



“PREVALENCE OF NICOTINE USE AND DEPENDENCE AMONG DEPRESSED PATIENTS”

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ABSTRACT

Background: Depression is one of the common psychiatric disorders that is often accompanied by the presence of substances, especially nicotine. People with depressive disorders tend to start smoking and continue to do so more often than others, which results in higher nicotine dependence and worsened mental health status. Although there is an increasing amount of research evidence on this relationship, data on hospital patients in developing countries are always scarce.

Objective: To determine the extent of nicotine use and dependence in patients with depressive disorders.

Materials and Methods: It was a cross-sectional study carried out at the Avicenna Medical College, Lahore, Pakistan, in the duration from May 2025 to October, 2025. In total, 180 patients, at least 18 years old, with a diagnosis of depression verified, were recruited by a consecutive sampling method. A structured proforma was used to gather socio-demographic and clinical information from patients. Patients self-reported their smoking status, and their nicotine dependence level was measured through the Fagerström Test for Nicotine Dependence. SPSS version 26 was used for data analysis.

Results: Among the 180 patients with depression, 104 (57.8%) were nicotine users. Most of these users (71.2%) preferred cigarette smoking as their nicotine source. About 41.3% of nicotine users demonstrated moderate dependence, and 33.7% showed high dependence. Patients who were male and had a longer period of depressive illness exhibited stronger nicotine dependence.

Conclusion: Nicotine abuse and dependence are very common among individuals suffering from depression. It is essential for psychiatric services to regularly check up on and properly treat nicotine dependence to help this delicate group of patients see better health and enjoy a higher quality of life.

Keywords: Depression, Nicotine use, Nicotine dependence, Smoking, Psychiatric patients, Prevalence

INTRODUCTION

Depression is a public health issue of great magnitude globally and is often found together with various maladaptive coping behaviors, especially the use of nicotine. The prevalence of cigarette smoking and nicotine dependence among individuals with depressive disorders is significantly higher than in the general population, implying a complex two-way relationship between mood dysregulation and substance use. People usually use nicotine to reduce their depressive symptoms temporarily, so long-term use of nicotine leads to deterioration of mental health and lower standards of living. The data suggest that major depressive disorder patients have a positive correlation between dependence scores and a negative correlation with psychosocial functioning, implying the necessity of clinical assessment for nicotine usage in this group (1). Furthermore, very large population-based studies have demonstrated that depression, anxiety, stress, and smoking behaviors are strongly related, emphasizing the importance of targeted epidemiological studies (2,3). The neurobiological interrelation between depression and nicotine dependence is a very strong argument for their common co-occurrence. The impairment of dopaminergic and serotonergic systems plays a role in the manifestation of depressive symptoms as well as addictive behaviors. Individuals with depression are at greater risk of developing nicotine dependence.

