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Original Article

Epidemiology Section

# Opioid Dependence Syndrome and Quality of Life: A Facility-based Exploratory Study among Drug Addicts at a Tertiary Care Hospital of Kolkata, India

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## ABSTRACT

**Introduction:** Opioid dependence syndrome is considered a chronic-relapsing medical illness that can affect the Quality of Life (QoL) of Injecting Drug Users (IDUs). They are at risk of contracting Human Immunodeficiency Virus (HIV) due to unsafe injection practices. Opioid Substitution Therapy (OST) is an effective treatment option for opioid dependence as well as HIV prevention and intervention among IDUs, subsequently improving their QoL.

**Aim:** To identify the opioids injected by addicts and evaluate QoL across different life areas among IDUs attending an OST centre. The authors also aimed to determine the factors affecting QoL regarding relationships with family and friends.

**Materials and Methods:** A facility-based, observational cross-sectional study was conducted on 168 IDUs at an OST centre in Calcutta National Medical College from April 2016 to March 2018. A predesigned and pretested structured schedule was used, which included socio-demographic characteristics, pattern of substance abuse, and HIV status. To evaluate QoL, the authors used a Likert scale with five domains specific to chronic diseases. Logistic regression was employed to determine associated factors with two QoL domains regarding relationships with family and friends. The Statistical Package for Social Sciences (SPSS) version 16.0 was used for data analysis.

**Results:** The mean age {Standard Deviation (±SD)} of the study participants was 36.53±9.514 years. The most common opioids injected by IDUs were buprenorphine (89.2%). Although QoL scores varied across different domains, it can be interpreted that the majority of participants had poor QoL. When assessing QoL in terms of relationships with family and friends, there was a significant association between better QoL and financial support {Adjusted Odds Ratios (AOR) Confidence Intervals (CI)} 2.550 (1.431-6.082), favourable living arrangements AOR(CI) 2.450 (1.010-4.443), and absence of seropositivity AOR(CI) 2.462 (1.141-7.476).

**Conclusion:** Buprenorphine was the most common substance of abuse among IDUs. The study revealed a high proportion of IDUs with poor QoL. The findings of the study might be helpful in designing appropriate strategies to improve personal relationships and social situations among IDUs.


**Keywords:** Buprenorphine, Chronic disease, Drug users, Human immunodeficiency virus, Opioid substitution therapy, Personal satisfaction

## INTRODUCTION

Substance use disorders are chronic relapsing conditions that significantly impact health and social functioning among addicts, consequently affecting QoL across various life domains [1,2]. Opioid dependence syndrome is considered a chronic medical illness, and the majority of Injecting Drug Users (IDUs) are dependent on some form of injectable opioids [3-5]. While there is considerable variation in the choice of drugs for injection among IDUs, many prefer short-acting illicit street opioids that provide instant euphoria [6]. IDUs have emerged as an important high-risk group for Acquired Immunodeficiency Syndrome (AIDS), with the potential to contract and transmit HIV infection among themselves and society at large [3-5,7]. HIV transmission among IDUs primarily occurs through sharing contaminated injecting equipment and engaging in high-risk sexual behaviour [4,5].

Needle Syringe Programmes (NSPs) and Opioid Substitution Therapy (OST) are two core interventions aimed at preventing HIV/AIDS among IDUs. NSPs distribute sterile needle-syringes to IDUs to prevent sharing of contaminated needles. OST, on the other hand, stabilises opioid-dependent IDUs by prescribing long-acting substitute opioids (such as Buprenorphine or Methadone) orally or sublingually, thereby helping them abandon their injecting habit. OST is an effective measure for HIV prevention and an opioid dependence treatment [3,4]. To diagnose dependence syndrome for a particular substance, certain criteria must be met, including: 1) Prolonged use of the substance in high doses despite self-harm; 2) Development of tolerance; 3) Experience of withdrawal symptoms and cravings; and 4) Significant socio-occupational dysfunction [4,8,9].

