such as mood disorders, anxiety disorders, post-traumatic stress disorder, personality disorders, schizophrenia, and other psychotic disorders (Parmar & Kaloiya, 2018; Pereiro et al., 2013). The simultaneous presence of substance use and mental health problems can make diagnosis and treatment more difficult, since symptoms of one condition may hide or worsen those of the other.

The psychological dimensions were incorporated into a study by Pani et al. (2016) to understand substance abuse through a comprehensive psychological framework. The paper suggests that factors such as anxiety, mood, impulse control, and emotional dysregulation influence both the development and ongoing maintenance of substance use disorder. Later, researchers narrowed their focus from a broad range of substance addictions to examining the psychic structure of opioid addiction, finding that heroin-dependent patients have a high prevalence of lifetime disorders. Interpersonal sensitivity and hostility were elevated. Paranoid ideation and psychoticism were higher, which contributes to mistrust and more complex treatment.

### **2.3 OUD and psychopathology:**

Emerging research indicates that psychopathology occurs at a higher rate compared to other substance use disorders, resulting in a greater prevalence of psychiatric illnesses. (McHugh ,2023) The levels of anxiety and depression are associated with increased opioid use. It is likely that individuals with depression and anxiety are less likely to self-medicate with opioids, but they have a higher likelihood of having a history of opioid use (Zhang et al.,2023). A nationwide cohort study conducted in Korea established a clear association between opioid use and an increased incidence of psychiatric disorders, with a 13% to 17% higher risk (Oh et al.,2024). To explore the pattern of psychological distress related to opioid use. Four hundred regular users were recruited from Sydney, Australia. The study concluded with a strong link between the frequency of heroin use and depression, showing high levels of psychological distress among heroin users. A cross-sectional study was conducted to determine the prevalence of psychiatric comorbidities among 8,324 pregnant women with OUD, revealing that 38% were diagnosed with generalised anxiety disorder and 36.9% with major depressive disorder (Shen et al., 2020).

The relationship between prescription opioid misuse and mental health issues among young people who inject drugs was investigated. The study involved 570 heroin users, and a semi-structured psychiatric interview revealed that opioid use raises the risk of depression recurrence. Additionally, misuse of prescription opioids is linked to substance-induced PTSD and depression (Scherrer et al.,2016).

The use of prescription opioids for medical purposes has also been associated with psychopathology, as reported by a study involving 40514 patients who underwent hip fixation surgery. Participants received pre-operative opioid prescriptions. It was noted that a higher rate of perioperative opioid prescription filling was associated with depression and substance use (Cunningham et al., 2021). The most common clinical diagnoses for prescription opioids among Americans were musculoskeletal issues, missing diagnoses, and poorly defined conditions. It was noted that 16% of Americans with mental health issues receive over half of all the opioids prescribed in the US, emphasising pain management to decrease dependency on opioids (David et al., 2017).

To dive deeper into the dichotomous relation between addiction and mental illness, it has been established that mental illness contributes to addictive behaviour and vice versa. A study was carried out to examine how bipolar disorder and heroin addiction present together clinically. The finding establishes a complex relationship between the symptoms of heroin use and bipolar disorder, interacting and influencing each other, resulting in a severe clinical presentation, highlighting the importance of tailored intervention addressing both issues of stabilising the mood and substance use, supported by psychosocial services for better treatment outcomes (Maremmoni et al., 2013). To tackle the issue of comorbidity, researchers and clinicians highlight the need for integrated treatment plans that simultaneously address both substance use and mental health problems (Kelly & Daley, 2013).

High prevalence of mental disorders among individuals with OUD, frequently co-occurring with conditions such as mood, anxiety, psychotic, and personality disorders. People with comorbid conditions tend to have poorer treatment results. This highlights the importance of routine screening for psychiatric comorbidities and integrating evidence-based treatments such as cognitive-behavioural therapy for depression, dialectical behaviour therapy for borderline personality disorder, medication management, and peer support, all customised to the individual's needs (Santo et al., 2022).

The racial minority, lower-income group, and females were seen to have low access to treatment for mental health, and individuals getting treatment for mental

health were from higher-income groups with insurance, highlighting the importance of targeting the vulnerable population for treatment (Dhinsa et al.,2023).In an Indian cross-sectional study done to explore the psychiatric comorbidity and psychosocial problems in IDUs. The study reports high psychiatric comorbidity with mood disorder, personality disorders, followed by anxiety disorder, with increased psychosocial problems among them. This study highlighted the need for early intervention for comorbid conditions, along with community-based psychosocial interventions (Farooqui et al., 2022).

## **2.4 Psychopathology associated with individuals under OST**

Many have explored the psychopathology associated with individuals under the maintenance program. The lifetime prevalence rate of mental disorders with opioid use disorder is 65.2%, and schizophrenia, with a 11.4% prevalence rate, is the highest rate among other substances such as marijuana, cocaine, barbiturates and hallucinogens. The rate of prevalence for anxiety with opiate use disorder is 31.6%, and the prevalence rate of affective disorder is 30.8% as per the results of the Epidemiological Catchment Area Study conducted in the United States (Regier et al.,1990). Another study reports that individuals under treatment had current comorbid psychiatric disorders accompanied by high psycho-social and medical problems at admission to Opioid treatment centres (Davis et al.,2017). For more understanding of the psychopathological symptoms of undergoing treatment, Jomehpour et al. (2022) conducted a cross-sectional comparative study to examine psychological traits using the Symptom Checklist 90-R among three groups: individuals on methadone maintenance therapy, those diagnosed with opioid use disorder, and a control group without OUD. The study revealed that levels of interpersonal depression, anxiety, and phobic anxiety were elevated in both the methadone-maintained group and the opioid use disorder (OUD) group. Conversely, obsession, compulsion, interpersonal sensitivity, hostility, and psychotic features were more prominent in the OUD group. No significant differences were observed between the Methadone Maintained Therapy Group and the OUD group, suggesting that the treatment did not alter the psychopathological profile of individuals with OUD. Another study conducted in Israel on 107 methadone maintenance therapy patients for 7 years, it was found that

Individuals under treatment for OUD had high psychopathy correlated with interpersonal and affective facets and also with lifestyle facets and behavioural transgressions, including high psychopathy, associated with physical aggression and verbal aggression (Potik et al., 2020).

A high rate of depressive symptomology in opioid users, along with personality disorders, primarily anti-social personality, and many with secondary psychiatric disorders. Many found links with affective disorder (Douglas et al., 2010). Fewer studies have been done on the psychopathology of individuals under treatment; the first study to understand psychopathology in two groups. The ones with only substance use disorder and the ones with comorbidity found that there was a lower probability of comorbidity with older age, and that being married was a protective factor. Females and younger ages were associated with comorbidity (Urbanoski et al., 2015)

Studies have been done to see the effect of different opioid agonist treatments, such as the use of methadone, buprenorphine and Slow Release of Oral Morphine (SROM). A unique study using urine toxicology analysis and comparing different modes of treatment found there was a negative correlation between the dose of buprenorphine and heroin craving and consumption (Gastberger et al., 2019). To explore the comorbid psychopathology among methadone maintenance treatment. A cross-sectional analysis was conducted, with 130 patients randomly selected from a population of 300 patients under treatment. The study found that 42.9% of participants reported depressive symptoms, 34.9% had obsessive-compulsive symptoms, 29.1% showed symptoms of somatisation, and 27.2% showed anxiety symptoms along with considerable psychological distress. There were substantiated lower levels of anxiety and paranoid ideation among individuals with employment (Moussas et al., 2015). There was a negative correlation between the length of time under treatment and paranoid ideation (Naji et al., 2017).

The use of prescription opioids was linked to psychiatric illnesses, namely schizophrenia, mood disorder, anxiety disorder and other mental illnesses. The study was a nationwide, population-based retrospective cohort study conducted by the National Health Insurance Service. It found that a short-term opioid prescription might

be associated with the recent diagnosis of mental illness. A long-term opioid medication with an increase in duration of use was associated with depression. The incidence of psychiatric disorders was higher in opioid users than non-users (Oh et al.,2024). This aligns with the study on subtyping patients with heroin addiction at treatment entry, where researchers used the self-report symptom inventory (SCL-90) on 1055 patients- 884 males and 171 females aged 16 to 59 years. The study identified four main symptom dimensions, including depressive symptoms in 14.2% of patients, characterised by feelings of worthlessness and entrapment. Somatic symptoms in 24.4% of patients, followed by interpersonal sensitivity and psychoticism in 19.4% of patients, of the association of mood disorder with neurobiological factors and predisposition factors of individuals entering the treatment. The other findings of the study include somatic symptoms, aggressiveness and self-injurious behaviour of individuals entering treatment, which are associated with withdrawal symptoms and anxiety disorder. They are prone to sensitivity and psychoticism related to substance use (Maremmanni et al.,2010).

An observational cross-sectional multicentre epidemiological study on comorbidities among OUD under the OST program in Spain recruited 621 patients with OUD and found a similar finding, with 67% of participants with at least one psychiatric disorder. Anxiety disorder had a 53% prevalence, 48% with mood disorder and also added personality disorder as another psychiatric illness associated with in-treatment individuals. Sleep disorder was prevalent in 41% of the participants and was identified as the effect of long-term opioid use (Roncero et al., 2016).

Treatment-seeking individuals (n=623) were examined to assess the impact of comorbid psychiatric symptoms on clinical outcomes in OUD patients receiving OST using the General Health Questionnaire (GHQ-28). It was found that the presence of psychiatric symptoms at baseline did not correlate with outcomes over 7 years. Disorders such as post-traumatic stress disorder (PTSD) and attention deficit hyperactivity disorder (ADHD) were found to influence long-term outcomes. The study concluded that although general psychiatric symptoms may not impact long-

term outcomes in OST, certain specific comorbidities, such as PTSD, have a significant impact on long-term outcomes (Kidd et al., 2018).

In India, a cross-sectional observation study was done in Lucknow, Uttar Pradesh, to examine the prevalence of psychiatric comorbidities among individuals with opioid use through injectables. The study recruited 100 male participants under buprenorphine maintenance therapy within the age range of 18-40 years. Data were collected using the Structured Clinical Interview for DSM-IV-TR (SCID) and the Addiction Severity Index-5 (ASI-5). The results show a high rate of psychiatric comorbidity, with 78% of participants affected. Mood disorder was the most common at 28.95%, followed by personality disorder at 27.63%, and anxiety disorder at 13.16%. Many individuals faced psychosocial problems such as unstable housing, unemployment and strained interpersonal relationships. The individuals with any psychiatric comorbidity were associated with functional impairment in daily functioning and self-care. Thus, highlighting the need for targeted intervention addressing psychiatric symptoms in conjunction with addiction treatment for better outcomes in OST (Farooqui et al., 2022).

## **2.5 Relationship between Onset Age and Psychopathology**

Many studies have examined how the age at which people start using opioids relates to the severity of their mental health issues. Those who begin using opioids at a younger age are more likely to develop mental health problems like depression, anxiety, and personality disorders, which can greatly affect their opioid use disorder progression and response to treatment. Early-onset opioid users often exhibit more impulsive and sensation-seeking behaviours, which may increase their risk of developing comorbid psychopathology (Wilsey et al., 2008; Sivolap, 2010). Various co-occurring psychiatric conditions, including internalising symptoms, PTSD, depression, and anxiety, accompany adolescents with substance use disorders (SUD). They display externalising behaviours including conduct disorder, attention deficit hyperactivity disorder, and oppositional defiant disorder (Quello et al., 2005). Among adolescents, polydrug use is indicative of long-term problems as the risk-taking increases, later increasing the intake of the substance (EMCDDA, 2009).

To examine the factors influencing the development of OUD and the role of age of initiation and psychopathology in the progression of OUD. The data sourced from the National Epidemiological Survey on Alcohol and Related Conditions highlights the importance of age at first opioid use in developing opioid use disorder. Younger initiators tend to develop OUD more gradually compared to those who start later. The presence of psychopathology increases the odds of the development of OUD, while psychopathology does not influence the time to OUD diagnosis. onset. This study found that psychopathology is a strong predictor of lifetime OUD, while alcohol use disorder is linked to earlier onset (Schepis & Hakes.,2017) . Early substance use, especially before age 15, is linked to increased psychopathological symptoms, higher substance use, use of multiple substances, and the development of other psychiatric issues (Anthony et al.,1995; Kandel et al.,1992). Logistic regression analysis showed that individuals with higher severity were more likely to re-enter treatment (Grella et al., 2003). Nearly 80% of those entering SUD treatment have one or more co-occurring psychiatric disorders. Furthermore, the presence of co-occurring psychiatric issues is linked to increased severity of substance use, more frequent placements in intensive care levels, reduced participation in treatment, and poorer outcomes (Angst et al., 2002; Enns et al., 2001; Grella et al., 2003).

To understand the role of age in the onset of substance use in patients with dual diagnosis, it was substantiated that early onset, less than 18 years, had a higher prevalence of cannabis use as their primary substance and a high incidence of psychotic disorder compared to later onset of more than 18 years. The finding includes a higher incidence of psychiatric admission, more risky sexual behaviour and poor treatment adherence in early-onset users (Subodh et al., 2019). A survey was conducted in Ireland that determined the relationship between the age of first use of alcohol, tobacco and cannabis and its relationship to later development of cannabis use disorder. The study substantiates that individuals with early use were more likely to be heavier users of cannabis and later diagnosed with Cannabis use disorder, emphasising the importance of delaying the initiation with preventive strategies for early substance use (Millar et al., 2021).

The substance use-related factors and psychosocial traits of individuals with early and late onset of substance use were explored in a Turkish study. It found that those who start using substances before age 18, often experiencing more traumatic events, are at a higher risk of PTSD and show more depressive symptoms than those who begin after age 18. Additionally, the study identified depressive symptoms, living arrangements, and employment status as predictors of when substance use begins. Factors like a family history of substance use and early life stressors were more common among early-onset users, emphasising the need for early prevention and customised intervention programs tailored to their specific needs (Yuksel et al., 2024). Another study highlights the importance of the age of onset with coping strategies in men with SUDs. The early onset of individuals below 16 years had greater severity, more dysfunctional coping strategies, higher levels of disengagement, lower social support and higher problem avoidance as compared to the late onset of individuals above 17 years (Del Mar Capella et al., 2017). A higher prevalence of primary anxiety disorders, including social phobias, PTSD, and personality disorders like antisocial, borderline, and passive-aggressive, in early-onset individuals compared to those with late onset. Early-onset individuals also received diagnoses for SUDs at a younger age, and AXIS 1 disorders were less common in late-onset individuals (Bakken et al., 2004).

Despite their high prevalence, co-occurring psychiatric issues are seldom assessed thoroughly or systematically in SUD treatment programs. Additionally, early onset of illness serves as a predictor of more severe addiction (Carpentier et al., 2012). Adolescents with more severe symptoms of addiction at the age of 18 had lower retention rates in the treatment program and were more likely to misuse substances in adulthood; hence, the need for assessment of the severity of addiction is highlighted for the right treatment modules (McCabe et al., 2022).

## **2.6 Addiction Severity and Psychopathology**

The severity of addiction impacts various aspects of an individual's life. The six key areas are medical history, employment status, alcohol use history, drug use

history, family and social relationships, and psychiatric history (McLellan et al., 1980). It is important to understand the level of addiction to effectively provide treatment services. Offering a single treatment approach for all SUDs, regardless of substance type, usage level, or sociodemographic factors, restricts treatment effectiveness. Tailoring treatment to meet the specific needs based on the type and severity of drug use is essential; for instance, the treatment requirements for severe OUD are likely different from those for mild alcohol use (Johnson et al., 2020). Addiction severity is the severity of problems related to SUDs. The number of issues in certain domains of life determines the severity of the addiction. The domains include family, employment, medical, legal, substance use and psychiatric status. The categorisation for the same is high addiction severity and low addiction severity (Henderson & Galen, 2003). The temperament of individuals with addiction severity, recognising the heterogeneity among the patients, Zafarghandi et al. (2018) conducted a study to identify distinct subtypes to form tailored treatment approaches. The study found that the severity of addiction was linked to high novelty seeking, low reward dependence, more frequent suicide attempts, as well as a history of legal issues and physical or verbal abuse. The analysis revealed different subtypes characterised by temperament profiles, suggesting that different underlying psychological and emotional factors contribute to addiction behaviour. Increased level of problems in domains of drug use, employment, psychiatry and being male was a predictor of future hospitalisation for mental health disorder, and drug use was the most potent predictor for the same. This is indicative of substance use disorder having co-occurring mental issues. The study indicated that men were less likely to seek treatment for mental health conditions as compared to females (Padyab et al., 2018).

To find the association between addiction treatment received and the severity of addiction, drug of choice, and socio-demography of the patients, a study was conducted in Florida. The result stated that individuals with greater severity were more likely to enter treatment facilities. Individuals with lower severity were more likely to enter the treatment program if they had involvement with the criminal justice system or legal issues. The study suggests that people with low severity in addiction can

benefit from providing primary care for harm reduction and monitoring for more severe symptoms (Johnson et al.,2020).

In order to delve into the approachability of treatment, a study was done to understand the willingness to pay for treatment-by-treatment payers and addiction severity. It was noted that the attitude of cost payers towards drug use and treatment is a major factor, as they preferred residential treatment. Patients in the residential treatment were mostly younger and dependent on their families for costs. While the Ost group had low-income-based employment, households in this group had a lower willingness to pay when income was lower. It was noted that mental health conditions getting severe were also associated with less willingness to pay. This willingness to pay plays a crucial role in policymaking, especially in the formulation of drug policies (Amadian et al., 2023).

The interrelationship between depression, anxiety, substance use and dependence among individuals under treatment, with the primary objective of these psychopathological symptoms being associated with addiction behaviour. The study recruited 280 outpatients under treatment. The assessment used the Patient Health Questionnaire, Generalised Anxiety Disorder-7, and Severity of Dependence Scale. The study concluded that psychopathology was associated with the severity of addiction and found evidence to associate depressive rumination with the severity. Further, a negative correlation was found between anxiety symptoms, uncontrollable worry, restlessness and inability to relax with addiction severity. These associations may not be the direct consequence of substance use. Therefore, the treatment approach should address these psychopathological symptoms as related but distinct entities to achieve better therapeutic outcomes (Delgadillo et al., 2016).

Conduct disorder is more common among OUD patients. Its severity is linked to the intensity of current psychopathology, as substance abuse often starts early, leading to more severe addiction, overdose, increased inpatient detoxifications, and a higher rate of psychiatric comorbidities, according to a retrospective cross-sectional study of 193 OUD patients. The study also found that 60% of participants could have

been identified as high-risk. Hence, juvenile conduct disorder can be considered as a primary group that need preventive strategies (Carpentier et al., 2012).

Brieman et al. (2024) studied the relationship between substance use and psychopathy among prison inmates. They recruited 418 male inmates from a Midwestern County jail and 354 male inmates from a southwestern state prison. The assessment was done using the Psychopathy Checklist-Revised (PCL-R) and self-report, and Severity of Lifetime Substance Use Disorder symptoms. It was found that interpersonal and lifestyle traits were more linked to substance misuse severity. Antisocial characteristics were related to illicit substance dependence, with a lower likelihood of abstinence. Affective traits may offer a protective effect against dependence. Thus, highlighting the multifaceted nature of psychopathy in developing targeted intervention programs.

## **2.7 Current Scenario in India:**

In India, Buprenorphine is widely used as the pharmacological treatment for OST. Reports indicate that 33% of 447 IDUs stopped injecting, and 35% reduced both the frequency of injecting and sharing during treatment (Dorabjee et al., 1998). Most clients reported satisfaction with their treatment, with the retention rate on OST at 70% at the end of 9 months (Dhawan et al., 2014). In India, besides buprenorphine and methadone, Slow-Release Oral Morphine (SROM) has also been explored as a treatment for opioid use disorder. The study reported that 61% of the participants had stopped the usage of heroin after the fourth week of the treatment, 75.7% started to work during the course, as compared to 21.2% before the start of the treatment, and 60.6% had started to contribute towards family expenditure (Rao et al., 2005).

The Third National AIDS Control Program (NACP III) “Strategy and Implementation Plan” includes harm reduction services aimed at preventing HIV among IDUs, following the guidelines from Opioid Substitution Therapy (OST) (NACP, 2006). The use of buprenorphine and methadone as OST medicine was included in the scheme. Although methadone is cheaper, NACO, a nodal agency of the Indian government under the Ministry of Health and Family Welfare, started its

program with the use of buprenorphine due to the unavailability of methadone in India. Mostly, government hospitals were identified to handle assessment, diagnosis, and daily dispensing of medication, along with counselling and follow-up. The psychiatrist was put in charge of the program. This scheme first started in the state of Punjab in 2010 (Rao et al., 2017). Currently, two-thirds of OST centres operate within government hospitals (National AIDS Control Organisation, 2016). Most of these centres adhere to NACO OST guidelines, though a few issues have been identified. One notable concern is the average buprenorphine dosage, which is about 4.4 mg per day. Consequently, 35% to 40% of clients report withdrawal symptoms and cravings, leading 28% to relapse with illicit opioids (Rao et al., 2012). There was a need for trained professionals through the Global Fund to Fight AIDS, Tuberculosis and Malaria. OST training was incorporated in the psychiatric departments of identified medical institutes. The National Technical Training Centre conducted 41 training programs on OST from 2012 to 2016 (Rao et al., 2016).

In 2010, the Drug Controller General of India (DCGI) approved the sale of methadone within the country. In February 2012, AIIMS initiated Methadone Maintenance Therapy and started it in 5 centres. In 2014, this project ended with a lower retention rate than buprenorphine and similar quality-of-life results. This established MMT as another pharmacological option for OST in India (Rao, 2017).

The NACO Program has made OST more available to approximately 25,000-30,000 recipients over the past 10 years. Still, this intervention has been limited to IDUs and OST as a long-term treatment for OUD, irrespective of the way of use, such as the use of injectables. The data indicate that only 5% of OUD receive treatment (Ambekar et al., 2013). Buprenorphine, a partial agonist, offers a safer profile than methadone because it is less likely to cause respiratory depression and carries a lower risk of overdose mortality during treatment induction (Kimber et al., 2015). Buprenorphine has a lower potential for abuse compared to methadone, but as its usage rises, instances of buprenorphine abuse have become more apparent (Sansone et al., 2015). Buprenorphine has been combined with naloxone to deter people from injecting sublingually; such a combination would have less potential for abuse or diversion.

According to a survey conducted in Australia, the naloxone group showed a lower incidence of prescription drug injection compared to the plain buprenorphine group (Larance et al., 2011). Buprenorphine is suitable for substitution therapy; the dosage required to suppress opiate consumption is above 4mg/day. The dosage ranges from 2 to 16 mg. A dosage of more than 16 mg can be given to patients with multiple substance use, such as the use of opiates and cocaine together (Schottenfield et al., 1993). The medicines used in OST have specific properties, such as: (i) similar action to the illicit opioid being consumed, (ii) a lesser addiction potential than the illicit opioid, (iii) easy to administer by oral or sublingual administration, (iv) a lasting action of 24 hours, (v) well tolerated and minimal side effects, and (vi) cheaper, readily available, easily stored and transported (Rao et al., 2014).

Sukla et al. (2022) carried out a cross-sectional study to examine the psychosocial functioning of two groups: individuals currently non-injecting opioid users on methadone maintenance treatment and those receiving standard treatment. The result establishes better socio-occupational functioning, quality of life and client satisfaction in the group under methadone maintenance treatment than in the treatment-as-usual group, highlighting the potential benefit of MMT in standard practice for OUD. A similar finding was established in another longitudinal observational study evaluating the impact of buprenorphine maintenance therapy on the quality of life of individuals over a 9-month treatment program. The study concluded that there was a significant improvement in participants' quality of life, including better physical health, enhanced psychological well-being, improved social relationships, and favourable environmental factors such as increased access to healthcare and better living conditions. This demonstrated the therapy's effectiveness and resulted in a higher retention rate (Dhawan et al., 2013).

The use of Slow-Release Oral Morphine (SROM) as a treatment option in India demonstrated its effectiveness (Rao et al., 2005). The first comparative study of buprenorphine and SROM was conducted to assess their efficacy. They found that SROM users had low withdrawal scores and low craving scores compared to buprenorphine users (Rao et al., 2012). A clinical study at a tertiary care centre in

eastern India evaluated OST in individuals diagnosed with OUD. The study found that the treatment retention rate was high. There was a significant reduction in opioid use and craving over time, along with improvement in mental health, employment status and family relationships. Some patients preferred buprenorphine due to fewer side effects compared to methadone (Mohapatra et al., 2017).

Although a great effort has been put into setting up these centres, a huge setback for the OST program in India is that its availability is restricted to IDUs and is seldom used as a treatment for opioid use disorder. The major lacunae identified include the impression of OST being a substitute rather than a treatment for OUD by a psychiatrist, as it was incorporated as a harm reduction program (Rao et al., 2017). Although OST is acknowledged as an effective harm reduction strategy for OUD, its implementation encounters several challenges because OST is authorised under India's Narcotic Drugs and Psychotropic Substances (NDPS) Act, 1985, but its application is heavily regulated. Methadone and Buprenorphine are the main medications used; they require strict licensing and distribution control, limiting access. OST clinics need special approvals, and there are limits on who can prescribe and dispense medication. Access to OST services is limited, primarily available in urban areas, leaving the rural population unserved. Policies have to be reformed to allow wider access and reduce punitive measures against opioid users, training the health workers to overcome the stigma of viewing OST as replacing one addiction with another (Math et al., 2018).

The clinical and psychosocial factors affecting the treatment outcome of buprenorphine-naloxone medication. The study recruited 106 opioid-dependent patients for 5 years, and each subject was followed up for 2 years. The results indicated that higher compliance was associated with early treatment initiation, stable social support and a higher motivational level at the treatment entry and lower compliance and relapse were associated with comorbidity, history of polysubstance use and legal and financial stressors. The study concluded that sublingual buprenorphine and naloxone effectively reduce opioid use and enhance compliance, highlighting the

importance of integrated psychosocial support and mental health interventions for improved treatment results (Das et al.,2024)

## **2.8 OST in the North-Eastern States of India**

India is the world's leading legal producer of opium. Situated between the Golden Crescent and the Golden Triangle - two of the largest illicit drug-producing regions - India serves as both a hub and a transit route for opioids (Ambedkar et al., 2018). Recent data from the study “Magnitude of Substance Use in India” indicates that the prevalence of opioid use in India is 2.1%, which is double the global rate of 0.7%. The northeastern states of India have a significant problem with OUD, as they share borders with illicit-producing countries. A high prevalence of pharmaceutical opioid use is seen in Sikkim (Arora et al.,2021).

The Northeastern states are geographically separated from other parts of India and face long-standing issues, including civil insurgency, poverty, and unemployment. Approximately 2% of the population in Manipur and Nagaland is involved in drug use. Commonly abused substances include heroin and Spasmoproxyvon (SP), a synthetic opioid analgesic that contains dextropropoxyphene, dicyclomine hydrochloride, and paracetamol. The highest HIV prevalence rates are found in these two states compared to the rest of the country (Chandrasekaran et al., 2006). In the late 1990s, HIV prevalence among IDUs in Manipur was 80% (Eicher et al., 2000). To counter the increasing HIV epidemic in the northeastern state community outreach program for HIV in IDUs was established in 1990, run by former drug users (Kumar et al., 2009). The State AIDS Control Societies start with the distribution of syringes, condoms and rapid counselling and testing is done. Since methadone was removed from the Indian pharmacopoeia in 1982 and became unavailable, sublingual buprenorphine has been licensed in India for opioid dependence treatment since 1999. It has been used for OST (Kumar et al.,1999). In Manipur, NGOs began the OST program with 250 IDUs (Singh et al., 1992). In 2012, methadone was introduced in Manipur as part of a pilot project (Dhawan et al., 2014).

In Imphal, a study (Kermode et al., 2020) dealing with clients at a methadone clinic found that after 12 months, the retention rate was 67.6%. It also noted reductions in needle sharing, drug use, property crimes, anxiety, depression, and suicidal thoughts, concluding that methadone is an effective treatment. In operational research on OST in Nagaland and Manipur, involving 2569 individuals under OST with 1853 individuals from Manipur and 716 individuals from Nagaland, found that the retention rate was 72% after 3 months and 63.3% after 6 months. The participants demonstrated improvements in needle sharing, unsafe sex, detention incidents, and overall quality of life. Factors predicting relapse included higher drug expenditure, missing doses, and heroin or SP as the main problematic drug, which were associated with longer treatment durations. In Assam, a study on the sociodemographic and clinical profiles of individuals with OUD presenting at a tertiary care centre found that the participants were mostly young, married males. The median age group was 25 years with 2 years of dependence duration. 55% had a history of injecting drug use, around 83.3% were positive with HCV, 9.8% for HBV and 28% for HIV. Early onset of heroin use was linked to higher HCV prevalence (Chakravarty et al., 2024). It was reported that there is a lacuna in dosing in natural opioid users, as the guidelines in India mention the maintenance dose to be 2 to 4 mg per day, whereas the Western guidelines suggest the maintenance dose to be 6 mg per day for buprenorphine. They also report the lack of research available to see the effect of buprenorphine on treating the poppy husk users (Arora et al., 2021).

In Sikkim, it was found that SP was the most common type of opioid being used (Bhalla et al., 2006). The Sikkim State AIDS Control Society (SSACS), founded in 1999, operates under NACO guidelines (Sikkim State AIDS Control Society, n.d.). It has designated four centres in Sikkim as OST centres, currently supporting 856 IDUs through buprenorphine intervention (NACO, 2021). The outlook of the program was to minimise the use and effect of illicit opioids, such as the Hepatitis C virus (HCV), which is mostly prevalent among opioid users due to needle sharing, and research has been emphasising the role of OST centres in reducing needle sharing (Bala et al., 2023). OST is the primary evidence-based treatment for patients with OUD, including methadone, buprenorphine, and naltrexone (Volkow et al., 2014).

## ***2.9 Summary of Review of Literature***

The current review of literature provided a comprehensive synthesis of theoretical and empirical research on individuals with OUD undergoing OST, with particular focus on developmental, psychological, and treatment-related correlates. It highlights that the multidimensional phenomenon is influenced by biological, psychological and social determinants, and these factors interact dynamically throughout one's life. The developmental psychopathology framework underscores how early exposure to psychoactive substances can disrupt normative emotional and cognitive development, predisposing to chronic dependency and comorbid psychopathological conditions. This section identified several research gaps despite these conclusions. The interaction between severity level and age of onset on the outcomes of psychopathological and functional treatments is not well studied in the literature. Instead of examining these factors within a comprehensive developmental and clinical framework, most previous research has examined them separately. There is also a need for culturally appropriate data on treatment response and psychopathological profiles among people enrolled in OST programs in Indian settings, as the majority of research in this area comes from Western populations.

Research reviews have shown that onset age and severity are important factors in determining psychopathology and the effectiveness of treatment for opioid use disorder. The diverse geographical and psychosocial backgrounds of individuals also play a crucial role in determining the outcome of OST, influenced by both social structure and availability factors. Nonetheless, it is clear that an integrative approach, which considers both their individual and combined effects, is necessary. To fill these gaps, the current study examines how severity level and age of onset interact to affect psychopathological symptoms and treatment outcomes in a variety of domains for patients undergoing opioid replacement therapy. The methodology for systematically examining these relationships is described in the following chapter, along with the research design, sample characteristics, tools, and statistical procedures.

**CHAPTER – III**  
**STATEMENT OF THE PROBLEM**

### ***3.1 Overview of Statement of the Problem***

Opioid Use Disorder (OUD) is a long-term, relapsing condition characterised by compulsive drug-seeking and significant impairments in medical, psychological, and social areas. While Opioid Substitution Therapy (OST)—using agents such as buprenorphine and methadone—has proven effective in stabilising neurochemical functioning and reducing relapse, many individuals continue to exhibit persistent psychopathological symptoms and social dysfunction despite pharmacological management, which raises critical questions about the underlying factors that contribute to differential treatment outcomes among individuals in OST programs.

Existing research suggests that the onset age and the severity of drug use are two pivotal variables influencing the course and consequences of addiction. Individuals who initiate substance use during adolescence often display heightened vulnerability to psychological disturbances, impaired social functioning, and poorer treatment outcomes compared to those with adult onset. Similarly, higher severity levels of substance use have been associated with cumulative biopsychosocial damage, intensifying both psychopathological distress and functional impairment. However, few empirical studies have examined how these two variables—onset age and severity level—independently and interactively influence clinical outcomes among individuals undergoing OST, particularly in the Indian treatment context. This knowledge gap limits the ability to identify high-risk subgroups and tailor interventions beyond pharmacotherapy.

### ***3.2. Identification of Research Gap***

Recent findings indicate that differences in dependence severity and age at first opioid use significantly influence the presence and length of psychological symptoms, even after treatment is stabilised (Zhang et al., 2023). Users who start early tend to have more deep-rooted emotional regulation issues and sensitivity in relationships, while those with more severe dependence may experience ongoing physical

complaints and obsessive-compulsive traits (Bhivandkar et al., 2024; Namchuk et al., 2022). Persistent symptoms like depression, anxiety, hostility, and paranoid thoughts can hinder treatment participation, social reintegration, and overall recovery. Therefore, it is essential to investigate the extent and nature of ongoing psychopathology in individuals undergoing OST, and to analyse how these outcomes differ based on severity and age of opioid use onset. Understanding these relationships helps identify remaining treatment needs, clarify the biopsychosocial mechanisms behind incomplete psychological recovery, and inform the development of integrated therapeutic strategies that combine pharmacological stabilisation with targeted psychiatric and psychosocial interventions. Empirical studies have demonstrated the association between psychopathology and opioid use disorder (Sullivan et al., 2006; Miccoli et al., 2021; Haris et al., 2022; Santo et al., 2022). In addition, psychopathologies pertinent to treatment-seeking individuals have been documented (Brooner et al., 1997; Maremmani et al., 2013; Gurodokin et al., 2018; Chugonov et al., 2021; Jomehpour et al., 2022) before the onset of the treatment (Maremmani et al., 2010) and also after participation in the treatment program (Kidd et al., 2018).

It is evident that most studies report a high prevalence of psychopathologies (Roncero et al., 2016; Urbanoski et al., 2015), although some studies have explored the etiological basis of the illness, including the psychosocial factors for the same (Jomehpour et al., 2022). The characteristic differences between opioid use disorder patients and treatment-seeking individuals, and one study has subtyped the foundation of opioid use disorder (Maremmani et al., 2010; Lister et al., 2022). Comorbidity is also often linked to psychopathology (Cacciola et al., 2001; Carra et al., 2015), but gaining a better understanding of individuals during treatment and the treatment process itself may not be sufficient.

There is a complex association between comorbidity and the use of opioid agonists as treatment. Most of the studies report buprenorphine being useful in managing depression and methadone being useful for psychotic disorders (Maremmani et al., 2006). A higher buprenorphine dosage reduces mortality and increases retention in the treatment program (Fareed et al., 2012). There is a notable

improvement in individuals' mental health, showing an effective reduction in psychiatric depressive and anxiety symptoms at the six-month follow-up. It was observed that early-onset users exhibited lower adherence to the treatment during and after the six-month follow-up period. Studies with longer follow-up periods reported that these improvements plateaued or were not sustained. The improvement is greater in the first year of treatment, and then the improvement rate drops over the next 2 to 4 years. However, compared to the baseline, it remains better after four to five years. Thus, highlighting the need for support or adjunct interventions to maintain improvements in mental health (Fingleton et al., 2015).

Early onset of substance use has been identified as a predictor for later diagnosis of substance use disorder (Schepis et al., 2017). Early initiation of use is linked to maladaptive coping strategies, with higher levels of disengagement observed. Such individuals have limited interpersonal skills and avoid expressing emotions. There is a higher severity level of the addiction when the onset is below 17 years. This factor significantly influences the outcome of OST treatment, as maladaptive coping mechanisms and early onset are correlated with an increased likelihood of relapse (Capella et al., 2017). This also highlights the delay in the initiation of treatment for patients with psychiatric illnesses, including substance use disorder.

The time between the onset and the first treatment of contact is reported as approximately 10 years of delay in seeking treatment for substance use disorder, and 14 years and 30 years of use before starting treatment for mood and anxiety disorders (Survey, 2001-2002). The earlier onset of disorders belonging to other cohorts was associated with a longer delay in treatment-seeking behaviour. Minors need adults for treatment, as adults normalise the symptoms, leading the minor into social withdrawal and encouraging maladaptive coping, which interferes with help-seeking behaviour later (Borges et al., 2007). This emphasises the need for expanding resources, optimising their allocation and implementing a targeted intervention to engage in early identification and treatment availability, catering to the treatment-seeking behaviour

The timelines of addiction treatment initiation and the impact of early intervention among individuals with OUD, utilising Medicaid claims data from 2001

to 2004 included individuals aged 13 to 22 years, found that only 1 out of 4 received any form of treatment within the three months of OUD diagnosis, and 1 in 21 youths were taken into the treatment program using buprenorphine, naltrexone or methadone. Youths in the medicine-assisted treatment program were more likely to remain in treatment at 3-month and 12-month intervals than those receiving only behavioural intervention (Hadland et al., 2018). This substantiates the importance of early identification and initiation of medicine-based treatment.

Nevertheless, personality factors such as elevated impulsivity, antisocial characteristics, anxiety, depression, and borderline personality features have been associated with patterns of substance use and the severity thereof. Multiple psychopathological symptoms and personality disorders are linked to a higher rate of relapses and less favourable treatment outcomes (Martinez-Loredo et al., 2021). Childhood adversity or adverse childhood experiences (ACEs) significantly influence the development of mental health comorbidities, displaying gender-specific patterns - higher rates of mood and anxiety disorders in women and conduct disorder in men among those with OUD. Thus, making it important to incorporate trauma-informed and gender-sensitive approaches in preventive treatment strategies for OUD (Evans et al., 2020).

The significance of cultural ethnicity, race, and demographics is paramount in the management of Opioid Use Disorder (OUD) as well as in preventing relapse. The role of disparity in the availability of treatment for OUD was established by Siddique et al. (2022) when they concluded that Hispanic and Latin populations with larger populations with OUD are often confronted with unfunded and resource-limited healthcare settings, making the particular ethnicity more challenging to access treatment due to greater barriers to implementation of policy for prevention. The role of religious involvement was established in a study on non-Hispanic black and white adults aged between 18-24, when the higher religious service attendance was associated with a lower risk of OUD among black respondents (Ransome et al., 2019).