Pharmacological and neuromodulation-based interventions aiming at the common pathways of depression and nicotine addiction have resulted in varying levels of success in alleviating both depressive symptoms and nicotine craving (4). Meta-analyses of clinical trials indicate that smoking cessation medications like varenicline and bupropion are helpful for smokers with depression, but the rates of quitting are always lower than those in non-depressed populations. These results emphasize the importance of understanding the prevalence to help design effective intervention strategies (5,6). Mental health disorders, specifically depression, have become more prevalent among tobacco-dependent individuals based on recent epidemiological studies. Both retrospective and cross-sectional research indicate that smokers who attend cessation programs often have undiagnosed or comorbid psychiatric disorders, such as depression (7). Furthermore, nicotine dependence through alternative delivery methods like e-cigarettes has created a new set of challenges, mainly affecting psychologically vulnerable youth (8). Besides that, behavioral addictions, such as excessive smartphone and internet use, have been found to correlate with depressive symptoms, indicating a wider pattern of maladaptive reward-seeking behaviors that can be associated with nicotine use (9). Nicotine consumption patterns are heavily influenced by psychosocial stressors and anxiety, particularly in times of significant societal disruptions such as the COVID-19 pandemic. The university students and young adults cohort studies show that elevated anxiety and stress levels correspond with higher nicotine dependence and greater quitting challenges (10). A similar trend toward clustering depression with various addictive behaviors has been confirmed by an independent study of internet addiction and another on lifestyle disorder behavior during the pandemic (11,12). These findings highlight that factors related to the context and environment play a major role in the nicotine use of people with depressive symptoms (10–12). It is well known that substance use behaviors tend to be comorbid, and the research on the culturally grounded addiction of areca nut consumption sheds light on situations of nicotine dependence. Areca nut users' dependence patterns, social acceptability, and psychological reinforcement mechanisms are very similar to those of smokers with depression (13). Depression, together with physical inactivity and excessive internet use, has been proven to elevate health risks through the interaction of the three factors (14). According to the findings of neurophysiological research, the main cortex is less active in patients suffering from major depressive disorder, which partly explains the craving for external stimulants like nicotine to relieve the negative mood and cognitive impairments (15). Depressive symptoms in adolescence and young adulthood can be a risk factor for the development of addictive behaviors. From cross-cultural perspectives, substance use, behavioral disorders, and emotional problems were found to be related in a number of studies in different parts of the world (16). Patients with severe mental disorders such as schizophrenia and major depression constitute an extremely high percentage of smokers, even though smoking is normally recognized as harmful, and normalizing smoking behavior in treatment settings is frequently criticized (17).

There is strong empirical evidence that links depressive symptoms, anxiety, and impulsivity to both cigarette and e-cigarette use, which spells out the necessity of early identification of nicotine dependence in patients with depression (18). Physical activity and sport habits are another example of the intricate connection between mood disorders and addictive behaviors. It is indeed well-known that regular exercise can prevent the onset of depression. However, there have also been reports of individuals who exhibit a dependence on exercising, which is often related to the presence of depressive symptoms, and in fact, these two conditions share common etiological factors (19). In overview, the current literature mostly gives a very detailed and diversified correlation between depression and nicotine dependence regardless of age or cultural origin. Clinical data on this issue from low- and middle-income countries are always scarce. Therefore, it is vital to have the hospital-based prevalence of tobacco and nicotine consumption among depressed patients to come up with mental health and smoking cessation interventions (1-3).

Objective: The purpose of the study was to reveal the prevalence of nicotine use and nicotine dependence among patients with depressive disorders, as well as to investigate the relationship of these disorders with some socio-demographic and clinical characteristics.

MATERIALS AND METHODS

Study Design

It was a hospital-based cross-sectional observational study that aimed to find out the prevalence of nicotine use and the level of nicotine dependence among patients diagnosed with depressive disorders.

Study Settings

The research was carried out at the Avicenna Medical College, Lahore, Pakistan.

Duration of Study: In the duration from May 2025 to October, 2025.

Sample Size: A total of 180 patients with depressive disorders were enrolled through a non-probability consecutive sampling technique.

Inclusion Criteria: Patients aged 18 years and older, both male and female, clinically diagnosed with depressive disorder as per the DSM-5 criteria, were selected. Patients from both the outpatient and inpatient departments who gave their informed consent and were able to communicate effectively were considered for the study.

Exclusion Criteria: Patients suffering from severe psychiatric disorders such as schizophrenia or bipolar disorder comorbidities, severely cognitively impaired, acutely medically unstable, or unwilling to give their consent were excluded from the study.

Methods

After the consent process, demographic and clinical data of the patients were gathered through a structured proforma. The diagnosis of depression was reconfirmed by the consultant psychiatrist. Through the patient's self-report, their nicotine use status was determined, which included both smoking and smokeless tobacco usage. The Fagerström Test for Nicotine Dependence was used to measure the level of nicotine dependence. Statistical analysis of the data was performed using SPSS version 26. Descriptive statistics were used to determine counts, percentages, averages, and standard deviations. Correlations between nicotine dependence and other selected characteristics were investigated using statistical tests, with p-values ≤ 0.05 considered significant. Permission for the research was granted by the institutional review board before the start of the study.