In OST, a long-acting opioid is administered orally under medical supervision for an extended period. Oral opioids alleviate withdrawal distress and subsequent cravings for illicit injectable opioids. Medically prescribed oral opioids are less euphoric but have a longer duration of action compared to street opioids [6]. As a result, IDUs are maintained in a stable state that neither produces intoxication nor withdrawals or cravings. It is worth noting that among illegal substances, opioid dependence contributes the most to the number of disability-adjusted life years lost (9.2 million) and drug-related deaths (43.5 deaths per million people aged 15-64 years) [1,2]. The World Health Organisation (WHO) defines QoL as "individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns" [10]. Gill TM and Feinstein AR, however, defined QoL as a reflection of respondents' perceptions and reactions not only to their mental and physical health but also to non health-related aspects of their lives (e.g., family, friends, work). Therefore, measuring QoL needs to encompass more than just the health-related aspects of respondents' lives [11].

The uniqueness of opioid dependence syndrome as a chronic relapsing disease among IDUs makes it critical to capture both the health-related and non health-related aspects of their lives that are important components of their QoL, particularly given their individual circumstances and environment. Opioid dependence syndrome is not a weakness of willpower or a "character defect" in addicts. Relapse is part of the recovery process, and there are strategies available to minimise relapse [4]. Among addicts, domain-specific measures are fundamentally important as they consider various life domains simultaneously (e.g., subjective QoL profile) and produce subscores for different domains (multidimensional). The lives of IDUs revolve around the use of illicit opioids, while other domains of life take a back seat [4]. As a consequence, IDUs become detached from their families and disconnected from society. Soon, they face social exclusion as their lives are shaped by the dual curse of addiction and low self-esteem. OST stabilises the social situation of opioid-dependent individuals [7,8,12].

The QoL of patients in Opioid Substitution Treatment (OST) has been extensively studied among IDUs in developed countries [13,14]. However, relatively few studies on this topic are available in less-resourced countries [15,16]. This prompted authors to conduct the current study on QoL among IDUs dependent on opioids, which was essentially part of a comprehensive research project among IDUs at the first Government OST centre in the city of Kolkata, exploring their high-risk behaviours, treatment compliance and retention in OST, as well as the stigma and discrimination they perceived. Hence, the objectives of the present study were to identify the illicit opioids injected by IDUs, assess QoL across different life domains among IDUs attending an OST centre, and determine the factors affecting QoL regarding relationships with family and friends.

## MATERIALS AND METHODS

A facility-based, observational cross-sectional study was conducted at an OST centre in Calcutta National Medical College from April 2016 to March 2018. The novelty of the study was assessed by the Institutional Review Board of the All India Institute of Hygiene and Public Health. Approval was subsequently obtained from the Ethics Committees of Calcutta National Medical College. IEC NUMBER: CNMC/8 dated 11.05.16.

**Inclusion criteria:** The IDUs who inject opioids, aged over 18 years and agreed to provide informed written consent were included in the study.

**Exclusion criteria:** The IDUs in the induction phase of OST and IDUs with severe cognitive deficits were excluded from the study.

### Study Procedure

A total of 198 IDUs were enrolled in the OST centre. IDUs visited the OST centre daily as it was a directly observed therapy that required daily attendance. A register was maintained at the centre, and a complete enumeration was done. Out of all the attendees, 168 met the inclusion criteria. Therefore, a total of 168 IDUs were recruited using the census method.

**Study tool:**

- **Structured schedule:** A predesigned and pretested structured questionnaire was used, which included socio-demographic characteristics, pattern of substance abuse, HIV status, and other co-morbidities. Initially, a semistructured questionnaire was developed by the authors of the institutes. Subsequently, a pilot study was conducted with the help of a Peer Educator among 30 IDUs selected from nearby hotspots (IDU-TI). The acceptability and feasibility of the questionnaire were examined, and necessary changes were made following the pilot study before finalising the questionnaire.
- **Quality of Life Scale (QoLS):** The QoLS is an instrument used to evaluate global QoL for chronic diseases [17]. It is a reliable and valid instrument for measuring QoL from the patients' perspective [18].