To emphasise this disparity, the race equity framework in the general medical setting aims to address disparities in accessibility by implementing culturally

responsive care and providing implicit bias training to healthcare providers (Jordan et al., 2021). India is a diverse cultural country with varied ethnicities and cultural backgrounds. It is difficult to implement a one-size-fits-all policy given the diversity of the population. A survey conducted by the Ministry of Social Justice and Empowerment indicates that the prevalence of substance use in India, specifically regarding opioid consumption, is quantified as 2.06. The national survey in 2004 reports opioid use in men to be 0.7, and in 2018, there has been a tremendous increase to 3.97. Sikkim has the highest prevalence of use of pharmaceutical opioids and also the highest use of sedatives compared to all other states in India. The pattern of high use of opioids in a state is followed by high use of sedatives, often mixed and administered through injections. The epidemiology study of prescription opioid abuse in Sikkim reports that OUD is more prevalent in Nepalese ethnicity from urban areas and highlights a propensity to risky sexual behaviour. The commonly used prescription opioids were dextropropoxyphene and codeine (Dutta et al., 2015). Although the Sikkim state implemented the Sikkim Anti-Drug Act (SADA) of 2006 to help control the availability of pharmaceutical drugs, this has not helped in decreasing the misuse of pharmaceutical drugs, establishing that a strict supply control measure may only hamper the access to patients who need it for a medical purpose (Ambedkar et al., 2019). There is a high incidence of psychiatric conditions such as depression, mood disorders, anxiety, and suicidal thoughts. The typical age for starting prescription opioids is among younger individuals, between 11 and 20 years old, with most being high school dropouts (Dutta et al., 2018).

Individuals with OUD experience internalised stigma, which is associated with lower educational achievement, higher unemployment rates, and greater dependence severity. This underscores the importance of addressing these issues within treatment strategies (Gupta et al., 2019). The psychosocial element contributing to relapse among OUD emphasises the role of high-risk situations, stressful life events and low self-efficacy in a high rate of relapse in the Indian population (Sureshkumar et al., 2021). Factors that interfere with the non-completion of the treatment program include younger age, unemployment and history of previous treatment attempts (Dayal et al., 2019). Opioid substitution therapy in the tertiary care setting is effective in reducing

opioid dependence, improving the psychosocial functioning and the treatment retention rate (Mahopatra et al., 2017).

Although studies suggest an association between substance use and psychopathology, the heterogeneity among individuals with substance use disorder is undeniable (Schepis et al., 2024). Hence, the latent class analysis within the population of substance users gives class-specific, distinct profiles based on the clinical symptoms. Common latent class identifiers are the low psychopathology group, where individuals have minimal psychiatric symptoms. The moderate symptom group includes moderate emotional distress and impulsivity, with more coping skills whereas the severe psychopathology group includes polysubstance use, co-occurring psychiatric illnesses, antisocial/externalising behaviour, and early onset users (Hochheimer et al., 2020; Martinez-Loredo et al., 2021; Bonfiglio et al., 2022).

Based on the theoretical foundation and empirical findings on psychopathology in individuals diagnosed with OUD currently under the OST program, the current study aims to examine the psychopathology based on the age at which substance use begins and the severity of drug use in individuals undergoing OST, and to examine the psychosocial aspects of progress through the functional domains of progress in OST within the population of Sikkim. The overall consideration would not only help address theoretical and methodological considerations but also provide a foundation for policy development and intervention programs, and further extend the knowledge base in this field of study.

The current study would use a quantitative research approach to examine the group differences between onset age and severity level using standardized psychological measures such as the Symptom Checklist–90–Revised (SCL-90-R) for assessing the psychopathological parameters and the Addiction Severity Index–5 (ASI-5) for assessing the functional domains of progress in OST which include selected parameters of medical status, employment status, alcohol use status, drug use status, legal status family/social conflict status and psychiatric status in the last 30 days to study the current status of progress in OST. Understanding these relationships will clarify how developmental timing and severity of substance use contribute to sustained

psychological and functional challenges during OST. Consequently, this study seeks to investigate the interaction effects of age of onset and severity of opioid use on psychopathological symptoms and functional domains of progress of individuals enrolled in OST with an aim to provide empirical insights for individualised, developmentally sensitive, and psychosocially integrated OST intervention programmes.

The following research objectives and hypotheses were framed in the present study.

### ***3.3 Formulation of Research Objectives:***

Considering the theoretical and methodological foundations of the research problem, the present study delineated the following objectives:

- O1: To study the difference in onset age of substance use on psychopathological symptoms and the functional domain of progress in OST
- O2: To examine the severity level of drug use on psychopathological symptoms and the functional domain of progress in OST
- O3: To study the correlation between onset age, severity level, psychopathological symptoms and progress in OST among individuals with OUD undergoing OST
- O4: To study the impact of onset age and severity level of substance use on psychopathological symptoms and functional domains of progress in OST

### ***3.4 Hypotheses:***

Following the review of literature on psychopathology associated with the onset age substance use and the severity level of addiction in individuals diagnosed with OUD currently under the OST, and to meet the objective of the study, the following hypotheses were set forth in the present study:

- H1: There will be a significant difference between adolescent onset and adult onset on psychopathological symptoms and functional domains of progress in OST

- H2: There will be a significant difference between high severity and low severity of drug use on psychopathological symptoms and functional domains of progress in OST
- H3: There will be a significant positive correlation between “onset age of substance use”, “severity level of drug use”, “psychopathological symptoms” and “the functional domains of progress in OST”
- H4: There will be a significant interaction effect between onset age (adolescent vs adult) and severity level (high vs low) on psychopathological symptoms and the functional domain of progress in OST

The next chapter (Methods and Procedure) outlines the methods used in the present study to explore the research objectives and hypotheses. All the methodological components, such as sample, research design, tools, procedure and statistical analyses used, will be discussed in detail.

**CHAPTER – IV**  
**METHODS AND PROCEDURE**

## **4.1 Overview**

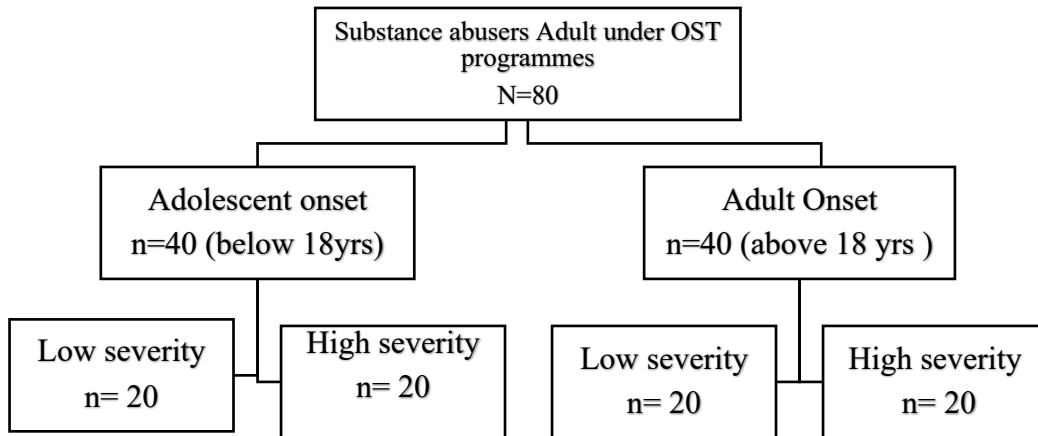
This chapter outlines the techniques and protocols used in the current study, which looked at how onset age and the severity level affect psychopathological symptoms and treatment outcomes in patients with Opioid Use Disorder (OUD) receiving Opioid Substitution Therapy (OST). The methodology was designed to ensure the reliability of the study results and systematically address the study's research objectives. This chapter describes the research design, the sampling technique used, and provides a detailed discussion of the sample characteristics, measurement tools, data collection procedure, and data analysis.

## **4.2 Research Design**

A cross-sectional, correlational, observational study was conducted to assess the psychopathological symptoms and progress in individuals undergoing OST. A 2x2 between-group comparison was used to examine differences between two groups based on the onset age of substance use, as reported in the demographic details, and the severity level of drug use, calculated from the composite score for the last 30 days of the drug use domain of the ASI-5.

The cross-sectional nature of the current research design allows for the assessment of multiple participant groups at a single point in time, thereby providing a snapshot of how onset age and severity interact to affect treatment outcomes, without the ethical and logistical constraints of longitudinal tracking. The comparative component of the design facilitates the evaluation of group differences across onset age (adolescent vs. adult) and severity level (low vs. high), while the correlational component enables the exploration of associations between these variables and measures of psychopathology and functional domains of progress in OST.

**Figure 1:** Diagram showing the 2 X 2 between-group comparative design used in the present study



#### 4.3 Target Population

The target population included individuals diagnosed with Opioid Use Disorder (OUD) receiving Opioid Substitution Therapy (OST) at government-designated de-addiction centres under the National AIDS Control Programme (NACP). This group was chosen as they represent a clinically relevant cohort for examining the relationship between the onset age of substance use, the severity level of substance use, psychopathology, and treatment outcomes. The target population in the present study were male individuals enrolled in a government-approved OST centre for treatment of OUD in the state of Sikkim. A range of such OST centres in Sikkim was considered to ensure an adequate sample.

#### 4.4 Sample

The present study focused on the OST (registered) centre at Sir Thuthop Namgyal Memorial Hospital (STNM), Gangtok operated by the Department of Health and Family Welfare, Government of Sikkim, where the registration for OST is done. A purposive sampling method was used to select 80 male participants for data collection. Gorodokin et al. (2019) also studied 80 male individuals, investigating the origins and structure of non-psychotic psychopathology in those undergoing opioid substitution maintenance therapy. The participants' ages ranged from 18 to 50 years ( $M=30.72$ ,  $SD=5.60$ ). Only participants diagnosed with OUD and currently

undergoing OST were included. The data were divided based on the age at which they started substance use: 40 participants with onset before 18 years old were labelled as "adolescent onset," and 40 with onset after 18 years old were labelled as "adult onset." These groups were identified using socio-demographic data such as age, birthplace, family details, family size, age at first use, and current medication dosage. Many studies include individuals with adolescent onset at age 18, indicating that adolescents with SUD have distinct characteristics compared to adults with SUD (Martin et al., 1996; Clark et al., 1997). This 18-year age is a transitional period, supported by researchers and social norms, which regard it as the age of emancipation (Clark et al., 1998). A NIHM ECA study also found the median age of onset for drug problems to be 18 years (Anthony et al., 1995).

The data was further categorised based on addiction severity level as 20 individuals with low severity and 20 individuals with high severity were selected from each adolescent-onset and adult-onset group based on the composite score of drug use from ASI-5 (Addiction Severity Index - 5), due to its multidimensionality. All the domains of ASI-50 are generally independent; hence, one domain can be used as an independent variable and the other domains as a dependent variable (Grahm et al., 2020). All participants were literate and had completed at least lower secondary education (ISCED Level 2), which generally includes students aged 12 to 14 years in 6th to 8th grade (UNESCO Institute for Statistics, 2012).

***Inclusion criteria:***

- Male individuals with OUD registered under the OST program.
- Individuals under buprenorphine-based OST
- Aged between 18 and 50 years.
- History of long-term opioid use (more than 3 years).
- At least a lower secondary level of education.

***Exclusion criteria***

- Female substance users
- Individuals enrolled in methadone-based OST
- Individuals enrolled in the OST program for less than 3 months.

#### **4.5 Tools used**

The current study employed a quantitative approach for evaluating the selected sample using the following two psychological assessment tools. A test booklet containing the socio-demographic information sheet, the Symptom Checklist (SCL-90-R; Derogatis et al., 1994), and the Addiction Severity Index 5 (ASI-5; McLellan et al., 1992) was administered to the sample to study the research objectives and hypotheses of this study. Many standardized psychological tools were considered, such as the General Health Questionnaire GHQ-28, Symptom Assessment Questionnaire-45, Structured Clinical Interview for DSM-5 (SCID-5) for assessing the psychopathological symptoms of the sample. The Symptom Checklist (SCL-90-R) was selected for use in the present study as it was found to be more robust and encompasses more symptomology parameters in comparison to other available tools. For the selecting second assessment tool, many appropriate scales, such as the Alcohol Use Disorders Identification Test (AUDIT), a 10-item screening instrument, and the Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST), were considered. However, ASI-5 was found to be more suitable for this study as it is multidimensional in nature and covers more functional domains, and the composite score over the last 30 days provided better insight into the individual's current level of functioning.

#### **Socio-Demographic Data Sheet**

A semi-structured Performa that includes socio-demographic variables such as age, sex, religion, education, marital status, permanent address/residence, occupation, current dosage level, treatment duration and age at first use, were used for collecting information from the sample.

#### **The Symptom Checklist Questionnaire (SCL-90-R)**

SCL-90 R is a 90-item self-report symptom inventory developed by Leonard R. Derogatis et al. in 1994 for the purpose of assessing a wide spectrum of psychological symptoms and psychopathological conditions (Derogatis et al., 1994). Each of the ninety items is evaluated using a five-point Likert scale to measure distress, ranging from 0 (not at all) to 4 (extremely). The subsequent answers are grouped under

the main symptom dimension, which encompasses somatisation, obsessive-compulsive behaviours, interpersonal sensitivity, depression, anxiety, anger-hostility, phobic anxiety, paranoid ideation, and psychoticism. Three overall indices - namely the Global Severity Index, the Positive Symptom Total, and the Positive Symptom Distress Index - are used to assess overall psychological distress.

The SCL-90 was initially published in 1983 by Leonard R. Derogatis, and a revised edition was subsequently developed in 1994 for use among individuals aged 15 to 67 years. The revised version adopted standardised norms and demonstrated improved internal consistency. Additionally, three global indices were introduced: GSI (Global Severity Index), PST (Positive Symptom Total), and PDSI (Positive Symptom Distress Index (Derogatis, 1994). The abnormality symptoms of the sample can be assessed by integrating the overall score with the individual scores for each dimension, then converting the results to a mean score. This mean score is then standardised into a T-score, with a threshold of 60 indicating an abnormal level. The present study involves comparing scores for each dimension with the normative table provided in the manual. Internal consistency reliability, as measured by Cronbach's alpha, ranged from 0.78 to 0.96 across the nine primary symptom dimensions. In the present study, Cronbach's alpha values for the SCL-90-R ranged from 0.766 to 0.890.

### **The Addiction Severity Index (ASI-5; McLellan et al., 1992)**

The ASI-5 is a semi-structured interview tool that characterises and quantifies issues commonly linked with substance dependence (McLellan et al., 2006). It is regarded as the gold standard for evaluating substance dependence. Since 1980, its widespread application has led to its translation into nine languages, including French, Spanish, German, Dutch, and Russian (McLellan et al., 1985). It is a concise, semi-structured interview designed to gather crucial information about an individual's life factors contributing to substance use across seven domains: Medical status, Employment status, Alcohol use status, Drug use status, Legal status, Family and social conflict status, and Psychiatric status. All the domains are multidimensional,

allowing clinicians and researchers to assess not only substance use itself but also its effects on various areas of daily functioning.

The first version of ASI was developed in 1977 for a patient-treatment-matching study funded by the Veterans Administration (VA) (McLellan et al., 1980). Its development prioritised ease of use in interviews to facilitate understanding of clients and to introduce them to treatment procedures. It needed to be multi-dimensional to serve as a comprehensive tool, covering seven key areas of an individual's life: medical status, employment and support, legal status, family/social situation, psychiatric health, alcohol use, and drug use. This assessment aimed to provide lifetime information on patients' functioning for clinical insights, while also focusing on recent problem status through re-administration at follow-up after treatment (McLellan et al., 2006). The third version, ASI 3, was published in 1980 and included severity ratings for each area. Each area has two ratings: a Patient Severity Rating (PSR) and an Interviewer Severity Rating (IRS). The PSR uses a 5-point scale from 0 to 4, where 0 means no problem and 4 means extremely severe. The IRS considers the amount, duration, and intensity of symptoms, rated from 0-1 (no real issue, treatment not needed), 2-3 (slight problem, likely requiring treatment), 4-5 (moderate problem, some treatment recommended), 6-7 (considerable problem, treatment necessary), and 8-9 (extreme problem, treatment absolutely necessary; McLellan et al., 2006).

In 1992, a revised edition of ASI 3, designated as ASI-5, was published. It preserved all the original items while incorporating additional details, such as the route of drug administration and questions pertaining to antisocial personality disorder, trauma, relapse environment, and biological heritability. ASI-5 contains 164 items, and the approximate time to complete is 45 to 75 minutes. In 1995, a shorter version with 111 items was published as the ASI Lite, which took around 30 to 40 minutes for completion. IRS was eliminated. A more reliable measure than the IRS was developed, known as the quantitative composite score (CSs).

The composite score is calculated from various items in each problem. It reflects changes over the past thirty days, not lifetime history, because there is no

normative data for the composite score. Instead, a mean score for the ASI composite can represent the nature and type of the problem (McLellan et al., 1992).

McGahan (1986) provided the formulas for calculating the composite score of ASI-5 and each domain has its own set of questions and formulas, ranging typically from 0.00 to 1.00, where higher = greater problem severity: For example, in the medical domain:

Q6. Number of days with a medical problem in the past 30 days

Q7. Patient's rating of how bothered they have been by the medical condition in the past 30 days

Q8. Patient's rating of how important it is to seek treatment for that medical condition

To sum up, Q6 has a value of 30, Q7 has a value of 4, and Q8 has a value of 4. Each question is divided by its maximum answer value and by the total number of questions in the composite. These individual results are then summed.

For example, if a subject reported 15 days of medical problems, in Q7 (rating = 3), Q8 (rating = 4). Then, the composite score would be calculated as given below:

$$\frac{15}{30 \times 3} + \frac{(B) 3}{4 \times 3} + \frac{(C) 4}{4 \times 3} = \frac{15}{90} + \frac{3}{12} + \frac{4}{12} = .750$$

The ASI software (or structured scoring key) automates similar scoring pattern.

For example:

- Alcohol Use Composite Score = (weighted frequency of medical problem × problem perception × desire for treatment) / 3
- Employment Composite = (days unemployed × dissatisfaction × income instability) / 3

The ASI-5 is a multidimensional tool. Its composite scores are generally independent. This allows one domain to be treated as a predictor of the independent variable for the other dependent variable. This tool exhibits robust psychometric properties, with test-retest reliability coefficients ranging from 0.83 to 0.95 and inter-

rater reliability exceeding 0.80, demonstrating high consistency (McLellan et al., 1980). It also has solid construct validity, as its composite scores correlate well with other validated instruments like the SCL-90R and AUDIT. The Cronbach's alpha for the ASI-5 varied from 0.62 to 0.87 in Methadone Maintenance Treatment (MMT) studies (Alterman et al., 1994). In the present study's sample, the Cronbach's alpha of ASI-5 ranged from 0.752 to 0.951.

#### **4.6 Ethical considerations**

All ethical guidelines for human safety, including confidentiality and voluntary participation, were strictly adhered to in the present study. The APA code of ethics for research (2002) was strictly followed. The present study was approved by the Human Ethics Committee of Mizoram University (MZUHEC) vide notification/letter no. MZU/HEC/2024/024 in compliance with the ethical guidelines for conducting a research study on human subjects to safeguard the study sample.

#### **4.7 Procedure**

The present study was conducted to examine the psychopathological symptoms in persons undergoing OST, focusing on how they relate with the age at which they first started substance use and the severity of their drug use. To achieve the study's objectives, two psychological tools, namely SCL-90-R and ASI-5, were used. The sample collection centre was located at STNM Hospital in Gangtok, which operates under the Health and Family Welfare Department of the Government of Sikkim.

In the next step, permission was obtained from the authorities of the OST programme Centres. A consent form was prepared in accordance with the APA Code of Ethics for Research (2002), along with a socio-demographic profile sheet, which will collect information about participants' details, such as name, age, gender, education, marital status, and other relevant details. Participants were then selected from the OST centre in accordance with the study design. Thereafter, the participants were informed that their involvement was entirely voluntary. They were provided assurance of confidentiality regarding any shared information or personal details.

Thereafter, the purpose of the present research study was explained, and informed consent was obtained accordingly.

After obtaining informed consent, participants were briefed about the psychological tests, which were administered individually in a quiet environment with minimal disturbance or distraction. All test questionnaires were administered according to the manual's instructions in their original form, with assistance and clarification provided as needed. After completing the test questionnaires, all the test booklets were thoroughly checked for any missing responses. The entire test administration lasted about 60 minutes, so a short break was provided after each test. After successfully completing test administration, all response sheets were collected and carefully checked in accordance with the test manual guidelines. The responses that were checked were then coded and entered into SPSS version 30 for statistical analysis.

#### **4.8 Statistical analyses**

Data were analysed using IBM SPSS Statistics (version 30) in the present study. The psychometric properties of the two psychological tests were assessed using Cronbach's alpha reliability coefficient. Cronbach's alpha for the ASI-5 ranges from 0.752 to 0.971, and for the SCL-90-R, it ranges from 0.766 to 0.890, indicating that both tools are suitable for the target population in the present study. The data were sorted according to the onset age, categorised as below 18 and above 18, based on the demographic details. The severity level of drug use was assessed using the domain of drug use from the ASI-5, which calculated the composite score to determine the current functioning level of individuals over the last 30 days. As the participants were undergoing treatment for over 6 months.

The Kolmogorov-Smirnov test was used to assess data normality and determine whether a parametric or nonparametric test should be used. Given that the data involve ordinal and non-normally distributed scores, a nonparametric test was selected because the data did not meet the assumptions of normality and equal variances required by parametric tests such as ANOVA (Field, 2024). It was used to evaluate differences between two or more groups, accounting for the interaction

between onset age and severity level of drug use, given that the data in the present study were ordinal and non-normal. Therefore, non-parametric statistical tests were used. The statistical analyses used in the current study include descriptive statistics with mean, SD, and frequency. The chi-square test was used to examine the relationships between demographic details, onset age, and severity level. The Mann-Whitney U test, to examine the differences between groups. The Spearman's rho correlation was used to identify statistically significant associations. This approach was chosen for its suitability in relation to the study's objectives, its ability to detect group differences, and its practicality in clinical research settings where manipulating variables is neither ethical nor feasible (Salkind et al., 2010; Setia et al., 2016). The Kruskal-Wallis test was employed to assess the interaction effect between groups and the effect size (Acharya et al., 2013).

**CHAPTER – V**  
**RESULTS AND DISCUSSION**

## **5.1 Overview**

The present study, entitled “Psychopathological Symptoms of Persons Under Opioid Substitution Therapy: An Observational Study” is an attempt to explore the differences in psychopathological symptoms and progress in OST based on age of onset and severity level. Four research objectives and four research hypotheses were formulated to analyse the study's outcome. This study employed a correlational research design to compare the age-of-onset groups (adolescent-onset under 18 and adult-onset over 18) and the addiction severity groups (40 high severity and 40 low severity). The sample was selected using a purposive sampling technique. A total of 80 individuals undergoing opioid substitution therapy at STNM Hospital, Gangtok, were selected with an equitable representation of those who initiated treatment at early and late ages. Participants' ages ranged from 18 to 50 years ( $M=30.72$ ,  $SD=5.60$ ). The sample comprised of individuals undergoing Opioid Substitution Therapy, who were diagnosed and receiving treatment at STNM, Gangtok, Government of Sikkim. The Symptom Checklist 90-Revised (SCL-90-R; Derogatis, 1994) was employed to assess the 9-symptom construct of psychopathology, and the Addiction Severity Index - 5 was used to assess the severity of drug use domain (McLellan, 1992). The psychological tests were administered in accordance with the instructions outlined in the test manual and in compliance with the ethical principles for psychologists engaged in research, as stipulated by the Code of Conduct (APA, 2002). The data collected from the sample were analysed to facilitate a better understanding of the study's research objectives, and the results are presented in the following proceedings.

## **5.2 Checking for missing raw data and outliers**

To guarantee the precision of the study outcomes, the research data were initially scrutinised for any potential missing or extreme outlier values. The researcher reviewed the data to identify any incomplete or missing data and, upon confirming its completeness, proceeded with the subsequent statistical analysis.

## **5.3 Psychometric properties of the tools used**

Two psychological assessment tools were used in the present study: the Symptom Checklist-90-R (Derogatis et al., 1994) and the ASI-5 (McLellan et al.,

1993), both of which are standardised tools. The SCL-90 was developed to evaluate symptom severity in clinical trials and is widely recognised as an effective instrument for assessing psychiatric symptoms and mental health issues in both general and psychiatric patient populations (Chooprayoon, 1978; Derogatis, 1994).

Psychometric analyses of the SCL-90-R scales and subscales were conducted in Microsoft Excel and SPSS 30 to assess their suitability and cultural relevance for the study population. The ASI-5 was created to gather information about a patient's life that can help in understanding substance abuse syndrome. It develops a patient profile, collecting lifetime information on problem behaviour and focusing on the 30 days preceding the assessment.

#### **5.4 Reliability of the tools used**

The internal consistency of the scales was assessed using Cronbach's coefficient alpha (Cronbach, 1951). All nine subscales of the symptom checklist- namely Somatisation, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Anger/Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism- were evaluated individually. Results indicate that the test was trustworthy for use on the targeted population. The internal consistency of the scale was assessed using Cronbach's coefficient alpha, demonstrating reliability across all scales and subscales. As illustrated in Table 1, the following alpha coefficients were observed: Somatization ( $\alpha = .800$ ), Obsessive-Compulsive ( $\alpha = .838$ ), Interpersonal Sensitivity ( $\alpha = .846$ ), Depression ( $\alpha = .890$ ), Anxiety ( $\alpha = .849$ ), Anger/Hostility ( $\alpha = .776$ ), Phobic Anxiety ( $\alpha = .827$ ), Paranoid Ideation ( $\alpha = .766$ , and Psychoticism ( $\alpha = .862$ ). Additional scale ( $\alpha = .814$ ). Although the addiction scale is not taken up for the study, as this study incorporated only the psychopathological parameters of the scale.

The reliability coefficient (Cronbach's Alpha) ensured the strength of the psychological tool used and the internal consistency of subject scores. The scores for each parameter lie between .776 and .890, as detailed in Table 1, indicating that the scale falls in the range of acceptable to good Cronbach's alpha. Hence, it is suitable for use in the population taken.

Table 1: Table showing the Mean, SD, Variance, and Cronbach's Alpha of the subscales of Psychopathological symptoms of SCL 90-R

| <b>Psychopathological symptoms</b> | <b>Mean</b> | <b>SD</b> | <b>No. of Items</b> | <b>Variance</b> | <b>Cronbach's alpha (<math>\alpha</math>)</b> |
|------------------------------------|-------------|-----------|---------------------|-----------------|-----------------------------------------------|
| Somatization                       | 14.44       | 8.22      | 12                  | 67.52           | .800                                          |
| Obsessive compulsive               | 10.84       | 7.66      | 10                  | 58.64           | .838                                          |
| Interpersonal sensitivity          | 9.85        | 7.69      | 9                   | 59.19           | .846                                          |
| Depression                         | 15.83       | 11.05     | 13                  | 122.07          | .890                                          |
| Anxiety                            | 7.77        | 7.03      | 10                  | 49.47           | .849                                          |
| Anger/Hostility                    | 6.19        | 5.36      | 6                   | 28.66           | .776                                          |
| Phobic Anxiety                     | 3.66        | 4.92      | 7                   | 24.15           | .827                                          |
| Paranoid Ideation                  | 6.76        | 5.211     | 6                   | 27.159          | .766                                          |
| Psychoticism                       | 5.91        | 6.753     | 10                  | 45.600          | .862                                          |
| Additional Scale                   | 7.76        | 6.471     | 7                   | 41.880          | .814                                          |

N=80

### **The Addiction Severity Index-5 (ASI-5)**

ASI-5 is reliable and valid across diverse clinical populations and substance abusers seeking treatment, regardless of clients' demographic details (Alterman et al., 1994). The Addiction Severity Scale encompasses seven domains: Medical Status, Employment Status, Drug Use Status, Alcohol Use Status, Legal Status, Family/Social Conflict Status and Psychiatric Status. The internal consistency of the scale was evaluated using Cronbach's alpha, and all domains demonstrated reliability, ranging from .752 to .971 as shown in Table 2. Using the scale reliability analysis in SPSS, the mean score across all participants for that single item was calculated, along with the SD, variance, and Cronbach's alpha. Specifically, medical status ( $\alpha=.971$ ), employment status ( $\alpha=.762$ ), drug use status ( $\alpha=.883$ ), alcohol use status ( $\alpha=.921$ ),

legal status( $\alpha=.951$ ), family /social conflict status( $\alpha=.752$ ), and psychiatric status ( $\alpha=.941$ ). The number of items selected for calculating Cronbach's alpha for the ASI-5 was based on specific questions with a Likert scale for each domain, as uniformity is required to calculate Cronbach's alpha.

**Table 2:** Table showing the Mean, SD, Variance, and Cronbach's Alpha of the selected ASI-5 parameters

| Domains            | Mean | SD   | No. of items | Variance | Cronbach's alpha ( $\alpha$ ) |
|--------------------|------|------|--------------|----------|-------------------------------|
| Medical Status     | 2.53 | 1.47 | 2            | 2.15     | .971                          |
| Employment Status  | 3.30 | 2.14 | 2            | 4.56     | .762                          |
| Alcohol Use        | 2.04 | .404 | 2            | .163     | .921                          |
| Drug Use           | 9.75 | .626 | 2            | .392     | .883                          |
| Legal Status       | 2.59 | 1.71 | 2            | 2.93     | .951                          |
| Family Conflict    | 4.96 | 2.05 | 4            | 4.19     | .752                          |
| Psychiatric Status | 2.73 | 1.82 | 2            | 3.29     | .941                          |
| N=80               |      |      |              |          |                               |

The overall analysis of both scales ensured the reliability and appropriateness of the psychological tool in the given population.

**5.5 Normality Test:** Descriptive statistics were computed to assess the normality of the ASI and SCL-90R subscales, as well as the overall data sample. The descriptive statistics included the Kolmogorov-Smirnov test and p-value, since the group size exceeded 30. Tables 3 and 4 present the results of the Kolmogorov-Smirnov test and p-value for ASI, based on onset age and severity level of substance use. The results show that the data significantly deviate from normality for both parameters. Table 3 presents the results of the Kolmogorov-Smirnov test and corresponding p-values, derived from data obtained via the SCL-90-R, for the onset age of substance use and the severity level of substance use. The results demonstrate that the data deviate significantly from normality for both parameters.

**Table :3** Table showing the Kolmogorov-Smirnov Test and p value of the sample on Symptom Checklist 90-R and Addiction Severity Index-5 according to the onset age of substance use

| Domain                    | Group            | Kolmogorov-Smirnov | Mean | SD   | Skewness | SE   | Kurtosis | SE   | p-value |
|---------------------------|------------------|--------------------|------|------|----------|------|----------|------|---------|
| Somatization              | Adolescent onset | .403               | 1.38 | .490 | .537     | .374 | -1.805   | .733 | <.001   |
|                           | Adult onset      | .403               | 1.63 | .490 | -.537    | .374 | -.135    | .733 | <.001   |
| Obsessive compulsive      | Adolescent onset | .478               | 1.23 | .423 | 1.369    | .374 | -.135    | .733 | <.001   |
|                           | Adult onset      | .540               | 1.05 | .221 | 4.292    | .374 | 17.285   | .733 | <.001   |
| Interpersonal-sensitivity | Adolescent onset | .489               | 1.20 | .405 | 1.559    | .374 | .451     | .733 | <.001   |
|                           | Adult onset      | .540               | 1.05 | .221 | 4.292    | .374 | 17.285   | .733 | <.001   |
| Depression                | Adolescent onset | .529               | 1.10 | .304 | 2.772    | .374 | 5.979    | .733 | <.001   |
|                           | Adult onset      | .536               | 1.08 | .267 | 3.354    | .374 | 9.736    | .733 | <.001   |
| Anxiety                   | Adolescent onset | .511               | 1.15 | .362 | 2.038    | .374 | 2.263    | .733 | <.001   |
|                           | Adult onset      | .538               | 1.03 | .158 | 6.325    | .374 | 40.000   | .733 | <.001   |
| Hostility                 | Adolescent onset | .478               | 1.23 | .423 | 1.369    | .374 | -.135    | .733 | <.001   |
|                           | Adult onset      | .489               | 1.20 | .405 | 1.559    | .374 | .451     | .733 | <.001   |
| Phobic Anxiety            | Adolescent onset | .478               | 1.23 | .423 | 1.369    | .374 | -.135    | .733 | <.001   |
|                           | Adult onset      | .540               | 1.05 | .221 | 4.292    | .374 | 17.285   | .733 | <.001   |
| Paranoid Ideation         | Adolescent onset | .453               | 1.28 | .452 | 1.048    | .374 | --.953   | .733 | <.001   |
|                           | Adult onset      | .521               | 1.13 | .335 | 2.357    | .374 | 3.741    | .733 | <.001   |
| Psychoticism              | Adolescent onset | .521               | 1.13 | .335 | 2.357    | .374 | 3.741    | .733 | <.001   |
|                           | Adult onset      | .540               | 1.05 | .221 | 4.292    | .374 | 17.285   | .733 | <.001   |
| Medical Status            | Adolescent onset | .540               | 1.05 | .221 | 4.29     | .374 | 17.29    | .733 | <.001   |

|                        |                  |      |      |      |      |      |       |      |       |
|------------------------|------------------|------|------|------|------|------|-------|------|-------|
|                        | Adult onset      | .521 | 1.13 | .335 | 2.36 | .374 | 3.74  | .733 | <.001 |
| Employment Status      | Adolescent onset | .351 | 1.48 | .506 | .104 | .374 | -2.10 | .733 | <.001 |
|                        | Adult onset      | .403 | 1.38 | .490 | .537 | .374 | -1.81 | .733 | <.001 |
| Drugs/alcohol Status   | Adolescent onset | .538 | 1.48 | .080 | .104 | .374 | -2.10 | .733 | <.001 |
|                        | Adult onset      | .511 | 1.35 | .076 | .654 | .374 | -1.66 | .733 | <.001 |
| Family Conflict Status | Adolescent onset | .351 | 1.08 | .267 | 3.35 | .374 | 9.74  | .733 | <.001 |
|                        | Adult onset      | .416 | 1.10 | .304 | 2.77 | .374 | 5.98  | .733 | <.001 |
| Legal Status           | Adolescent onset | .511 | 1.15 | .362 | .204 | .374 | 2.26  | .733 | <.001 |
|                        | Adult onset      | .536 | 1.08 | .267 | 3.35 | .374 | 9.74  | .733 | <.001 |
| Psychiatric Status     | Adolescent onset | .536 | 1.08 | .267 | 3.35 | .374 | 9.74  | .733 | <.001 |
|                        | Adult onset      | .529 | 1.05 | .221 | 4.29 | .374 | 17.26 | .733 | <.001 |

N=40

**Table 4:** Table showing the Kolmogorov-Smirnov Test and p value of the sample on Symptom Checklist 90-R and Addiction Severity Index-5 according to the severity level of substance use

| Domain                    | Group         | Kolmogorov-Smirnov | Mean | SD   | Skewness | SE   | Kurtosis | SE   | P-value |
|---------------------------|---------------|--------------------|------|------|----------|------|----------|------|---------|
| Somatization              | Low severity  | .416               | 1.35 | .483 | .654     | .374 | -1.658   | .733 | <.001   |
|                           | High severity | .416               | 1.66 | .483 | -.654    | .374 | -1.658   | .733 | <.001   |
| Obsessive Compulsive      | Low severity  | .536               | 1.08 | .267 | 3.354    | .374 | 9.736    | .733 | <.001   |
|                           | High severity | .489               | 1.20 | .405 | 1.559    | .374 | .451     | .733 | <.001   |
| Interpersonal-sensitivity | Low severity  | .536               | 1.08 | .267 | 3.354    | .374 | 9.736    | .733 | <.001   |
|                           | High severity | .500               | 1.18 | .385 | 1.778    | .374 | 1.220    | .733 | <.001   |
| Depression                | Low severity  | .536               | 1.08 | .267 | 3.354    | .374 | 9.736    | .733 | <.001   |
|                           | High severity | .529               | 1.10 | .304 | 2.772    | .374 | 5.978    | .733 | <.001   |
| Anxiety                   | Low severity  | .529               | 1.10 | .304 | 2.772    | .374 | 5.979    | .733 | <.001   |
|                           | High severity | .536               | 1.08 | .267 | 3.354    | .374 | 9.736    | .733 | <.001   |
| Hostility                 | Low severity  | .521               | 1.13 | .335 | 2.357    | .374 | 3.741    | .733 | <.001   |
|                           | High severity | .441               | 1.30 | .464 | .907     | .374 | -1.242   | .733 | <.001   |
| Phobic Anxiety            | Low severity  | .511               | 1.15 | .362 | 2.038    | .374 | 2.263    | .733 | <.001   |
|                           | High severity | .521               | 1.13 | .335 | 2.357    | .374 | 3.741    | .733 | <.001   |
| Paranoid Ideation         | Low severity  | .489               | 1.20 | .405 | 1.559    | .374 | .451     | .733 | <.001   |
|                           | High severity | .489               | 1.20 | .405 | 1.559    | .374 | .451     | .733 | <.001   |
| Psychoticism              | Low severity  | .536               | 1.08 | .267 | 3.354    | .374 | 9.736    | .733 | <.001   |
|                           |               | .529               | 1.10 | .304 | 2.357    | .374 | 3.741    | .733 | <.001   |

|                        |               |      |      |      |        |      |        |      |       |
|------------------------|---------------|------|------|------|--------|------|--------|------|-------|
| Medical status         | Low severity  | .540 | 1.05 | .221 | 4.292  | .374 | 17.285 | .733 | <.001 |
|                        | High severity | .521 | 1.13 | .335 | 2.357  | .374 | 3.741  | .733 | <.001 |
| Employment Status      | Low severity  | .390 | 1.40 | .497 | .424   | .374 | -1.919 | .733 | <.001 |
|                        | High severity | .364 | 1.45 | .504 | .209   | .374 | -2.062 | .733 | <.001 |
| Drugs/alcohol Status   | Low severity  | .529 | 1.10 | .304 | 2.772  | .374 | 5.979  | .733 | <.001 |
|                        | High severity | .453 | 1.73 | .452 | -1.048 | .374 | -.953  | .733 | <.001 |
| Legal Status           | Low severity  | .540 | 1.05 | .221 | 4.292  | .374 | 17.285 | .733 | <.001 |
|                        | High severity | .500 | 1.18 | .385 | 1.778  | .374 | 1.220  | .733 | <.001 |
| Family Conflict Status | Low severity  | .536 | 1.08 | .267 | 3.354  | .374 | 9.736  | .733 | <.001 |
|                        | High severity | .529 | 1.10 | .304 | 2.772  | .374 | 5.979  | .733 | <.001 |
| Psychiatric Status     | Low severity  | .536 | 1.08 | .267 | 3.354  | .374 | 9.736  | .733 | <.001 |
|                        | High severity | .540 | 1.05 | .221 | 4.292  | .374 | 17.285 | .733 | <.001 |
| N=40                   |               |      |      |      |        |      |        |      |       |

A socio-demographic profile sheet, informed consent form, and two psychological tools were employed for the psychopathological evaluation of the samples. The administration was conducted with due diligence and in accordance with the instructions provided in the manual and APA guidelines (2002). Psychometric analysis of the scales and subscales was conducted using Microsoft Excel 2013 and SPSS 30.