Results

The study included a total of 180 patients diagnosed with depressive disorder. The average age of the participants was 38.6 ± 11.4 years, with the youngest being 18 and the oldest 65 years. Most of the

patients were males (58.9%), and females made up 41.1% of the sample. A large number of participants were married (61.7%), and a significant proportion came from the urban areas (63.3%). Further information on the socio-demographic characteristics can be found in **Table 1**.

Table 1: Socio-demographic characteristics of the study participants (n = 180)

Variable	Frequency	Percentage (%)
Gender (Male)	106	58.9
Gender (Female)	74	41.1
Married	111	61.7
Unmarried	69	38.3
Urban residence	114	63.3
Rural residence	66	36.7

Among the 180 patients, 104 (57.8%) indicated that they were currently using nicotine, while 76 (42.2%) were non-users. In the group of nicotine users, the majority smoked cigarettes (71.2%), and the minority used smokeless tobacco (28.8%). The total prevalence of nicotine consumption in patients with depression is shown in **Figure 1**.

Table 2: Pattern of nicotine use among nicotine users (n = 104)

Type of Nicotine Use	Frequency	Percentage (%)
Cigarette smoking	74	71.2
Smokeless tobacco	30	28.8

Assessment of the level of nicotine dependence among nicotine users by means of the Fagerström Test for Nicotine Dependence indicated that 41.3% of users had a moderate level of dependence, while 33.7% were highly dependent. A small number, 25.0% of users, had low dependence. Therefore, a large part of the nicotine-using depressed patients were not only smokers but also nicotine-dependent to a considerable degree.

Table 3: Levels of nicotine dependence among nicotine users (n = 104)

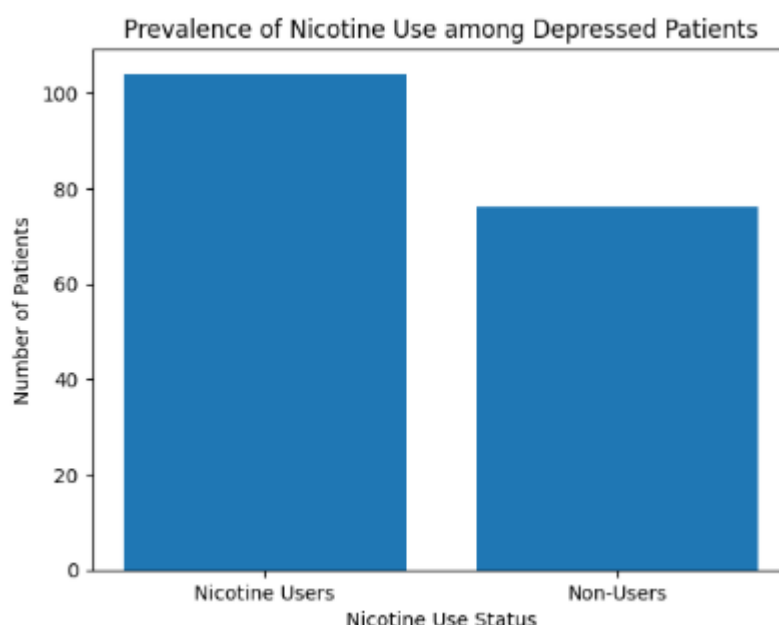
Level of Dependence	Frequency	Percentage (%)
Low	26	25.0
Moderate	43	41.3
High	35	33.7

Male patients were more likely to be dependent on nicotine than female patients. The percentage of males with a very high dependence was 38.7%, and that of females was 26.1%. Moreover, patients who had suffered from a depressive illness for a long time (>2 years) showed greater nicotine dependence than those whose illness had been of a shorter duration.

Table 4: Association of nicotine dependence with gender (n = 104)

Gender	Low	Moderate	High
Male	12	27	24
Female	14	16	11

The results suggest that nicotine use and dependence are very common among people with depressive disorders, and there are significant variations between men and women, as well as by levels of dependence severity. It is through recognizing such findings that psychiatric settings should consider implementing routine nicotine dependence screening and combined care.