This validated instrument consisted of 15 items that measure five potentially independent QoL domains: (1) Physical and material well-being; (2) Relations with other people; (3) Social, community, and civic activities; (4) Personal development and fulfillment; and (5) Recreation. The scale ranges from "terrible" (1) to "delighted" (7), with higher scores indicating better QoL. The internal consistency of the scale (Bengali Vernacular) was computed using Cronbach's alpha, and a value of 0.6 or more was considered acceptable [19]. Each IDU was required to answer these items, even if they did not experience the life events (e.g., not married or having children).

While assessing global QoL, IDUs who achieved scores above the median of the attained score in a particular domain were considered to have better QoL in that domain. In the current study, the social relationships domain was explored, which included questions pertaining to satisfaction with personal relationships, social support systems, and sexual satisfaction. The different domains of the Quality of Life Scale are shown in the following [Table/Fig-1a].

| Domains | Items | Attainable score |
|---|---|---|
| **Physical and material well-being** Cronbach's alpha=0.794 | 1. Material well-being and financial security<br>2. Health and personal safety | Maximum=14<br>Minimum=2<br>Mean=8 |
| **Relation with other people** Cronbach's alpha=0.879 | 3. Relation with parent, sibling and other relatives<br>4. Having and raising children*<br>5. Close relation with spouse and significant other<br>6. Relation with friends | Maximum=28<br>Minimum=4<br>Mean=16 |
| **Social, community and civic activities** Cronbach's alpha=0.685 | 7. Activities related to encouraging others<br>8. Activities related to local organisations and public affairs | Maximum=14<br>Minimum=2<br>Mean=8 |
| **Personal development and fulfilment** Cronbach's alpha=0.877 | 9. Intellectual development<br>10. Personal understanding<br>11. Occupational role<br>12. Creativity and personal expression | Maximum=28<br>Minimum=4<br>Mean=16 |
| **Recreation** Cronbach's alpha=0.768 | 13. Socialising<br>14. Passive and observational recreational activities<br>15. Active and participatory recreational activities | Maximum=21<br>Minimum=3<br>Mean=12 |
| Cronbach's alpha of the scale=0.801 | | |

**[Table/Fig-1a]:** Quality of Life (QoL) scale for individuals with opioid dependence syndrome.

Three to five participants were interviewed per day, one day per week at the OST centre. The purpose of the study was explained to the participants, and informed consent was obtained. Face-to-face interviews were conducted at the OST centre, ensuring confidentiality. Records were also reviewed.

The outcomes variables studied were: Opioids of abuse among IDUs and Quality of Life (QoL) in different life domains. Predictor variables for better QoL in terms of social relationships (Domain-2): Financial support, living arrangement, educational level, HIV status, and co-morbidity (other than HIV). These predictor variables were identified by the researchers based on a review of the literature [20-23].

## STATISTICAL ANALYSIS

The SPSS version 16.0 was used for data analysis. Descriptive statistics were used to summarise the data. The association between better QoL and predictor variables was examined using univariate logistic regression. Odds Ratios (OR) with 95% Confidence Intervals (CI) were computed. Explanatory variables found to be statistically significant in univariate logistic regression were entered into multivariable logistic regression, and a p-value of <0.05 was considered statistically significant.

## RESULTS

Out of 168 IDUs who met the inclusion criteria and were approached to participate, 167 agreed, resulting in a response rate of 99.4%.

As shown in [Table/Fig-1b], the mean age {Standard Deviation (±SD)} of the study participants was 36.53 (±9.514) years. The majority (98.2%) of the participants were males. A total of 67% of the participants had a low educational level. A total of 67 (40.1%) out of 167 IDUs were currently married.