## **5.6 Sample characteristics**

The study's sample characteristics included male adults aged between 18 to 50 years, overall mean (30.72) and SD (5.60) of the total sample, which is in line with the WHO standard age range classification. Sixteen per cent (16%) of the sample were between 15 and 24 years, whereas 83% comprised of male sample between 25 to 35 years (both age groups are categorised as youth), and only 1% comprised young adults between 36 to 50 years, known as middle-aged adults. The distribution of education levels showed that participants who had completed lower secondary education were 31%, those with secondary education were 25%, those with higher secondary education were 17%, those with a graduation degree were 23%, and those with a postgraduate degree were 4%.

The longest work period of the participants showed that 12% were unemployed, 44% had the longest job for one to six months, 30% had the longest job for six months to one year, 13% had one to two years, and 1% had the longest job for more than two years. This finding is in line with the results of earlier studies (Eddie et al., 2020; Holtyn et al., 2021) which state that individuals under treatment often face persistent employment issues for various reasons, such as their educational qualifications, adherence issues with employment, or their history of being unemployed - all of which could be associated with a lower chance of being employed. In terms of religion, the present sample included Protestants (15%), Roman Catholics (4%), Muslims (1%), Buddhists (21%), and Hindus (59%).

Among the participants, 58.8% were married, 2.5% were separated, and 38.8% were never married. 51% had no family issues, and 49% had some ongoing family

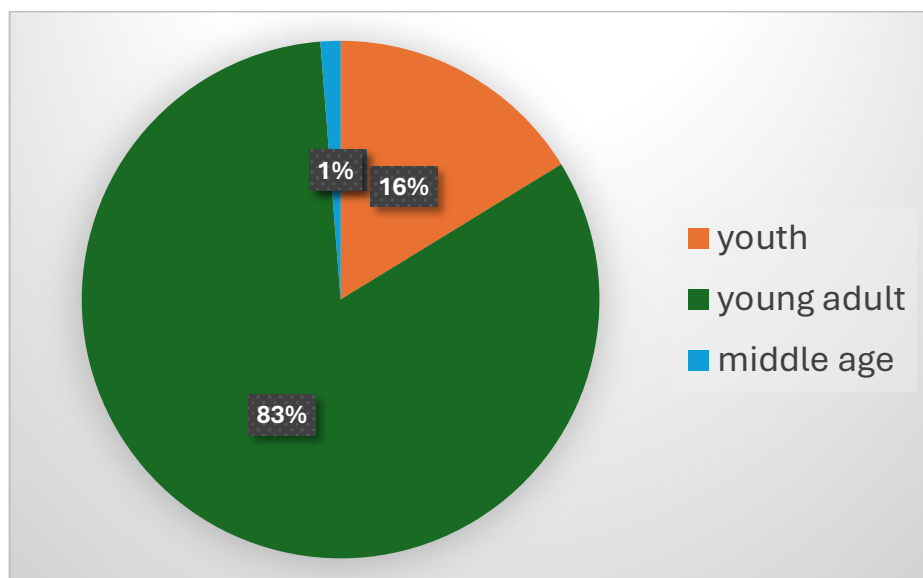
issues. In terms of employment status, 13% of the sample were unemployed, 85% were employed, and 2% were students. The data obtained regarding participants' income showed that 50% earned below the minimum wage in India of Rs 20358/-, which is 783/- for unskilled labour, set under the Minimum Wage Act of 1948, revised 2026, and 50% were receiving above the minimum wage. Approximately 76.25% of the participants had no legal issues, while 23.75% were dealing with ongoing legal problems.

The participants were categorised based on the duration of their treatment: 52.5% had a treatment duration of up to 1 year, whereas 47.5% of the sample reported having a treatment duration of more than 1 year. According to the dosage of buprenorphine, 31% of the participants were in maintenance mode with a dosage of 4-8 mg, also known as the stabilising dose, and 69% were in active withdrawal mode with a dosage more than 8-16 mg (Rao, 2008).

The sample characteristics of the study can be explained with the help of a diagram as follows:

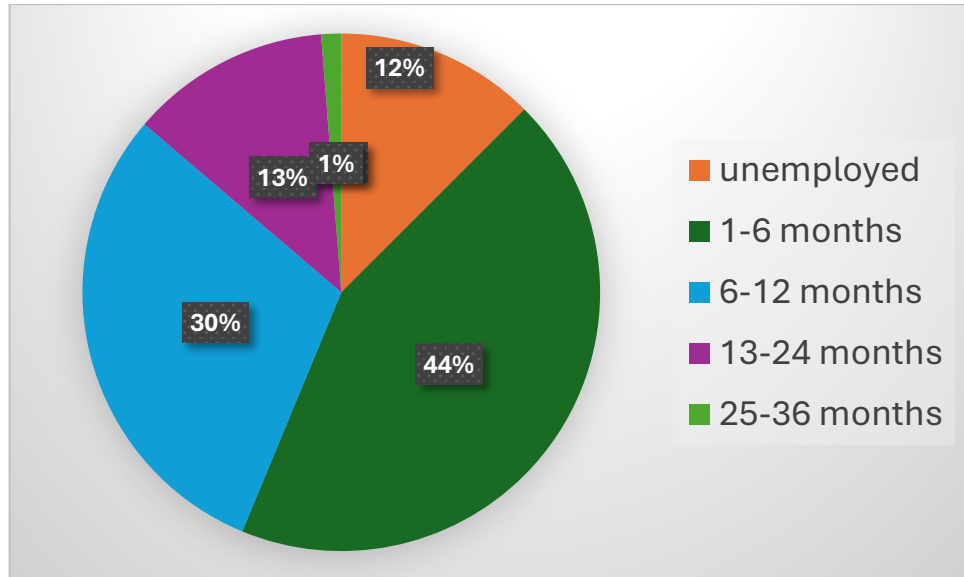
- (i) Distribution of age groups among the sample

**Figure -2:** Pie chart showing the distribution of age groups of the sample



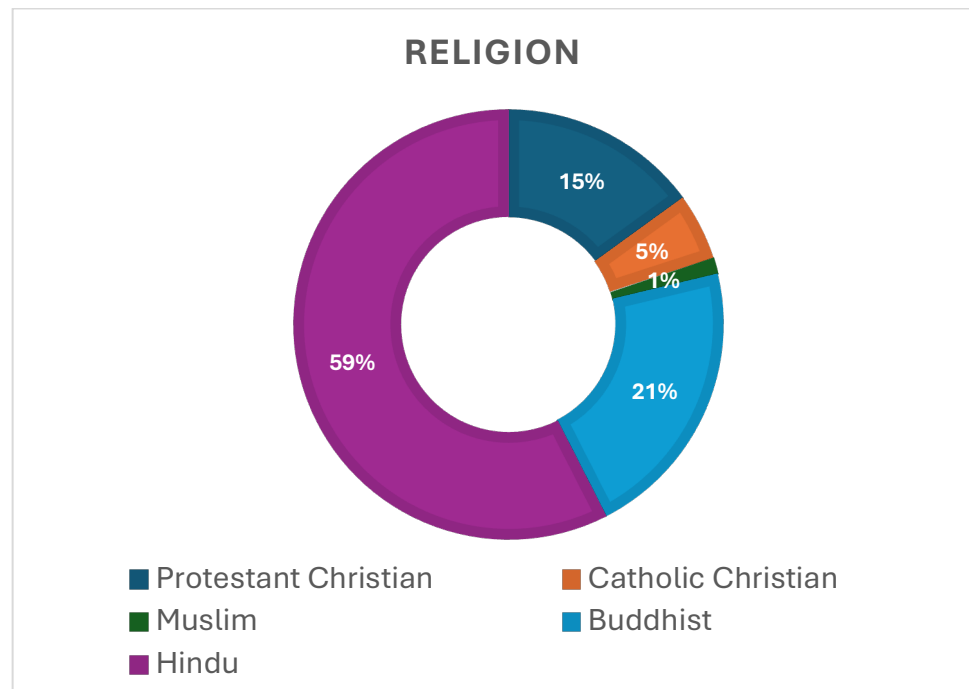
- (ii) Distribution of employment history among the sample

**Figure -3:** Pie chart showing the employment history of the sample



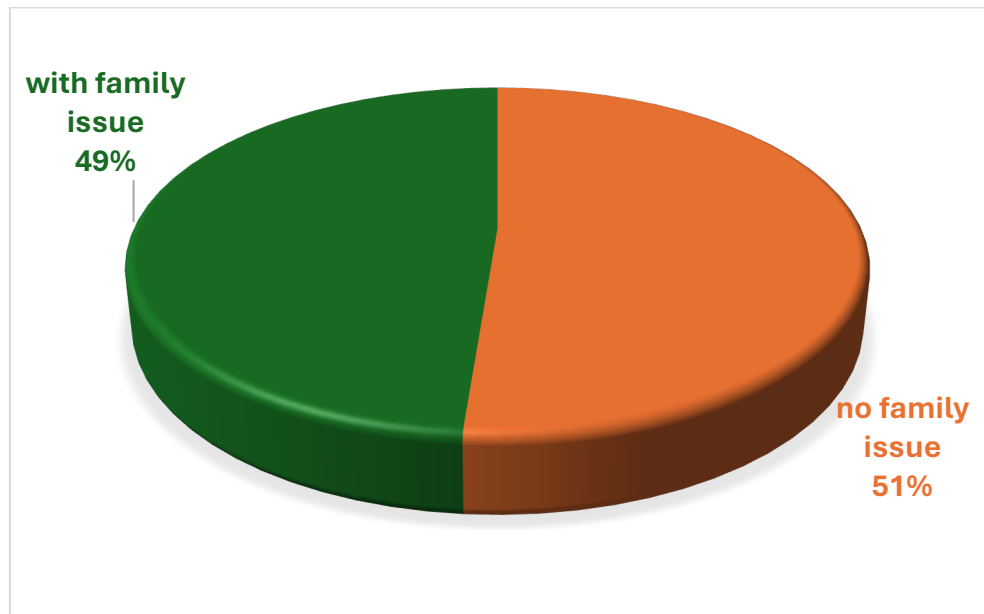
- (iii) Distribution of religion among the sample

**Figure 4:** Pie chart showing the distribution of religion in the sample



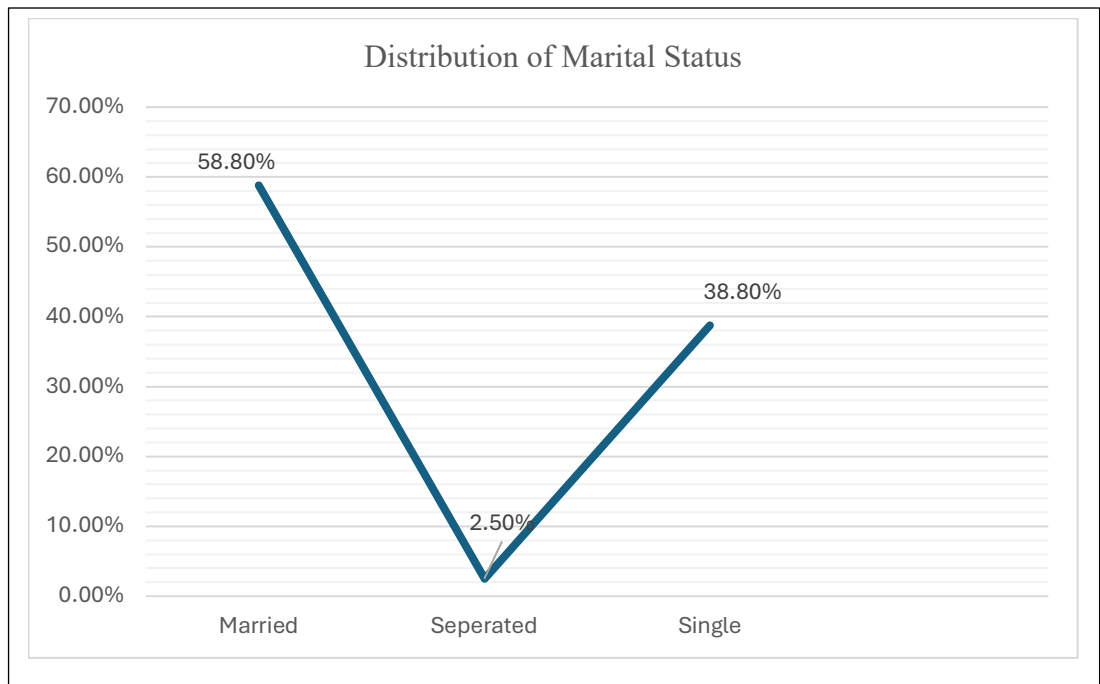
- (iv) Distribution of family discord among the sample

**Figure 5:** Pie chart showing the distribution of family discord of the sample



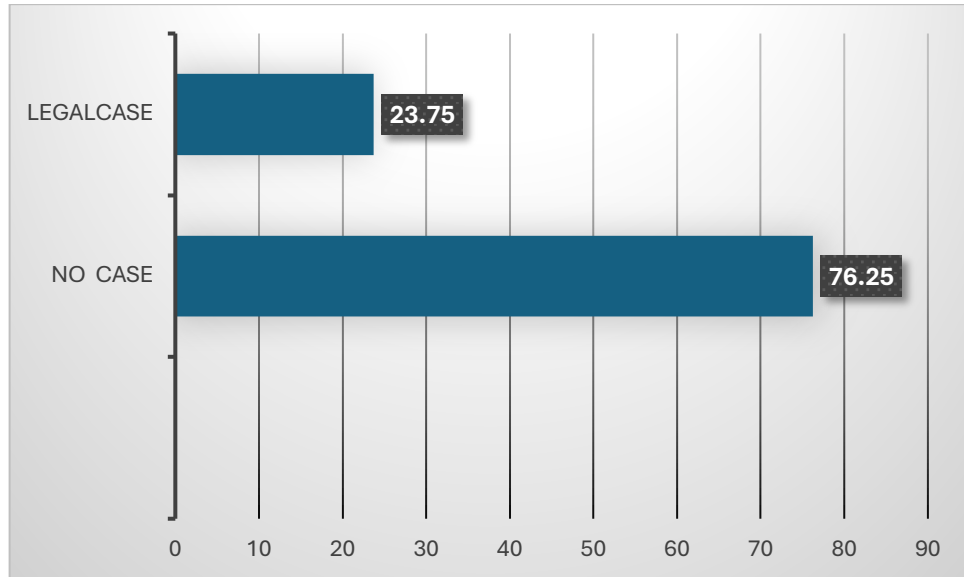
- (v) Distribution of marital status among the sample

**Figure 6:** Graph showing the distribution of marital status of the sample



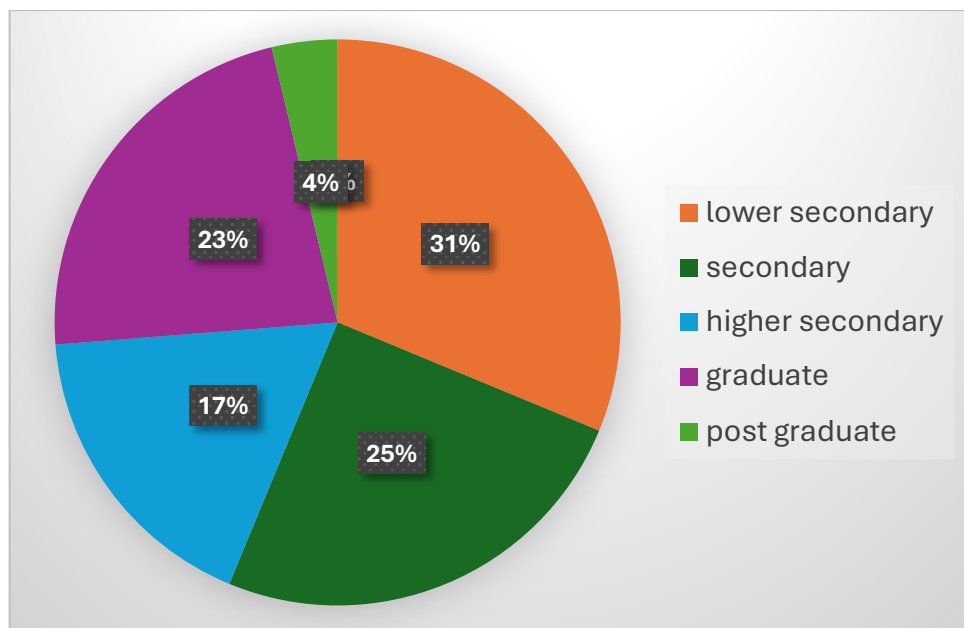
(vi) Distribution of Legal Status among the sample

**Figure-7:** Graph showing the legal status of the sample



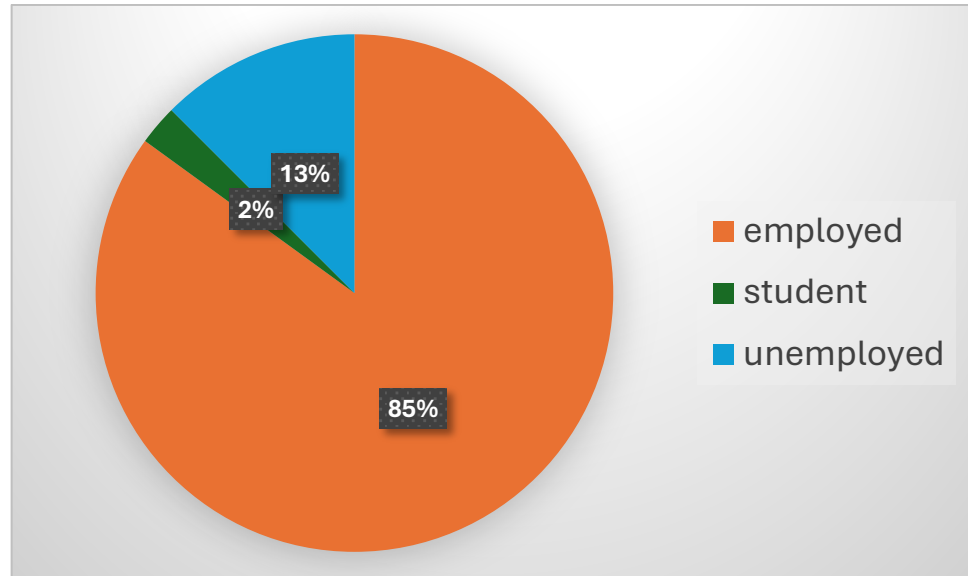
(vii) Distribution of Educational Level among the sample

**Figure 8:** Pie chart showing the educational level of the sample



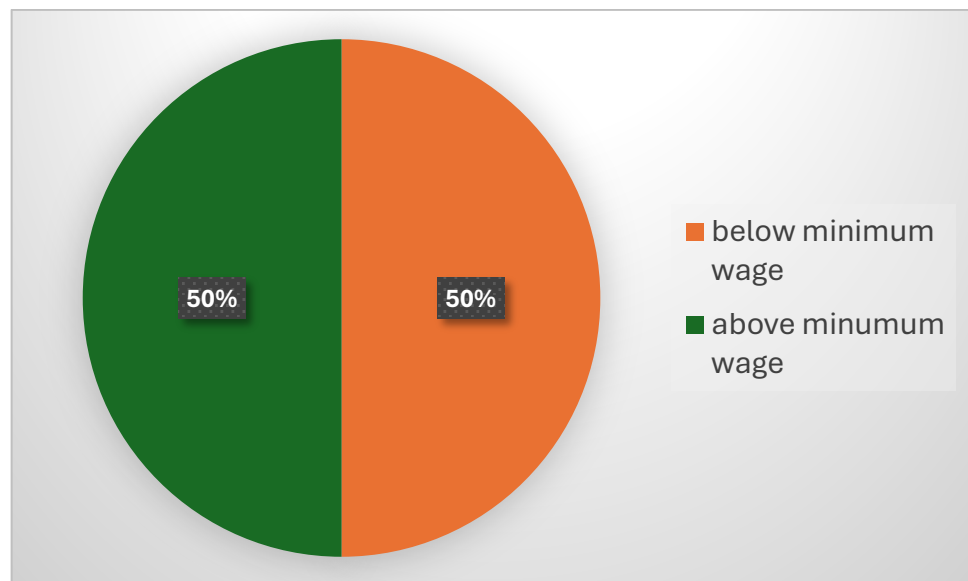
(viii) Distribution of employment status among the sample

**Figure 9:** Pie chart showing the employment status of the sample



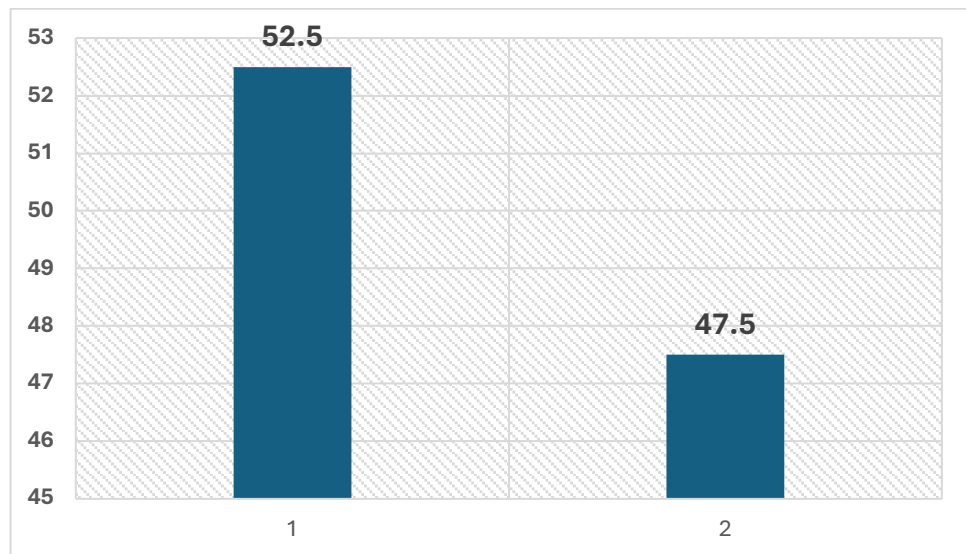
(viii) Distribution of the monthly wage among the sample

**Figure 10:** Pie chart showing the monthly salary according to the minimum wage of Rs 20358/- for unskilled labour (Minimum Wage Act of India, 1948 revised in 2026)



(ix) Distribution of treatment duration among the sample

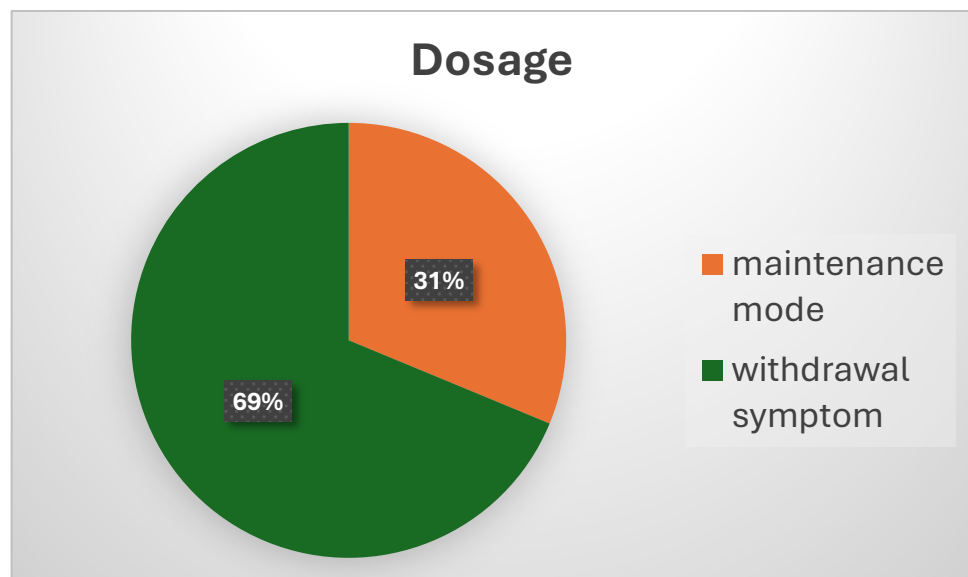
**Figure 11:** Graph showing the duration of treatment of the sample



*Note: 1= Sample having treatment duration up to 1 year  
2= Sample having treatment duration of above 1 year*

(x) Distribution of the current dose of buprenorphine among the sample

**Figure 12:** Pie chart showing the buprenorphine dose of the sample



*Note: Maintenance mode = 4-8mg; Withdrawal symptom = 8-16 mg (Rao,2008)*

**Table 5:** Table showing the Chi-Square ( $\chi^2$ ) Test of Independence Between Onset Age and Socio-Demographic Details

| Variables                  | Socio-Demograph    | Adolescent onset | Adult onset | E  | $\chi^2$ | df | p-value |
|----------------------------|--------------------|------------------|-------------|----|----------|----|---------|
| <b>Age</b>                 | Youth              | 9                | 4           | 13 | 3.469    | 2  | .177    |
|                            | Young adult        | 30               | 36          | 66 |          |    |         |
|                            | Middle age         | 1                | 0           | 1  |          |    |         |
| <b>Marital Status</b>      | Married            | 22               | 25          | 47 | .482     | 2  | .786    |
|                            | Separated          | 1                | 1           | 2  |          |    |         |
|                            | Single             | 17               | 14          | 31 |          |    |         |
| <b>Educational</b>         | Lower              | 12               | 13          | 25 | 6.983    | 4  | .137    |
|                            | Secondary          |                  |             |    |          |    |         |
|                            | Secondary          | 8                | 12          | 20 |          |    |         |
|                            | Higher             | 5                | 9           | 14 |          |    |         |
|                            | Secondary          |                  |             |    |          |    |         |
| <b>Employment status</b>   | Graduate           | 12               | 6           | 18 | 2.059    | 2  | .357    |
|                            | Post-Graduate      | 3                | 0           | 3  |          |    |         |
|                            | Employed           | 35               | 33          | 68 |          |    |         |
|                            | Student            | 0                | 2           | 2  |          |    |         |
|                            | Unemployed         | 5                | 5           | 10 |          |    |         |
| <b>Employment Duration</b> | Unemployed         | 7                | 3           | 10 | 3.890    | 2  | .143    |
|                            | 1-24 months        | 30               | 29          | 59 |          |    |         |
|                            | Above 36 months    | 3                | 8           | 11 |          |    |         |
| <b>Monthly salary</b>      | Below minimum wage | 23               | 17          | 40 | 1.800    | 1  | .180    |
|                            | Above minimum wage | 17               | 23          | 40 |          |    |         |
|                            |                    |                  |             |    |          |    |         |
| <b>Dosage</b>              | Initiation         | 13               | 12          | 25 | .058     | 1  | .809    |
|                            | Stabilizing        | 27               | 28          | 55 |          |    |         |
| <b>Treatment duration</b>  | Up to 1 yr         | 21               | 18          | 39 | .450     | 1  | .502    |
|                            |                    |                  |             |    |          |    |         |
| <b>Legal case</b>          | Above 1 yr         | 19               | 22          | 41 | .621     | 1  | .431    |
|                            | No case            | 29               | 32          | 61 |          |    |         |
|                            | Ongoing            | 11               | 8           | 19 |          |    |         |
| <b>Religion</b>            | Christianity       | 8                | 8           | 16 | 3.253    | 3  | .516    |
|                            | Islam              | 0                | 1           | 1  |          |    |         |
|                            | Buddhist           | 6                | 11          | 17 |          |    |         |
|                            | Hindu              | 26               | 20          | 46 |          |    |         |

N=80

Table 5 shows that the relationship between age of onset (adolescent vs. adult) and a variety of sociodemographic and treatment-related factors was investigated using chi-square tests of independence. There were no statistically significant correlations between onset age and age group ( $\chi^2(2, N = 80) = 3.47, p = .177$ ); marital status ( $\chi^2(2, N = 80) = 0.48, p = .786$ ); employment status ( $\chi^2(2, N = 80) = 2.06, p = .357$ ); employment duration ( $\chi^2(5, N = 80) = 6.05, p = .301$ ); monthly salary ( $\chi^2(1, N$

= 80) = 1.80,  $p = .180$ ); dosage ( $\chi^2(1, N = 80) = 0.06, p = .809$ ; treatment duration ( $\chi^2(1, N = 80) = 6.05, p = .401$ ); legal case ( $\chi^2(1, N = 80) = 0.62, p = .431$ ); or religion ( $\chi^2(3, N = 80) = 3.25, p = .516$ ). Overall, these findings show that participants with adolescent-onset and adult-onset substance use did not significantly differ in terms of sociodemographic and treatment-related characteristics.

**Table 6:** Table showing the Chi-Square ( $\chi^2$ ) Test of Independence Between Severity Level and Socio-Demographic Details

| Variables                  |                    | High Severity | Low Severity | E  | $\chi^2$ | df | p-value |
|----------------------------|--------------------|---------------|--------------|----|----------|----|---------|
| <b>Age</b>                 | Youth              | 6             | 7            | 13 | 1.077    | 2  | .584    |
|                            | Young adult        | 33            | 33           | 66 |          |    |         |
|                            | Middle age         | 1             | 0            | 1  |          |    |         |
| <b>Marital Status</b>      | Married            | 27            | 20           | 47 | 3.849    | 2  | .142    |
|                            | Separated          | 0             | 2            | 2  |          |    |         |
|                            | Single             | 13            | 18           | 31 |          |    |         |
| <b>Educational</b>         | Lower Secondary    | 17            | 8            | 25 | 6.367    | 4  | .173    |
|                            | Secondary          | 10            | 10           | 20 |          |    |         |
|                            | Higher Secondary   | 4             | 10           | 14 |          |    |         |
|                            | Graduate           | 8             | 10           | 18 |          |    |         |
| <b>Employment status</b>   | Post-Graduate      | 1             | 2            | 3  | 4.129    | 2  | .127    |
|                            | Employed           | 37            | 31           | 68 |          |    |         |
|                            | Student            | 1             | 1            | 2  |          |    |         |
|                            | Unemployed         | 2             | 8            | 10 |          |    |         |
| <b>Employment Duration</b> | Unemployed         | 6             | 4            | 10 | 1.642    | 2  | .440    |
|                            | 1-24 months        | 27            | 32           | 59 |          |    |         |
| <b>Monthly salary</b>      | Above 24 months    | 7             | 4            | 11 | 1.800    | 1  | .180    |
|                            | Below minimum wage | 16            | 24           | 40 |          |    |         |
|                            | Above minimum wage | 24            | 16           | 40 |          |    |         |
| <b>Dosage</b>              | Initiation         | 15            | 10           | 25 | 1.455    | 1  | .228    |
|                            | Stabilizing        | 25            | 30           | 55 |          |    |         |
| <b>Treatment duration</b>  | Up to 1 yr         | 26            | 16           | 42 | 5.013    | 1  | .043*   |
|                            | Above 1 yr         | 14            | 24           | 38 |          |    |         |
| <b>Legal case</b>          | No case            | 31            | 30           | 61 | .069     | 1  | .793    |
|                            | Ongoing            | 9             | 10           | 19 |          |    |         |
| <b>Religion</b>            | Christianity       | 6             | 10           | 16 | 3.175    | 3  | .529    |
|                            | Islam              | 0             | 1            | 1  |          |    |         |
|                            | Buddhist           | 8             | 19           | 17 |          |    |         |

N=80;  $p < .05$

Table 6 shows that in both severity groups (high and low), young adults comprised the majority of participants (82.5%), followed by youth (16.3%), with only one person in the middle age range. Most respondents (58.8%) reported being married, while fewer reported being single (38.8%) or being separated (2.5%). Despite some variation in educational attainment, the most common levels were lower secondary (31.3%) and secondary (25.0%). Only a small percentage of participants were students (2.5%) or unemployed (12.5%), while the majority (85.0%) were employed.

The distribution of monthly income was equal, with half earning less than the minimum wage (50.0%) and the other half earning more (50.0%). According to treatment-related factors, about two-thirds of participants (68.8%) were in the stabilising dosage phase, whereas 31.3% were in the initial phase. About half (48.8%) had been in treatment for less than a year, and half (51.3%) had been in treatment for more than a year. While 23.8% had an active legal case, the majority (76.3%) did not. The majority of the sample was Hindu (57.5%), followed by Buddhists (21.3%), Christians (20.0%), and Muslims (1.3%).

Chi-square tests showed that the length of treatment varied significantly between the high and low severity groups ( $\chi^2(1, N = 80) = 5.013, p = .043$ ), with a higher percentage of the high severity group receiving treatment for up to a year and a lower percentage of the low severity group continuing treatment for more than a year. Age group, marital status, education level, employment status, length of employment, monthly salary, dosage phase, legal case, and religion did not show any significant associations (all  $p > .05$ ).

## 5.7 Findings of the present study:

Results are discussed according to the research objectives, as sequentially given below:

**5.7.1 Objective 1:** To study the difference in the onset age of substance use on psychopathological symptoms and the functional domains of progress in OST. The sample was divided into two groups. One group consisted of individuals with an onset age before 18 years, classified as adolescent onset, while the other group consis

ted of those with an onset age after 18 years, classified as adult onset. Many epidemiological studies (Palmer et al., 2009; McGorry et al., 2011; Kirst et al., 2014) indicate that substance use and abuse tend to increase during adolescence and peak in early adulthood. The age range of 12 to 18 years has been associated with the onset of various psychiatric disorders related to substance use.

The psychopathological symptoms in the present study consist of nine parameters of SCL-90-R: Somatisation, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Anger/Hostility, Phobic Anxiety, Paranoid ideation, and Psychoticism. The Mann-Whitney U test was conducted to meet the study's first objective, as shown in Table 7.

**Somatisation:** Results demonstrated that the mean rank for adolescent onset was 50.00 and adult onset was 31.00, indicating that somatisation was more prevalent in individuals with the adolescent onset. The difference between the two groups was highly significant, with the asymptotic value of  $<.001$ . The level of somatisation is associated with increased use of opioids (Trafton et al., 2011). To support this finding, a similar study substantiated that the duration of use of the substance tends to indicate severe dependence, having more symptomology of somatisation as compared to those with shorter duration of dependence (Jomehpour et al., 2022).

**Obsessive-Compulsive:** The symptomology of obsessive-compulsive was relatively higher among individuals with adolescent onset, with a mean rank of 45.50, as compared to individuals with adult onset, with a mean rank of 35.50, suggesting a significant difference between the two, with the asymptotic value of  $.008$ . This finding is in line with the early initiation of substance use, which is associated with severe

psychiatric symptoms (Haahes et al., 2002; Subodh et al., 2019). Previous studies had established that obsessive-compulsive disorder is a protective factor for substance abuse (Regier et al., 1990; Blom et al., 2011). The finding of this study indicates high incidence of obsessive-compulsive symptoms when the initial age of use is below 18 which is supported by a cohort longitudinal study done in Sweden which reports a high association of obsessive-compulsive symptoms with increased risk of substance use as high incidence of alcohol and drug use was prevailing among individual with obsessive compulsive symptomology by the age of 16yrs (Virtanen et al., 2022).

**Interpersonal Sensitivity:** The mean rank for adolescent onset is 45.00 and for adult onset was 36.00, with an asymptotic value of .007, indicating a significant difference in interpersonal sensitivity between the two age groups. Interpersonal sensitivity is high in individuals who lack interpersonal skills. They tend to have difficulty expressing themselves, which makes it harder for them to defend themselves (Vojude et al., 2015). Individuals with high sensitivity tend to modify their behaviour in line with others' expectations (Boyce et al., 1989). This explains the results of this study, as interpersonal sensitivity is high in individuals with adolescent-onset.

**Depression:** The results indicated that the mean rank for adolescent onset was 43.50 and the mean rank for adult onset was 36.50, indicating that the symptomology of depression was found more in the onset before 18 years group. The difference between the two groups was insignificant, with the asymptotic value of .079. Many studies have reported major depressive disorder as common among users and also that depressive symptomology was more heightened (Liao et al., 2011; Mills et al., 2004; Rao et al., 2004). The depressive symptomology was mostly reported by active injecting users (Buse et al., 2012). This result is supported by findings of a study where it was found that adolescent onset has a higher rate of major depressive disorder than adult onset of substance takers (Clark et al., 1998).

**Anxiety:** The result for symptomology of Anxiety was statistically significant with an asymptotic value of .026, indicating that there is a difference in the level of anxiety according to the age of onset. The mean rank for adolescent onset was 44.50,

while the mean rank for adult onset was 36.50, indicating that more symptomology of anxiety was found among the group with substance use onset before the age of 18. Earlier studies have substantiated that the symptomology of anxiety is one of the common features in opioid users (Rao et al.,2005; Gorodkin et al.,2019). Many have associated anxiety disorder with substance use disorder (Grant et al.,2004; Swendsen et al.,1998). One study highlights the causal role of anxiety on substance use and vice versa (Kushner et al.,2001). Anxiety was associated with the risk for early initiation of substance use (Marmorstein et al.,2010).

**Anger/Hostility:** The mean rank for adolescent onset was 41.00, and the mean rank for adult onset was 40.00, indicating that the adolescent-onset group had greater anger/hostility symptomatology. However, the difference between the groups was insignificant, with an asymptotic value of .786. This finding is supported by an Epidemiological Catchment Area Survey, which reported that individuals with substance use disorder are 10 times more likely to report of history of violence (Swanson et al.,1990). Early as well as biological effects of substance use are predictive of later aggression (Jaffee et al.,1988). Aggression, anger/hostility were more prevalent with individuals who use escape avoidance distancing, and use confrontation as a coping mechanism (McCormick et al.,1995). This result is contradictory to the findings of a study where it was established that there were higher behavioural disruptions when the onset of substance use is in adolescence (Clark et al.,1998). This can be attributed to the effectiveness of buprenorphine in treating aggressive behaviour over methadone (Maremmani et al., 2020), considering the participants to be under treatment for more than three months.

**Phobic Anxiety:** The mean rank of the adolescent onset group was 45.50, and the mean rank for the adult-onset group was 35.50, indicating that the early onset has more symptomology of phobic anxiety. The asymptotic value of .010 reveals a significant difference between the two groups. Phobic anxiety includes irrational fear of particular objects, situations and activities. Phobic anxiety has been associated with substance use disorders as a common comorbidity (Davidson et al.,1993; Grant et al.,2005). Studies have associated social phobia with substance use disorder. Myers et

al. (2003) reported the complex association between social phobia and substance use. Panic and social phobia were found to be predictors of later substance use among all other types of anxiety (Zimmerman et al.,2003). The median age of onset of social phobia was 15 years, with 50% experiencing the symptom earlier than 15 years, and about 60% of patients with social phobia symptoms had symptoms before substance taking. Individuals with symptoms of social phobia reported greater dependency than those who did not have social phobia (Thomas et al.,1999).