Discussion

The current investigation reveals that a significant number of nicotine consumption and dependence cases exist among depressive disorder patients, confirming the already well-established link between depression and smoking. It has been forcibly shown that more than half of the depressed patients in this hospital-based sample were current smokers, which is consistent with earlier studies showing elevated cigarette smoking rates among patients with major depressive disorder as compared to the general population. Wang et al. reported that depressed patients have significantly higher levels of nicotine addiction and a lower quality of life, implying that smoking might serve as a negative coping mechanism used to deal with depressive symptoms (1). In the same way, demographic studies carried out in Egypt have demonstrated strong correlations between smoking, depression, anxiety, and stress, adopting the idea that affective distress leads to increased susceptibility to nicotine addiction (2,3).

The dominance of cigarette smoking over smokeless tobacco in the present study corresponds with the agreement of previous clinical trials and observational studies dealing with depressed smokers. Pharmacological research suggests that the short-term antidepressant-like effects of nicotine, through dopaminergic reward pathways, might be the basis for depressed individuals to be more reinforced by smoking (3). Nevertheless, controlled trials for smoking cessation in depression patients show that quit rates are lower and relapse is higher as compared to non-depressed smokers, revealing that nicotine dependence is deeply chronic and stubborn in this group (4). The growing number of patients with mental disorders among those who are trying to quit tobacco also indicates that there is a two-way relationship between psychiatric illness and smoking (5,6).

A large share of nicotine users among the current study sample displayed moderate to high dependence levels, suggesting clinically significant addiction rather than casual use. This is consistent with the continuing research evidence that individuals suffering from depression have a higher risk of developing severe nicotine dependence due to shared neurobiological vulnerabilities and impaired impulse control. Investigations into the use of newer forms of nicotine delivery, such as e-cigarettes, also indicate that psychological distress may be an underlying factor contributing to the maintenance of and dependency on the use of such products, especially in younger adults (6). Furthermore, co-morbid behavioral addictions, such as problematic smartphone and internet use, have been found to align with depression and substance use, indicating a broader addiction-prone behavioral profile (7). The gender-based differences found in this study, with males having a higher level of nicotine dependence, are in line with regional and international literature. Social norms, greater exposure to tobacco products, and cultural acceptance of smoking among men may be some of the reasons for this male-female difference. Research done during the COVID-19 pandemic, on university students, showed that male students developed anxiety-driven nicotine dependence, showing that these students became more dependent on nicotine due to stress (10). Studies conducted on internet addiction and lifestyle changes during the pandemic also serve as evidence of how depressive symptoms lead to more addictive behaviors (11,12).

This study is finding of an association between the longer duration of depressive illness and greater nicotine dependence is indicative of how chronic depression might gradually strengthen smoking habits over time. Similar instances are observed in studies of culturally ingrained substance use, such as dependence on the areca nut, where extended psychological distress was linked to stronger dependence and cessation difficulties (13). Besides this, a European study during the pandemic revealed that depression, low physical activity, and excessive internet use combined in a way that worsened mental health outcomes and sustained addictive behaviors (14). Neurophysiological evidence also aligns with the above by revealing that major depressive disorder is characterized by lesser frontal cortical activity, which in turn might lead to a greater vulnerability to external stimulants such as nicotine (15). The results of this study echo those of adolescent and young adult research, depression is not only a consistent predictor of drug involvement but also of behavioral problems and poor academic performance. In Jordan, cross-sectional data showed that drug addiction, violence, and school misbehaviors were very related, pointing out that emotional dysregulation during one's formative years is a path leading to addictive behaviors (16). In the case of patients with severe mental illness, smoking prevalence is even more elevated, and it is the norm in such psychiatric healthcare environments that are often unaware of its detrimental effects (17). Results from young adult studies also indicate that depressive symptoms, anxiety, and impulsivity can be strong determinants of both cigarette and e-cigarette use (18).