| Characteristics | Categories | Number (%) | |
|---|---|---|---|
| **Age (in years)** | 19-29 | 41 (24.6%) | Mean(±SD)=36.53 (9.514) Median=35 (IQR 30-45) Range=38 (19-57) |
| | 30-39 | 62 (37.1) | |
| | 40-49 | 48 (28.7%) | |
| | 50 and above | 16 (9.6%) | |
| **Gender** | Male | 164 (98.2%) | |
| | Female | 3 (1.8) | |
| | Transgender | 0 | |
| **Education** | Illiterate | 30 (18%) | Mean (±SD) year of Schooling=5.2 (±4.08) Median=5 (IQR2-9) |
| | Below primary | 43 (25.7%) | |
| | Primary | 39 (23.4%) | |
| | Middle and above | 55 (32.9%) | |
| **Main source of income during the previous six months** | Regular Job | 108 (64.7%) | |
| | Temporary work or other sources | 59 (35.3%) | |
| **Marital status** | Never married | 45 (26.9%) | |
| | Currently married | 67 (40.1%) | |
| | Separated/ Divorced/ Widower/Widow | 55 (32%) | |
| **Religion** | Hindu | 61 (36.5%) | |
| | Muslim | 96 (57.5%) | |
| | Christian | 10 (6%) | |
| **Socio-economic status (BG Prasad Scale, 2016) [24]** | Class-I | 4 (2.4%) | |
| | Class-II | 10 (6%) | |
| | Class-III | 41 (24.6%) | |
| | Class-IV | 53 (31.7%) | |
| | Class-V | 59 (35.3%) | |
| **Financial support#** | Present | 87 (52.1%) | |
| | Absent | 80 (47.9%) | |
| **Living arrangement** | Home | 97 (58.1%) | |
| | Unstable housing | 70 (41.9%) | |

**[Table/Fig-1b]:** Distribution of study subjects according to their socio-demographic characteristics (N=167) [24].

Buprenorphine was the most commonly used substance among the injectable opioids, with 149 (89.2%) participants reporting its use [Table/Fig-2].

| Substances used* | Number (%) |
|---|---|
| Impure heroin (Smack) | 2 (1.2%) |
| Pure heroine | 26 (15.6%) |
| Buprenorphine | 149 (89.2%) |
| Dextropropoxyphene | 3 (1.8%) |
| Pentazocine | 5 (3%) |

**[Table/Fig-2]:** Distribution of study subjects according to the injectable opioids used by them in preceding one year before attending the OST centre (N=167).
*Multiple responses

It is worth mentioning that the mean score for each domain was well below the scale mean for that domain [Table/Fig-3]. The Mean (±SD) QoL score was found to be 39.79±3.26.

[Table/Fig-4] shows that nearly two-thirds of the IDUs experienced poor QoL in domains 2, 3, and 4. Out of 167 IDUs 18.6% tested positive for HIV, and no participants were positive for Hepatitis B [Table/Fig-5a]. A total of 70.7% of the IDUs did not have any co-morbidity, while 20.4% (34) had hypertension [Table/Fig-5b].

| Domains | Mean±SD | Median | Range |
|---|---|---|---|
| Physical and material wellbeing | 4.635±1.98 | 4 | 2-11 |
| Relation with other people | 10.27±4.04 | 9 | 5-21 |
| Social, community and civic activities | 5.29±1.78 | 5 | 2-11 |
| Personal development and fulfilment | 10.97±3.4 | 10 | 7-23 |
| Recreation | 8.62±2.15 | 8 | 6-17 |

**[Table/Fig-3]:** Responses of the study participants to items regarding QoL score.

| Domain | | n (%) |
|---|---|---|
| Domain-1 | Physical and material wellbeing | 65 (38.9%) |
| Domain-2 | Relation with other people | 58 (34.7%) |
| Domain-3 | Social, community and civic activities | 52 (31.1%) |
| Domain-4 | Personal development and fulfilment | 57 (34.1%) |
| Domain-5 | Recreation | 72 (43.1%) |

**[Table/Fig-4]:** Distribution of IDUs who achieved scores above the median of the attained score in each domain (N=167).

| Clinical conditions | | Number (%) |
|---|---|---|
| No special clinical conditions | | 132 (79.04%) |
| Human Immunodeficiency Virus (HIV positive) | HIV on ART (8) | 31 (18.6%) |
| | HIV- Follow-up (23) | |
| Hepatitis C virus positive | | 2 (1.2%) |