**Paranoid Ideation:** The mean rank for the adolescent onset group was 45.50, while for the adult-onset group it was 35.50, indicating that individuals with an onset age before 18 exhibited more symptoms of paranoid ideation. The difference between the two groups was significant, with an asymptotic value of paranoid ideation, which refers to unfounded suspicion, mistrust, and the belief that others intend to harm or exploit them. This is commonly found in substance-induced states. Prolonged use from an early age can alter brain chemistry, it hampers the maturation of the cerebral cortex with a decrease in the volume of cortical grey matter in male adolescents, and leads to symptoms resembling psychotic like experiences, including paranoid ideation. Cannabis has been found to have a high association with paranoid symptoms when the use begins in adolescent age (Arseneault et al.,2002; French et al.,2015)

**Psychoticism:** The mean rank for both the onset of age before and after 18 years was similar, with 41.00 and 40.00, respectively, with no significant difference with an asymptotic value of .725. The mean rank indicates that the symptomology of psychoticism was found to be similar in both groups. Psychoticism has been positively associated with substance use, particularly with cannabis and stimulants. Substance use may either exacerbate pre-existing psychotic traits or induce psychotic symptoms in vulnerable individuals (Saha et al., 2011; Ksir et al., 2016). In this study, the difference between symptomology of psychoticism was similar irrespective of age of onset, and this could be attributed to the antipsychotic effect of buprenorphine (Schmauss et al.,1987).

**Table 7:** Results showing the Mann-Whitney U test between adolescent-onset and adult-onset groups on psychopathological symptoms and functional domains of progress in OST

| Parameters                | Categories       | Mean<br>Rank | Mann<br>U | Assymp<br>Sig | Effect<br>Size (r) |
|---------------------------|------------------|--------------|-----------|---------------|--------------------|
| Somatization              | Adolescent onset | 50.00        | 420.0     | <.001**       | 0.472              |
|                           | Adult onset      | 31.00        |           |               |                    |
| Obsessive Compulsive      | Adolescent onset | 45.50        | 600.0     | .008*         | 0.298              |
|                           | Adult onset      | 35.50        |           |               |                    |
| Interpersonal Sensitivity | Adolescent onset | 45.00        | 620.0     | .007*         | 0.303              |
|                           | Adult onset      | 36.00        |           |               |                    |
| Depression                | Adolescent onset | 43.50        | 680.0     | .079          | 0.196              |
|                           | Adult onset      | 37.50        |           |               |                    |
| Anxiety                   | Adolescent onset | 44.50        | 640.0     | .026*         | 0.248              |
|                           | Adult onset      | 36.50        |           |               |                    |
| Anger/Hostility           | Adolescent onset | 41.00        | 780.0     | .786          | 0.03               |
|                           | Adult onset      | 40.00        |           |               |                    |
| Phobic Anxiety            | Adolescent onset | 45.50        | 600.0     | .010*         | 0.287              |
|                           | Adult onset      | 35.50        |           |               |                    |
| Paranoid Ideation         | Adolescent onset | 45.50        | 600.0     | .008*         | 0.298              |
|                           | Adult onset      | 35.50        |           |               |                    |
| Psychoticism              | Adolescent onset | 41.00        | 780.0     | .725          | 0.039              |
|                           | Adult onset      | 40.00        |           |               |                    |
| Medical Status            | Adolescent onset | 39.00        | 740.0     | .292          | 0.118              |
|                           | Adult onset      | 42.00        |           |               |                    |
| Employment Status         | Adolescent onset | 45.00        | 620.0     | .044*         | 0.225              |
|                           | Adult onset      | 36.00        |           |               |                    |
| Alcohol Use               | Adolescent onset | 39.00        | 740.0     | .333          | 0.108              |
|                           | Adult onset      | 42.00        |           |               |                    |
| Family Conflict           | Adolescent onset | 47.50        | 520.0     | .001**        | 0.355              |
|                           | Adult onset      | 33.50        |           |               |                    |
| Legal Status              | Adolescent onset | 41.50        | 760.0     | .579          | 0.062              |
|                           | Adult onset      | 39.50        |           |               |                    |
| Psychiatric Status        | Adolescent onset | 40.00        | 780.0     | .747          | 0.036              |
|                           | Adult onset      | 41.00        |           |               |                    |

*N* = 80; *p* < 0.05\*; *p* < 0.01\*\*; *Effect size (r) range* - Small (< .30), Medium (.30 - .50), Large (> .50)

**Medical Status:** The mean rank for the adolescent onset group was 39.00, and the mean rank for the adult-onset group was 42.00, indicating that individuals with an onset age after 18 years were more prone to having medical issues. The difference in medical status between the two groups was insignificant, with an asymptotic value of .292. This result is contrary to the finding that early onset of substance use compromises the medical condition of the individual as it disrupts the developmental processes (McLellan et al.,2000). Injectable drug users are prone to the hepatitis C Virus and HIV (Kourounis et al.,2016). Medical problems complicated treatment and contributed to poorer outcomes (Sterling et al., 2011). Opioid use has been associated with a plethora of chronic medical conditions, some more severe than others.

**Employment Status:** The mean rank for the adolescent-onset group was 45.00, and for the adult-onset group, 36.00, indicating that the adolescent-onset group had more employment complications. The difference in employment status between the two groups was significant, with an asymptotic p-value of .044. Earlier studies have found that unemployment was more prevalent among substance users, as it was found that it was less likely to have regular jobs (Orum, 2020). Early onset of substance use is linked to educational disruption, such as low performance in academics, school dropout and low educational attainment (Brook et al., 2008). A longitudinal study focusing on student work intensity linked to later educational attainment and substance use spanning over three decades found that low academic performance and low aspiration contributed to substance use (Bachman et al., 2011). The result of this study is supported by a longitudinal study done in New Zealand to examine the relationship between cannabis use in adolescence and the level of educational attainment, where it was found that cannabis use decreases the level of educational achievement, which likely affects their long-term employment later (Fergusson et al., 2003)

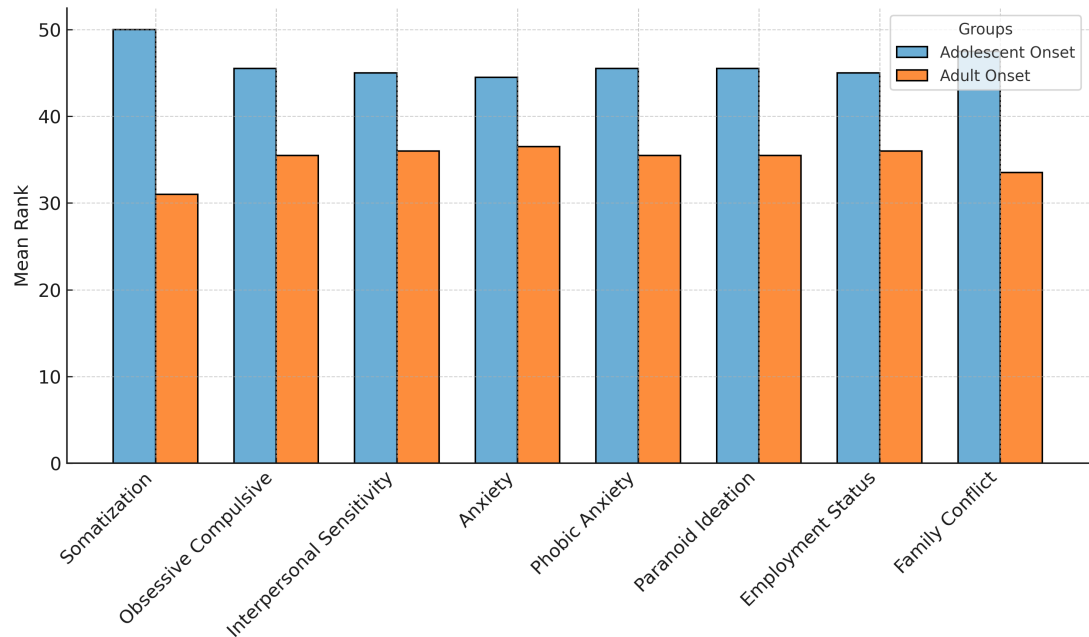
**Alcohol Use Status:** The results showed the mean rank for the adolescent onset was 39 and the adult-onset group was 42, indicating that alcohol use was seen more in the adult-onset group. The difference between the two groups in terms of alcohol use was not significant, with an asymptotic value of .333. Earlier literature suggests that alcohol use during OST significantly increases the likelihood of relapse

and dropout rates, interfering with the treatment outcome (Subramaniam et al., 2009). The use of alcohol and buprenorphine can be dangerous due to increased use of sedation, respiratory depression, and even moderate alcohol use may lead to Central Nervous System depression (Fiellin et al., 2002).

**Family Conflict Status:** The results show that the adolescent-onset group had a mean rank of 47.50, while the adult-onset group had a mean rank of 33.50, indicating that the group with onset age before 18 experienced more family conflict. The difference between the two groups was highly significant, with a p-value of  $<.001$ . This finding is similar to another study where family conflict and poor parenting were significant predictors of substance use in adolescents (Brooks et al., 2000). Another study supporting this adds that early initiation of substance use is associated with disrupted families (Hayatbakhsh et al., 2008). Adolescents with high family conflict are more likely to relapse and are less likely to stay in OST programs, according to research (Subramaniam et al., 2006; Winters et al., 2008). The effectiveness of OST can also be diminished by the social stigma associated with addiction and harmful peer pressure, which can further isolate teenagers and encourage substance use (Dakof et al., 2015). Protective family process buffers against substance use in adolescents, even when the environmental risk is higher (Cleveland et al., 2010).

**Legal issue:** The mean rank for the adolescent-onset group was 41.50, while the adult-onset group was 39.50, indicating they are relatively similar. The difference between the two groups was not significant, with an asymptotic value of .579. This suggests that, regarding legal issues, the adolescent-onset group has slightly more problems in this area than the adult-onset group. This finding aligns with McGue et al. (2001), stating that early onset of alcohol use was linked to a higher likelihood of criminal behaviour and legal problems in adulthood. Early substance use combined with higher family dysfunction was likely associated with juvenile justice involvement (Dembo et al., 1992).

**Figure 13:** Bar graph showing the significant findings from the Mann–Whitney U Test between adolescent-onset and adult-onset groups on psychopathological symptoms and functional domains of progress in OST. Only variables with  $p < .05$  are presented.



*Note.* The figure displays domains with statistically significant group differences ( $p < .05$ ) between adolescent-onset and adult-onset participants. Blue bars represent adolescent-onset mean ranks and orange bars represent adult-onset mean ranks. Higher mean ranks indicate greater symptom severity or functional impairment.

**Psychiatric Status:** The results showed that the adolescent-onset group had a mean rank of 40.00, and the adult-onset group had a mean rank of 41.00, indicating that the mean ranks for both groups are similar for psychiatric issues. There was an insignificant difference between the groups in psychiatric status, with an asymptotic  $p$ -value of .747. Earlier studies have substantiated the link between early substance use and an array of psychiatric comorbidities, including mood, anxiety, and behavioural disorders (Swendsen et al.,2012; Brook et al.,2002). The psychiatric comorbidity can affect the adherence to buprenorphine (Litz et al.,2017). This is similar to the finding that comorbidity with psychiatric disorder affects the long-term outcomes of OST and also that new comorbidity during OST interferes with the treatment (Astals et al.,2009). A study on treatment outcomes in Buprenorphine -Naloxone and Methadone

Therapy found that psychiatric comorbidities were associated with the risk of worse treatment outcomes, including higher risk for relapse and non-adherence to the treatment program (Zhu et al., 2021), including higher risk for relapse and non-adherence to the treatment program (Zhu et al., 2021).

A significant relationship was found with the asymptotic values of Somatisation (<.001), Obsessive-compulsive (.008), Interpersonal Sensitivity (.007), Anxiety (0.26), Phobic Anxiety (.010), Paranoid ideation (.008) and Employment (0.44) and family conflict (.001) in the functional domains of progress in OST. Initial age of substance use was not significant, as depicted in Table 7. Figure 13 displays the significant findings from the Mann–Whitney U Test comparing psychopathology and functional domains between adolescent- and adult-onset groups.

The first hypothesis states that there will be a significant difference between adolescent-onset and adult-onset on psychopathological symptoms and functional domains of progress in OST. This hypothesis is accepted, as 6 out of 9 psychopathology parameters are significant, and 2 out of 6 functional domains of progress in OST are significant. Previous studies have found a strong association of psychopathology related to later development of substance use disorder with early substance use initiation (Pardini et al., 2007; Schepis et al., 2017). Early onset of use increases the risk of greater physical and psychiatric comorbidity (Naji et al., 2017).

The relationship between psychopathology and substance use is conditional rather than bidirectional, meaning there are other eminent factors other than psychiatric symptoms and substance use impacting the association between the two (Marsden et al., 2000). Early initiation of substance use is also related to the onset of psychopathology, leading to substance use. When the onset of substance use is late, it is preceded by psychopathology (Cicchetti et al., 1999). These findings suggest that the developmental timing of substance initiation is critical for subsequent psychosocial functioning and rehabilitation potential.

Overall, the key findings show that adolescent-onset opioid users have more extensive and severe psychopathology and worse functional outcomes compared to

adult-onset users. Effect sizes varied from small to large ( $r = 0.23\text{--}0.47$ ), indicating moderate to substantial group differences. Early exposure to opioids during adolescence disrupts neurodevelopmental maturation within prefrontal–limbic circuits, contributing to persistent anxiety, compulsivity, and stress sensitivity (Squeglia et al., 2017). Moreover, the observed family conflict and occupational dysfunction among early-onset users are consistent with the developmental psychopathology model of addiction, which emphasises that early substance use interferes with social role acquisition and emotional competence (Windle, 2016). Although opioid substitution therapy (OST) stabilises biological dependence, residual psychopathology may persist due to pre-existing vulnerabilities and early neuroadaptations (Zaaijer et al., 2016). These findings underscore the need for integrated psychosocial interventions that address both emotional regulation and social reintegration for individuals with adolescent-onset conditions.

**5.7.2 Objective 2:** To evaluate the severity level of drug use on the psychopathological symptoms and functional domains of progress in OST. To determine the relationship, the Mann-Whitney U test was done to meet the objective and second hypothesis of the present study, as shown in Table 9.

**Somatisation:** The results show a mean rank of 35.00 for the low-severity group and 46.00 for the high-severity group. There was a significant difference between the two groups with an asymptotic value of .014, indicating that the high severity in addiction is associated with symptomology of somatisation. Similar to the finding that somatisation is elevated in high severity in substance use in patient treatment (Derogatis et al.,1983). A significant number of patients with opioid use disorder reported somatic symptoms and showed significant improvement over one year in the treatment (Skeie et al.,2008). This finding is similar to previous findings of Aksu (2020), where a high level of somatisation was found in severe opioid users. They also report on inconsistency in causal factors as symptom overlap between depressive and anxiety features, as the level of depression and anxiety increases with the severity of addiction, a high level of somatisation is assigned to the withdrawal symptoms associated with opioid use disorder (Maremmanni et al.,2010). Somatoform is related to over- and underuse of opioids. Higher symptomology of somatisation leads to overuse of opioids, contributing to the severity of addiction. Somatisation is associated with non-adherence to treatment (Trafton et al.,2011). The findings of this study establish that symptomology of somatisation is greater in individuals with higher severity.

**Obsessive Compulsive:** The results indicate a significant difference between the high- and low-severity groups, with an asymptotic p-value of .033. The mean rank for low severity was 36.50 and for high severity was 44.50, indicating a higher level of symptomology of obsessive-compulsive in the high severity group. This finding supports the finding that individuals with high levels of severity exhibit greater levels of obsessional thinking and are more likely to have a compulsive use pattern (Fineberg et al.,2010). Manacebo et al. (2009) found that obsessive-compulsive disorder typically begins before substance use, supporting the self-medication hypothesis,

hence substantiating that comorbidity with OCD is more prevalent when severity is high.

**Interpersonal Sensitivity:** The mean rank for the low severity group was 40.00, and the high severity group had, mean rank of 41.00. There was no significant difference in interpersonal sensitivity between the groups, with an asymptotic value of .763. The mean rank showed that interpersonal sensitivity was slightly higher at the high-severity level. Interpersonal sensitivity is associated with opioid use (Hall et al.,2023) as well as continued substance use (Hassel et al.,2013). Contrary to this finding, researchers have found that interpersonal sensitivity is correlated with greater addiction severity (Crockford et al.,1998).

**Depression:** The level of depression in the low and high severity groups differed, with an asymptotic value of .559, indicating that there is no significant difference in symptomology of Depression. The mean rank for low severity was 39.50 and for high severity was 41.50, indicating that symptomology was slightly higher in the high-severity group. The presence of comorbidity with depression is associated with reduced motivation for treatment, increased dropout rates and a high likelihood of relapse (Nunes et al.,2004).

**Anxiety:** The mean rank for the low severity group was 41.50, and for the high severity group, 39.50, indicating that anxiety symptomology was slightly higher in the high severity group, although the difference between the two groups was insignificant, with an asymptotic value of .579. Among patients receiving OST, anxiety symptoms are very common, and the severity of the underlying addiction frequently affects how severe the symptoms are due to a combination of withdrawal symptoms, psychosocial instability, and biological vulnerability. Patients with high-severity substance use disorders typically report more frequent and severe anxiety symptoms than those with lower severity (Barry et al., 2016). These people may have had multiple unsuccessful treatment attempts, polysubstance dependence, or long-term substance use, which increases psychological distress and impairs coping mechanisms. When this is not addressed through psychiatric care during OST, it increases the risk of relapse,

decreases medication adherence, and compromises treatment retention (Trafton et al., 2006).

**Anger/Hostility:** The mean rank for low-severity groups was 38.00, and the mean rank for high-severity groups was 43.00, indicating that the symptomology of anger and hostility is more prominent in the high-severity group. The results indicate no significant difference between the high- and low-severity groups in the symptomology of anger/hostility, with an asymptotic p-value of .174. Supporting the findings of this study, an earlier study substantiated that polysubstance users had a higher level of aggression, with higher levels of emotional lability, dysphoria, irritability and explosiveness resulting in higher levels of trait anger, anger reaction and anger expression were found in polysubstance users (Rajesh et al., 2005). Individuals using more than one form of illicit substances were significantly more likely to be aggressive due to the complex withdrawal process (Tardiff et al., 1997).

**Phobic Anxiety:** The results indicate that there is no significant difference between the high and low severity groups, with an asymptotic value of .608. The mean rank for the high severity group was 39.50, and the mean rank for the low severity group was 41.50, indicating that the low severity group had more symptomology of phobic anxiety. Phobic anxiety encompasses conditions like social anxiety disorder and specific phobias, which frequently occur with substance use (Kushner et al., 1994). Earlier researches suggest that social anxiety is associated with a lower level of substance use as individuals with low severity in substance use retain more social and occupational functioning, hence amplifying interpersonal fear, public exposure and situational avoidance (Mayer et al., 2003; Steward et al., 2006). Individuals with high severity present more generalised psychiatric disorders. Supporting the findings of this study, Frojd (2011) reports that social phobia is a protective factor for later substance use, which explains a high level of symptomology of phobic anxiety among individuals having low severity in substance use.

**Table 8:** Results showing the Mann-Whitney U test between high severity and low severity groups on psychopathological symptoms and functional domains of progress in OST

| Parameters                | Categories    | Mean rank | Mann - U | Assymp-value | Effect Size (r) |
|---------------------------|---------------|-----------|----------|--------------|-----------------|
| Somatisation              | Low severity  | 35.00     | 580.0    | <b>.014*</b> | 0.273           |
|                           | High severity | 46.00     |          |              |                 |
| Obsessive-compulsive      | Low severity  | 36.50     | 640.0    | .033*        | 0.238           |
|                           | High severity | 44.50     |          |              |                 |
| Interpersonal-sensitivity | Low severity  | 40.00     | 780.0    | .763         | 0.034           |
|                           | High severity | 41.00     |          |              |                 |
| Depression                | Low severity  | 39.50     | 760.0    | .559         | 0.065           |
|                           | High severity | 41.50     |          |              |                 |
| Anxiety                   | Low severity  | 41.50     | 760.0    | .597         | 0.062           |
|                           | High severity | 39.50     |          |              |                 |
| Anger-Hostility           | Low severity  | 38.00     | 700.0    | .174         | 0.152           |
|                           | High severity | 43.00     |          |              |                 |
| Phobic Anxiety            | Low severity  | 39.50     | 760.0    | .608         | 0.057           |
|                           | High severity | 41.50     |          |              |                 |
| Paranoid Ideation         | Low severity  | 38.50     | 720.0    | .287         | 0.119           |
|                           | High severity | 42.50     |          |              |                 |
| Psychoticism              | Low severity  | 39.00     | 740.0    | .292         | 0.118           |
|                           | High severity | 42.00     |          |              |                 |
| Medical Status            | Low Severity  | 38.00     | 700.0    | .079         | 0.197           |
|                           | High Severity | 43.00     |          |              |                 |
| Employment Status         | Low Severity  | 36.00     | 620.0    | <b>.044*</b> | 0.225           |
|                           | High Severity | 45.00     |          |              |                 |
| Alcohol Use               | Low Severity  | 43.00     | 700.0    | .107         | 0.18            |
|                           | High Severity | 38.00     |          |              |                 |
| Family Conflict           | Low Severity  | 35.50     | 600.0    | <b>.023*</b> | 0.254           |
|                           | High Severity | 45.50     |          |              |                 |
| Legal Status              | Low Severity  | 36.50     | 640.0    | <b>.026*</b> | 0.248           |
|                           | High Severity | 44.50     |          |              |                 |
| Psychiatric Status        | Low Severity  | 38.00     | 700.0    | .107         | 0.18            |
|                           | High Severity | 43.00     |          |              |                 |

Note: N= 80;  $p < 0.05^*$ ,  $p < 0.01^{**}$ ; Effect size (r) range - Small ( $< .30$ ), Medium (.30 - .50), Large ( $> .50$ )

**Paranoid Ideation:** The results indicate that the mean ranks for the low- and high-severity groups were 38.50 and 42.50, respectively. This indicated paranoid ideation symptomology was found more in the high severity group, but the difference between the symptomology of the two groups was not significant, with the asymptotic value of .287. Aiding the findings of this study, numerous studies have reported that paranoid ideation is high among severe substance use disorder with polysubstance use and dependence (Zhornitsky et al., 2015; Prodrorno et al., 2016).

**Psychoticism:** The results indicated that the low severity group had a mean rank of 39.00 and the high severity group had a mean rank of 42.00, indicating that the symptomology of psychoticism was slightly higher in high severity groups, although the difference in low and high severity groups was not significant, with an asymptotic value of .292. An epidemiological study reported an increase in psychotic symptoms with an increase in the severity of dependence on various substances. In contrast, individuals with low severity undergoing treatment with Buprenorphine tend to report low symptomology of psychoticism. As buprenorphine acts as a  $\kappa$ -opioid receptor antagonist and a partial  $\mu$ -agonist, modulating dopamine and glutamate circuits, it has an antipsychotic-like effect (Zhornitsky et al., 2015; Shah et al., 2023). Rabinowitz et al. (1998) examined the severity and prevalence of substance use disorders and the onset of psychotic illness among multiple samples. In their study, the severity of substance abuse did not appear to be a pivotal correlate of the onset of psychotic illness.

**Medical status:** The results showed a mean rank of 38.00 for low severity and 43.00 for high severity, suggesting that the medical condition of the low-severity group is better than that of the high-severity group. The asymptotic value of .079 indicated that the difference between the groups was insignificant. The findings of this study support that severe substance use is linked to various health issues, with alcohol linked with liver disease, pancreatitis and cardiovascular damage. Opioid users are associated with respiratory distress, HIV, and stimulants are associated with cardiovascular events and seizures, substantiating that greater medical complications are often associated with higher addiction severity (McLellan et al., 1980). Many studies have established the association of substance use with medical issues, including physical

conditions such as chronic lung diseases, asthma for substance intake through smoking, hepatitis C in injecting drug users and chronic diseases as liver cirrhosis (McLellan et al., 2000; Kouronis et al., 2016). All the diseases develop after a lengthy duration of use, and the severity of addiction does not have a duration of substance use as an indicator of severity. This could be the reason for the study's results.

**Employment Status:** The mean rank for the low-severity group was 35.50, and for the high-severity group, it was 45.50, indicating more employment issues in the high-severity group. The asymptotic value was 0.025, indicating a significant difference in employment status between the two groups. The current literature suggests that substance use increases the risk of unemployment and also decreases the opportunities of being hired (Jorgensen et al., 2019). Crompton et al (2014) reported that high severity in substance use is associated with a higher rate of unemployment, job instability and workplace conflict., Employment post-treatment is associated with treatment completion (Zarkin et al., 2002).

**Alcohol use:** The results indicated that there was no significant difference between the two groups, with an asymptotic value of .107. The low-severity group had a mean rank of 43.00, and the high-severity group had a mean rank of 38.00. indicating that the alcohol use was seen more in low severity. Many studies have reported that even when under treatment for opioid use, the alcohol use pattern doesn't change while in the OST (Soyka et al., 2015). The results can be interpreted as high severity in addiction, most likely to use other substances as preferred over alcohol, as most of the participants of this study were polysubstance users. Severity in addiction has been linked to dropping out early from treatment. Severity is negatively associated with 6-month retention in OST with comorbidities with psychopathology (Otiashvili et al., 2013).

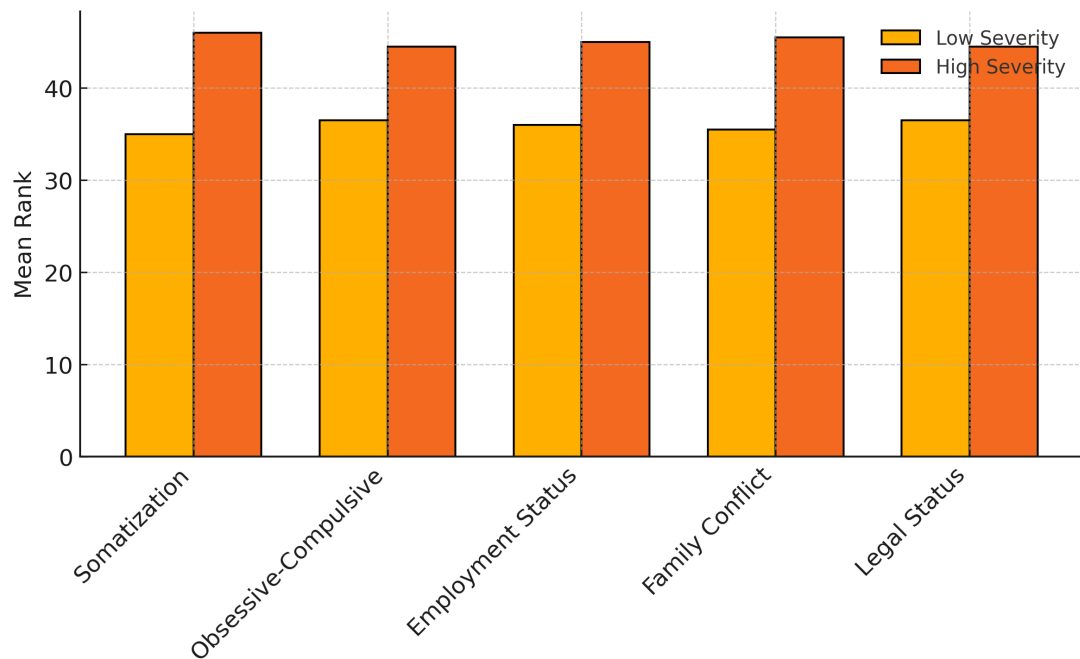
**Family/Social Conflict:** The low-severity group had a mean rank of 35.50, and the high-severity group had a mean rank of 45.50, indicating greater family conflict in the higher-severity group. There is a significant difference in the domain of family conflict between the two groups, with an asymptotic value of .025. Individuals with high severity in substance use are most likely to have frequent social conflict and

greater interpersonal dysfunction (Kelley et al., 2015). The level of substance consumption is associated with the type of interaction, and high consumption is associated with a negative interaction pattern (Jacob et al., 2001). Families of high-severity users often experience co-addiction, enabling behaviour and emotional exhaustion, which complicate treatment (Orford et al., 2005).

**Legal issues:** the mean rank for high severity was 44.50, and for low severity, 36.50, indicating more legal issues in the high-severity group. There is a significant difference in the legal issues between the two groups, with an asymptotic p-value of .026. The result is similar to the finding that individuals with a low level of severity are less likely to be involved in the treatment program unless they are involved in the criminal justice system (Carbollo et al., 2007). Another study found the association with drug use and crime 64% of drug users have legal issues, and half of them have been to prison (Orum, 2020).

**Psychiatric Status:** The results showed no significant difference between the high- and low-severity groups in psychiatric status, with an asymptotic value of .107. The mean rank for the high-severity group was 43.0, and the mean rank for the low-severity group was 38.00. Numerous studies have found that substance use is associated with numerous psychiatric issues, which include major depressive disorder, anxiety disorder, ADHD, Personality disorder, psychotic disorder, etc. (Kendel et al., 1993; Pardini et al., 2007; Marsden et al., 2000). This result could indicate the use of buprenorphine and its effects on psychiatric illness, such as depression, anxiety and psychotic illness (Kosten et al., 1993), as the participants of this study were under treatment for more than three months.

**Figure 14:** Bar graph showing the significant findings from the Mann–Whitney U Test between low-severity and high-severity groups on psychopathology parameters and functional domains of progress in OST



*Note. The figure displays domains with statistically significant group differences ( $p < .05$ ) between high-severity and low-severity groups. Yellow bars represent high-severity mean ranks and orange bars represent low-severity mean ranks. Higher mean ranks indicate greater symptom severity or functional impairment.*

Figure 14 shows significant differences in Somatisation, Obsessive Compulsive, Employment Status, Family Conflict, and Legal Status domains. Participants with high severity reported significantly higher somatisation symptoms, indicating greater physical distress associated with substance use severity. Similarly, those with higher severity also exhibited greater family conflict ( $U = 600.00, p = .023, r = .25$ ) and legal problems ( $U = 640.00, p = .026, r = .25$ ), suggesting that the severity of substance involvement is associated with more pronounced interpersonal and legal difficulties. Additionally, employment status differed significantly between groups ( $U = 620.00, p = .044, r = .23$ ), with high-severity participants experiencing more employment-related impairments. No significant differences were found across other psychopathological domains such as depression, anxiety, phobic anxiety,

or psychoticism, implying that these symptoms were comparably distributed among participants regardless of severity level.

The second hypothesis, which states that there will be a significant difference between high severity and low severity of drug use on psychopathological symptoms and functional domains of progress in OST, is accepted as 2 out of 9 psychopathology parameters and 3 out of 6 functional domains of progress in OST are found to be statistically significant. Individuals with high severity reported significantly greater somatisation and obsessive–compulsive symptoms, indicating that higher substance involvement is associated with increased physical and cognitive manifestations of psychological distress. This pattern supports the view that as substance use becomes more severe, the interconnection between physiological and psychological processes strengthens, often resulting in heightened bodily symptoms of distress and compulsive thought patterns (Khantzian, 1997; Chen et al., 2011). These findings align with the self-medication hypothesis, which proposes that individuals with higher psychopathological vulnerability engage in more severe substance use as a maladaptive strategy to manage internal distress (Khantzian, 2012). The elevated obsessive–compulsive tendencies observed among high-severity users may also reflect difficulties with impulse control, cognitive rigidity, and maladaptive coping mechanisms - features often observed in chronic opioid dependence (Zaaijer et al., 2016).

The significant differences in employment status, family conflict, and legal status suggest that greater substance use severity is associated with increased social and occupational dysfunction. High-severity individuals exhibited poorer work outcomes and more relational disturbances, which may stem from cumulative psychosocial stressors, loss of social support, and behavioural instability associated with chronic addiction (Darke et al., 2007). Elevated legal problems among high-severity users further reflect the social consequences of escalated substance use, including greater involvement in illegal activities, reduced self-regulation, and social marginalisation (Brooner et al., 1997). These findings underscore the pervasive functional toll of severe substance use, extending beyond psychological distress to impact social, occupational, and legal domains.

The effect size ( $r$ ) for differences in the severity level of psychopathological symptoms and functional domains of progress in OST ranged from **0.23 to 0.27**, corresponding to small to moderate effects (Cohen, 1988). These findings suggest that, although statistically significant, the magnitude of these effects is modest. This indicates that while severity exerts a measurable influence, other contextual or developmental factors (e.g., age of onset, trauma exposure, or treatment duration) may further moderate these relationships (Windle, 2016). Thus, interventions for individuals with high-severity opioid use should incorporate multimodal approaches that target both psychopathological symptoms and social functioning.

**5.7.3 Objective 3:** To study the correlation between the onset age of substance use, severity level, psychopathological symptoms and progress in the functional domain of OST. To meet this objective, Spearman's rank-order correlation was used to see the correlation among all the variables. Table 11 presents the Spearman correlation.

**Somatisation:** The results demonstrated that somatisation had a significant positive relationship with Obsessive Compulsive( $rs=0.29, p<.05$ ), Interpersonal Relationship( $rs=0.30, p<0.01$ ), Depression( $rs=0.32, p<.0.01$ ), Anxiety( $rs=0.43, p<.001$ ), Anger/Hostility( $rs=0.38, p<.001$ ), Phobic Anxiety( $rs=0.27, p<0.05$ ), Paranoid Ideation ( $rs=0.35, p<0.05$ ), Psychoticism( $rs=0.35, p<0.05$ ), Employment status ( $rs=0.22, p<0.05$ ) Family Conflict ( $rs=0.24, p<0.05$ ), and Severity level ( $rs=0.28, p<0.05$ ). Further findings revealed a significant negative correlation with Onset Age ( $rs = -0.48, p < 0.01$ ). The results of the study are similar to the findings of Jomehpour et al (2022), where a high correlation was found between somatisation, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, phobic anxiety, paranoid ideation, psychoticism, to duration of dependency among individuals under Methadone Maintenance Treatment (MMT). A Ukrainian study to establish predictors of psychopathy in individuals undergoing treatment and the analysis of correlation between psychopathological symptoms formed six symptoms, which included anxious-obsessive syndrome, obsessively sensitive syndrome, depressively-sensitive syndrome, depressive dysphoric syndrome, paranoically dysphoric syndrome and anxious paranoic syndrome. (Gorodokin, 2019). Somatisation leads to occupational and functional impairment; their ability to work is hindered by poor performance,

difficulty completing tasks, and increased absenteeism, resulting in financial loss. (De Waal et al.,2004). Increased somatisation reduced participation in social activities, severely affecting the ability to form and maintain relationships, thereby increasing family dysfunction and social conflict (Iheme et al., 2014). In a recent study (van der Heijden et al.,2024), an attempt was made to understand the relation with somatisation and early onset of psychosis, where it was established that somatisation precedes the onset of psychosis. Increased somatic symptoms and heightened bodily preoccupation cause high functional impairment (APA, 2022). The current study findings corroborate the recent research in the same area. As shown in Table 11, somatisation shows a significant negative correlation with onset age, indicating that early onset is associated with higher somatisation. Individuals with an early onset of substance use experience higher levels of somatisation, such as fatigue, pain, and gastrointestinal issues, due to psychological distress (Deas et al.,2002) and can be the predictor of other psychopathology, such as depression with its somatic manifestation (Wu et al., 2004).

**Obsessive Compulsive** symptomology had a significant negative relationship with Onset Age( $rs=-0.30, p<0.01$ ).A significant positive relationship with Severity Level( $rs=0.24, p<0.05$ )Interpersonal Sensitivity( $rs=0.57, p<0.01$ ),Depression( $rs=0.38, p<0.01$ ),Anxiety( $rs=0.40, p<0.01$ ),Anger/Hostility( $rs=0.31, p<0.01$ ),PhobicAnxiety ( $rs=0.31, p<0.01$ ),Paranoid Ideation( $rs=0.36, p<0.01$ ),Psychoticism ( $rs=.38, p<0.01$ ), Employment Status( $rs=0.22, p<0.05$ ),Family Conflict ( $rs=0.35, p<0.01$ ).The results indicate that there is high symptomology of obsessive-compulsive disorder when the substance use begins at an earlier age. In an epidemiological study in Britain, it was found that obsessive-compulsive disorder was 4 times more common in men with substance use disorder than in women with substance use disorder (Torres et al.,2006). Earlier research has reported similar findings where obsessive-compulsive disorder has been found more in individuals with a lower onset age and had co-occurring psychopathology of anxiety and depression (Zilberman et al.,2003). The co-occurrence of obsessive-compulsive symptoms with psychosis is well documented, and this concept led to the subtype schizo-obsessive (Poyurovsky et al.,2013). The causal factors include stressful events and substance use (van Os et al., 2010).

The correlation between family conflict with obsessive-compulsive symptomology reveals that an individual with elevated obsessive-compulsive symptomology was also prone to more family conflict, likely due to interpersonal conflict as depicted in this study, earlier research has stated that obsessive-compulsive behaviour such as rigidity, excessive control or repetitive behaviour likely increase conflict and tension among family members due to family accommodation (Lebowitz et al., 2012). An individual with intense obsessive-compulsive symptomology has problems with fulfilling his duties on time and decreasing productivity, and hampering social relationships (Huppert et al., 2009; Patel et al., 2023).

**Interpersonal Sensitivity** had a significant negative correlation with Onset Age ( $rs=-0.30, p<0.01$ ) and significant positive correlation with Depression ( $rs=0.51, p<0.01$ ), Anxiety ( $rs=0.46, p<0.01$ ), Anger/Hostility ( $rs=0.35, p<0.01$ ), Phobic Anxiety ( $rs=0.45, p<0.01$ ), Paranoid Ideation ( $rs=0.25, p<0.01$ ), Psychoticism ( $rs=0.49, p<0.01$ ), Psychiatric status ( $rs=0.34, p<0.01$ ) signifies that the participants with high interpersonal sensitivity also had greater psychological distress as they are more prone to interpersonal rejection sensitivity, feelings of being judged and misunderstood or ridiculed (Park et al., 1992). They tend to lack in expression of negative emotion, such as anger, due to fear of rejection (Harb et al., 2002), contributing to the fragile inner self and separation anxiety and over time, this heightened vigilance contributes to their feeling of suspiciousness and psychotic like state (Garety et al., 2001; Masillo et al., 2019). This corroborates the finding that the onset age of substance use is lower, the greater the symptomology of interpersonal sensitivity.