Extensively, addiction vulnerability in depression from a behavioral health perspective is not limited only to nicotine. One example of research looking at addiction to exercise shows that even health-promoting behaviors can become maladaptive when depressive symptoms are present. This is the shared underlying mechanism of compulsivity and reward dysregulation at work (19). Together, these results indicate that tobacco addiction in individuals with depression should not be regarded merely as a separate phenomenon, but rather as one aspect of a complex array of other addictive and compulsive behaviors that may co-exist in these individuals. The outcome of this research can serve as a valuable guide in clinical practice. Firstly, screening tobacco use and dependence should become a routine part of psychiatric evaluations, especially when the focus is on patients with longstanding or very severe forms of depression. When depression and nicotine addiction are dealt with at the same time, it may lead to better treatment results, enhanced quality of life, and an improved long-term prognosis. Nevertheless, the current research had the intrinsic limitations of a cross-sectional design and being site-specific, which might affect its wider application. In spite of these shortcomings, the study adds informative local data points and strengthens the worldwide evidence base that draws attention to the critical need for joint mental health and smoking cessation programs (1-5).

Conclusion

The study revealed that nicotine use and dependence were extremely common among patients with depressive disorders, and a large number of them showed moderate to high levels of dependence. These results point to a strong and long-lasting link between depression and nicotine addiction, which is probably due to the fact that the two conditions share neurobiological, psychological, and social factors. Being male and having a longer duration of depressive illness were identified as factors leading to a higher degree of nicotine dependence, which indicates the role of demographic and clinical characteristics in smoking behavior. The heavy load of nicotine dependence in depressed individuals calls for tobacco use to be routinely screened and identified at an early stage in psychiatric settings. The combination of smoking cessation interventions with standard depression treatment might result in better treatment outcomes, lower relapse rates, and an improved overall quality of life. It is suggested that further longitudinal and multi-center studies be conducted to gain a deeper understanding of the causal pathways and to assess the effectiveness of integrated intervention approaches.

References

- Wang P, Abdin E, Asharani PV, Seet V, Devi F, Roystonn K, Lee YY, Cetty L, Teh WL, Verma S, Mok YM. Nicotine dependence in patients with major depressive disorder and psychotic disorders and its relationship with quality of life. *International journal of environmental research and public health*. 2021 Dec 10;18(24):13035.
- El-Sherbiny NA, Elsary AY. Smoking and nicotine dependence in relation to depression, anxiety, and stress in Egyptian adults: A cross-sectional study. *Journal of Family and Community Medicine*. 2022 Jan 1;29(1):8-16.
- Abdelrahman AA, Noaman M, Fawzy M, Moheb A, Karim AA, Khedr EM. A double-blind randomized clinical trial of high frequency rTMS over the DLPFC on nicotine dependence, anxiety and depression. *Scientific Reports*. 2021 Jan 15;11(1):1640.
- Cinciripini PM, Kypriotakis G, Green C, Lawrence D, Anthenelli RM, Minnix J, Blalock JA, Beneventi D, Morris C, Karam-Hage M. The effects of varenicline, bupropion, nicotine patch, and placebo on smoking cessation among smokers with major depression: a randomized clinical trial. *Depression and anxiety*. 2022 May;39(5):429-40.
- Zvolska K, Tichopad A, Stepankova L, Pankova A, Adamcekova Z, Donin G, Rafl J, Kralikova E. Increasing prevalence of mental disorders in smokers seeking treatment of tobacco dependence: a retrospective observational study. *BMC psychiatry*. 2023 Aug 24;23(1):621.
- Sargent JD, Stoolmiller M, Dai H, Barrington-Trimis JL, McConnell R, Audrain-McGovern J, Leventhal AM. First e-cigarette flavor and device type used: associations with vaping persistence, frequency, and dependence in young adults. *Nicotine and Tobacco Research*. 2022 Mar 1;24(3):380-389.
- Alageel AA, Alyahya RA, A. Bahatheq Y, Alzunaydi NA, Alghamdi RA, Alrahili NM, McIntyre RS, Iacobucci M. Smartphone addiction and associated factors among postgraduate students in an Arabic sample: a cross-sectional study. *BMC psychiatry*. 2021 Jun 10;21(1):302.
- Ali AM, Hori H, Kim Y, Kunugi H. Predictors of nutritional status, depression, internet addiction, Facebook addiction, and tobacco smoking among women with eating disorders in Spain. *Frontiers in Psychiatry*. 2021 Nov 26;12:735109.
- Biswas PR, Ahammed B, Rahman MS, Nirob BM, Hossain MT. Prevalence and determinants of internet addiction among adults during the COVID-19 pandemic in Bangladesh: An online cross-sectional study. *Heliyon*. 2022 Jul 1;8(7).
- Ayran G, Köse S, Küçükoğlu S, Aytekin Özdemir A. The effect of anxiety on nicotine dependence among university students during the COVID-19 pandemic. *Perspectives in psychiatric care*. 2022 Jan;58(1):114-23.
- Zenebe Y, Kunno K, Mekonnen M, Bewuket A, Birkie M, Necho M, Seid M, Tsegaw M, Akele B. Prevalence and associated factors of internet addiction among undergraduate university students in

