RESEARCH PAPER

Socio-Demographic and Behavioural Determinants of Depression in Pune District, India: A Cross-Sectional Study

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Abstract
Nowadays, a complex mental health problem is caused due to a lack of social help, a modern lifestyle, a frequent stress environment, anxiety, and socioeconomic status. Depression occurs due to differences in rituals and social culture. The paper attempts to focus on identifying the main social culture and adapted lifestyle that are responsible for depression among individuals of the Pune district of Maharashtra, India. For the present research, a sample of 2026 individuals were collected from the rural and urban populations of Pune. A chi-square test of independence was used for examining the relationship between categorical variables.
Data was collected across rural and urban areas between November 2025 and March 2026. The analysis was conducted using the Chi-square test of independence. The focus of the statistical analysis is to identify whether the chosen factors contribute to depression. The factors chosen in the study are inadequate social support, contributing to feelings of loneliness and low mood; sedentary lifestyle, contributing to fatigue, sleep disturbances, and reduced physical well-being; chronic stress and anxiety, contributing to emotional instability and cognitive difficulties; and socioeconomic status, contributing to financial stress, limited access to resources, and reduced overall life satisfaction. Significant associations were found between these factors and depression in the study population. These findings provide evidence-based insights to guide local and global mental health management strategies and inform interventions aimed at reducing the prevalence of depression at both community and broader regional levels worldwide.

Keywords: Depression; Social support; Sedentary lifestyle; Anxiety; Socioeconomic status; Mental health

How to cite this article: Dubey UKB, Patil M. Socio-Demographic and Behavioural Determinants of Depression in Pune District, India: A Cross-Sectional Study. Int J Drug Deliv Technol. 2026;16(33s):155-166. DOI: 10.25258/ijddt.16.33s.19.

1. Introduction

A complex interaction of socio-demographic, behavioral, and environmental factors influences depression, a major public health concern. Cultural diversity, lifestyle patterns, socioeconomic conditions, and medications can significantly affect the prevalence and manifestation of depressive symptoms across populations. Limited social support among elderly individuals or those who are socially isolated has a higher risk of depression. Berta Obispo et al. (2025) stated that the prevalence and intensity of depression may vary depending on factors such as tumour type and prognosis, treatment-related symptoms, altered body image, female gender, younger age, and lack of social support. Carol Vidal et al. (2024) declared that significant associations were also found between past/chronic stressful events and suicidality and depression, as well as between lack of social support and suicidality, contributing to fatigue, sleep-related problems, and a decline in psychological well-being. Canan Bozkurt & Hülya Bulut (2025)) Anxiety, depression, and stress are distinct but interrelated psychological constructs, each with unique characteristics and impacts on mental health and quality of life. Currently stress and anxiety, maybe due to work, family responsibilities, and societal expectations, may further lead to being unable to cope with daily life and difficulties in the mental processes and intellectual abilities of the brain. Socio-economic factors, viz., low earnings and lack of availability of required resources, may cause financial burden and affect satisfaction in life. Hence, an individual is more likely to develop depression.

Isis Gastaldo-Jordán et al. (2025) conveyed that in addition to genetic and epigenetic factors, sustained psychological stress linked to modern lifestyles may trigger depression.History shows that factors that are responsible for mental health need to find the main causes, viz., housing, work, finances, abuse, etc. However, relatively few studies have focused on the combined effect of socio-demographic and behavioral factors within regional contexts, particularly in the Pune District of Maharashtra, India. Gaining a clearer understanding of these relationships at the local level is essential for developing structured, evidence-based, and focused actions designed for specific individuals or subgroups that effectively address the specific needs of the community.

Statistical methods are useful for examining relationships between variables in health research. Chi-square is a non-parametric technique used for analyzing associations between categorical variables. It is useful

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when researchers try to find out whether a significant relationship exists between variables within a given population.