**Depression** had a positive relationship with Anxiety ( $rs=0.67, p<0.01$ ), Anger/Hostility ( $rs=0.40, p<0.01$ ), Phobic Anxiety ( $rs=0.27, p<0.01$ ), Paranoid ideation ( $rs=0.30, p<0.01$ ), Psychoticism ( $rs=0.46, p<0.01$ ), and Employment Status ( $rs=0.19, p<0.01$ ). This finding substantiates the previous evidence of depression accompanied by anger and hostility, and elevated anxiety and avoidance or withdrawal from social exposure (Deschne et al., 2015). The emotional process influences the delusional belief (Freeman et al., 2000). Earlier studies have established that depression

is the leading contributor to reduced functionality, work productivity, absenteeism and occupational impairment (Kessler et al., 2005).

**Anxiety** had a significant negative correlation with Onset Age ( $r_s = -0.25, p < 0.05$ ) and significant positive relationships with Anger/Hostility ( $r_s = 0.50, p < 0.01$ ), Phobic Anxiety ( $r_s = 0.43, p < 0.01$ ), Paranoid ideation ( $r_s = 0.40, p < 0.01$ ), Psychoticism ( $r_s = 0.61, p < 0.01$ ) This signifies that Anxiety symptoms are associated with hypervigilance, interpreting ambiguous situations as threatening and ambiguous intent as hostile (Deschneis et al., 2015). The negative correlation between onset age and anxiety is in line with a previous study by Marmorstein et al. (2010), where it was substantiated that anxiety is a predictor of substance use and later substance use disorder.

**Anger/Hostility** had a significant positive correlation with Paranoid Ideation ( $r_s = 0.23, p < 0.05$ ) and Psychoticism ( $r_s = 0.49, p < 0.01$ ). This finding substantiates that anger /hostility is linked to paranoid ideation, with a threat-perceiving thought process and psychotic like experiences (Freeman et al., 2000). Individuals with high paranoid ideation are more likely to perceive others as threatening and with suspiciousness and show defensive aggression; likewise, psychoticism likely leads to misinterpretation of reality and increased emotional dysregulation, triggering aggressive responses (Bjorkly, 2002).

**Phobic Anxiety** had a significant negative correlation with Onset Age ( $r_s = -0.29, p < 0.01$  and Alcohol use ( $r_s = -0.23, p < 0.05$ ). A significant positive correlation with Paranoid Ideation ( $r_s = 0.50, p < 0.01$ ), Psychoticism ( $r_s = 0.25, p < 0.01$ ), Psychiatric Status ( $r_s = 0.23, p < 0.01$ ) and a This signifies that Phobic anxiety affects the cognitive process” loss of control,” leading to unusual fear or increased suspiciousness (Schutters et al., 2012).

The negative correlation between alcohol use and onset age indicates that the more alcohol is used, the fewer symptoms of phobic anxiety, and the earlier the use of substances starts in one’s life, the higher the symptomology of phobic anxiety. This

finding is in tune with previous findings of the “self-medication hypothesis “that the effect of alcohol use decreases inhibition and helps in coping with anxiety (Khantzian,1997). Early study has established that early substance use is a risk factor for phobic anxiety, which includes social phobia and situational avoidance (Goodwin et al.,2004).

**Paranoid ideation** had a significant negative correlation with Onset age ( $r_s = -0.30$ ,  $p < 0.01$ ) and a significant positive correlation with psychoticism ( $r_s = 0.30$ ,  $p < 0.01$ ) and employment status ( $r_s = 0.22$ ,  $p < 0.05$ ). This result is consistent with earlier findings of paranoid ideation being a common feature in psychotic episodes; individuals with high paranoid ideation are more likely to perceive others as threatening and with suspicion (Freeman et al.,2000). The employment status of an individual suffers when the paranoid ideation is high due to a decrease in functioning and absenteeism from work (Kessler et al.,2005). As per onset age, the negative correlation signifies that the lower the onset age of substance use, the higher the symptomology of paranoid ideation. This finding is corroborated by previous evidence of paranoid ideation and psychotic-like symptoms as a risk factor in individuals with early onset of substance use (Kuepper et al., 2011).

**Medical status** had a significant positive correlation with psychiatric status ( $r_s = .547$ ,  $p < 0.01$ ) and a significant negative correlation with employment status ( $r_s = -.25$ ,  $p < 0.05$ ). This supports the earlier finding that medical problems lead to reduced productivity at work and absenteeism, affecting an individual’s capacity to be employed and stay employed. (Compton et al.,2007).

**Employment status** showed a significant negative correlation with onset age ( $r = -0.25$ ,  $p < 0.01$ ). and a significant positive correlation with severity level ( $r_s = .25$ ,  $p < 0.01$ ). The findings suggest that a lower onset age is associated with greater employment problems, while greater severity is associated with more employment problems. This supports the earlier finding that the earlier onset of substance use interferes with completing education, which hampers employment status (Henkel, 2011). Early substance use is linked to lower educational achievement, occupational

status, and income, as established in an observational twin study (Bufquin et al., 2021). Education level is associated with substance use and with past employment status, unemployment, and loss of employment; self-employment was also associated with substance use (Kiarie, 2021). Severity of addiction is associated with long-term unemployment (Lindner et al., 2024).

**Legal status** had a significant correlation with severity level ( $r_s = .25, p < .01$ ). This suggests that the higher the severity level of substance use, the greater the likelihood of legal issues. This supports earlier studies that have found a strong association between severity in substance use and juvenile offending (Mulvey et al., 2010). Severity in addiction is a risk factor for risky behaviour (Tilson et al., 2018). Bada et al. (2022) found a positive correlation between substance use and delinquent behaviour. Similarly, a high level of severity was found in probationers (Yucel et al., 2023).

**Family conflict** status showed a significant negative correlation with age of onset ( $r_s = -0.36, p < 0.01$ ) and a positive correlation with severity level ( $r_s = .26, p < 0.05$ ). The findings suggest that higher severity levels are associated with increased family conflict, similar to Zeng et al. (2021), who found that higher addiction severity was negatively associated with family function, which increased relapse tendency. This is in line with earlier theories on the role of family in substance use, including family system theory, which identifies that adolescent substance use is not just an individual problem but also a family system issue, such as conflict between parents and adolescents (Baumrind et al., 1987; Hall, 1987).. The negative, significant correlation suggests that the younger the age of onset, the greater the family conflict. Parental conflict between a parent and an adolescent has been found to be a predictor of addictive behaviour (Amani et al., 2025).

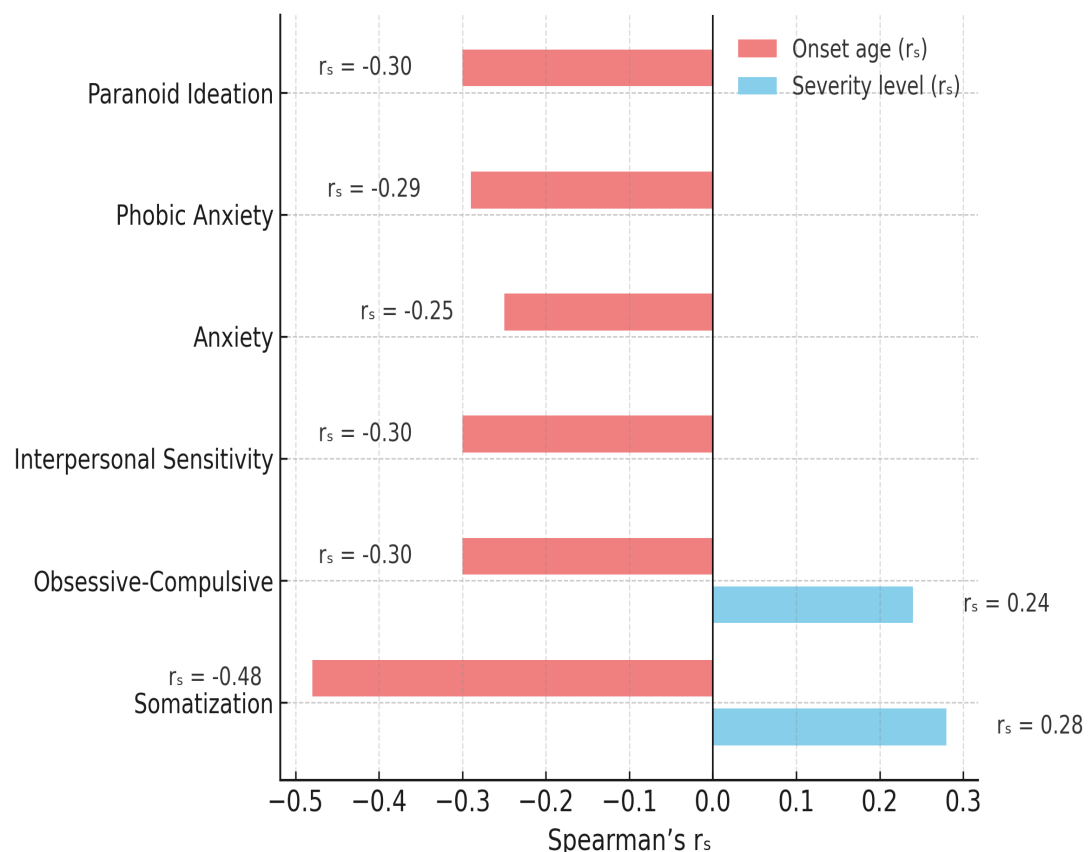
**Table 9:** Table Showing Spearman rho correlation between variables

| Variable                          | 1 | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   |
|-----------------------------------|---|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|
| <b>1.Somatization</b>             | 1 | *   | **  | **  | **  | **  | *   | **  | **  |      | *    |      |      | *    |      | **   | *    |
| <b>2. Obsessive compulsive</b>    |   | .29 | .30 | .32 | .43 | .38 | .27 | .35 | .35 | .03  | .22  | -.05 | .11  | .24  | -.05 | -.48 | .28  |
| <b>3. Interpersonal Relation</b>  |   |     | **  | **  | **  | **  | **  | **  | **  |      | *    |      |      | **   |      | **   | *    |
|                                   |   |     | .57 | .38 | .40 | .31 | .31 | .36 | .38 | -.10 | .22  | -.13 | .03  | .35  | .13  | -.30 | .24  |
|                                   |   |     |     | **  | **  | **  | **  | **  | **  |      |      |      |      |      |      | **   |      |
| <b>4. Depression</b>              |   |     | 1   | .51 | .46 | .35 | .45 | .25 | .49 | -.05 | .17  | -.18 | -.14 | .19  | .12  | -.30 | .03  |
|                                   |   |     |     | 1   | **  | **  | **  | **  | **  |      | *    |      |      |      |      |      |      |
| <b>5. Anxiety</b>                 |   |     |     |     | .67 | .40 | .27 | .30 | .46 | -.16 | .19  | -.09 | .02  | .09  | -.09 | -.20 | .07  |
|                                   |   |     |     |     | 1   | **  | **  | **  | **  |      |      |      |      |      |      | *    |      |
| <b>6. Anger/Hostility</b>         |   |     |     |     |     | .50 | .43 | .40 | .61 | -.08 | -.05 | -.11 | -.16 | .10  | -.02 | -.25 | -.06 |
|                                   |   |     |     |     |     | 1   |     | *   | **  |      |      |      |      |      |      |      |      |
| <b>7. Phobic Anxiety</b>          |   |     |     |     |     |     | .19 | .23 | .49 | .01  | .01  | -.12 | .12  | .14  | .06  | -.03 | .15  |
|                                   |   |     |     |     |     |     | 1   | **  | **  |      |      | *    |      |      |      | **   |      |
| <b>8. Paranoid Ideation</b>       |   |     |     |     |     |     |     | .50 | .25 | -.11 | .08  | -.23 | .11  | .12  | .11  | -.29 | -.06 |
|                                   |   |     |     |     |     |     |     | 1   | **  |      | *    |      |      |      |      | **   |      |
| <b>9. Psychoticism</b>            |   |     |     |     |     |     |     |     | .38 | -.10 | .22  | -.22 | .03  | .11  | -.04 | -.30 | .12  |
|                                   |   |     |     |     |     |     |     |     | 1   |      |      |      |      |      |      |      |      |
| <b>10. Medical Status</b>         |   |     |     |     |     |     |     |     |     | .12  | .14  | -.14 | .02  | .03  | -.03 | -.04 | .12  |
|                                   |   |     |     |     |     |     |     |     |     | 1    | *    |      |      |      | **   |      |      |
| <b>11. Employment status</b>      |   |     |     |     |     |     |     |     |     |      | -.25 | -.03 | -.08 | -.05 | .547 | .12  | .20  |
|                                   |   |     |     |     |     |     |     |     |     |      |      |      |      |      |      | *    | *    |
| <b>12. Alcohol Use status</b>     |   |     |     |     |     |     |     |     |     |      | 1    | .05  | .05  | .08  | -.10 | -.25 | .25  |
|                                   |   |     |     |     |     |     |     |     |     |      |      | 1    | -.11 | .04  | -.16 | .11  | -.18 |
| <b>13. Legal status</b>           |   |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      | .*   |
|                                   |   |     |     |     |     |     |     |     |     |      |      |      | 1    | .17  | -.02 | -.06 | .25  |
| <b>14. Family Conflict status</b> |   |     |     |     |     |     |     |     |     |      |      |      |      |      |      | **   | *    |
|                                   |   |     |     |     |     |     |     |     |     |      |      |      |      | 1    | .12  | -.36 | .26  |
| <b>15. Psychiatric status</b>     |   |     |     |     |     |     |     |     |     |      |      |      |      |      |      | *    |      |
|                                   |   |     |     |     |     |     |     |     |     |      |      |      |      |      | 1    | .04  | .18  |
| <b>16. Onset Age</b>              |   |     |     |     |     |     |     |     |     |      |      |      |      |      |      | 1    | .00  |
| <b>17 Severity Level</b>          |   |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      | 1    |

Note: N= 80;  $p < 0.05^*$ ,  $p < 0.01^{**}$

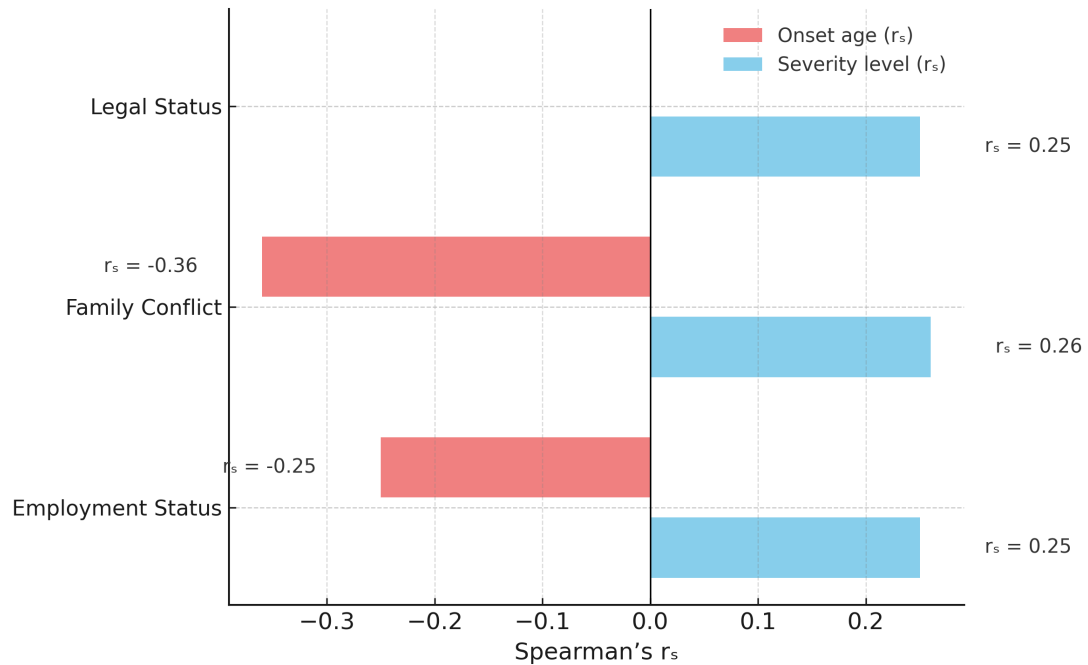
**Psychiatric status:** A statistically significant but weak positive correlation was found between onset age and psychiatric status ( $\rho = .04$ ,  $p < .05$ ), indicating that later onset of substance use was slightly associated with poorer psychiatric outcomes. The correlation between severity level and psychiatric status ( $\rho = .18$ ) was positive but not statistically significant, suggesting that while higher severity might relate to greater psychiatric disturbance, this association was not consistent in the sample. The non-significant correlation between severity and psychiatric status may also reflect the stabilising effect of opioid substitution therapy, which has been linked to reductions in depressive and anxiety symptoms.

**Figure 15:** Significant correlations between psychopathological symptoms and Onset Age/Severity Level



*Note.* Bars represent Spearman correlation coefficients ( $r$ ) for significant associations ( $p < .05$ ). Positive values indicate that higher symptom severity is associated with greater severity level or later onset age. In contrast, negative values indicate that earlier onset is associated with greater symptom severity

**Figure 16:** Significant correlations between functional domains of progress in OST and Onset Age/Severity Level



*Note. Bars represent Spearman correlation coefficients ( $r$ ) for significant associations ( $p < .05$ ). Negative values indicate that earlier onset is associated with greater impairment. In contrast, positive values indicate that higher severity is associated with worse functional outcomes.*

Figure 15 shows the significant negative correlation between onset age and somatisation, paranoid ideation, interpersonal sensitivity, obsessive-compulsive, phobic anxiety, anxiety, and depression, which means that the lower the age of onset the higher the symptomology of all the significant parameters of psychopathology. Figure 15 also shows a negative correlation between severity level and anxiety and phobic anxiety, indicating that the lower the severity, the higher the symptomology of phobic anxiety and anxiety. The significant positive correlation between severity level and depression, psychoticism, paranoid ideation, anger/hostility, obsessive-compulsive, and somatisation is also revealed, corresponding to higher severity, the higher the symptomology.

Figure 16 shows a significant negative correlation between onset age and progress in functional domains in OST. A significant negative correlation exists between onset age and family conflict, legal status, and employment status, indicating

that earlier onset is associated with greater dysfunction. Furthermore, findings reveal a positive correlation between severity level and family conflict, suggesting that higher severity levels are associated with increased dysfunction in this domain. Therefore, the third hypothesis, which states that there will be a significant positive correlation between “onset age of substance use”, the “severity level of drug use”, “psychopathological symptoms” and “functional domains of progress in OST”, is accepted. Onset age showed significant negative correlations with 6 of the 9 psychopathology parameters, while the severity level of drug use was positively correlated with 2 of those psychopathology parameters. Regarding progress in functional domains of OST, a significant negative correlation was identified in 2 of 6 domains with age at onset, and a positive correlation was observed in 3 of 6 domains with the severity level of drug use.

**5.7.4 Objective 4:** To study the impact of onset age and severity level of substance use on psychopathological symptoms and the functional domain of progress in OST. A Kruskal–Wallis H test was conducted to examine the interaction effects between onset age and severity level groups on psychopathological symptoms and functional domains of progress in OST. The nonparametric test was chosen because several dependent variables were not normally distributed. The results revealed significant differences across interaction groups for several domains, indicating that the combined influence of early onset and higher severity of opioid use significantly affects certain psychopathological and functional outcomes.

**Somatisation:** Results showed that in the four onset–severity interaction groups, adolescent/low severity group had a mean rank of 44.00; adolescent/high severity group had a mean rank of 56.00; adult/low severity group had a mean rank of 26; and adult/high severity group had a mean rank of 36.00. The Kruskal-Wallis value was  $H(3) = 23.86, p < .001$  with effect size  $\eta^2 = .14$ . The large effect size indicates a substantial difference between the four groups. Participants with early onset and high severity of opioid use reported higher somatic symptoms, suggesting greater psychosomatic distress and body-related manifestations of psychological strain. Earlier studies have established that patients with heroin addiction had severe

addiction and displayed more somatisation symptoms (Aksu et al.,2000). Individuals under buprenorphine-naloxone treatment experience withdrawal symptoms, manifested as somatic complaints due to dose reduction in the treatment (Maremmanni et al.,2010), which might increase the manifestation of the somatic symptomology, as all the participants were under OST. Although the increased use of substances increases somatic symptoms (Tien et al.,1998), the increased duration with early onset of substance use is significant in having more somatic symptoms (Jomehpour et al.,2022), which confirms that earlier onset and severity level of substance use manifests more somatisation symptomology. There is improvement in the somatic symptoms when under opioid maintenance therapy (Skeie et al., 2008).

**Obsessive compulsive:** Significant differences were also found for obsessive–compulsive symptoms,  $H(3) = 12.74$ ,  $p = .005$ ,  $\eta^2 = .20$  (large effect). The adolescent/high-severity group again showed the highest mean rank (51.50), indicating more frequent obsessive thoughts and compulsive behaviours compared to adult/low-severity users (33.50). These findings suggest greater cognitive rigidity and anxiety-linked repetitive behaviours in those exposed to opioids earlier and at higher severity, consistent with the view that chronic substance exposure amplifies compulsive response patterns (Fineberg et al., 2010). This current finding is backed by a previous study by Bakken et al. (2004), which established that individual with an early onset of substance use has more symptoms of obsessive-compulsive disorder. Studies done to establish a relationship between substance use and OCD concluded with the finding that obsessive-compulsive symptoms start with anxiety, and for harm avoidance, substance use starts and gradually evolves into more habitual responses leading to the progression of illness as Individuals with OCD showed a high level of impulsivity (Kashyap et al., 2012). Impaired reward and punishment processing in the ventral striatum is linked to this self-defeating, repetitive behaviour. There is behavioural and cognitive inflexibility associated with OCD (Figuee et al., 2015), leading to maladaptive obsessive-compulsive behaviours such as substance use and high resistance to seeking treatment (Fontenelle et al., 2011).

**Interpersonal Sensitivity:** Differences in interpersonal sensitivity were not statistically significant,  $H(3) = 7.53, p = .057, \eta^2 = .12$ . Although not reaching significance, the trend indicates that adolescent/high-severity users (mean rank = 46.00) tend to perceive greater interpersonal criticism or inferiority than adult/low-severity users (36.00). These patterns may reflect heightened interpersonal insecurity among early-onset individuals, potentially shaped by stigma and attachment disruptions. The earlier the substance use starts, the more likely an individual is to have a fear of rejection, fear of being ridiculed, and fear of being judged, which decreases (Parke et al. 1992) and can be influenced by an adverse childhood environment (Grant et al. 2001). The lack of significance in severity levels might be due to emotional numbing, detachment, or social withdrawal, as their focus increasingly shifts to obtaining substances, leading to a decrease in reporting interpersonal sensitivity (Khantzian et al. 1997; Weiss et al. 1992).

**Depression,** no significant group differences were observed for depressive symptoms,  $H(3) = 3.76, p = .288, \eta^2 = .06$ . The mean rank for Depression for both adolescent onset high and low severity was 43.50, suggesting that irrespective of severity level, adolescent onset would have more of this symptomology. The insignificant finding may be due to the antidepressant quality of buprenorphine. This suggests that depressive mood is a common feature among individuals with opioid use disorder, regardless of age of onset or severity, aligning with findings by Volkow et al. (2016) indicating high baseline dysphoria across opioid-using populations. Depression has been associated with substance use (Swendsen et al., 2000); studies suggest a 16 to 59% prevalence of depressive symptoms in this population. Some studies (Merikangas et al., 1990; Davidson et al., 1995) suggest that depressive symptoms may remit after 2 to 4 weeks of detoxification. Schuckit et al. (1995) concluded that the primary and secondary diagnoses of depression might be key to understanding this. They stated that when depression is a secondary diagnosis, remission occurs when the patient is treated for substance use, but when depression is a primary diagnosis, it tends to persist alongside the severity of addiction. In this study, participants have been under treatment for 3 months, which explains these results.

**Anxiety** levels differed significantly among groups,  $H(3) = 8.02, p = .046, \eta^2 = .13$  (medium effect). The highest anxiety was reported among adolescent/low-severity users (mean rank = 48.50), suggesting that early exposure itself—not only severity—contributes to heightened anxiety sensitivity. This supports the developmental psychopathology perspective that early substance exposure primes the stress-response system and leads to chronic anxiety vulnerability (Clark et al., 2008). Young adolescents with excessive timidity or inhibited behaviour have a higher risk of developing SUDs (Vorspan et al., 2015). The cognitive structure of catastrophizing is associated with substance dependence (Martins et al., 2012; Martel et al., 2013). Researchers also suggest that treating comorbid anxiety can potentially prevent 40% transitions from abuse to dependence (Swendsen et al., 2012).

**Anger Hostility**, no significant differences were found across groups,  $H(3) = 5.53, p = .137, \eta^2 = .09$ . Mean ranks were relatively uniform, indicating that anger and irritability are common among opioid users, likely reflecting generalized frustration and withdrawal-related emotional instability rather than group-specific differences. Contrary to this finding, numerous studies have reported high levels of anger-hostility among SUDs (Bácskai et al., 2011; Laitano et al., 2022). This could be attributed to anger being predictive of drug use (Baharvand et al., 2019). Anger can also be experienced as a symptom of craving (Legrand et al., 2020). Laitano et al. (2022) reported that anger intensity was independent of age and abstinence duration. The literature also suggests that anger responses decrease with age due to reduced neurophysiological reactivity (Tivis et al., 1998).

**Table 10:** Mean Ranks and Kruskal–Wallis H Test Results Between Onset Age (Adolescent & Adult) and Severity Level (High & Low) on Psychopathological and Functional Domains of Progress in OST

| Parameter                        | Group                      | Mean Rank | H      | df | P       | Effect Size ( $\eta^2$ ) |
|----------------------------------|----------------------------|-----------|--------|----|---------|--------------------------|
| <b>Somatization</b>              | Adolescent / low severity  | 44.00     | 23.863 | 3  | <.001** | 0.37                     |
|                                  | Adolescent / high severity | 56.00     |        |    |         |                          |
|                                  | Adult /low severity        | 26.00     |        |    |         |                          |
|                                  | Adult /high severity       | 36.00     |        |    |         |                          |
| <b>Obsessive-Compulsive</b>      | Adolescent / low severity  | 39.50     | 12.742 | 3  | .005*   | 0.20                     |
|                                  | Adolescent / high severity | 51.50     |        |    |         |                          |
|                                  | Adult /low severity        | 33.50     |        |    |         |                          |
|                                  | Adult /high severity       | 37.50     |        |    |         |                          |
| <b>Interpersonal Sensitivity</b> | Adolescent / low severity  | 44.00     | 7.528  | 3  | .057    | 0.12                     |
|                                  | Adolescent / high severity | 46.00     |        |    |         |                          |
|                                  | Adult /low severity        | 36.00     |        |    |         |                          |
|                                  | Adult /high severity       | 36.00     |        |    |         |                          |
| <b>Depression</b>                | Adolescent / low severity  | 43.50     | 3.762  | 3  | .288    | 0.06                     |
|                                  | Adolescent / high severity | 43.50     |        |    |         |                          |
|                                  | Adult /low severity        | 35.50     |        |    |         |                          |
|                                  | Adult /high severity       | 39.50     |        |    |         |                          |
| <b>Anxiety</b>                   | Adolescent / low severity  | 48.50     | 8.023  | 3  | .046*   | 0.13                     |
|                                  | Adolescent / high severity | 40.50     |        |    |         |                          |
|                                  | Adult /low severity        | 34.50     |        |    |         |                          |
|                                  | Adult /high severity       | 38.50     |        |    |         |                          |
| <b>Anger/Hostility</b>           | Adolescent / low severity  | 42.00     | 5.532  | 3  | .137    | 0.09                     |
|                                  | Adolescent / high severity | 40.00     |        |    |         |                          |
|                                  | Adult /low severity        | 34.00     |        |    |         |                          |
|                                  | Adult /high severity       | 46.00     |        |    |         |                          |
| <b>Phobic Anxiety</b>            | Adolescent / low severity  | 48.50     | 7.900  | 3  | .048*   | 0.13                     |
|                                  | Adolescent / high severity | 42.50     |        |    |         |                          |
|                                  | Adult /low severity        | 34.50     |        |    |         |                          |
|                                  | Adult /high severity       | 36.50     |        |    |         |                          |
| <b>Paranoid Ideation</b>         | Adolescent / low severity  | 43.50     | 8.211  | 3  | .042*   | 0.14                     |
|                                  | Adolescent / high severity | 47.50     |        |    |         |                          |
|                                  | Adult /low severity        | 33.50     |        |    |         |                          |
|                                  | Adult /high severity       | 37.50     |        |    |         |                          |
| <b>Psychoticism</b>              | Adolescent / low severity  | 40.00     | 1.360  | 3  | .715    | 0.02                     |
|                                  | Adolescent / high severity | 42.00     |        |    |         |                          |

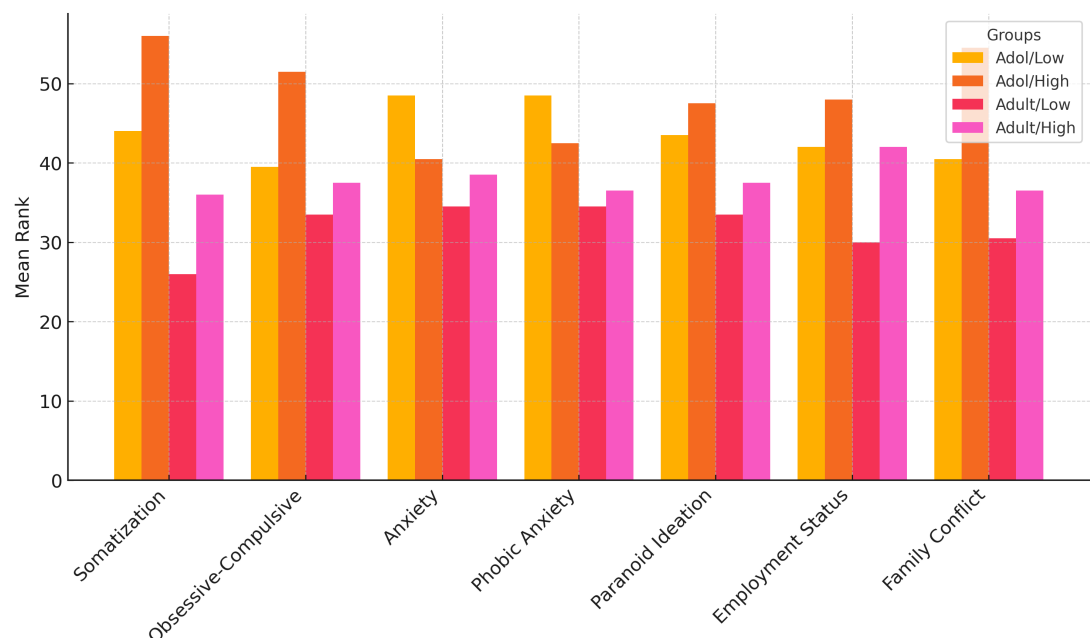
|                           |                            |       |        |   |               |      |
|---------------------------|----------------------------|-------|--------|---|---------------|------|
| <b>Medical Status</b>     | Adult /low severity        | 38.00 | 5.316  | 3 | .150          | 0.09 |
|                           | Adult /high severity       | 42.00 |        |   |               |      |
|                           | Adolescent / low severity  | 38.00 |        |   |               |      |
|                           | Adolescent / high severity | 40.00 |        |   |               |      |
| <b>Employment Status</b>  | Adult /low severity        | 38.00 | 8.577  | 3 | <b>.035*</b>  | 0.14 |
|                           | Adult /high severity       | 46.00 |        |   |               |      |
|                           | Adolescent / low severity  | 42.00 |        |   |               |      |
|                           | Adolescent / high severity | 48.00 |        |   |               |      |
| <b>Alcohol Use</b>        | Adult /low severity        | 30.00 | 6.141  | 3 | .105          | 0.10 |
|                           | Adult /high severity       | 42.00 |        |   |               |      |
|                           | Adolescent / low severity  | 39.00 |        |   |               |      |
|                           | Adolescent / high severity | 39.00 |        |   |               |      |
| <b>Family Conflict</b>    | Adult /low severity        | 47.00 | 16.047 | 3 | <b>.001**</b> | 0.25 |
|                           | Adult /high severity       | 37.00 |        |   |               |      |
|                           | Adolescent / low severity  | 40.50 |        |   |               |      |
|                           | Adolescent / high severity | 54.50 |        |   |               |      |
| <b>Legal Status</b>       | Adult /low severity        | 30.50 | 5.555  | 3 | .135          | 0.09 |
|                           | Adult /high severity       | 36.50 |        |   |               |      |
|                           | Adolescent / low severity  | 36.50 |        |   |               |      |
|                           | Adolescent / high severity | 46.50 |        |   |               |      |
| <b>Psychiatric Status</b> | Adult /low severity        | 42.50 | 3.643  | 3 | .303          | 0.06 |
|                           | Adolescent / low severity  | 39.00 |        |   |               |      |
|                           | Adolescent / high severity | 41.00 |        |   |               |      |
|                           | Adult /low severity        | 37.00 |        |   |               |      |
|                           | Adult /high severity       | 45.00 |        |   |               |      |

*Note.*  $\eta^2$  represents the effect size calculated using  $\eta^2 = H / (N - 1)$ .  
Range of  $\eta^2$ : small = .01 - .06, medium = .06 - .14, large = >.14.

**Phobic Anxiety:** A significant difference was observed for phobic anxiety,  $H(3) = 7.90$ ,  $p = .048$ ,  $\eta^2 = .13$ . Adolescent/low-severity users (mean rank = 48.50) reported the highest levels of fear and avoidance, while adult/low-severity users (mean rank = 34.50) scored lowest. This suggests that early initiation of opioid use is linked to greater social and situational avoidance, possibly due to chronic anxiety sensitisation and social alienation from a young age. Phobic anxiety involves intense fear of a specific place, situation, or object, which can lead individuals to fear humiliation in social settings, making them feel incapacitated and unable to function normally (Can et al., 2023). In adolescents, social phobia is influenced by peer

pressure, as peers play a significant role in their lives and their perceived opinions become important; peer pressure can also lead to harmful behaviours such as substance use (Studer et al., 2016). The higher the peer pressure, the greater the social phobia (Can et al., 2023). This supports the finding that early onset is a predictor of social phobia.

**Figure17:** Graph displaying the significant results of the Kruskal Wallis H test between onset-age and severity-level on psychopathological symptoms and functional domains of progress in OST



*Note. The figure displays group-wise mean rank differences across domains showing significant Kruskal–Wallis results ( $p < .05$ ).*

**Paranoid ideation** significantly differed across groups,  $H(3) = 8.21, p = .042$ ,  $\eta^2 = .14$  (large effect). The adolescent/high-severity group (mean rank = 47.50) exhibited higher levels of suspicion and mistrust than adult/low-severity users (mean rank = 33.50). This pattern reflects interpersonal hypervigilance and distrust, which may emerge from chronic stress exposure and marginalisation experienced by early, high-severity users (Najt et al., 2011). Paranoid ideation includes suspiciousness, fear of persecution, mistrust and distorted perception of others (APA, 2018). Early onset of

substance use interferes with brain development regions like the prefrontal cortex and limbic system, regulating emotion and social cognition is disrupted, leading to cognitive disorganisation and mistrust (Squeglia et al., 2009). A long-term sensitisation of dopaminergic brain receptors had a role in the development of psychotic symptoms (Rossler et al., 2012), which is in support of the current study findings.

**Psychoticism,** no significant differences were found for psychoticism,  $H(3) = 1.36, p = .715, \eta^2 = .02$ . Mean ranks were closely aligned (38.00–42.00), indicating that psychotic-like experiences are not significantly affected by onset or severity interaction within this population. Although the mean rank for adolescent onset and adult onset with high severity was the same at 42.00, this reflects the fact that, regardless of age at onset, this psychopathology tends more towards higher severity levels of drug use. Many studies have found an association with early substance use, especially cannabis use, and psychosis, and the level of severity is associated with psychoticism. The non-significant finding could be attributed to Buprenorphine, which has kappa-antagonist activity and some antipsychotic properties (Maremmanni et al., 2006). The participants had been in the treatment program for more than 3 months and were using buprenorphine and naloxone daily; there was a decrease in this symptomatology.

**Medical status:** The mean rank for adult onset /high severity was 46.00 highest among all groups, indicating that this group showed maximum medical issues, although the differences in medical status were non-significant,  $H(3) = 5.32, p = .150, \eta^2 = .09$ . This indicates that general health complications would likely affect the progress in this group. Although medical issues are prevalent among all groups, regardless of when or how severely opioid use began. Chronic opioid exposure itself contributes to sustained medical morbidity (Kosten et al., 2002). Previous research has substantiated that under treatment individuals have many physical problems related to respiratory symptoms (O'Toole et al., 2014), gastrointestinal (Brock et al., 2012), dental (Titsas et al., 2002), musculoskeletal (Rosenblum et al., 2003) and sexual dysfunction (Khajehei et al., 2015) and non-availability of the health care system

interferes with the progress of treatment (Troberg et al.,2019. Early onset of substance use is associated with greater lifetime exposure to health risk (Wolitzky-Taylor et al.,2017),

**Employment Status:** Significant group differences were found for employment status,  $H(3) = 8.58, p = .035, \eta^2 = .14$  (large effect). Adolescent/high-severity participants had the highest mean rank (48.00), while adult/low-severity participants had the lowest (30.00). This reflects greater occupational impairment among those with earlier and more severe substance involvement, likely due to prolonged educational and vocational disruptions, which could disrupt the progress of OST in the adolescent/high-severity group. Previous studies have substantiated substance use as a risk factor for job instability in adulthood (Kandel et al., 1987). Adolescents with high severity of substance use were more likely to report no lifetime pursuit such as completing their education, getting married or working (Newcomb et al., 1985) or led to precocious development with early involvement in marriage and joining work forsaking their education which later led to unsuccessful role in life such as failed marriage or job instability (Newcomb et al., 1985) This explains the earlier the onset age more difficulty in getting employment. Adolescent substance use is associated with job instability (Kandel et al.,1986). Another study by Bachman et al. (1997) concluded that substance use did not lead to unemployment and unemployment did not lead to substance use. Early substance use predicts a less adequate work history for males aged between 23 and 26 (Friedman et al., 2004).

**Alcohol use:** The mean rank for adult /low severity is 47.00 which is indicative that alcohol use can hamper the progress in OST of this group although no significant differences were found for alcohol use,  $H(3) = 6.14, p = .105, \eta^2 = .10$ . Secondary alcohol consumption patterns appear consistent across groups, suggesting that polysubstance behaviours are a general characteristic rather than interaction-specific. This aligns with the finding that poly-substance use is common among people with a severe level of addiction (Grant et al., 1997). Also, all the participants were polysubstance users; alcohol may not be their focus substance, and their preference differs.