- Ethiopia: a community university-based cross-sectional study. *BMC psychology*. 2021 Jan 6;9(1):4.
- Romero-Blanco C, Hernández-Martínez A, Parra-Fernández ML, Onieva-Zafra MD, Prado-Laguna MD, Rodríguez-Almagro J. Food addiction and lifestyle habits among university students. *Nutrients*. 2021 Apr 18;13(4):1352.
- Kumar A, Oswal K, Singh R, Kharodia N, Pradhan A, Sethuraman L, Venkataramanan R, Purushotham A. Assessment of areca nut use, practice and dependency among people in Guwahati, Assam: a cross-sectional study. *Ecancermedicalscience*. 2021 Mar 4;15:1198.
- Zalewska A, Gańczyk M, Sobolewski M, Białokoz-Kalinowska I. Depression as compared to level of physical activity and internet addiction among polish physiotherapy students during the COVID-19 pandemic. *International Journal of Environmental Research and Public Health*. 2021 Sep 25;18(19):10072.
- Riddle J, Alexander ML, Schiller CE, Rubinow DR, Frohlich F. Reduction in left frontal alpha oscillations by transcranial alternating current stimulation in major depressive disorder is context dependent in a randomized clinical trial. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*. 2022 Mar 1;7(3):302-11.
- Raffee LA, Al-Qudah MA, Hayajneh WA, Alawneh KZ, Mahasneh OI, Alomari MM, Al-Mistarehi AH. Prevalence estimates of drug addiction among high-school students and its association with violence, and school behaviors: a cross-sectional study from Jordan. *Annals of Medicine and surgery*. 2021 Jul 1;67:102490.
- Caponnetto P, Maglia M, Mangione M, Vergopia C, Prezzavento GC, Polosa R, Quattropiani MC, DiPiazza J, Signorelli MS. Smoking addiction in patients with schizophrenia spectrum disorders and its perception and intervention in healthcare personnel assigned to psycho-rehabilitation programs: a qualitative research. *InHealthcare* 2022 Nov 13 (Vol. 10, No. 11, p. 2275). MDPI.
- Masaki K, Taketa RM, Nakama MK, Kawamoto CT, Pokhrel P. Relationships between depressive symptoms, anxiety, impulsivity and cigarette and e-cigarette use among young adults. *Hawai'i journal of health & social welfare*. 2022 Mar;81(3):51.
- Alcaraz-Ibáñez M, Paterna A, Griffiths MD, Sicilia Á. An exploratory examination of the relationship between symptoms of depression and exercise addiction among undergraduate recreational exercisers. *International Journal of Mental Health and Addiction*. 2022 Jun;20(3):1385-97.