**[Table/Fig-5a]:** Distribution of study subjects according to their special clinical conditions* (N=167).
*Conditions related to receptive sharing of needles

| Diseases* | Number (Percentage) |
|---|---|
| No disease | 118 (70.7%) |
| Hypertension | 34 (20.4%) |
| Diabetes mellitus | 12 (7.2%) |
| Chronic obstructive pulmonary diseases | 17 (10.2%) |
| Ischaemic heart disease | 12 (7.2%) |
| Tuberculosis | 2 (1.2%) |

**[Table/Fig-5b]:** Distribution of study subjects according to their other co-morbidities* (N=167).
*Multiple responses

The responses of the study participants were not normally distributed, so the idea of using linear regression with the total average score was abandoned. The domains were considered potentially independent, and focus was given to the social relationship domains. Participants were dichotomised based on the median score attained in domain-2. IDUs with a score above the median were considered to have better QoL in terms of relationships (domain-2).

As for the relationship with family and friends, domain-2 was further explored. The association between better QoL regarding social relationships and different independent variables was examined using univariate and multivariable logistic regression. All four explanatory variables that were found to be associated with a higher QoL score in domain-2 were entered into multivariable logistic regression for adjustment [Table/Fig-6a].

[Table/Fig-6b] shows that three explanatory variables- absence of HIV infection, favourable living arrangement, and financial support were associated with better QoL in terms of relationships with family and friends. These associations were statistically significant. IDUs without HIV infection had 2.462 (1.141-7.476) times higher odds of having a higher QoL score in domain-2 compared to those with seropositivity. Similarly, IDUs who had financial support were 2.550 (1.431-6.082) times more likely to have a higher QoL score in domain-2 compared to those without financial support. Likewise, IDUs who had a favourable living arrangement (stable home) were 2.450 (1.010-4.443) times more likely to have a higher QoL score in domain-2 compared to those with unstable housing.

| Variables | Number (%) | | Study subjects achieving better QoL in Domain-2 n (%)=58 (34.7%) | OR (95%CI) | p-value |
|---|---|---|---|---|---|
| HIV status | Negative | 136 (81.4%) | 52 (38.2%) | 2.249 (1.124-6.021) | 0.041* |
| | Positive | 31 (18.6%) | 6 (19.4%) | 1 | |
| Financial support | Present | 87 (52.1%) | 39 (44.8%) | 2.675 (1.378-5.214) | 0.004* |
| | Absent | 80 (47.9%) | 19 (23.8%) | 1 | |
| Living arrangement | Home | 97 (58.1%) | 38 (39.2%) | 2.121 (1.001-4.687) | 0.03* |
| | Unstable housing | 70 (41.9%) | 20 (28.6%) | 1 | |
| Co-morbidity (Other than HIV) | Absent | 118 (70.7%) | 40 (33.9%) | 2.182 (0.908-4.532) | 0.06 |
| | Present | 49 (29.3%) | 18 (36.7%) | 1 | |
| Educational level | Higher (Middle and above) | 55 (32.9%) | 26 (47.3%) | 2.247 (1.015-4.302) | 0.02* |
| | Lower | 112 (67.1%) | 32 (28.6%) | 1 | |

**[Table/Fig-6a]:** Univariate logistic regression between relationship with other people and different independent variables: (N=167).
*p-value <0.05 was considered significant

| Variables | | OR (CI) | AOR (CI) | p-value |
|---|---|---|---|---|
| HIV status | Negative | 2.249 (1.124-6.021) | 2.462 (1.141-7.476) | 0.040* |
| | Positive | 1 | 1 | |
| Financial support | Present | 2.675 (1.378-5.214) | 2.550 (1.431-6.082) | 0.045* |
| | Absent | 1 | 1 | |
| Living arrangement | Home | 2.121 (1.001-4.687) | 2.450 (1.010-4.443) | 0.048* |
| | Unstable housing | 1 | 1 | |
| Educational level | Higher | 2.247 (1.015-4.302) | 1.365 (0.842-2.980) | 0.401 |
| | Lower | 1 | 1 | |