**Family and social conflict:** A statistically significant difference was found in family conflict,  $H(3) = 16.05, p = .001, \eta^2 = .25$  (large effect). The adolescent/high-severity group had the highest mean rank (54.50), whereas adult/low-severity users had the lowest (30.50). This indicates that family dysfunction is particularly pronounced among those with early-onset and high-severity use, highlighting intergenerational stress, relational instability, and emotional dysregulation (Windle, 2016). Earlier studies have substantiated the association between substance use and family and social conflict in individuals undergoing treatment, and also a predictor of high incidence of relapses (Daley et al., 2013). This can hamper the progress in OST.

**Legal Status:** Legal status differences were not statistically significant,  $H(3) = 5.56, p = .135, \eta^2 = .09$ . While minor differences exist, legal problems were generally consistent across all groups, suggesting that criminal involvement may reflect broader socioeconomic and systemic factors rather than developmental onset differences. Earlier research has associated the severity of addiction with criminal behaviour arrests, probation and parole status (Hser et al., 1998). In a Swedish study, it was found that a quarter of people in outpatient treatment were convicted of offences within one year of follow-up, most of offences were drug-related (Anderberg et al., 2022).

**Psychiatric Status:** Differences in psychiatric status were not significant,  $H(3) = 3.64, p = .303, \eta^2 = .06$ . This suggests psychiatric comorbidity (e.g., mood or anxiety disorders) remains consistently elevated across opioid users, irrespective of onset age or severity. Although earlier research has linked psychiatric issues with substance use (Grant et al., 2004; Kessler et al., 2005), the finding for this study is insignificant. The role of buprenorphine as an antidote to dysphoria, depression, mood disorder and even psychosis has been substantiated (Maremmanni et al., 2006). Since the participants were under treatment for more than 3 months, this could have masked the psychiatric issues.

As shown in fig. 17, significant findings were observed for Somatization ( $H = 23.86, p < .001, \eta^2 = .14$ ), Obsessive–Compulsive symptoms ( $H = 12.74, p = .005, \eta^2 = .07$ ), Anxiety ( $H = 8.02, p = .046, \eta^2 = .05$ ), Phobic Anxiety ( $H = 7.90, p = .048, \eta^2 = .04$ ), Paranoid Ideation ( $H = 8.21, p = .042, \eta^2 = .05$ ), Employment status ( $H = 8.58, p = .035, \eta^2 = .05$ ), and Family Conflict ( $H = 16.05, p = .001, \eta^2 = .09$ ). These results

indicate statistically meaningful differences among the interaction groups in these specific domains. No significant differences were observed in Depression, Hostility, Psychoticism, or Medical and Legal status. The fourth hypothesis, There will be a significant interaction effect between onset age (adolescent vs adult) and severity level (high vs low) on psychopathological symptoms and functional domain of progress in OST is accepted as 5 of 9 psychopathology parameters are significant, and 2 of 6 functional domains of progress in OST are found to be statistically significant. Overall, the findings suggest that individuals with early onset and higher severity of opioid use report greater levels of somatisation, obsessive-compulsive symptoms, anxiety, and interpersonal paranoia, along with higher family and employment dysfunction. These domains reflect both internalising and externalising psychopathological features associated with the interaction of developmental onset and addiction severity.

The results of the Kruskal–Wallis test demonstrate that the interaction between onset age and severity level of opioid use significantly influences multiple psychopathological and functional domains of progress in OST. Specifically, early onset and higher severity of opioid use were associated with increased somatic complaints, obsessive-compulsive features, anxiety-related symptoms, and interpersonal distrust. These findings align with developmental psychopathology frameworks, suggesting that earlier exposure to substance use disrupts neurocognitive and emotional regulation processes, predisposing individuals to chronic psychological distress and maladaptive coping mechanisms (Clark et al., 2008). The significant differences in somatisation ( $H = 23.86, p < .001$ ) indicate that individuals with early onset and severe opioid use are more likely to express psychological distress through physical symptoms. This aligns with prior research showing that somatic symptoms frequently manifest in opioid-dependent populations as a function of chronic physiological dysregulation and trauma exposure (Khantzian, 2017). The observed differences in obsessive-compulsive symptoms ( $H = 12.74, p = .005$ ) suggest the persistence of intrusive thoughts and compulsive tendencies in those with severe dependency, possibly reflecting heightened anxiety sensitivity and impaired executive control linked to long-term substance exposure.

The anxiety and phobic anxiety domains ( $H = 8.02$ ,  $p = .046$ ;  $H = 7.90$ ,  $p = .048$ ) were also significantly influenced by the interaction of onset and severity. The adolescent-onset, low-severity group showed greater symptomatology. These results support the well-established association between chronic opioid use and dysregulated affective states, including hyperarousal and fear-based psychopathology (Ziedonis et al., 2009). The significant differences in paranoid ideation ( $H = 8.21$ ,  $p = .042$ ) further indicate that individuals with early onset and low severity level of drug use may develop social withdrawal, potentially reflecting neurotoxic and social consequences of opioid exposure.

Functional impairment findings, particularly in family conflict ( $H = 16.05$ ,  $p = .001$ ) and employment status ( $H = 8.58$ ,  $p = .035$ ), underscore the pervasive social impact of early and severe substance use. These outcomes are consistent with previous studies emphasising how chronic addiction erodes interpersonal trust, family cohesion, and occupational functioning (Kosten et al., 2002). Family dynamics may be further strained by the emotional dysregulation associated with high psychopathological distress, leading to cyclical patterns of conflict and relapse.

**CHAPTER – VI**  
**SUMMARY AND CONCLUSION**

## 6.1 Overview

The present study, entitled “Psychopathological symptoms of persons under opioid substitution therapy: An observational study”, aimed to explore the association between the psychopathological symptoms and the functional domain of progress in Opioid Substitution Therapy with respect to the age of onset of substance use and the severity level of drug use. The study focused on the nine parameters of psychopathological symptoms, which include somatisation, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, anger/hostility, phobic anxiety, paranoid ideation and psychoticism, along with the functional domains of progress in OST, which include medical status, employment status, alcohol use, family conflict, legal issues and psychiatric status. It was hypothesised that there would be a significant difference in psychopathological symptoms and the functional domain of progress in OST concerning the adolescent-age and adult-onset ages of substance use. It was also assumed that the severity level of drug use affects psychopathy and the functional domain of progress in OST. It was expected that the onset age of substance use would correlate with psychopathology, the functional domain of progress in OST, the severity level of drug use, and the onset age of substance use. Additionally, the onset age of substance use and the severity level of drug use were hypothesised to have interaction effects on psychopathology and the functional domain of progress in OST.

To achieve the research objectives, 80 male adults undergoing OST were selected using purposive sampling technique out of which 40 participants reported the onset age of substance use before the age of 18 years (considered as adolescent onset), and another 40 participants reported the onset age of substance use after the age of 18 years (considered as adult onset). Both the groups were further divided into 20 participants each having high severity and low severity in substance use. All the participants were enrolled at the STNM hospital OST centre in Gangtok, Sikkim and had been receiving treatment for the last 3 months.

Two psychological scales were used to measure the variable of interest: the Symptom Checklist 90-R (Derogatis, 1994) and the Addiction Severity Index 5 (McLellan, 1994). Subject-wise scores for the specific item of the scale were prepared

and analysed separately to assess their psychometric adequacy for measurement across the sample. The psychometric adequacy of the behavioural measures was analysed using SPSS 30 (Statistical Package for the Social Sciences).

## **6.2 Summary**

Firstly, the psychometric adequacy of each scale used in the target population was analysed using the reliability coefficients (Cronbach's Alpha). The normality of the data was tested using the Kolmogorov-Smirnov test. Thereafter, analysis of research data was performed to test the four research objectives and hypotheses which were framed in the present study.

The first objective of the present study was to study the differences in the onset age of substance use concerning the psychopathological symptoms and the functional domain of progress in OST. Statistical analysis compared the psychopathological symptoms and functional domains between adolescent onset and adult onset of substance use. The Mann–Whitney U test was used to examine group differences in symptom severity across several domains. It was found that individuals with adolescent-onset reported higher levels of somatisation, obsessive-compulsive, interpersonal-sensitivity, anxiety and paranoid ideation compared to those with adult-onset of substance use. Early initiation of substance use (adolescent onset) is significantly associated with greater family conflict and poorer employment outcomes in later life. However, alcohol use, legal status, and medical status did not significantly vary based on the onset age. These results reinforce the importance of delaying substance use initiation as part of adolescent mental health interventions. This supports the notion that early-onset substance use is associated with elevated psychological distress, particularly in areas related to anxiety and social functioning. Preventive and early intervention strategies targeting adolescents may be crucial in reducing long-term psychological impacts. These findings emphasise the psychological risks of early substance use and support public health initiatives aimed at prevention and early intervention. The finding highlights the significant association between lifetime psychiatric problems and OUD. The associated co-occurring psychopathology gives insight into the treatment module of a tailored intervention plan

specific to the co-occurring illness, focusing on primary rather than the secondary illness. Adolescent onset has some effect on the progress of OST due to family conflict and employment issues. These two domains have been identified to hamper the progress of OST. Thus, there is a need to find the protective factors such as parental influence in family domain as the strongest precursor for adolescent substance use, making parents to have positive interaction and modelling. Previous study (Friedman et al., 2004) has substantiated that adolescent onset of substance use is linked to non-completion of school leading to job instability, most of the participants of this study were drivers not earning any fixed income, highlighting the need for vocational training for retention in the treatment and also reduced relapse rate (Magura et al., 2004).

The second objective was to evaluate the severity level of drug use on psychopathological symptoms and the functional domain of progress in OST. Individuals with high severity of substance use reported significantly higher somatisation and obsessive-compulsive symptoms compared to those with low severity. Other psychological symptoms, including interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism, were reported as higher in the high severity group, but the relationship was not statistically significant. These findings suggest that increased substance use severity is particularly associated with elevated somatic complaints and phobic anxiety, highlighting the importance of assessing these specific psychological domains in clinical evaluations of individuals with severe substance use patterns. The domains of employment status, family conflict and legal status were significant, and domains such as medical status, alcohol use, and psychiatric status were high when the severity level was high, but the difference was insignificant. The progress in OST can be hampered among individuals with a high severity level when employment is unstable or they are unemployed, when family conflict is greater, and when legal issues are pending.

The third objective was to study the correlation between onset age, severity level, psychopathological symptoms and functional domain of progress in OST. It was found that the onset age of substance use had a significant, negative correlation with

psychopathology, namely somatisation, paranoid ideation, interpersonal sensitivity, obsessive-compulsive compulsion, phobic anxiety, anxiety and depression. Whereas the severity level had a negative correlation with phobic anxiety and anxiety and a positive correlation with symptoms of psychopathology such as depression, psychoticism, paranoid ideation, anger, hostility, obsessive compulsive and somatisation.

The fourth objective was to study the impact of the onset age of substance use and the severity level of drug use on psychopathological symptoms and the functional domain of progress in OST. Findings showed that individuals who experienced earlier and more severe drug use tend to show more pronounced psychopathological symptoms, including somatisation, obsessive-compulsive behaviours and paranoid ideation. Anxiety and phobic anxiety were seen more among the adolescents in the low-severity group. They also face greater social and functional challenges, especially in family and work settings. The substantial effect sizes ( $\eta^2$  from .13 to .37) indicate these differences are not only statistically significant but also clinically meaningful. These findings support the developmental psychopathology perspective, which suggests that early substance exposure can disrupt emotional regulation, cognitive control, and social functioning, increasing the risk for chronic psychological distress and less favourable outcomes during OST.

The current finding aligns with the previous research that indicated that earlier initiation of substance use is a risk factor for adverse mental health outcomes, with some studies reporting an estimated 2-4 times higher likelihood of experiencing clinical issues after 2 years of initiation of substance use (Chen et al., 2009). The onset age below 18 years had an increased likelihood of having psychiatric comorbidity as compared to adult onset (Naji et al., 2017). The two causal theories of addiction self-medication hypothesis and the induced hypothesis, for these psychopathologies are crucial for diagnosing (Khanzitian et al., 1997) as studies have found that when it comes to comorbidity, it is still crucial to find the primary and secondary illness, as evidence suggests that when treating the primary illness, the symptomology of secondary illness decreases (Schuckit et al., 1995). The results show the importance of

first diagnosing and treatment for psychiatric disorders while considering OST (Sullivan et al.,2006). Early prevention and personalised intervention for people with early substance use can lower the chances of ongoing psychological issues. The addiction severity groups showed different functional paths. High-severity users, regardless of when they started using, reported more problems in employment, legal issues, and psychiatric areas. Participants in the low-severity, adult-onset group showed more stable functioning and fewer psychopathological symptoms. This highlights the importance of tailoring treatment based on both severity and age of onset to offer more focused intervention strategies.

Considering the severity level and onset age of substance use in its role in the progression of OST, certain domains such as employment, family and social conflict and legal status were more likely to affect the progress, consistent with the finding that higher addiction severity affects the occupational functioning, from job instability to cognitive functioning, such as decision making. It has been substantiated that factors like family and social conflict, interpersonal conflicts, positive and negative reinforcements, and difficulty in following the treatment were related to increased relapse rate (Appiah et al.,2017).

The current findings provide guidance toward a more robust treatment module for a personalised intervention tailored to the unique condition hindering the treatment process. It emphasises integrated care that addresses not only the psychopathology but also the social domain of individual functioning (Maremmani et al., 2017).

### 6.3 Implications of the Study

Opioid Use Disorder (OUD) remains a serious public health issue in India and worldwide. It affects individuals, families, communities, and healthcare systems. This study adds valuable insights to the existing literature by looking at the relationship between the age at which opioid use begins, its severity, and various psychological issues and treatment progress among individuals in Opioid Substitution Therapy (OST). Although opioid dependence is rising in India and OST programs are expanding, there is still a significant lack of understanding about how developmental and clinical factors influence treatment paths and psychological outcomes. This research is important for improving theoretical models, guiding clinical practice, shaping public health strategies, and supporting future research. Advancing the Developmental Psychopathology Perspective This study uses a developmental psychopathology approach to explore how the age of starting substance use, especially opioids, impacts psychological symptoms and responses to treatment. Starting opioid use early is often associated with more severe substance use patterns, higher rates of psychiatric disorders, and worse treatment outcomes (Grella & Joshi, 2003). However, there is limited research in Indian OST settings. By comparing individuals who started using opioids early to those who began later, this study enhances our understanding of the risks involved in development. Such findings can help clinicians identify high-risk individuals sooner in their addiction journey and adjust their treatment accordingly.

#### *Addressing Severity and Functional Impairment.*

The severity of substance use has long been recognised as a predictor of poor mental health outcomes and lower treatment adherence (Darke et al., 2007). This study deepens our understanding by examining how severity levels, measured by the validated Addiction Severity Index (ASI-5), relate to symptoms across nine psychological domains, including depression, anxiety, somatisation, and interpersonal sensitivity. Additionally, the research investigates whether severity affects progress in key areas such as employment, medical status, legal issues, and psychiatric stability,

either on its own or in combination with the age of onset. The findings are crucial for tailoring stage-specific care models within OST programs, encouraging clinicians to develop treatment plans that fit individual needs.

### ***Contextual Relevance to the Indian Setting***

India's drug scene shows rising opioid use, often starting in adolescence or young adulthood. However, much of the research and intervention strategies are based on Western models that may not reflect the social and cultural realities or gaps in service delivery in India. By focusing on a treatment-seeking population in Sikkim, a northeastern state with distinct demographics and healthcare patterns, the study offers valuable insights specific to the region. As OST continues to grow under the National AIDS Control Organisation (NACO) and other health agencies, research grounded in the local context is essential for effective program implementation.

The current findings support the need for mental health screenings and interventions in OST services, which are often underused in government settings. Enhancing Clinical and Policy Interventions. The use of validated psychological tools, such as the Symptom Checklist-90-R (SCL-90-R), in OST evaluations is underrepresented in Indian research. This study utilises this tool to determine the prevalence and patterns of psychological symptoms among individuals receiving OST. These insights are crucial for developing dual-diagnosis strategies, enhancing patient retention, and improving the quality of life for individuals with OUD.

On the policy side, the findings suggest that comprehensive mental health assessments should be included in OST protocols, and OST staff should receive training in recognising psychological symptoms. Policymakers and other stakeholders can use these results to allocate resources effectively and promote holistic, person-centred treatment approaches.

## **6.4 Limitations of the Study**

### ***Cross-sectional design and temporal ambiguity***

One major limitation of this study is its cross-sectional design, which limits the ability to draw causal conclusions about the relationship between early onset or severity of substance use and treatment progress or psychological symptoms. While the analyses showed significant associations, it is unclear if early onset or higher severity leads to increased psychological issues, or if people with existing psychological vulnerabilities are more likely to develop severe substance use disorders at a young age. A longitudinal approach would be more effective in determining the direction and cause of these relationships.

### ***Limited generalizability***

The study was conducted at a single OST centre affiliated with STNM Hospital, under the Government of Sikkim. While this setting provides important insights into the experiences of individuals in the area, it limits the generalizability of the findings. The social and healthcare context of Sikkim may not represent other parts of India or the world. Furthermore, the sample's demographic makeup, which is predominantly male, may not reflect all individuals with opioid use disorder (OUD). Differences in regional substance use patterns, access to healthcare, and treatment resources could significantly impact the outcomes.

### ***Diagnostic uncertainty***

Although the SCL-90-R is useful for identifying patterns of psychological symptoms, it does not provide categorical diagnoses based on DSM-5 criteria. This restricts the ability to determine whether the reported symptoms indicate substance-induced conditions, independent psychiatric disorders, or a mix of both. Additionally, the overlap between substance use symptoms and primary psychiatric disorders, such as somatisation, depression, and anxiety, makes interpretation difficult. For example, symptoms of anxiety induced by substance use may resemble generalised anxiety disorder but could fade with abstinence from substance use.

### ***Polysubstance use and comorbidities***

Another limitation is the insufficient assessment of polysubstance use, which is common in people with opioid dependence. The co-use of alcohol, benzodiazepines, cannabis, or stimulants could greatly impact psychological and functional outcomes, complicating the ability to isolate the effects of opioid use alone. The study also did not examine other potentially confounding or moderating factors, such as trauma history, physical health issues, chronic pain, or family psychiatric history, all of which could affect the expression of the psychological problems and OST outcomes.

### ***Lack of female representation and subgroup analysis***

The sample was predominantly male, reflecting the gender distribution in treatment-seeking populations in India; however, this limitation restricts the understanding of gender-specific experiences and challenges in OST. The study did not investigate gender-based differences in symptom expression, treatment adherence, or psychosocial functioning.

## **6.5 Future Directions for Research**

Given the limitations noted above, several important potential research areas emerge for future directions to expand on the findings of the present study.

### ***Longitudinal research designs***

To better understand the changing relationships between onset age, severity levels, and psychopathological outcomes, researchers should conduct longitudinal studies. Following individuals through different stages of OST—from initiation to stabilisation and possible discontinuation—would help capture changes in mental health, social functioning, and treatment responsiveness over time. This approach would also reveal early risk and protective factors influencing long-term recovery.

### ***Inclusion of structured diagnostic interviews***

Future studies should use structured diagnostic tools, such as the Structured Clinical Interview for DSM-5 (SCID-5) or the MINI International Neuropsychiatric Interview (MINI), to improve diagnostic accuracy. This would allow for better classification of psychiatric comorbidities and a clearer distinction between substance-induced and independent mental disorders. Such accuracy is crucial for developing effective treatment plans tailored to individual diagnostic profiles.

### ***Expansion of sample diversity***

To enhance generalizability, future research should include larger and more diverse samples from multiple OST centres across various states and healthcare settings, both public and private. Including rural, semi-urban, and urban populations, as well as underrepresented groups like women and adolescents, would provide a more complete view of the OST experience. Comparative studies across regions could also illuminate how social, economic, and policy factors impact treatment outcomes.

### ***Integration of biological and behavioural data***

When possible, future research should incorporate objective measures such as urine drug tests, blood markers (e.g., liver function tests), and neurocognitive assessments. These biomarkers can support self-report data and provide insights into the physiological and cognitive effects of substance use. Including behavioural observations or clinician-rated assessments could further strengthen data reliability and identify symptoms not captured by self-report tools.

### ***Exploration of psychosocial mediators and moderators***

To understand how early substance use and psychological issues are linked, research should investigate potential mediators and moderators. Factors such as childhood trauma, coping styles, attachment patterns, social support, stigma, and treatment motivation should be included in future models. The biopsychosocial framework (Engel, 1977) provides a robust theoretical foundation for examining how these factors interact to shape health outcomes.

### ***Gender-sensitive and developmentally informed research***

Given the gender differences in substance use research, future studies must actively seek to recruit female participants and investigate gender-specific pathways. Likewise, adolescents and young adults are a particularly vulnerable group that deserves focused study. Research tailored to their developmental stage, with age-appropriate tools and interventions, is critical for early prevention and intervention efforts.

### ***Evaluation of OST adherence and real-world functional outcomes***

In addition to psychological outcomes, future research should look at long-term adherence to OST and its impact on real-world functioning, such as employment status, family dynamics, legal issues, and quality of life. These aspects reflect broader recovery goals and provide a more comprehensive evaluation of treatment

effectiveness. Incorporating client satisfaction and perceived obstacles to care could also improve service delivery.

Despite strong foundational models, research on the long-term treatment paths for individuals with significant psychiatric comorbidity remains scarce. Few studies look at how substance use severity, functional impairment, gender, trauma history, and mental health vulnerability interact. More long-term studies are necessary to investigate how somatisation, interpersonal relationships, and obsessive-compulsive traits influence relapse and dropout from treatment. Additionally, the use of developmental models in everyday care and assessments is still underused. Future research should aim to replicate these findings in larger, more diverse samples and consider using continuous or ordinal predictors to preserve statistical power.

Given the ongoing and complicated nature of substance use disorders (SUDs), especially opioid use disorder (OUD), a combined treatment approach is needed. Short-term programs that focus only on abstinence do not address the structural, emotional, and mental health needs of most patients. Instead, treatment should be: **Developmentally Informed:** It should address trauma, adverse childhood experiences (ACEs), and early emotional issues.

**Comorbidity-Aware:** It should assess and treat psychiatric symptoms alongside substance use. **Functionally Grounded:** It should cover all areas of the Addiction Severity Index (ASI), with special focus on employment, mental health stability, and social support.

**Long-Term Oriented:** Approaches like Opioid Substitution Therapy (OST) with additional support services show promise in maintaining recovery.

**Individually Tailored:** Personalised treatment methods based on factors such as gender, age of onset, severity, and mental health profile can improve outcomes.

## **6.6 Conclusion:**

The present study has important implications for clinical psychology, addiction psychiatry, and public health. It addresses key knowledge gaps by examining how early-onset and severe opioid use are linked to various psychological symptoms and treatment outcomes. In doing so, it supports the creation of early intervention frameworks, the integration of mental health care in OST settings, and the development of region-specific addiction science. As India faces the growing issue of opioid-related harm, research like this is essential for providing evidence-based, developmentally informed, and culturally relevant care for those in need.

The findings of the present study provide a comprehensive understanding of the psychopathological correlates and treatment outcomes among individuals with Opioid Use Disorder (OUD) undergoing Opioid Substitution Therapy (OST). The results indicate that both the onset age of substance use and the severity level of drug use significantly influence the expression of psychological symptoms and the course of recovery across several domains of functioning in the progress of OST.

### **MAJOR SIGNIFICANT FINDINGS OF THE PRESENT STUDY**

1. Individuals with adolescent onset demonstrated higher levels of psychopathology, particularly in the dimensions of somatisation, obsessive compulsive, interpersonal sensitivity, anxiety, phobic anxiety and paranoid ideation, suggesting a more pervasive and developmentally rooted vulnerability. The adolescent-onset age group showed greater dysfunction in employment status and more family conflict in the functional domain of progress in OST.
2. Similarly, individuals with high severity level of substance use exhibited greater clinical distress across somatisation and obsessive-compulsive, reinforcing the role of substance use intensity in aggravating psychological comorbidities. The high-severity group also showed greater dysfunction in employment status, family conflict, and legal status in the functional domain of progress in OST.

3. There was a significant negative correlation established between the onset age with somatisation, paranoid ideation, interpersonal sensitivity, obsessive-compulsive, phobic anxiety, anxiety and depression in SCL-90-R parameters. The severity level had a negative correlation with phobic anxiety and anxiety and a positive correlation with depression, psychoticism, paranoid ideation, anger/hostility, obsessive compulsive and somatisation. Regarding the functional domain of progress in OST, the onset age showed a significant, negative correlation with family conflict, medical status and employment status, whereas the severity level showed a significant positive correlation with employment status and family conflict.
4. The interaction between early onset and more severe substance use was significantly linked to increased psychological distress and poorer functional adjustment. Significant differences between groups were found in somatisation, obsessive-compulsive features, anxiety, phobic anxiety, paranoid ideation, employment status, and family conflict. This suggests that individuals who began drug use during adolescence and had high severity experienced the highest levels of psychopathology and functional impairment. Effect sizes ranged from medium to large, emphasising the clinical importance of these findings.
5. Aligning with the individual's addiction history, high-severity treatment can begin not only by addressing cravings but also by targeting somatic and obsessive-compulsive symptoms. Strengthening social support through family therapy is crucial, as family conflict and legal issues can influence progress in OST. The study indicates that vocational training for employment also supports successful OST outcomes. A history of early substance use onset is associated with various psychopathologies, making it necessary to initiate interventions for these mental health issues alongside family therapy for social support and vocational training to enhance progress in OST. Although many earlier studies have found depression and psychoticism to be highly comorbid with OUD, this study did not show a clear connection. This suggests that using buprenorphine for more than six

months may have had its antidepressant and antipsychotic effects on the patients, and using buprenorphine alone may not result in treatment success. It can be said that relying solely on buprenorphine might not be enough for managing psychopathological symptoms.

## **APPENDICES**

## **APPENDIX – I**

### **INFORMED CONSENT FORM**

#### **Information for the patient**

The focus of this study is to understand the psychopathological symptoms in persons under Opioid Substitution Therapy. Participants have answered questions via questionnaires. All information that is provided will be kept confidential.

#### **Consent**

“I have been informed about the procedure of the study. I understand that I have the right to refuse or withdraw my consent at any time during the study, and that this will not affect any further services from this institution. I am aware that by subjecting myself to this investigation, I will have to give time for assessments, and I may or may not benefit from the same”

I,.....the undersigned, give my consent to be a participant in this study.

Signature of the participant

Address:

#### **Undertaking by the investigator**

Your consent to participate in the above study is sought. Your taking part in this study is voluntary. You have the right to refuse consent or withdraw the same during any part of the study without giving a reason. If you have any doubts about the study, please feel free to contact the investigator for clarification that you desire.

Signature of the investigator

Sangila Dorjee

Ph.D. Scholar

Department of Clinical Psychology

Mizoram University

## APPENDIX – II

### Socio-Demographic Profile of the Sample (English)

|                                                   |       |
|---------------------------------------------------|-------|
| Name:                                             | _____ |
| Date of Admission:                                | _____ |
| Date of Interview:                                | _____ |
| Age of Onset:                                     | _____ |
| Current Dosage:                                   | _____ |
| Religion:                                         | _____ |
| Date of Birth:                                    | _____ |
| How long have you lived in the<br>current address | _____ |
| Is the resident owned by your family              | _____ |

## APPENDIX – III

### The Symptom Checklist 90-Revised (Derogatis et al., 1994)

Name \_\_\_\_\_

Date \_\_\_\_\_

Below is the list of problems and complaints that people sometimes have. Please read each one carefully. After you have done so, select one of the numbered descriptors that best describes it. **HOW MUCH HAS THAT PROBLEM BOTHERED OR DISTRESSED YOU DURING THE PAST WEEK, INCLUDING TODAY?** Circle the number in the space to the right of the problem and do not skip any items. Use the following key to guide how you respond:

Circle 0 if your answer is NOT AT ALL

Circle 1 if A LITTLE BIT

Circle 2 if MODERATELY

Circle 3 if QUITE A BIT

Circle 4 if EXTREMELY

Please read the following example before beginning:

Example. In the previous week, how much were you bothered by:

Backaches. 0. 1. **2.** 3. 4

In this case, the respondent experienced backaches moderately (2)

Please proceed with the questionnaire

#### HOW MUCH WERE YOU BOTHERED BY:

|    |                                                       |   |   |   |   |   |
|----|-------------------------------------------------------|---|---|---|---|---|
| 1  | Headaches                                             | 0 | 1 | 2 | 3 | 4 |
| 2  | Nervousness or shakiness inside                       | 0 | 1 | 2 | 3 | 4 |
| 3  | Unwanted thoughts                                     | 0 | 1 | 2 | 3 | 4 |
| 4  | Faintness or dizziness                                | 0 | 1 | 2 | 3 | 4 |
| 5  | Loss of sexual interest or pleasure                   | 0 | 1 | 2 | 3 | 4 |
| 6  | Feeling critical of others                            | 0 | 1 | 2 | 3 | 4 |
| 7  | The idea that someone else can control your thoughts  | 0 | 1 | 2 | 3 | 4 |
| 8  | Feeling others are to blame for most of your troubles | 0 | 1 | 2 | 3 | 4 |
| 9  | Trouble remembering things                            | 0 | 1 | 2 | 3 | 4 |
| 10 | Worried about sloppiness or carelessness              | 0 | 1 | 2 | 3 | 4 |
| 11 | Feeling easily annoyed or irritated                   | 0 | 1 | 2 | 3 | 4 |
| 12 | Pains in heart or chest                               | 0 | 1 | 2 | 3 | 4 |
| 13 | Feeling afraid in open spaces or on the streets       | 0 | 1 | 2 | 3 | 4 |
| 14 | Feeling low in energy or slowed down                  | 0 | 1 | 2 | 3 | 4 |
| 15 | Thoughts of ending your life                          | 0 | 1 | 2 | 3 | 4 |

|    |                                                                                 |   |   |   |   |   |
|----|---------------------------------------------------------------------------------|---|---|---|---|---|
| 16 | Hearing voices that other people do not hear                                    | 0 | 1 | 2 | 3 | 4 |
| 17 | Trembling                                                                       | 0 | 1 | 2 | 3 | 4 |
| 18 | Feeling that most people cannot be trusted                                      | 0 | 1 | 2 | 3 | 4 |
| 19 | Poor appetite                                                                   | 0 | 1 | 2 | 3 | 4 |
| 20 | Crying easily                                                                   | 0 | 1 | 2 | 3 | 4 |
| 21 | Feeling shy or uneasy with the opposite sex                                     | 0 | 1 | 2 | 3 | 4 |
| 22 | Feeling of being trapped or caught                                              | 0 | 1 | 2 | 3 | 4 |
| 23 | Suddenly scared for no reason                                                   | 0 | 1 | 2 | 3 | 4 |
| 24 | Temper outbursts that you could not control                                     | 0 | 1 | 2 | 3 | 4 |
| 25 | Feeling afraid to go out of your house alone                                    | 0 | 1 | 2 | 3 | 4 |
| 26 | Blaming yourself for things                                                     | 0 | 1 | 2 | 3 | 4 |
| 27 | Pains in lower back                                                             | 0 | 1 | 2 | 3 | 4 |
| 28 | Feeling blocked in getting things done                                          | 0 | 1 | 2 | 3 | 4 |
| 29 | Feeling lonely                                                                  | 0 | 1 | 2 | 3 | 4 |
| 30 | Feeling blue                                                                    | 0 | 1 | 2 | 3 | 4 |
| 31 | Worrying too much about things                                                  | 0 | 1 | 2 | 3 | 4 |
| 32 | Feeling no interest in things                                                   | 0 | 1 | 2 | 3 | 4 |
| 33 | Feeling fearful                                                                 | 0 | 1 | 2 | 3 | 4 |
| 34 | Your feelings being easily                                                      | 0 | 1 | 2 | 3 | 4 |
| 35 | Other people being aware of your private thoughts                               | 0 | 1 | 2 | 3 | 4 |
| 36 | Feeling others do not understand you or are unsympathetic                       | 0 | 1 | 2 | 3 | 4 |
| 37 | Feeling that people are unfriendly or dislike you                               | 0 | 1 | 2 | 3 | 4 |
| 38 | Having to do things very slowly to insure correctness                           | 0 | 1 | 2 | 3 | 4 |
| 39 | Heart pounding or racing                                                        | 0 | 1 | 2 | 3 | 4 |
| 40 | Nausea or upset stomach                                                         | 0 | 1 | 2 | 3 | 4 |
| 41 | Feeling inferior to others                                                      | 0 | 1 | 2 | 3 | 4 |
| 42 | Soreness of your muscles                                                        | 0 | 1 | 2 | 3 | 4 |
| 43 | Feeling that you are watched or talked about by others                          | 0 | 1 | 2 | 3 | 4 |
| 44 | Trouble falling asleep                                                          | 0 | 1 | 2 | 3 | 4 |
| 45 | Having to check and double check what you do                                    | 0 | 1 | 2 | 3 | 4 |
| 46 | Difficulty making decisions                                                     | 0 | 1 | 2 | 3 | 4 |
| 47 | Feeling afraid to travel on buses, subways, trains                              | 0 | 1 | 2 | 3 | 4 |
| 48 | Trouble getting your breath                                                     | 0 | 1 | 2 | 3 | 4 |
| 49 | Hot or cold spells                                                              | 0 | 1 | 2 | 3 | 4 |
| 50 | Having to avoid certain things, places, or activities because they frighten you | 0 | 1 | 2 | 3 | 4 |
| 51 | Your mind going blank                                                           | 0 | 1 | 2 | 3 | 4 |
| 52 | Numbness or tingling in parts of your body                                      | 0 | 1 | 2 | 3 | 4 |
| 53 | A lump in your throat                                                           | 0 | 1 | 2 | 3 | 4 |
| 54 | Feeling hopeless about the future                                               | 0 | 1 | 2 | 3 | 4 |
| 55 | Trouble concentrating                                                           | 0 | 1 | 2 | 3 | 4 |

|    |                                                                       |   |   |   |   |   |
|----|-----------------------------------------------------------------------|---|---|---|---|---|
| 56 | Feeling weak in parts of your body                                    | 0 | 1 | 2 | 3 | 4 |
| 57 | Feeling tense or keyed up                                             | 0 | 1 | 2 | 3 | 4 |
| 58 | Heavy feelings in your arms or legs                                   | 0 | 1 | 2 | 3 | 4 |
| 59 | Thoughts of death or dying                                            | 0 | 1 | 2 | 3 | 4 |
| 60 | Overeating                                                            | 0 | 1 | 2 | 3 | 4 |
| 61 | Feeling uneasy when people are watching or talking about you          | 0 | 1 | 2 | 3 | 4 |
| 62 | Having thoughts that are not your own                                 | 0 | 1 | 2 | 3 | 4 |
| 63 | Having urges to beat, injure, or harm someone                         | 0 | 1 | 2 | 3 | 4 |
| 64 | Awakening in the early morning                                        | 0 | 1 | 2 | 3 | 4 |
| 65 | Having to repeat the same actions such as touching, counting, washing | 0 | 1 | 2 | 3 | 4 |
| 66 | Sleep that is restless or disturbed                                   | 0 | 1 | 2 | 3 | 4 |
| 67 | Having urges to break or smash things                                 | 0 | 1 | 2 | 3 | 4 |
| 68 | Having ideas or beliefs that others do not share                      | 0 | 1 | 2 | 3 | 4 |
| 69 | Feeling very self-conscious with others                               | 0 | 1 | 2 | 3 | 4 |
| 70 | Feeling uneasy in crowds, such as shopping or at a movie              | 0 | 1 | 2 | 3 | 4 |
| 71 | Feeling everything is an effort                                       | 0 | 1 | 2 | 3 | 4 |
| 72 | Spells of terror or panic                                             | 0 | 1 | 2 | 3 | 4 |
| 73 | Feeling uncomfortable about eating or drinking in public              | 0 | 1 | 2 | 3 | 4 |
| 74 | Getting into frequent arguments                                       | 0 | 1 | 2 | 3 | 4 |
| 75 | Feeling nervous when you are left alone                               | 0 | 1 | 2 | 3 | 4 |
| 76 | Others not giving you proper credit for your achievements             | 0 | 1 | 2 | 3 | 4 |
| 77 | Feeling lonely when you are with people                               | 0 | 1 | 2 | 3 | 4 |
| 78 | Feeling so restless you couldn't sit still                            | 0 | 1 | 2 | 3 | 4 |
| 79 | Feeling of worthlessness                                              | 0 | 1 | 2 | 3 | 4 |
| 80 | Feeling that familiar things are strange or unreal                    | 0 | 1 | 2 | 3 | 4 |
| 81 | Shouting or throwing things                                           | 0 | 1 | 2 | 3 | 4 |
| 82 | Feeling afraid you will faint in public                               | 0 | 1 | 2 | 3 | 4 |
| 83 | Feeling that people will take advantage of you if you let them        | 0 | 1 | 2 | 3 | 4 |
| 84 | Having thoughts about sex that bothers you a lot                      | 0 | 1 | 2 | 3 | 4 |
| 85 | The idea that you should be punished for your sins                    | 0 | 1 | 2 | 3 | 4 |
| 86 | Feeling pushed to go get things done                                  | 0 | 1 | 2 | 3 | 4 |
| 87 | The idea that something serious is wrong with your body               | 0 | 1 | 2 | 3 | 4 |
| 88 | Never feeling close to another person                                 | 0 | 1 | 2 | 3 | 4 |
| 89 | Feelings of guilt                                                     | 0 | 1 | 2 | 3 | 4 |
| 90 | The idea that something is wrong with your mind                       | 0 | 1 | 2 | 3 | 4 |

## APPENDIX – IV

### The Addiction Severity Index 5<sup>th</sup> Edition (McLellan et al., 1992)

#### SEVERITY RATINGS

The severity ratings are interviewer estimates of the patient's need for additional treatment in each area. The scales range from 0 (no treatment necessary) to 9 (treatment needed to intervene in a life-threatening situation). Each rating is based upon the patient's history of problem symptoms, present condition and subjective assessment of his treatment needs in a given area. For a detailed description of severity ratings' derivation procedures and conventions, see manual.

**Note:** These severity ratings are optional.

#### MEDICAL STATUS

- M1 How many times have you been hospitalized for medical problems? (*Include o,d's, d.t's, exclude detox*) -----
- M2 How long ago was your last hospitalization for a physical problem -----/-----  
YRS MOS
- M3 Do you have any chronic medical problems that continue to interfere with your life? -----
- M4 Are you taking any prescribed medication on a regular basis for a physical problem? -----
- M5 Do you receive a pension for a physical disability? (*Exclude psychiatric disability*). 0 No. 1 Yes. -----
- M6 How many days have you experienced medical problems in the past 30? -----

FOR QUESTIONS M7 & M8 PLEASE ASK  
PATIENT TO USE THE PATIENT'S  
RATING SCALE

M7    How troubled or bothered have you been by these -----  
          medical problems in the past 30 days?