Dubey et al. (2016) mention that chi-square distribution makes it possible to derive inferences about population parameters with specified levels of significance and given degrees of freedom. In the present study, the chi-square test of independence was used to examine whether selected social and demographic factors and actions, habits, and lifestyle choices viz., inadequate social support, sedentary lifestyle, chronic stress and anxiety, and socioeconomic status are suggesting a real, meaningful connection with depression in Pune District, India. Identifying these associations can help in recognizing key risk factors and provide evidence for developing approaches that involve residents in decision-making, planning, and implementing solutions to address social, economic, and environmental challenges aimed at improving mental health and reducing the burden of depression in the total number of people living in Pune. Rabie Karrouri et al. (2021) mention that pharmacotherapy consists of administering classical antidepressants to recover impaired brain functions and reduce depressive symptoms.

2. METHODS

2.1 Study Design and Study Area

The design of the study included an observation method; accordingly, data was collected from a specific population for examining the association between the factors under study. The study area consists of individuals having sundry backgrounds, cultures, ages, and genders, including both rural and urban with varying lifestyle patterns. Data was collected over a four-to-five-month period, from November 2025 to March 2026.

2.2 Sample Size and Sampling Procedure

The required sample size of 2,026 participants was determined to ensure sufficient statistical power for detecting associations between categorical variables. Participants were selected from both urban and rural areas of Pune District. Individuals aged 18 years and above were eligible to participate in the study. The sampling approach aimed to capture a diverse representation of socio-demographic backgrounds within the district.

2.3 Data Collection

Dubey and Kothari (2025) say that they develop a structured set of questions that cater to the survey's objectives. Data was collected using a structured questionnaire to obtain information on socioeconomic factors, demographic profiles, population attributes, actions, conduct, attitudes, mannerisms, lifestyle choices, and mental health indicators. The questionnaire covers areas viz., social support, daily routines, exercise habits, activity levels, inactive, desk-bound, sitting, stationary, and motionless experiences of stress and anxiety, socioeconomic status, and indicators related to depressive symptoms.The study followed ethical guidelines by ensuring participants understood the research goals, risks, and procedures before agreeing to participate, free from compulsion. Response data will be protected, private, and used to advance academic study only.

2.4 Study Variables

The researchers were studying depression as the outcome. The independent variables, viz.,

Social support (adequate / inadequate), sedentary lifestyle (active / sedentary), chronic stress and anxiety (present / absent), and socioeconomic status (categorized based on income and related indicators). These variables were analyzed to determine whether significant associations existed between them and depression.

2.5 Statistical Analysis

The data collected was organized and analyzed using statistical techniques. Descriptive statistics are used to summarize the characteristics of the population under study. To evaluate the relationship between depression and the selected socio-demographic and behavioral variables, the chi-square test of independence is used. Dubey and Kothari (2022) say that the test of independence will only enable the researcher to identify whether there is an association between the two variables. However, this test will not describe the strength or magnitude of the association. A test of association compares actual data against predicted if no relationship exists to find out if there is a statistically significant association between two categorical variables.A significance level of 0.05 ($p < 0.05$) was used to evaluate statistical significance. When the calculated p-value was found to be less than the significance level, i.e., α, commonly 0.05, the null hypothesis of independence was rejected, indicating the presence of a statistically significant association between the variables under study.