**[Table/Fig-6b]:** Association between IDUs achieving higher QoL score in domain-2 (Relation with other people) and the explanatory variables: Multivariable logistic regression (n=167).
*p-value <0.05 was considered significant; Nagelkerke R2 value=0.301
Hosmer Lemeshow was non-significant. Hence the model was good fit to the data

## DISCUSSION

In the present facility-based exploratory study, the researchers examined the pattern of psychoactive substance use and its impact on the QoL among individuals with opioid dependence syndrome. The findings of the current study shed light on the preferences of IDUs regarding opioid substances and the domains of life affected by their addiction. The analysis of the data revealed several important insights that contribute to authors' understanding of opioid dependence syndrome and its impact on QoL.

The study highlighted notable variations in the choice of psychoactive substances among IDUs. The majority of participants (89.2%) preferred illegally procured street opioids, particularly injection buprenorphine, followed by pure heroin consumption (15.6%). This aligns with the broader trends seen in India, where opioids emerge as the primary substances of choice, often used in conjunction with other injectable psychoactive agents such as benzodiazepines or antihistamines [4,6]. Heroine and dextropropoxyphene are commonly used opioids in the northeastern states of India [4,25]. In metropolitan cities like Delhi, Mumbai, Chennai, and Kolkata, impure heroin, smack, and buprenorphine are the most commonly used opioids. In states such as Karnataka, Andhra Pradesh, Chhattisgarh, etc., pentazocine is the commonly injected opioid. In Punjab and Haryana, buprenorphine is the opioid of choice for injection [4].

Regarding the QoL analysis, the present study uncovered consistently low QoL scores across different life domains among the majority of the participants. Notably, the mean scores in each domain were significantly lower than the scale mean, suggesting a generally poor QoL for the majority of the participants. In particular, domain-2 (Relation with other people), encompassing aspects like family relations, raising children, spousal relations, and friendships, had been explored. Furthermore, within domain-2, as low as 34.7% of participants achieved scores above 9, indicating challenges faced by the addicts in maintaining healthy relationships.

Intriguingly, the present study revealed three predictors associated with an improved QoL in domain-2: (a) Absence of HIV infection; (b) Financial support; and (c) Favourable living arrangement. This aligns with previous research, such as the study by Castillo I, which identified that financial support was associated with better QoL [20]. Similarly, a cross-sectional study conducted by Yen YF et al., among IDUs in Taipei, demonstrated that social support and income from temporary jobs were linked to better Health-related QoL (HRQoL) [21]. The present study corroborated these findings by indicating that HIV positivity was associated with a poorer QoL in Domain-2 (Relation with other people).

Comparative studies have described the multifaceted nature of factors affecting QoL among drug users. For instance, Conroy E et al., explored the impact of family, health, housing, money, and partnerships on the QoL of IDUs in Australia [22]. The study's outcomes resonated with the present findings, particularly the positive influence of financial support on QoL. A case-control study conducted by Lee TSH et al., in northern Taiwan examined QoL among IDUs with HIV/AIDS, in comparison to the IDUs without HIV/AIDS. The study revealed that the four domains of QoL were significantly higher among IDUs without HIV compared with those with HIV [23]. Similarly, in the present study, HIV positivity was associated with poor QoL in domain-2. Pant SB et al., in their study showed that QoL scores were significantly lower in the IDU group across all the domains in a bivariate analysis, but on multivariate analysis, this was only significant for the physical domain [26].

The present research echoes the global call for enhanced exploration of QoL among drug users, as noted by De Maeyer J et al., [27]. While some studies tangentially address QoL, comprehensive research with a central focus on various life components influencing overall well-being is essential. To the best of authors' knowledge, the present study is the first study on the QoL among addicts attending this Opioid Substitution Therapy (OST) centre. The present study revealed that a large proportion of addicts had experienced poor QoL. The findings of the study can be used to design appropriate strategies to improve QoL among Injection Drug Users (IDUs). The uniqueness of the current study was that the researchers considered opioid dependence syndrome to be a chronic relapsing disease among IDUs. Essentially, IDUs were portrayed as patients in need of treatment, rather than just one of the high-risk groups for HIV/AIDS or individuals who inject drugs. Moreover, when assessing QoL from their perspective, each domain of life was seen as a distinct entity.