M8    How important to you now is treatment for these -----  
          medical problems?

INTERVIEWER SEVERITY RATING

M9    How would you rate the patient's need for medical -----  
          treatment?

CONFIDENCE RATING

M10   Is the above information significantly distorted by -----  
          Patient's misrepresentation

M11   Patient's inability to understand? -----

---

EMPLOYMENT/SUPPORT STATUS

E1    Education completed -----/-----  
          YRS.   MOS

E2    Training or technical education completed. -----/-----  
          MOS

E3    Do you have a professional, trade or skill? 0-No 1- -----  
          Yes

E4    Do you have a valid driver's license? 0-No 1-Yes -----

|     |                                                                                                                                                                                                                             |                         |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| E5  | Do you have an automobile available for use? 0-No 1-Yes                                                                                                                                                                     | -----                   |
| E6  | How long was your longest full-time job?                                                                                                                                                                                    | -----/-----<br>YRS. MOS |
| E7  | Usual (or last) occupation                                                                                                                                                                                                  | -----                   |
| E8  | Does someone contribute to your support in any way?                                                                                                                                                                         | -----                   |
|     | 0-No 1-Yes                                                                                                                                                                                                                  |                         |
| E9  | Only if item E8 is yes). 0-No 1-Yes<br>Does this constitute the majority of your support?                                                                                                                                   | -----                   |
| E10 | Usual employment pattern past 3 years<br>1.full time (40 hrs/wk)<br>2.part time(reg.hrs)<br>3. part time (irreg.daywork)<br>4.Student<br>5.service<br>6.retires/disability<br>7. unemployed<br>8. in controlled environment | -----                   |
| E11 | How many days were you paid for working in the past 30 days                                                                                                                                                                 | -----                   |
| E12 | Employment net income                                                                                                                                                                                                       | -----                   |
| E13 | Unemployment compensation                                                                                                                                                                                                   | -----                   |
| E14 | DPA                                                                                                                                                                                                                         | -----                   |
| E15 | Pension benefits or social security                                                                                                                                                                                         | -----                   |
| E16 | Mate family or friends (Money for personal expenses)                                                                                                                                                                        | -----                   |
| E17 | Illegal                                                                                                                                                                                                                     | -----                   |

E18 How many people depend on you for the majority of their food, shelter, etc? -----

E19 How many days have you experienced employment problems in the past 30 days? -----

FOR QUESTIONS E20 & E21 PLEASE ASK PATIENT TO USE THE PATIENT'S RATING SCALE

E20 How troubled or bothered have you been by these employment problems in the past 30 days -----

E21 How important to you now is counselling for these employment problems? -----

INTERVIEWER SEVERITY RATING

E22 How would you rate the patient's need for employment counselling? -----

CONFIDENCE RATINGS

E23 Is the above information significantly distorted by Patient's misrepresentation? 0-No 1-Yes -----

E24 Patient's inability to understand? 0-No 1-Yes -----

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DRUGS/ALCOHOL USE

D1 Alcohol-Any use at all -----

D2 Alcohol-To intoxication -----

D3 Heroin -----

D4 Methadone -----

D5 Other opiates/analgesics -----

|     |                                                                                                                                                                  |       |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| D6  | Barbiturates                                                                                                                                                     | ----- |
| D7  | Other sed./hyp./tranq.                                                                                                                                           | ----- |
| D8  | Cocaine                                                                                                                                                          | ----- |
| D9  | Amphetamines                                                                                                                                                     | ----- |
| D10 | Cannabis                                                                                                                                                         | ----- |
| D11 | Hallucinogens                                                                                                                                                    | ----- |
| D12 | Inhalants                                                                                                                                                        | ----- |
| D13 | More than one substance per day (including alcohol)                                                                                                              | ----- |
| D14 | Which substance is the major problem? <i>Code as per above 00 for no problem 15-Alcohol &amp; Drug (drug addiction) 16 Polydrug when not clear, ask patient.</i> | ----- |
| D15 | How long was your last period of voluntary abstinence from this major substance? (00 -never abstinent)                                                           | ----- |
| D16 | How many months ago did this abstinence end? (00-still abstinent)                                                                                                | ----- |
|     | How many times have you                                                                                                                                          |       |
| D17 | Had alcohol d.t.'s (detoxification)                                                                                                                              | ----- |
| D18 | Overdosed on drugs                                                                                                                                               | ----- |
|     | How many times in your life have you been treated for                                                                                                            |       |
| D19 | Alcohol Abuse                                                                                                                                                    | ----- |
| D20 | Drug Abuse                                                                                                                                                       | ----- |

How many of these were detox only?

D21 Alcohol -----

D22 Drugs -----

D23 How much would you say you spent during the  
past 30 days on -----

Alcohol -----

D24 Drugs -----

D25 How many days have you been treated in an  
outpatient setting for alcohol or drugs in the past  
30 days (Include NA, AA) -----

How many days in the past 30 have you  
experienced -----

D26 Alcohol problems -----

D27 Drugs problem -----

FOR QUESTIONS D28-D31 PLEASE ASK  
PATIENT TO USE THE PATIENT RATING  
SCALE

D28 Alcohol Problems -----

D29 Drugs Problem -----

How important to you now is treatment for these

D30 Alcohol Problems -----

D31 Drugs Problem -----

INTERVIEWER SEVERITY RATING

How would you rate the patient's need for  
treatment for

D32 Alcohol Problems -----

D33 Drugs Problem -----

CONFIDENCE RATINGS

Is the above information significantly distorted by

D34 Patient's misrepresentation? 0-No. 1-Yes -----

D35 Patient's inability to understand? 0-No. 1-Yes -----

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LEGAL STATUS

L1 Was this admission prompted or suggested by the  
criminal justice system (judge/probation/parole  
officer etc) 0-No. 1-Yes -----

L2 Are you on probation or parole? 0-No 1 Yes -----

How many times in your life have you been  
arrested and charged with the following:

L3 Shoplifting/Vandalism -----

L4 Parole Violation -----

L5 Drug charges -----

L6 Forgery -----

L7 Weapon offense -----

L8 Burglary, larceny, B&E -----

L9 Robbery -----

L10 Assault -----

L11 Arson -----

L12 Rape -----

- |     |                                                                                 |       |
|-----|---------------------------------------------------------------------------------|-------|
| L13 | Homicide, manslaughter                                                          | ----- |
| L14 | Prostitution                                                                    | ----- |
| L15 | contempt of court                                                               | ----- |
| L16 | Other                                                                           | ----- |
| L17 | How many of these charges resulted in convictions?                              | ----- |
|     | How many times in your life have you been charged with the following            |       |
| L18 | Disorderly conduct, vagrancy public intoxication                                | ----- |
| L19 | Driving while intoxicated                                                       | ----- |
| L20 | Major driving violations (reckless driving, speeding, no license, etc.)         | ----- |
| L21 | How many months were you incarcerated in your life?                             | ----- |
| L22 | How long was your last incarceration                                            | ----- |
| L23 | What was it for (use code 3-16, 18-20. If multiple charges, code most severe)   | ----- |
| L24 | Are you presently waiting charges trial or sentence? 0-No 1-Yes                 | ----- |
| L25 | What for (if multiple charges use most severe)                                  | ----- |
| L26 | How many days in the past 30 were you detained or incarcerated?                 | ----- |
| L27 | How many days in the past 30 have you engaged in illegal activities for profit? | ----- |

FOR QUESTIONS L28&L29 PLEASE ASK  
PATIENT TO USE THE PATIENT RATING  
SCALE

L28 How serious do you feel your present legal position  
are? (Exclude civil problem) -----

L29 How important to you now is counselling or  
referral for this legal problem? -----

INTERVIEWER SEVERITY RATING

L30 How would you rate the patient's need for legal  
services or counselling? -----

CONFIDENCE RATINGS

Is the above information significantly distorted by

L31 Patient's misrepresentation? 0-No. 1-Yes -----

L32 Patient's inability to understand? 0-No. 1-Yes -----

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FAMILY/SOCIAL RELATIONSHIPS

F1 Marital Status  
1-Married 4-Seperated  
2-Remarried 5-Divorced -----  
3-Widowed 6-Never Married

F2 How long have you been in this marital status? (If  
never married, since age 18). -----

F3 Are you satisfied with this situation? 0-No 2 –  
Indifferent 3-Yes -----

F4 Usual living arrangements (past 3 yrs)  
1-With sexual partner and children  
2- With sexual partner alone  
3-With children alone  
4-With parents  
5-With family  
6- With friends  
7- Alone  
8- Controlled environment

|                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                          |       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 9-No stable arrangements                                                                 | ----- |
| F5                                                                                                                                                                                                                                                                                                                                                                                                                                                     | How long have you lived in these arrangements. (If with parents or family since age 18). | ----- |
| F6                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Are you satisfied with these living arrangements?<br>0-No 2 – Indifferent 3-Yes          | ----- |
| F7                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Has a current alcohol problem?                                                           | ----- |
| F8                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Uses non-prescribed drugs?                                                               | ----- |
| F9                                                                                                                                                                                                                                                                                                                                                                                                                                                     | With whom do you spend most of your free time:<br>1-Family<br>2- Friends<br>3- Alone     | ----- |
| F10                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Are you satisfied with spending your free time this way? 0-No 2 – Indifferent 3-Yes      | ----- |
| F11                                                                                                                                                                                                                                                                                                                                                                                                                                                    | How many close friends do you have?                                                      | ----- |
| <p>Direction for F12-F26: Place “0” in relative category where the answer is clearly no for all relatives in the category; “1” where the answer is clearly yes for any relative within the category; “X” where the answer is uncertain or “I don’t know” and “N” where there never was a relative from the category.</p> <p>Would you say you have had close, long lasting, personal relationships with any of the following people in your life.:</p> |                                                                                          |       |
| F12                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Mother                                                                                   | ----- |
| F13                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Father                                                                                   | ----- |
| F14                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Brother/Sisters                                                                          | ----- |
| F15                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Sexual Partner/Spouse                                                                    | ----- |
| F16                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Children                                                                                 | ----- |

|     |                                                                                                     |              |              |
|-----|-----------------------------------------------------------------------------------------------------|--------------|--------------|
| F17 | Friends                                                                                             | -----        |              |
| F18 | Have you had significant periods in which you have experienced serious problems getting along with: | Past 30 days | In your life |
|     | Mother                                                                                              | -----        | -----        |
| F19 | Father                                                                                              | -----        | -----        |
| F20 | Brother/Sisters                                                                                     | -----        | -----        |
| F21 | Sexual partner/spouse                                                                               | -----        | -----        |
| F22 | Children                                                                                            | -----        | -----        |
| F23 | Other significant Family                                                                            | -----        | -----        |
| F24 | Close friends                                                                                       | -----        | -----        |
| F25 | Neighbours                                                                                          | -----        | -----        |
| F26 | Co-Worker                                                                                           | -----        | -----        |
|     | Did any of these people(F18-F26) abuse you: 0-No. 1-Yes                                             |              |              |
| F27 | Emotionally (make you feel bad through harsh words)?                                                | -----        | -----        |
| F28 | Physically (cause you physical harm)                                                                | -----        | -----        |
| F29 | Sexually (force sexual advances or sexual acts)?                                                    | -----        | -----        |
|     | How many days in the past 30 days have you had serious conflicts:                                   |              |              |
| F30 | With your family?                                                                                   | -----        |              |
| F31 | With other people? (excluding family)                                                               | -----        |              |

FOR QUESTIONS F32-F35 PLEASE ASK  
PATIENT TO USE THE PATIENT'S RATING  
SCALE

How troubled or bothered have you been in the  
past 30 days by these:

F32 Family problems -----

F33 Social problems -----

How important to you now is treatment or  
counselling for these:

F4 Family problems -----

F35 Social problems -----

INTERVIEWER SEVERITY RATING

F36 How would you rate the patient's need for family  
and/or social counselling? -----

CONFIDENCE RATINGS

F37 Is the above information significantly distorted by:  
  
Patient's misrepresentation? 0-No. 1-Yes -----

F38 Patient's inability to understand? 0-No. 1-Yes -----

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PSYCHIATRIC STATUS

How many times have you been treated for any  
psychological or emotional problems?

P1 In a hospital -----

P2 As an Opt. or Priv. patient -----

P3 Do you receive a pension for a psychiatric faculty?  
0-No 1- Yes -----

Past In  
30 your  
Days life

|                                                                                       |                                                                                                                         |       |       |
|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|-------|-------|
| P4                                                                                    | Have you had significant period, (that was not a direct result of drugs/alcohol use), in which you have.<br>0-No. 1-Yes | ----- | ----- |
|                                                                                       | Experienced serious depression                                                                                          |       |       |
| P5                                                                                    | Experienced serious anxiety or tension                                                                                  | ----- | ----- |
| P6                                                                                    | Experienced hallucinations                                                                                              | ----- | ----- |
| P7                                                                                    | Experienced troubled understanding, concentrating or remembering                                                        | ----- | ----- |
| P8                                                                                    | Experienced trouble controlling violent behaviour                                                                       | ----- | ----- |
| P9                                                                                    | Experienced serious thoughts of suicide                                                                                 | ----- | ----- |
| P10                                                                                   | Attempted suicide                                                                                                       | ----- | ----- |
| P11                                                                                   | Been prescribed medication for any psychological emotional problem                                                      | ----- | ----- |
| P12                                                                                   | How many days in the past 30 days have you experienced these psychological/emotional problems?                          | ----- |       |
| <u>FOR QUESTIONS P13&amp;P14 PLEASE ASK PATIENT TO USE THE PATIENT'S RATING SCALE</u> |                                                                                                                         |       |       |
| P13                                                                                   | How much have you been troubled or bothered by these psychological or emotional problems in the past 30 days            | ----- |       |
| P14                                                                                   | How important to you now is treatment for these psychological problems?                                                 | ----- |       |
| <u>THE FOLLOWING ITEMS ARE TO BE COMPLETED BY THE INTERVIEWER</u>                     |                                                                                                                         |       |       |
| P15                                                                                   | At the time of the interviewer, is patient: 0-No. 1-Yes<br>Obviously depressed withdrawn                                | ----- |       |

- P16 Obviously hostile -----
- P17 Obviously anxious/nervous -----
- P18 Having trouble with reality testing thought disorders, paranoid thinking -----
- P19 Having trouble comprehending, concentrating, remembering. -----
- P20 Having suicidal thoughts -----

INTERVIEWER SEVERITY RATING

- P21 How would you rate the patient's need for psychiatric/psychological treatment? -----

CONFIDENCE RATINGS

- P22 Is the above information significantly distorted by: -----  
Patient's misrepresentation? 0-No. 1-Yes
- P23 Patient's inability to understand? 0-No. 1-Yes -----

## APPENDIX – V

### MZU Human Ethics Committee Approval



#### Human Ethics Committee MIZORAM UNIVERSITY

A Central University  
(Accredited by NAAC with "A Grade")  
Aizawl - 796 004, Mizoram, India

No. MZU/HEC/2024/024

Dated: 17/06/2024

To  
Sangila Dorjee  
Department of Clinical Psychology  
Mizoram University  
Aizawl, Mizoram

The Human Ethics Committee in its meeting held on 17. 06. 2024 has reviewed and discussed your application to conduct the project entitled: "**Psychopathological Symptoms of Persons under Opioid Substance Therapy :An Observational Study**".

#### The following documents were reviewed:

- Proposal for Ethics Committee and trial protocol (including protocol amendments)/ project.
- Participant/ Patient Information Sheet and Informed Consent Form (including updates if any)in, English and/ or vernacular language.
- Current CV of investigator(s).
- Insurance Policy/Compensation for participation and for serious adverse events occurring during the study participation, if any.
- DCGI/DBT/BARC/Hospital/ Centre approval letter/ submission letter, if any.

Decision of Committee: **Approved**

Member secretary  
Institutional Human Ethics Committee  
Mizoram University

Chairperson  
Institutional Human Ethics Committee  
Mizoram University

Prof. Zokaitluangi  
Dean,  
School Of Medical & Paramedical Sciences  
Mizoram University

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**Paper presentation in Seminar/Conference:**

- (i) International Conference on Emerging Trends in Psychological Interventions (Health and Allied Sciences): Future Prospects and Challenges organized by the School of Medical and Paramedical Sciences, Mizoram University from 14<sup>th</sup> to 16<sup>th</sup> Nov. 2023 (RCI CRE - Accredited)

*Topic:* Duration of Therapy and Psychological Distress among Individuals Under Opioid Substitution Therapy

- (ii) International Conference on Emerging Trends in Psychological Interventions (Health and Allied Sciences): Future Prospects and Challenges organized by the School of Medical and Paramedical Sciences, Mizoram University from 14<sup>th</sup> to 16<sup>th</sup> Nov. 2023 (RCI CRE - Accredited)

*Topic:* Somatisation and Depression among Individuals Under Opioid Substitution Therapy

- (iii) 6<sup>th</sup> International Conference of Mental Healthcare in India: Basics & Beyond organized by Shia P.G. College, Lucknow from 5<sup>th</sup> and 6<sup>th</sup> Oct. 2024 (RCI CRE - Accredited)

*Topic:* Age of Initiation and Current Psychopathology in Opioid Use Disorder under Treatment

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3. Dorjee,S., Moirangthem,Poulose,S. (2025) *Delineating the Psychopathy of Depression and hostility among individuals under Opioid Substitution Therapy.Mizoram University Journal of Humanities and Social Science*,11(2),309-319.ISSN(P)2395-7352



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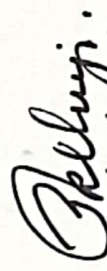
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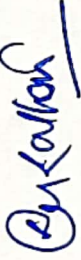
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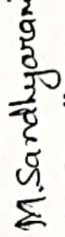
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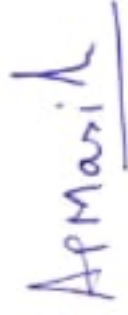
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## *Delineating the Psychopathy of Depression and hostility among individuals under Opioid Substitution Therapy*

Sangila Dorjee\*

Sandhyarani Moirangthem<sup>†</sup>

Sibi Poulose<sup>‡</sup>

### Abstract

*Opioid Substitution Therapy (OST) plays a crucial role in treating Opioid Dependency Syndrome, which has been linked to depression, anxiety, and pain-related issues (Mattick et al., 2008, 2009). This study aims to examine how the duration of OST influences the progression in symptomology of depression and hostility over time. The sample included 50 individuals aged 18 to 50 years ( $M=31.12$ ,  $SD=6.27$ ) with primary education up to the 8th standard, all enrolled in the OST program at Sikkim STNM Hospital. Data collection employed purposive sampling. Participants were grouped based on OST duration: less than 6 months and more than 24 months. The SCL-90 (R) by Leonard R. Derogatis (1994) assessed levels of anger/hostility and depression. Findings indicated a significant difference in depression levels: those with less than 6 months of OST experienced higher depression symptomology than those with over 24 months. Conversely, hostility levels were lower in the <6 months group compared to the >24 months group.*

**Keywords:** Hostility, depression, opioid substitution therapy, OST, opioid dependency syndrome

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## Introduction:

Opioid substitution therapy (OST), combined with psychosocial interventions, is the most widely used treatment for opioid dependence (EMCDDA, 2015). OST involves administering medications under medical supervision alongside psychosocial support to opioid-dependent injecting drug users, using long-acting opioid agonists. These medications help alleviate withdrawal symptoms and cravings without causing acute intoxication when used properly. They are typically given orally or sublingually. In 2007, OST was included as a harm reduction program for HIV prevention under the National AIDS Planning Program (NACP III). In the final phase, called the action phase, starting from 2007, methadone, along with buprenorphine, was introduced as an OST medication. The role of buprenorphine as an antidepressant has been widely accepted, with it being effective in major depressive disorder, along with handling suicidal ideation (Namjuk et al., 2023; Bachmann, 2018). Use of Buprenorphine effectively improves treatment adherence, lowers opioid use, prevents overdose deaths, reduces criminal activity and domestic violence, and enhances child care and family relationships, along with helping individuals regain productivity (Rao et al., 2014). However, while OST stabilises substance use, psychological symptoms such as **depression and hostility** frequently persist among individuals receiving treatment.

Long-term use of opioids is associated with a wide range of mental health conditions (Harris, 2022). Depression among individuals undergoing OST was reported among 52% of individuals undergoing OST (Rathi et al., 2024). Hostility has two key components, cynicism and mistrust, which are associated with depression. The cytokine level is positively linked to hostility in depressive dependent (Nygard-Odeh et al., 2025)

Hostility is part of a wide range of human behaviour, exhibited to adapt to one's situation or circumstances, deeming aggression as practical and creative; it can also be seen as harmful, destructive, and socially deplorable behaviour (Weiss et al., 2020). Aggression/Hostility is a part of

addiction disorder contributing to family discord and interpersonal conflict (Vojudi et al.,2014). Numerous studies have associated substance use with hostility. Substances like alcohol, cocaine, amphetamine, opioid and cannabis (Beck et al.,2014; Boles et al., 2003). Many studies have substantiated that opioid users undergoing treatment have a high level of anger-hostility at the initiation of the treatment (Weiss et al., 2020). Individuals with high anger and hostility tend to ignore the problem, ultimately affecting their recovery process as they tend to get triggered easily, with high relapse potential.

Patients with OUD frequently experience challenges in emotional regulation (Zengin et al., 2023). Substance use may directly and indirectly influence behaviour—either through disinhibition during intoxication or via social context and personality traits (Hoaken et al., 2003). Persistent immune and neuroinflammatory activation brought on by long-term opioid exposure, ongoing psychosocial stress, and co-occurring psychopathology is probably the cause of elevated cytokine levels in OST patients(Nygard-Odeh et al.,2025). Duration of OST has an impact on cytokine levels. The immune function demonstrated by cytokine expression can be restored to the normal range after OST (Lu et al.,2019).

Despite the effectiveness of OST in managing opioid dependence, the persistence of depression has important clinical implications, including poorer quality of life, reduced treatment satisfaction, and potential impact on long-term recovery outcomes. Understanding the nature and correlates of depression among individuals receiving OST is therefore essential for informing integrated treatment approaches that address both substance use and mental health needs. Psychosocial stressors play a central role in the persistence of depression and hostility during OST. Long-term engagement in treatment may be accompanied by stigma, unemployment, family conflict, and treatment fatigue, which can foster feelings of demoralisation, frustration, and resentment. Importantly, as intoxication and withdrawal-related symptoms diminish with sustained OST, underlying affective

dysregulation may become more apparent. The persistence of depression and hostility has significant clinical implications, including poorer quality of life, interpersonal difficulties, and reduced treatment satisfaction, underscoring the need for integrated treatment approaches that address both substance use and co-occurring psychological distress.

The current study aimed to assess the symptomology of depression and hostility among individuals undergoing OST accordingly to the duration of treatment according to the SCL-90-R.

The hypothesis for the study was outlined in accordance with the objective of the study

There will be a difference between the symptomology of depression and hostility according to the duration of OST of less than 6 months and more than two years.

## **Research Methods**

Fifty (50) patients with Opioid Use Disorder (OUD) under the OST programmes were randomly selected from the OST Centre in STNM Hospital, Gangtok, Sikkim. Permission was obtained from the authorities of the OST programme Centres. Socio-demographic details were presented after the participants were informed that their involvement was entirely voluntary. They were provided assurance of confidentiality regarding any shared information or personal details. Thereafter, the purpose of the present research study was explained, and informed consent was obtained accordingly. The present study was approved by the Human Ethics Committee of Mizoram University (MZUHEC) in compliance with the ethical guidelines for conducting a research study on human subjects to safeguard the sample.

Twenty-five participants were under treatment for less than six months, and twenty-five were under treatment for more than two years. The ethical clearance was Socio-Demographic Data Sheet, and the symptom questionnaire SCL-90-R by Derogatis (1994) was used to evaluate depression and anger hostility among participants.

This is a cross-sectional, observational study with purposive sampling. The inclusion criteria were Male participants enrolled on OST. The minimum age was 18 years with a lower secondary education level. All the participants were undergoing OST with the use of buprenorphine.

The sample consisted of 50 male participants aged 18 to 50 years; the mean age is 31.12, and the SD is 6.27. The distribution of education levels showed that participants who had completed their lower secondary education were 35%, those with secondary education were 25%, those with higher secondary education were 17%, and those with a graduation degree were 23%. Among the participants, 60% were married, 2% were separated, and 38% were never married. According to their employment status, 15% were unemployed, and 85% were employed.

**Table 1: Mann-Whitney U Test results for depression symptomology in individuals in therapy for less than 6 months and more than 2 years**

| Variable                        | Group     | Mean rank | Z     | Sig           |
|---------------------------------|-----------|-----------|-------|---------------|
| <b>Loss of sexual interest.</b> | <6months  | 21.34     | -     | <b>.029*</b>  |
|                                 | >24months | 29.66     | .2.19 |               |
| <b>Feeling low in energy.</b>   | <6months  | 29.26     | -2.62 | <b>.009**</b> |
|                                 | >24months | 21.74     |       |               |
| Thought of ending life.         | <6months  | 25.96     | -.429 | .668          |
|                                 | >24months | 25.04     |       |               |
| Crying easily.                  | <6months  | 25.62     | -.083 | .934          |
|                                 | >24months | 25.38     |       |               |
| Feeling of being trapped.       | <6months  | 23.44     | -1.12 | .262          |
|                                 | >24months | 27,56     |       |               |
| <b>Feeling lonely?</b>          | <6months  | 30.18     | -2.38 | <b>.017*</b>  |
|                                 | >24months | 20.82     |       |               |
| <b>Blaming yourself</b>         | <6months  | 30.44     | -2.57 | <b>.010**</b> |
|                                 | >24months | 20.56     |       |               |
| Feeling blue                    | <6months  | 24.34     | -.712 | .476          |
|                                 | >24months | 26.66     |       |               |
| Worrying to much                | <6months  | 27.30     | -.939 | .348          |

|                                  |           |       |              |              |
|----------------------------------|-----------|-------|--------------|--------------|
|                                  | >24months | 23.70 |              |              |
| <b>Feeling no interest</b>       | <6months  | 29.38 | <b>-1.96</b> | <b>.050*</b> |
|                                  | >24months | 21.62 |              |              |
| Feeling hopeless about future?   | <6months  | 27.96 | -1.39        | .163         |
|                                  | >24months | 23.04 |              |              |
| Feeling everything is an effort. | <6months  | 25.84 | -.190        | .849         |
|                                  | >24months | 25.16 |              |              |
| Feeling worthlessness.           | <6months  | 25.92 | -.235        | .814         |
|                                  | >24months | 25.08 |              |              |
| <b>Depression score.</b>         | <6months  | 29.50 | <b>-2.40</b> | <b>.016*</b> |
|                                  | >24months | 21.50 |              |              |

*Note: The Significance level is < .01\*\* and < .05\**

**Table 2: Mann-Whitney U Test results for symptomology of hostility in individuals in therapy for less than 6 months and more than 2 years**

| Variables                          | Duration  | Mean rank | Z      | Assymp sig        |
|------------------------------------|-----------|-----------|--------|-------------------|
| Feeling easily annoyed             | <6months  | 24.60     | -.480  | .631              |
|                                    | >24months | 26.40     |        |                   |
| <b>Temper outburst</b>             | <6months  | 18.84     | -3.450 | <b>&lt;.001**</b> |
|                                    | >24months | 32.16     |        |                   |
| Urges to beat hurt others          | <6months  | 27.82     | .1.266 | .206              |
|                                    | >24months | 23.18     |        |                   |
| <b>Urges to break smash things</b> | <6months  | 18.82     | -3.496 | <b>&lt;.001**</b> |
|                                    | >24months | 32.18     |        |                   |
| Frequent arguments                 | <6months  | 26.22     | -.432  | .666              |
|                                    | >24months | 24.78     |        |                   |
| <b>Shouting throwing things</b>    | <6months  | 19.92     | -3.169 | <b>.002**</b>     |
|                                    | >24months | 31.08     |        |                   |
| <b>Anger hostility</b>             | <6months  | 16.94     | -4.770 | <b>&lt;.001**</b> |
|                                    | >24months | 34.06     |        |                   |

*Note: The Significance level is  $< .01^{**}$  and  $< .05^{*}$*

### **Discussion:**

Buprenorphine, with its unique pharmacological profile as a partial agonist of  $\mu$ -opioid receptors, is a standard for the management of opioid use disorder. It has had a decade-long acceptance for its antidepressant and mood-elevating properties (Bhavindkar et al., 2024; Emrich, 1982). The use of buprenorphine in low dosage has been effective as a treatment for depressive disorder (Riblet et al., 2023). The psychological intervention was received in accordance with the OST also plays a role in the outcome.

The present study was an attempt to explore the symptomology of depression according to the duration of treatment of individuals under OST. Table 1 shows the results, which indicate that there was a significant difference in symptomology of loss of sexual interest among the individuals who had been in treatment for longer than 2 years. Symptomology of Low energy, feeling lonely, blaming yourself and no interest were mostly seen more often among individuals under treatment for less than 6 months. This can be attributed to the long-term misuse of opioids. This finding is supported by the finding that a higher level of depressive symptomology was found in individuals with opioid use disorder as compared to individuals undergoing OST (Jomehpour et al., 2022). Thus highlighting the mood-elevating and antidepressant characteristics of buprenorphine. There are differences in symptomology of depression, being significantly affected by the duration of therapy, with the significance value being .016, indicating that there is a significant difference in the level of depression and duration of treatment. The loss of sexual interest was found to be more in participants with more than 2 years of treatment duration can be attributed to Opioid-induced suppression of the hypothalamic-pituitary-gonadal axis, which lowers gonadal hormone levels, and may account for decreased sexual interest in people on long-term buprenorphine-based OST (O'Rourke et al., 2016).

Evidence suggests that clinically significant reductions in testosterone and sexual functioning continue with extended treatment, despite buprenorphine's relatively favourable endocrine profile (Bliesener et al., 2005; Hallinan et al., 2008). Furthermore, dopaminergic reward dysregulation linked to long-term opioid exposure may reduce sexual motivation and interest (Koob & Volkow, 2016). Anhedonia and decreased libido in this population may be caused by ongoing inflammatory activation, according to new psychoneuroimmunological research (Raison et al., 2006).

Hostility symptoms evolve over the course of therapy among individuals undergoing OST. Table 2 presents the results, indicating that symptoms such as temper outbursts, urges to smash things, shouting, and throwing objects were primarily observed in individuals who had been in treatment for over two years, while symptomology of hostility such as urges to beat others and frequent argument although asymptotic were seen in individuals under treatment for 6 months suggests that less treatment duration depicts more anger towards others and overt behaviour while when the treatment duration is longer the overt behaviour is towards things and increased frustration this can be attributed to treatment fatigue (Dennis et al., 2005). There is a significant relationship between anger/hostility with an asymptotic p-value of  $<0.001$ . This aligns with the findings of Maremanni et al (2019), where a high level of aggression was reported at the treatment entry with assault dimension or behaviour of harming others, while Carlyle et al.'s (2020) findings reported a greater anger response following social exclusion in OST patients. Another study found that anger and hostility levels decreased after four months of treatment but noted no significant improvement in disruptive behaviours or self-concept (Smyth et al., 2018).

### **Conclusion:**

The current study shows that people receiving long-term opioid substitution therapy have higher levels of hostility and lower levels of depression, indicating that although OST successfully stabilises depressive

symptomology except for loss of sexual interest, serious emotional dysregulation may still exist, which starts affecting their interpersonal relationships. These results demonstrate that rather than full psychological recovery, extended treatment duration is linked to persistent emotional dysregulation. The persistence of hostility highlights the need for integrated treatment strategies that address affective distress and enhance overall treatment outcomes by combining pharmacological management with focused psychological interventions. The need to address the treatment fatigue, which makes the undertreatment individual in individuals receiving the OST, should not be undermined but taken in full accordance with which planning for that psychopharmacological intervention. An integrated treatment approach is needed

There are a number of limitations to consider when interpreting the results of this study. First, the cross-sectional design makes it impossible to conclude the causal relationship between the length of OST and hostility and depression. Second, conclusions about changes in hostility over time are limited by the lack of baseline (pre-OST) psychological data. Third, response and recall biases could affect the use of self-report measures (SCL-90-R). Fourth, there was no direct evaluation of biological correlates (such as hormone levels and inflammatory markers) that are thought to underlie hostility and depression. Lastly, the observed associations may have been distorted by unmeasured psychosocial factors like stigma, work status, and family conflict, polysubstance use, as well as differences in buprenorphine dosage and treatment compliance, which would have limited the findings' generalisability.

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# Intensity Of Psychological Distress And Extension Of Distress Symptomology Across Psychopathology Among Individuals Under Opioid Substitution Therapy

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**Abstract:** Opioid Substitution Therapy (OST) is an integral part of treatment for Opioid Dependency Syndrome. In the Indian state of Sikkim, OST started in 2012 under The National Aids Control Program (NACP III- 2006) to reduce the prevalence of ODS currently the program initiated gives an account of psychosocial and pharmacological intervention. The current study is an attempt to explore the association of duration of therapy (OST) with psychological distress, level of distress, and extension of symptoms of distress in individuals under opioid substitution therapy. Data was collected using purposive sampling. The sample comprised 60 individuals enrolled in the OST program at Sikkim STNM Hospital between the ages of 18 to 50 years ( $M=30.26$ ,  $SD=5.300$ ) and having primary education of 5<sup>th</sup> standard. The sample was divided into three groups according to the duration of participation in the OST Program, such as <12 months, between 13 to 36 months, and 37 to 96 months. The SCL-90 (R) by Leonard R. Derogatis, was used to assess the psychological distress of the sample. Statistical analysis of the research data showed significant differences in psychological distress, the level of psychological distress, and the extension of the symptoms in all three groups. This study has been undertaken to investigate the determinants of stock returns in Karachi Stock Exchange (KSE) using two assets pricing models the classical Capital Asset Pricing Model and Arbitrage Pricing Theory model. To test the CAPM market return is used and macroeconomic variables are used to test the APT. The macroeconomic variables include inflation, oil prices, interest rate and exchange rate. For the very purpose monthly time series data has been arranged from Jan 2010 to Dec 2014. The analytical framework contains.

**Index Terms** - Psychological distress, Opioid Substitution Therapy (OST), Opioid Dependency Syndrome

## I. INTRODUCTION

The current prevalence rate of Opioid use in India is 2.06%. Heroin is the most used opioid in India with 1.14%. pharmaceutical opioids followed them at 0.96% and opium at 0.52%. About 0.70% of Indians. are estimated to need help with their opioid use problem. In Sikkim, the use of pharma opioids and heroin is more prevalent (Ambekar et al.,2019). The regular use of opioids is associated with elevated rates of mood and anxiety disorders, conduct disorder, and borderline personality disorder. With the injection of these drugs. It is associated with high rates of pathology (Conway et al.,2006; Dark et al.,2008).

II. Previous studies have found a relationship between the diagnosis of substance dependence and psychological distress. Comorbid diagnosis and levels of individual substance use with the severity of pathology (Conway et al.,2006; Marsden et al., 2000; Nakama et al.,2008). Psychological distress is defined as a state of emotional suffering and is characterized by symptoms of loss of interest, sadness, hopelessness, anxiety, and Somatic symptoms. (Mirawsky & Ross, 2002). Psychological distress impacts an individual's social functioning and day-to-day living (Wheaton, 2007). The prevalence of compulsive behaviour and its role in the affective process is associated with addictive behaviour (Den Ouden et al., 2020). Opioid Substitution Therapy began in India with the use of buprenorphine for the treatment of opioid dependence in 1989 in the deaddiction centre of AIIMS, New Delhi after which a few of the NGOs also started the program in a community setting (Mohan et al.,2006).

III. A project supported by the Department of International Development; United Kingdom supported various centres in India for the prevention of HIV among Injecting Drug users (IDU). Under UNODC, Regional Office of South Asia with the help of the National Drug Dependence Treatment Centre (NDDTC), AIIMS started the study to validate OST in India (Ray et al.,2012). The National Aids Control Program (NACP III, 2006), "Strategy and Implementation Plan identified various harm reduction services to prevent HIV which included syringe exchanges, abscess management, condoms, and residential care. In 2010 NACP started the pilot program in Punjab (Ambekar et al.,2018). In Sikkim, the program commenced in 2012 (SSACS, 2012).

IV. This study highlights the association between duration in a therapy program and psychological distress as most studies evaluated outcomes relative to the index episode of care with only one or two of these factors. Unfortunately, hardly available studies estimated the duration of treatment and its association with psychological distress. Moreover, co-occurring psychiatric problems are associated with higher substance use severity, more intensive level of care placements, lower treatment participation, and worse outcomes (Angst et al., 2002; Enns et al., 2001; Grella, 2003).

## RESEARCH METHODOLOGY

The sample for the study was collected from the OST centre in STNM Hospital Gangtok, Sikkim. The sample was collected using the Purposive sampling method. Sixty samples were taken and the sample was divided into three groups based on the duration in the OST program for less than a year, 1-3 years, and more than three years. The Symptom Checklist 90 R (SCL-90-R) is a 90-item self-report symptom inventory developed by Leonard R. Derogatis in the mid-1970s to measure three parameters Global severity index GSI, the positive Symptom Distress index PSDI, and Positive Symptom Total.



V. The GSI measures psychological distress, while the PSDI reflects the level of distress reported as symptoms. The PST reflects IV. **RESULTS AND DISCUSSION**

Table 1: *Demographic details of the participants*

| Groups.        | 0-12 months | 13.36 months | 37-96 months |
|----------------|-------------|--------------|--------------|
| Age            |             |              |              |
| 22-30          | 9           | 15           | 11           |
| 31-43          | 11          | 5.           | 9            |
| Religion       |             |              |              |
| Christianity.  | 3           | 4            | 4            |
| Hinduism.      | 12          | 11           | 13           |
| Buddhism.      | 3           | 4            | 3            |
| Islamic        | 2           | 1            | 0            |
| Marital status |             |              |              |
| Married.       | 13          | 12.          | 9            |
| Unmarried.     | 7           | 7            | 11           |
| Separated.     | 0           | 1            | 0            |

**Table 2:** *Kruskal Wallis value, degree of freedom, and asymptomatic significance for all group*

| Mean rank        | PSDI   | PST     | GSI    |
|------------------|--------|---------|--------|
| 0-12mnths        | 38.85. | 37.08   | 39.98  |
| 13-36mnths       | 25.03  | 30.98   | 27.43  |
| 37-96mnths       | 27.63  | 23.45   | 24.10  |
| Kruskal Wallis H | 7.101  | 6.132   | 9.214  |
| df               | 2      | 2       | 2      |
| Assymp Sig       | .029*  | 0.047 * | .010** |

p>0.01\*\* p>0.05 \* level of significance

## Discussion

Studies in South Asia and the Middle East show a high lifetime prevalence of psychiatric disorders, especially depression and anxiety, and psychological distress among opioid users (De Maeyer et al., 2010). The results indicate an association between GSI psychological distress, PSDI the severity, and PST the extension of symptomology over all three groups of patients being treated for one year, 1-3 years, and three years and more. The mean rank of 39.98 for less than a year in the therapy group to 27.43 in 1 - 3 years in the therapy group and 24.10 in more than three years in the therapy group indicate that psychological distress is more in

individuals who are in therapy for less than one year. Hence, the duration of treatment has an association with psychological distress with the asymptomatic significance of .010. Opioid agonist medications are the first line of treatment for opioid use disorder that has a long history in the treatment of mood disorders even before antidepressants became available in the market (Stoll & Reuter, 1999).