### Limitation(s)

One potential limitation of the present study was recall bias, as the information collected relied heavily on participants' self-reporting based on their memory. Because of social desirability, some answers may have been biased and inaccurate, particularly for sensitive questions. Other limitations included a small sample size and a lack of generalisability. Linear regression with the total QoL score and predictor variables was not possible as the responses were not normally distributed.

## CONCLUSION(S)

In conclusion, the present study provided valuable insights into the opioid preferences among IDUs and the impact of opioid dependence

on QoL across different domains. The study findings revealed the significance of factors such as financial support, living arrangements, and HIV infection in shaping the QoL of individuals struggling with opioid dependence, particularly in terms of their relationships with family and friends. As further investigations continue to uncover the complex relationships between substance use and subjective well-being, we can gain a more comprehensive understanding of the challenges faced by this vulnerable population.

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## REFERENCES

[1] United Nations Office on Drugs and Crime. World Drug Report 2016. United Nations publication, Sales No. E.16.XI.7.
[2] Degenhardt L, Whiteford HA, Ferrari AJ, Baxter AJ, Charlson FJ, Hall WD, et al. Global burden of disease attributable to illicit drug use and dependence: Findings from the Global Burden of Disease Study 2010. Lancet. 2013;382(9904):1564-74. Doi: 10.1016/S0140-6736(13)61530-5. Epub 2013 Aug 29. PMID: 23993281.
[3] Park K. Park's Textbook of Preventive and Social Medicine. 26th ed. Jabalpur, India: M/s Banarsidas Bhanot Publishers; 2021. Pp. 391-94.
[4] Rao R, Agrawal A, Ambekar A. Opioid substitution therapy under National AIDS control programme: Clinical practice guidelines for treatment with buprenorphine. Department of AIDS Control, Ministry of Health and Family Welfare, Government of India, New Delhi. 2014.
[5] Vickerman P, Degenhardt L, Hickman M. The impact of opiate substitution therapy and highly active antiretroviral therapy on mortality risk among people who inject drugs. Clin Infect Dis. 2015;61(7):1166-68. Doi: 10.1093/cid/civ481.
[6] Rao R, Agrawal A, Ambekar A. Methadone Maintenance Treatment Under National AIDS Control Programme: Practice Guideline. National AIDS Control Organisation, Ministry of Health and Family Welfare, Government of India, New Delhi.2017. https://www.lgbrimh.gov.in/resources/Addiction_Medicine/elibrary/methadone_maintenance.pdf.
[7] Spire B, Lucas GM, Carrieri MP. Adherence to HIV treatment among IDUs and the role of opioid substitution treatment (OST). Int J Drug Policy. 2007;18(4):262-70. Doi: 10.1016/j.drugpo.2006.12.014. Epub 2007 Jan 26. PMID: 17689374.
[8] Tripathi KD. Opioid analgesic and antagonist. Essentials of medical pharmacology, 8th ed. New Delhi, India: Jaypee Brothers Medical Publishers Pvt., Ltd; 2019. Pp. 497-517.
[9] Gutstein HB, Akil H. Opioid analgesics. In: Hardman JG, Limbird LE, editors. Goodman and Gilman's The Pharmacological Basis of Therapeutics. 11th ed. New York: McGraw-Hill; Pp. 569-84.
[10] World Health Organization (WHO). The World Health Organization Quality of Life (WHOQOL) [Internet]. Geneva: WHO; 2012. Available from: https://www.who.int/tools/whoqol.
[11] Gill TM, Feinstein AR. A critical appraisal of the quality of quality-of-life measurements. JAMA. 1994;272(8):619-26. PMID: 7726894.