Opioid-dependent patients with psychiatric comorbidities benefit from Opioid Agonist treatment targeting both mental issues and addictive problems. (Marmannani et al., 2011) Buprenorphine reduces the risk of dependence and has a therapeutic effect on depressed patients. (Emrich, 1984). Opioid agents act as anti-panic agents for anxiety disorder and are responsible for the prevention of psychotic relapse (Gold et al., 1982). Opioid agonists have been effective in controlling aggressive behaviours (Shaikh et al., 1990).

The mean rank of PDSI for less than a year in the therapy group is 38.85 and 25.03 in 1- 3 years in the therapy group. The mean rank in the more than three years group is 27.63, reflecting the level of distress higher in the less than a year group (Gorodokin, 2019), established structural and dynamic pathology symptoms in persons undergoing Opioid Substitution Therapy. The severity of mental disorders in the initial stage of pathogenesis was highly correlated.

The mean rank of PST In less than a year in the therapy group is 37.08 and 30.98 in 1-3 years in a therapy group. The mean rank for more than three years group in therapy is 23.45. This is indicative that Individuals in less than a year in therapy group have more extension of symptoms. The asymptomatic significance value of 0.047 is an indication that the duration of therapy is associated with the extension of this distressed symptomology.

## Conclusions

The study substantiates that the duration of therapy in OST decreases psychological distress and the intensity of distress. The longer the duration of therapy lower the psychological distress along with a lower intensity of distress level. Buprenorphine not only possesses an anti-craving activity but is also able to act as a psychotropic instrument in treating mental illness, with special reference to mood, anxiety, and psychotic syndromes (Maremmani et al., 2006). This study established an association between the treatment period and psychological distress. One year of treatment with opioid agonists works effectively for the psychiatric well-being of opioid-dependent patients. (Marmmani et al., 2011).

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## Addiction Severity and Psychopathology in Persons with Substance Use Disorder under Opioid Substitution Therapy

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### ABSTRACT

**Background:** Opioid substitution therapy (OST) is widely used as an effective pharmacological intervention program to address substance use disorders. This study focused on examining the severity of substance use disorder and psychopathology among persons diagnosed with substance use disorder who are under opioid substitution therapy.

**Methods:** 60 individuals under the OST program participated from the OST Centre in STNM Hospital Gangtok Sikkim. A total sample of 60 was drawn using purposive sampling which was further divided into two groups based on the composite score in the drugs parameter in the Addiction Severity Index ( $<0.36$  and  $>0.37$ ) according to the mean score obtained. The Addiction Severity Index by McLellan (1980) and the Symptom 90 questionnaire SCL-90-R by Derogatis (1983) were used to evaluate the addiction severity and psychopathology. Results were statistically analyzed using the Mann-Whitney U Test.

**Results:** Somatization, Hostility, and Phobic anxiety are parameters of psychopathology, which are significant at 0.05 level, with individuals having higher severity in addiction with greater mean rank. "Obsessive Compulsive", "Depression", "Phobic anxiety", "Paranoid Ideation", "Psychoticism", and "Global Severity Index", which depict psychological distress, are significant at 0.01 level with individuals with higher severity in addiction with greater mean rank than individuals with lower severity.

### Keywords

Addiction severity, Opioid substitution therapy (OST), Psychopathology, Substance use disorder (SUD)

### INTRODUCTION

Addiction is a maladaptive pattern of substance use leading to clinically significant psychological distress. The nosography defines addiction as the presence of core symptoms such as compulsive substance-seeking behaviour, a continuation of use despite consequences, reduction of other interests and activities, craving, decontrol, and lastly, psychiatric comorbidity (APA, 2000). There is persistent uncertainty in the classification of psychiatric symptoms. As per Morisano et al. (2014), there are five ways to understand addiction concerning psychopathology: 1) Psychopathology, which increases the probability of drug abuse, 2) Drug abuse increases the probability of psychopathology, 3) Overlaying genetic vulnerabilities, 4) Bidirectional consequential association between the two, and 5) Etiological independence.

Numerous research suggests an association between the severity of substance use and higher levels of mental distress. There is a connection between the present level of severity of substance use and lifetime mental disorders with their effect on mental distress; hence, the importance of treatment that integrates both mental health

disorders and substance use is critical for improvement in long-term prognosis (Hjemseter et al., 2019; Morisano et al., 2014; Lai et al., 2015; Regier et al., 1990). This relationship between substance use disorder and psychological distress is vital as the issues related to psychological distress adversely influence the treatment or the recovery process (Kavanagh & Connolly, 2009). Psychological distress is particularly more profound in those with severe substance use disorder. Many studies report that individuals undergoing treatment for substance use disorder (SUD) have co-occurring mental health problems (Chi et al., 2005; Chan et al., 2008).

The archetype of multiple drug use increases psychological distress. It can be understood that elevation in drug use or psychological distress can heighten the other as the two are linked inversely (Fleming et al., 2008). A higher frequency of use was linked with greater psychiatric severity (Chi & Weisner, 2008). Patients seeking treatment for multiple drug use have more significant levels of depression and suicidal tendencies at treatment admission than single substance users. Multiple drug users showed higher psychiatric comorbidities in the Australian sample (Lynskey et al., 2006), and as the drug abuse increased, so did the psychological distress (Booth et al., 2010).

Previous studies confirmed a high prevalence of psychopathology among opioid users (Darke et al., 1992). Affective disorder in substance abuse and depressive disorder having a prevalence rate of 74% are associated with poor social functioning.

It has been substantiated by numerous studies that substance use disorder has an inversely proportional relationship with psychological distress. This study attempts to incorporate patients under treatment for opioid use disorder with the level of severity of addiction and psychological distress. Individuals with higher levels of severity were more likely to re-enter treatment, around 80% of the people entering SUD treatment were with one or more co-occurring psychiatric disorders (Bakken et al. 2007). Co-occurring psychiatric problems are associated with higher levels of severity in substance use, intense level of care requirement, lower level of treatment participation, and worse results (Angst et al., 2002). The purpose of this study was to evaluate the addiction severity in individuals under the OST program and evaluate the nine parameters of psychopathological symptoms, namely “somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism”, according to the severity index of addiction.

## **METHODS**

**Sample:** A total number of 60 samples diagnosed with substance use disorder undergoing the OST program from the OST Centre in STNM Hospital, Gangtok, Sikkim participated in the present study. The sample was separated into two groups of low severity index ( $<0.36$ ) and high severity index ( $>0.37$ ) of addiction according to the mean composite score of Addiction Severity Index in persons under OST. The present study used a descriptive research design, and sampling was done using a purposive sampling technique. The following research objective of the present study is to study the nine parameters of psychopathological symptoms, namely “somatisation, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism”, in persons with substance use disorder under the OST Program based on the addiction severity index. The tools used for assessment were The Addiction Severity Index (ASI -6) by McLellan 199 and The Symptom Checklist Questionnaire (SCL-90-R) a self-report symptom inventory with 90 items, developed by Leonard R. Derogatis in 1994 to measure psychological symptoms and psychological distress. The SCL-90-R has internal consistency reliability with Cronbach’s alpha coefficients ranging from 0.78 to 0.96.

## **Procedure:**

Data was collected individually from a clinical setting (hospital), and the test administration took 40 to 45 minutes for the Addiction Severity Index and 10 to 15 minutes for SCL-90 R.. After the data collection, scoring and coding were done with the help of statistical software IBM SPSS version-20 for further analysis. Mann-Whitney U Test was performed to study the significant difference in nine parameters of psychopathology based on the high and low addiction severity index of persons with SUD under the OST program.

**RESULTS****Table 1:** Results showing Mann-Whitney U test for parameters of psychopathology of the sample based on severity index of addiction

| Parameters of Psychopathology | Groups        | Mean Rank | Mann-Whitney U | Z-Score | Assymp Sig        |
|-------------------------------|---------------|-----------|----------------|---------|-------------------|
| Somatization                  | Low severity  | 27.00     | 345.000        | -2.175  | <b>.030*</b>      |
|                               | High severity | 34.00     |                |         |                   |
| Obsessive Compulsive          | Low severity  | 24.50     | 270.000        | -3.188  | <b>.001**</b>     |
|                               | High severity | 36.50     |                |         |                   |
| Interpersonal Sensitivity     | Low severity  | 27.50     | 360.000        | -1.550  | .121              |
|                               | High severity | 33.50     |                |         |                   |
| Depression                    | Low severity  | 24.00     | 255.000        | -3.330  | <b>&lt;.001**</b> |
|                               | High severity | 37.00     |                |         |                   |
| Anxiety                       | Low severity  | 27.50     | 360.000        | -1.737  | 0.82              |
|                               | High severity | 33.50     |                |         |                   |
| Hostility                     | Low severity  | 26.50     | 795.000        | -2.053  | <b>.040*</b>      |
|                               | High severity | 34.50     |                |         |                   |
| Phobic Anxiety                | Low severity  | 26.50     | 330.000        | -2.173  | <b>.030*</b>      |
|                               | High severity | 34.50     |                |         |                   |
| Paranoid Ideation             | Low severity  | 24.00     | 255.000        | -3.345  | <b>&lt;.001**</b> |
|                               | High severity | 37.00     |                |         |                   |
| Psychoticism                  | Low severity  | 26.50     | 330.000        | -2.560  | <b>.010*</b>      |
|                               | High severity | 34.50     |                |         |                   |
| Global Severity Index         | Low severity  | 23.00     | 225.000        | -3.950  | <b>&lt;.001**</b> |
|                               | High severity | 38.00     |                |         |                   |

$N = 60$ ;  $p < 0.05^*$ ,  $p < 0.01^{**}$

Table 1 shows the differences in psychopathological symptoms in persons with SUD based on the high and low severity index of addiction. Results reveal that high and low addiction severity in persons with SUD did not differ significantly in interpersonal sensitivity and anxiety.

However, the findings of the present study indicate that the four parameters of psychopathological symptoms as Obsessive-Compulsive, Depression, Paranoid Ideation, and Psychoticism, are significant at 0.01 level which indicates that the persons with higher addiction severity experience greater Obsessive Compulsive, Depression, Paranoid Ideation and Psychoticism as compared to persons with low addiction severity.

The Global Severity Index which depicts the psychological distress level also is significant at .01 level indicating that persons with higher addiction severity have more psychological distress as compared to persons with lower addiction severity.

Furthermore, findings reveal that somatization, hostility, and phobic anxiety differ significantly at 0.05 level of significance in persons with high addiction severity and low addiction severity, which confirms that high addiction severity persons experience a greater amount of somatization, hostility and phobic anxiety

**Discussion:** The present study explored the index of addiction severity and psychopathology in persons with SUD under the OST program. Sixty samples were drawn using purposive sampling and data was collected from an OST Center based in one of the North-East Indian states. The findings of the present study demonstrated high levels of psychological distress and psychopathological symptoms in individuals with high addiction severity under the OST. Substance use disorder and its comorbidity with anxiety and depression can be linked to a complex range of factors from biological to cultural and societal. Previous studies have found a high prevalence of psychopathology among Substance users (Darke et al.,1992). According to Hartz et al. (2014), the prevalence of substance use disorders in severe psychopathological conditions was underestimated in different social and

cultural contexts and the comorbidity of substance use disorders with severe behaviour or psychotic illnesses among multi-ethnic samples was high. Individuals with severe psychotic disorders had increased risks of substance use disorders compared to those with mild mental illness, and the findings of this study align with those of Hartz et al. among the individuals under OST in the state of Sikkim, India.

Rabinowitz et al. (1998) examined the severity and prevalence of substance use disorders and the onset of psychotic illness among multiple samples. In their study, the severity of substance abuse did not appear to be a pivotal correlate of the onset of psychotic illness. The findings of this study contradicted the findings of Rabinowitz et al. and demonstrated high levels of psychological distress and psychopathology in individuals with high addiction severity under OST. Studies also showed that the onset of psychotic symptoms occurred after many years of substance abuse (Strakowski et al., 1995).

Studies showed that the elevation of either mental distress or drug use could lead to the escalation of both constructs because they are linked. Active poly-drug use and mental stress affected the dose response where mental distress increased both in severity and the number of drugs used (Andreas et al., 2015); therefore, multiple drug use and the level of psychopathological distress are strongly co-related. Individuals with severe poly-substance use disorders also have more psychopathological problems compared to patients with less severe substance use disorder patients. Substance use disorders were associated with higher levels of psychopathological distress, like having lifetime affective, anxiety, and personality disorders (Hjemsæter et al., 2020). In their study, Erga et al. (2021) found that stable abstinence had a lower baseline SCL-90-R score. They found that increased levels of psychological distress indicate an increased risk of relapses among patients with SUD. This study's findings align with those of Erga et al. (2021).

Individuals who are dependent on various substances often have problems in various domains of life like employment, interpersonal relationships, physical and psychological health, and psychopathology (Colpaert et al., 2013). The severity of substance use disorder and other psychopathological disorders like anxiety, mood disorders, and personality disorders deteriorate the quality of life of individuals with SUDs (Lazano et al., 2017). Daigre et al. (2021) examined the treatment adherence and abstinence of patients with substance use disorders according to the severity of addiction and psychotic comorbidity through a first study. They found that dual diagnoses with psychotic illnesses were associated with short abstinence periods, and depressive disorders had shorter abstinence. Psychotic symptoms among substance use disorders usually manifest after repeated administration of psychostimulant drugs, showing a closer association between psychosis and substance use disorders due to a process of hyperdopaminergic status at the limbic level (Kapur, 2003; Pani et al., 2010). The findings of this study are consistent with the findings of other studies.

**Conclusion:** The finding of this study demonstrated high levels of psychological distress and psychopathology in individuals with high addiction severity under OST. The research findings suggest that individuals with dual diagnosis and dual dependence form a separate group of substance users with specific intervention and treatment needs. The higher level of severity of the addiction showed the lower level of quality of life (Colpaert et al., 2013). 'One size fit' programs like OST programs may not fulfil the purpose for all substance use. This paper suggests practical, individualized, specialized approaches to make OST programs more effective.

**Declaration:** The authors declare that there is no conflict of interest and no financial assistance acquired.

**Ethical Considerations:** Due permission was obtained from the hospital authority for data collection; staff and others involved were duly informed to conduct the test on the sample. Informed consent was obtained from the sample as they were briefed about the purpose of testing. Data collected were scrutinized with strict adherence and confidentiality protocol was maintained.



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## **ABSTRACT**

### **PSYCHOPATHOLOGICAL SYMPTOMS OF PERSONS UNDER OPIOID SUBSTITUTION THERAPY: AN OBSERVATIONAL STUDY**

**AN ASDTRACT SUBMITTED IN PARTIAL FULFILLMENT OF  
THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF  
PHILOSOPHY**

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**DEPARTMENT OF CLINICAL PSYCHOLOGY  
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**PSYCHOPATHOLOGICAL SYMPTOMS IN PERSONS UNDER OPIOID  
SUBSTITUTION THERAPY: AN OBSERVATIONAL STUDY**

**BY**

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**Submitted**

**In partial fulfillment of the requirement of the Degree of Doctor of Philosophy  
in Clinical Psychology of Mizoram University, Aizawl**

## **Introduction**

Opioid use disorder (OUD) is a chronic, relapsing condition marked by periods of remission, characterised by a loss of control over compulsive use and ongoing consumption despite negative consequences (Taylor et al., 2022). This complex disorder causes significant physical, psychological, and social impairments. It encompasses dependency and addiction to opioids, with addiction reaching a severe level (McLellan et al., 2000). Risk factors for adolescent age groups include early antisocial behaviour, depression, anxiety, academic failure, low socioeconomic status, delinquency, abuse, hyperactivity, and family substance history (Kilpatrick et al, 2000).

Opioid substitution therapy (OST) involves providing medications under medical supervision, along with psycho-social support, to opioid-dependent drug users using long-acting opioid agonists. These medicines relieve withdrawal symptoms and cravings without causing intoxication when used properly. They act slowly over at least 24 hours, are administered orally or sublingually for safety, and have known potency and purity. Medications are available free at government centres or hospitals, reducing legal issues and petty crimes, such as theft. OST is primarily a medical intervention carried out by healthcare staff (doctors and nurses) for assessment, diagnosis, treatment planning, monitoring, managing comorbidities, and terminating treatment. Prescribing the right medication dose for effective outcomes is essential. OST typically lasts months to years, helping clients stabilise chaotic lifestyles related to drug use and improve familial, social, and occupational functioning. It combines psychosocial interventions to enhance retention, rebuild family and social ties, and encourage employment, thereby reducing dropout rates.

In India, the 2006 NACP III strategy included harm reduction services, such as syringe exchanges and condom distribution. In 2010, a pilot program started in Punjab, followed by Sikkim in 2012. OST is seen as harm reduction for OUD patients, reducing drug-related harm without enforcing abstinence, thus lowering access barriers (Islam et al, 2013). Literature indicates that OST is used in mid- to long-term relapse prevention (Dennis et al., 2016).

Substance dependence, especially regarding age at onset, duration, and co-occurring psychiatric issues, is increasingly seen as a chronic, relapsing condition that may require extended care for sustained abstinence. There's a significant link between 'somatisation' and 'violence-suicide' among OST patients, with more severe psychopathological factors like 'worthlessness-being trapped,' 'somatic symptoms,' and 'panic anxiety' (Pani et al., 2014). Dependence correlates with a twofold increase in anxiety disorders and a fourfold increase in generalised anxiety disorder (Conway et al., 2016). Anxiety decreases with abstinence but doubles relapse risk when present (Rounsaville et al., 1997). Depressive symptoms are related to higher substance use (Crum et al., 2001). Recovery rates vary by gender, race, age at first use, treatment timing, history, patterns, and psychiatric disorders. Compulsive behaviours and affect regulation are also connected to addiction (Den Ouden et al., 2020).

### **Statement of the problem**

Research shows that the age of onset and drug use severity influence addiction trajectories (Anthony et al., 1995; Kendal et al., 1992). Those starting in adolescence often have more psychological and social difficulties and poorer treatment results compared to adult-onset users. Higher severity also causes more biopsychosocial damage, worsening symptoms and impairments. Few studies (Arora et al., 2021; Johnson et al., 2020) have explored how these variables independently and interactively affect outcomes in OST, particularly in India. This gap hinders the development of targeted interventions beyond medication. Understanding these relationships clarifies how developmental timing and severity contribute to ongoing psychological and functional issues during OST.

The present study aimed to examine how the age of onset and severity influence symptoms such as somatisation, anxiety, depression, and functional areas like medical and social status among OST participants. Recent research (Subodh et al., 2019; Schepis et al., 2017) indicates that dependence severity and age at first use impact long-term psychological symptoms. Early users often face emotional regulation issues and relationship sensitivities, while severe dependence is associated with ongoing physical and obsessive traits. Persistent symptoms can hinder treatment,

social reintegration, and recovery. Thus, analysing ongoing psychopathology based on age and severity of opioid use is crucial as it will help in identifying the treatment gaps and understanding biopsychosocial mechanisms to develop a combined pharmacological and psychosocial therapy.

The following research objectives and hypotheses were framed in the present study.

***Objectives:***

Considering the theoretical and methodological foundations of the research problem, the present study formulated the following objectives:

- O1: To study the difference in the onset age of substance use on psychopathological symptoms and the functional domain of progress in OST
- O2: To examine the severity level of drug use on psychopathological symptoms and the functional domain of progress in OST
- O3: To study the correlation between onset age, severity level, psychopathological symptoms and progress in OST among individuals with OUD undergoing OST
- O4: To study the impact of onset age and severity level of substance use on psychopathological symptoms and functional domains of progress in OST

***Hypotheses:***

- H1: There will be a significant difference between adolescent onset and adult onset on psychopathological symptoms and functional domains of progress in OST
- H2: There will be a significant difference between high severity and low severity of drug use on psychopathological symptoms and functional domains of progress in OST
- H3: There will be a significant positive correlation between “onset age of substance use”, “severity level of drug use”, “psychopathological symptoms” and “the functional domains of progress in OST”
- H4: There will be a significant interaction effect between onset age (adolescent vs adult) and severity level (high vs low) on psychopathological symptoms and the functional domain of progress in OST

## **Design**

A cross-sectional, correlational, observational study was conducted to assess the psychopathological symptoms and progress in individuals undergoing OST. A 2x2 between-group comparison was used to examine differences between two groups based on the onset age of substance use, as reported in the demographic details, and the severity level of drug use, calculated from the composite score for the last 30 days of the drug use domain of the ASI-5.

Given that the data involve ordinal and non-normally distributed scores from psychometric scales, nonparametric tests, such as the Chi-Square test and the Mann-Whitney U test, were conducted to examine the differences between groups. The Spearman's rho correlation was also used to identify statistically significant associations. The Kruskal-Wallis test was employed to assess the interaction effect between groups and the effect size (Acharya et al., 2013). This approach was chosen for its suitability in relation to the study's goals, its ability to detect group differences, and its practicality in clinical research settings where manipulating variables is neither ethical nor feasible (Salkind et al., 2010; Setia et al., 2016).

## **Sample**

The study focused on the OST (registered) centre at Sir Thuthop Namgyal Memorial Hospital (STNM), Gangtok, which is operated by the Department of Health and Family Welfare, Government of Sikkim. A sample of 80 male participants was selected using a purposive sampling technique. Participants aged 18-50 ( $M=30.72$ ,  $SD=5.60$ ) were included if diagnosed with OUD and on OST. They were split into two groups – 'adolescent onset' (before 18; 40 participants) and 'adult onset' (after 18; 40 participants), and data were further categorised by addiction severity: 20 low severity and 20 high severity per group. The inclusion criteria of the sample consisted of: Male individuals with OUD registered under the OST program, receiving Buprenorphine-based treatment, aged 18 to 50 years, with a history of more than 3 years of opioid use, and holding a lower secondary level of education.

## **Psychological tools used**

The symptom checklist questionnaire (SCL-90-R) developed by Derogatis et al. (1994) was used to assess a wide spectrum of psychopathological symptoms, parameters such as somatisation, obsessive-compulsive behaviours, interpersonal sensitivity, depression, anxiety, anger-hostility, phobic anxiety, paranoid ideation, and psychoticism and psychopathological conditions. Cronbach's alpha values for the SCL-90-R in the present study ranged from 0.766 to 0.890.

The Addiction Severity Index-5 (McLellan et al., 1992) was used to gather crucial information about an individual's life factors contributing to substance use across seven domains: Medical status, Employment status, Alcohol use status, Drug use status, Legal status, Family and social conflict status, and Psychiatric status. All domains are multidimensional, allowing clinicians and researchers to assess not only substance use itself but also its effects on various areas of daily functioning. In the present study's sample, the Cronbach's alpha of ASI-5 ranged from 0.752 to 0.951.

## **Procedure**

The sample was collected from STNM Hospital, Gangtok, under the Health and Family Welfare Department of the Government of Sikkim. After obtaining approval from the OST Centres, a consent form in compliance with the APA Ethics Code (2002) was used, along with a socio-demographic profile sheet, in addition to the SCL-90 R and ASI-5. Participants were informed about the voluntary nature of their participation, confidentiality, and the purpose of the research, and provided informed consent. Tests were administered individually in a quiet environment, with assistance provided as needed. Test booklets were checked for missing responses. Raw scores of the SCL-90-R were converted to t-scores, with scores above 60 indicating the 80th percentile. The functional domain of progress in OST was scored on the ASI-5, ranging from 0 to 1; scores of 0.50 or higher indicated high severity.

## **Statistical analyses**

Data were analysed using IBM SPSS (version 30). Descriptive statistics such as Mean, SD, frequency, and percentage were used to define the sample characteristics.

The reliability of the tests was assessed using Cronbach's alpha, which ranged from 0.752 to 0.971 for the ASI-5 and from 0.776 to 0.890 for the SCL-90-R, indicating adequate suitability for the present study. The Kolmogorov-Smirnov test was used to check data normality, guiding the choice between parametric and nonparametric tests. The Chi-Square test was used to examine the relationships between demographics, onset age, and severity. Mann-Whitney U tested the group differences in psychopathological symptoms and OST progress based on the onset age of substance use and the severity level of substance use. Spearman's rho was used to identify the correlations between the variables. The Kruskal-Wallis H test was used to compare the median scores across groups by onset age (adolescent/adult) and severity (high/low), as the data were non-normal and ordinal in nature.

### **Results and Discussion:**

The present study assessed the differences in the onset age of substance use on psychopathological symptoms and the functional domains of progress in OST. Findings revealed that individual participants with adolescent onset of substance use reported significantly higher mean rank scores compared to those with adult onset in several psychopathological domains: Somatisation,  $U = 420.00$ ,  $p < .001$ ,  $r = .47$ ; Obsessive-Compulsive,  $U = 600.00$ ,  $p = .008$ ,  $r = .30$ ; Interpersonal Sensitivity,  $U = 620.00$ ,  $p = .007$ ,  $r = .30$ ; Anxiety,  $U = 640.00$ ,  $p = .026$ ,  $r = .25$ ; Phobic Anxiety,  $U = 600.00$ ,  $p = .010$ ,  $r = .29$ ; and Paranoid Ideation,  $U = 600.00$ ,  $p = .008$ ,  $r = .30$ . The effect sizes ( $r$ ) ranged from .25 to .47, suggesting small to moderate effects according to Cohen (1988). These findings indicate that individuals who initiated substance use during adolescence exhibited more severe psychopathological symptoms, particularly somatisation, obsessive-compulsive features, interpersonal sensitivity, anxiety, and paranoid ideation, than those who initiated use in adulthood.

In the functional domains of progress in OST, the participants with adolescent onset of substance use scored significantly higher (indicating greater impairment) in Employment Status,  $U = 620.00$ ,  $p = .044$ ,  $r = .23$ , and Family/Social Conflict,  $U = 520.00$ ,  $p = .001$ ,  $r = .36$ . These results suggest poorer occupational and interpersonal functioning among the adolescent-onset group. The results suggest that adolescent

onset of substance use is associated with greater psychopathological distress and functional impairments. These findings highlight the developmental vulnerability of early-onset users, whose substance use may coincide with critical neuropsychological and social maturation periods, leading to more persistent psychosocial and emotional difficulties. Thus, the first hypothesis that there will be a significant difference between adolescent-onset and adult-onset on psychopathological symptoms and functional domains of progress in OST was accepted, as 6 out of 9 psychopathology parameters are significant, and 2 out of 6 functional domains of progress in OST were significant.

The second objective was to evaluate the severity level of drug use on the psychopathological symptoms and functional domains of progress in OST. The results indicated that participants with high substance use severity scored significantly higher on several psychopathological measures compared to those with low severity. Notably, significant differences were observed in Somatisation,  $U = 580.00$ ,  $p = .014$ ,  $r = .27$ , and Obsessive–Compulsive symptoms,  $U = 640.00$ ,  $p = .033$ ,  $r = .24$ , with higher severity linked to increased symptoms. No significant differences appeared in Interpersonal Sensitivity ( $U = 780.00$ ,  $p = .763$ ,  $r = .03$ ), Depression ( $U = 760.00$ ,  $p = .559$ ,  $r = .07$ ), Anxiety ( $U = 760.00$ ,  $p = .597$ ,  $r = .06$ ), Anger/Hostility ( $U = 700.00$ ,  $p = .174$ ,  $r = .15$ ), Phobic Anxiety ( $U = 760.00$ ,  $p = .608$ ,  $r = .06$ ), Paranoid Ideation ( $U = 720.00$ ,  $p = .287$ ,  $r = .12$ ), and Psychoticism ( $U = 740.00$ ,  $p = .292$ ,  $r = .12$ ). These results suggest that higher severity of substance use is significantly associated with increased somatic and obsessive–compulsive distress, while other domains did not differ significantly between the two groups. The effect sizes ranged from .24 to .27, indicating small-to-moderate effects (Cohen, 1988).

The functional domains of progress in OST revealed significant differences in Employment Status,  $U = 620.00$ ,  $p = .044$ ,  $r = .23$ ; Family Conflict,  $U = 600.00$ ,  $p = .023$ ,  $r = .25$ ; and Legal Status,  $U = 640.00$ ,  $p = .026$ ,  $r = .25$ . In each case, the high-severity group exhibited more impairment than the low-severity group, indicating that greater substance use severity was linked to worse occupational functioning, higher levels of family or interpersonal conflict, and increased legal issues. These results

imply that as the severity of substance use increases, individuals experience not only greater psychological symptom burden but also more pronounced disruptions in key functional domains of daily life. Thus, the second hypothesis, that there will be a significant difference between high severity and low severity of drug use on psychopathological symptoms and functional domains of progress in OST, was accepted as 2 out of 9 psychopathology parameters and 3 out of 6 functional domains of progress in OST were found to be statistically significant.

The third objective was to study the correlation between the onset age of substance use, severity level, psychopathological symptoms and progress in the functional domain of OST. To meet this objective, Spearman's rank-order correlation was used to see the correlation among all the variables. It was found that the onset age demonstrated significant negative correlations with multiple psychopathological domains. Earlier onset of substance use was significantly associated with higher levels of Somatisation ( $r_s = -.48$ ), Obsessive–Compulsive features ( $r_s = -.30$ ), Interpersonal Sensitivity ( $r_s = -.30$ ), Anxiety ( $r_s = -.25$ ), Phobic Anxiety ( $r_s = -.29$ ), and Paranoid Ideation ( $r_s = -.30^*$ ). These findings indicate that individuals who began substance use during adolescence reported more severe somatic, cognitive, and affective disturbances compared to those who initiated use later in life. Onset age exhibited negative correlations with Employment Status ( $r_s = -.25$ ) and Family Conflict ( $r_s = -.36^*$ ). These findings indicate that participants who initiated substance use earlier tended to have greater employment-related difficulties and more family or interpersonal conflicts. The negative direction of the correlations suggests that a younger age of onset was associated with poorer functional outcomes in these domains. The strength of these associations ranged from small to moderate in magnitude (Cohen, 1988). No significant correlation was found between onset age and Legal Status, indicating that the timing of substance use initiation did not strongly relate to legal involvement in this sample. The magnitude of the correlations ranged from moderate to strong, suggesting that the earlier onset of substance use is a notable risk factor for persistent psychopathological distress. In contrast, the severity level of substance use showed positive associations with only a few domains specifically Somatisation ( $r_s = .28$ ) and Obsessive–Compulsive symptoms ( $r_s = .24$ ).

The severity level of substance use showed positive correlations with all three ASI domains: Employment Status ( $r_s = .25$ ), Family Conflict ( $r_s = .26$ ), and Legal Status ( $r_s = .25$ ). These results suggest that as the severity of substance use increased, individuals reported greater difficulties in occupational functioning, higher levels of family conflict, and more frequent legal problems.

Although the correlations were small in effect size, they consistently point toward a cumulative burden of dysfunction associated with more severe patterns of substance use. Early-onset users exhibited higher levels of psychological distress across multiple dimensions, including somatic complaints, intrusive thoughts, interpersonal discomfort, and anxiety symptoms. Earlier onset and greater severity of substance use were linked to poorer outcomes across key functional areas. Early onset was more strongly associated with interpersonal and family disturbances, while higher severity levels were more broadly associated with occupational, relational, and legal impairments. Therefore, the third hypothesis, that there will be a significant positive correlation between “onset age of substance use”, the “severity level of drug use”, “psychopathological symptoms” and “functional domains of progress in OST”, was accepted. Onset age showed significant negative correlations with 6 of the 9 psychopathology parameters, while the severity level of drug use was positively correlated with 2 of those psychopathology parameters. Regarding progress in functional domains of OST, a significant negative correlation was identified in 2 of 6 domains with age at onset, and a positive correlation was observed in 3 of 6 domains with the severity level of drug use.

The fourth objective was to study the impact of onset age and severity level of substance use on psychopathological symptoms and the functional domain of progress in OST. A Kruskal–Wallis H test was conducted to examine the interaction effects of onset age and severity level on psychopathological symptoms and functional domains of progress in OST. Findings showed that there were significant group differences in several psychopathological dimensions. The Somatisation domain showed a statistically significant difference among the four groups,  $H(3) = 23.86$ ,  $p < .001$ ,  $\eta^2 = .37$ , indicating a large effect size. Participants in the adolescent high-severity group

reported the highest levels of somatic symptoms, while adult low-severity participants reported the lowest. Similarly, significant group differences were observed in Obsessive–Compulsive symptoms,  $H(3) = 12.74$ ,  $p = .005$ ,  $\eta^2 = .20$ , suggesting a moderate effect. Paranoid Ideation,  $H(3) = 8.21$ ,  $p = .042$ ,  $\eta^2 = .14$  reflected a small to moderate effect. In the adolescent onset low-severity group, more symptoms of Anxiety,  $H(3) = 8.02$ ,  $p = .046$ ,  $\eta^2 = .13$ , and Phobic Anxiety,  $H(3) = 7.90$ ,  $p = .048$ ,  $\eta^2 = .13$ , showed significant group differences, each reflecting small to moderate effects. In contrast, Interpersonal Sensitivity ( $H(3) = 7.53$ ,  $p = .057$ ,  $\eta^2 = .12$ ) approached significance, while Depression, Anger/Hostility, and Psychoticism did not demonstrate statistically significant differences among the groups (all  $p > .05$ ). The functional domains of progress in OST revealed significant group-level differences. Employment status differed significantly across groups,  $H(3) = 8.58$ ,  $p = .035$ ,  $\eta^2 = .14$ , with the adolescent high-severity group showing the highest impairment in occupational functioning. Family conflict also showed a significant difference,  $H(3) = 16.05$ ,  $p = .001$ ,  $\eta^2 = .25$ , reflecting a large effect size. Adolescents with high severity reported greater family and interpersonal conflict hampering their progress in OST. These results indicate that both age of onset and severity level significantly influence several dimensions of psychopathology and functional adjustment among individuals undergoing Opioid Substitution Therapy. Current findings underscore the importance of early intervention and tailored psychosocial support for individuals initiating substance use during adolescence, as this subgroup appears more vulnerable to enduring emotional and functional difficulties. Thus, the fourth hypothesis, that there will be a significant interaction effect between onset age (adolescent vs adult) and severity level (high vs low) on psychopathological symptoms and the functional domain of progress in OST, was accepted as 5 of 9 psychopathology parameters are significant, and 2 of 6 functional domains of progress in OST were found to be statistically significant.

### **Implications of the present study**

The findings of this study can help clinicians identify high-risk individuals sooner in their addiction journey and adjust their treatment accordingly. By comparing individuals who started using opioids early to those who began later, this study enhances our understanding of the risks involved in development.

Addressing Severity and Functional Impairment is crucial for tailoring stage-specific care models within OST programs, encouraging clinicians to develop treatment plans that fit individual needs. The current findings support the need for mental health screenings and interventions in OST services, which are often underused in government settings. Enhancing Clinical and Policy Interventions. The use of validated psychological tools, such as the Symptom Checklist-90-R (SCL-90-R), in OST evaluations is underrepresented in Indian research. This study utilises this tool to determine the prevalence and patterns of psychological symptoms among individuals receiving OST. These insights are crucial for developing dual-diagnosis strategies, enhancing patient retention, and improving the quality of life for individuals with OUD. On the policy side, the findings suggest that comprehensive mental health assessments should be included in OST protocols, and OST staff should receive training in recognising psychological symptoms. Policymakers and other stakeholders can use these results to allocate resources effectively and promote holistic, person-centred treatment approaches.

### **Limitations of the present study**

Cross-sectional design limits causal conclusions about the relationship between early substance use or severity and treatment outcomes or psychological symptoms. Although significant associations were found, it's unclear if early onset or severity causes increased psychological issues, or if pre-existing vulnerabilities lead to severe substance use.

Use of self-report measures presents a limitation. Self-reports can be biased by social desirability, recall issues, and underreporting, especially in individuals with substance use disorders. These biases may be exacerbated by denial, minimisation, or cognitive impairment from prolonged substance use, affecting response accuracy.

Limited generalizability: The study was conducted at one OST centre linked to STNM Hospital under the Sikkim government. While it offers valuable local insights, it limits broader applicability. The mostly male sample may not represent all those with opioid use disorder (OUD). Regional differences in substance use, healthcare access, and treatment resources could affect outcomes. Diagnostic uncertainty: Although the SCL-90-R helps identify patterns of psychological symptoms, it doesn't provide DSM-5 diagnoses. This limits identifying if symptoms are substance-induced, independent disorders, or a mix.

### **Suggestions of future directions for research**

Longitudinal research designs: To better understand how age of onset, substance use severity, and outcomes change, researchers should conduct studies following individuals through the stages of OST, from initiation to stabilisation and discontinuation.

Future research should include larger, more diverse samples from multiple OST centres across various regions, including rural, semi-urban, and urban populations, as well as underrepresented groups such as women and adolescents. Comparing regions can reveal how social, economic, and policy factors affect treatment outcomes. Studies should include objective measures, such as urine tests, blood markers, and neurocognitive assessments, to supplement self-report data. Adding behavioural observations or clinician-rated assessments can improve reliability and detect symptoms that self-reports might overlook. To increase generalizability, studies should involve larger and more diverse samples from multiple OST centres across different states and healthcare environments. Include females for more gender sensitive and developmentally informed research.

### **Conclusion:**

The current study revealed significant differences in onset age and substance use severity on psychopathological symptoms. Higher severity was linked to more somatisation, while early onset was associated with somatisation, OCD, interpersonal sensitivity, anxiety, phobic anxiety, and paranoid ideation, suggesting that treatment should be more comprehensive than just addressing OUD. The major finding was that

adolescent onset/high-severity substance use showed more OCD, somatisation, and paranoid ideation, with employment and family issues hindering progress. Interestingly, the adolescent onset/low severity group exhibited more anxiety and phobic anxiety. Treating severe cases of OUD should address cravings, somatic, and compulsive symptoms, and involve family therapy to strengthen social support, as family conflict and legal problems affect OST outcomes. Early substance use is linked to various psychopathologies, requiring early mental health interventions, alongside family therapy and vocational support.