[12] Yadav D, Ambekar A, Sethi H. OST program in Government health care settings: Treatment compliance and retention. Technical Report. 2012. Doi: 10.13140/RG.2.1.1754.9920.
[13] De Maeyer J, Vanderplasschen W, Lammertyn J, van Nieuwenhuizen C, Sabbe B, Broekaert E. Current quality of life and its determinants among opiate-dependent individuals five years after starting methadone treatment. Qual Life Res. 2011;20(1):139-50. https://doi.org/10.1007/s11136-010-9732-3.
[14] Strada L, Franke GH, Schulte B, Reimer J, Verthein U. Development of OSTQOL: A measure of quality of life for patients in opioid substitution treatment. Eur Addict Res. 2017;23(5):238-48. Doi: 10.1159/000484239. Epub 2017 Nov 21. PMID: 29161720.
[15] Dhawan A, Rao R, Ambekar A, Chopra A, Jain R, Yadav D, et al. Methadone Maintenance Treatment in India: A feasibility and effectiveness Report. UNODC (ROSA) and NDDTC (AIIMS), New Delhi, India. 2014.
[16] Nair R, Nair SS, Malhotra S, Sachdeva A. Shifting trends of HIV epidemiology among most at risk groups (MARGs) in India. Int J Med Sci Public Health. 2012;1(2):18-31.
[17] Flanagan JC. A research approach to improving our quality of life. American Psychologist. 1978;33(2):138-47. https://doi.org/10.1037/0003-066X.33.2.138.
[18] Burckhardt CS, Anderson KL. The Quality of Life Scale (QOLS): Reliability, validity, and utilization. Health Qual Life Outcomes. 2003;1:60. https://doi.org/10.1186/1477-7525-1-60.
[19] Creswell JW. Educational research- planning, conducting, and evaluating quantitative and qualitative research, (4th Ed.), Pearson Merril Prentice Hall, New Jersey. (2010).
[20] Castillo I. Injection drug user Quality of Life scale (IDUQoL): Psychometric assessment of the Spanish version. Adicciones. 2008;20(3):281-94. PMID: 18813774.
[21] Yen YF, Chou P, Lin YS, Deng CY. Factors associated with health-related quality of life among injection drug users at methadone clinics in Taipei, Taiwan. J Chin Med Assoc. 2015;78(5):292-98.
[22] Conroy E, Kimber J, Dolan K, Day C. An examination of the quality of life among rural and outer metropolitan injecting drug users in NSW, Australia. Addiction Research and Theory. 2008;16(6):607-17.
[23] Lee TSH, Shiu CS, Tuan YC, Wu WH, Huang CW, Yen MY, et al. Quality of life among injection drug users living with or without HIV/AIDS in Taiwan: A case control group design. J AIDS Clin Res. 2013;4(3):199. Doi: 10.4172/2155-6113.1000199.
[24] Khairnar M, Wadgave U. Updated BG Prasad socioeconomic classification for 2016. J Indian Assoc Public Health Dent. 2016;14(4):469-70. Doi: 10.4103/2319-5932.195832.
[25] WHO/UNODC/UNAIDS position paper. Substitution maintenance therapy in the management of opioid dependence and HIV/AIDS prevention. World Health Organization, United Nations Office on Drugs and Crime, Joint United Nations Programme on HIV/AIDS, 2004.
[26] Pant SB, Thapa SB, Howard J, Ojha SP, Lien L. Psychological distress and quality of life among opioid agonist treatment service users with a history of injecting and non-injecting drug use: A cross-sectional study in Kathmandu, Nepal. PLOS One. 2023;18(2):e0281437. Doi: 10.1371/journal.pone.0281437. PMID: 36745666; PMCID: PMC9901755.
[27] De Maeyer J, Vanderplasschen W, Broekaert E. Quality of life among opiate-dependent individuals: A review of the literature. Int J Drug Policy. 2010;21(5):364-80. Doi: 10.1016/j.drugpo.2010.01.010. Epub 2010 Feb 20. PMID: 20172706.

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