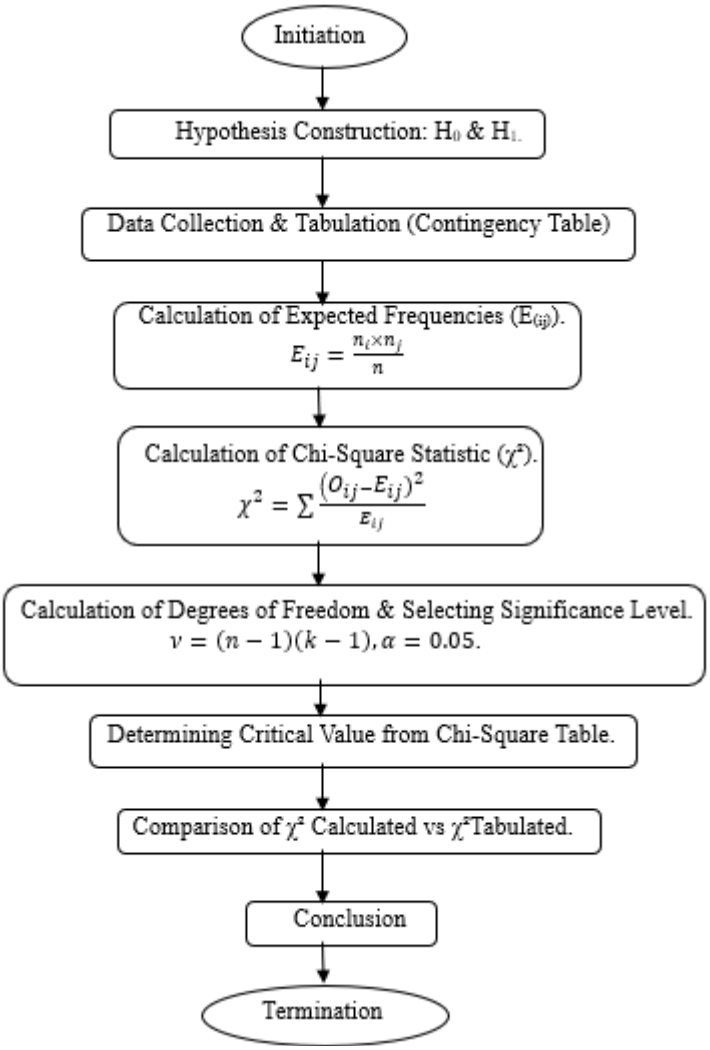

Fig.1. Flowchart of the procedure for conducting the Chi-square test of independence.

Caption: Flowchart illustrating the step-by-step procedure for conducting the Chi-square test of independence, including hypothesis formulation, data tabulation, calculation of expected frequencies, computation of the chi-square statistic, determination of degrees of freedom and significance level, comparison with the critical value, and conclusion.

2.6 Statement of the Problem

Depression turns into a major public health concern worldwide. Katie J. et al. (2025) said that adolescence represents a period of development in which depressive symptoms skyrocket, especially for girls. Adolescent depressive symptoms have been associated with serious long-term sequelae, including failure to complete secondary school, unemployment, enduring mental health problems, and social and cultural backgrounds. Md Asaduzzaman et al. (2025) reported that while the estimated incidence of stress ranges from 30% to 50% depending on the country, depression has been reported in roughly one third of medical students. It is influenced by socio-demographic, behavioral, and environmental factors, which may vary from one region to another. Despite growing awareness around mental health, depression still tends to be underdiagnosed and inadequately addressed in many communities, especially in developing regions.

Rapid urbanization, changing lifestyles, socioeconomic disparities, and increasing work stress contributed much to mental health issues. Factors viz., limited social support, a sedentary way of life, persistent stress and anxiety, and socioeconomic challenges are influencing the risk of depressive symptoms. However, the extent to which these factors are associated with depression within specific regional populations has not been explored as required.

Pune District, with a mix of urban and rural communities and diverse socioeconomic conditions, offers a meaningful platform to study the determinants of depression. Examining how socio-demographic and behavioral factors contribute to depression in this population is important for developing effective and locally relevant prevention and intervention strategies.

Therefore, the present study aims to examine the association between socio-demographic and behavioral factors, viz., inadequate social support, sedentary lifestyle, chronic stress and anxiety, and socioeconomic status among individuals in Pune District. Identifying these relationships contributes towards mental health awareness and designing targeted interventions at the community level.

2.7 Location and Study Design (Fig.2)

For the present study, data was collected from both rural and urban areas of Pune.

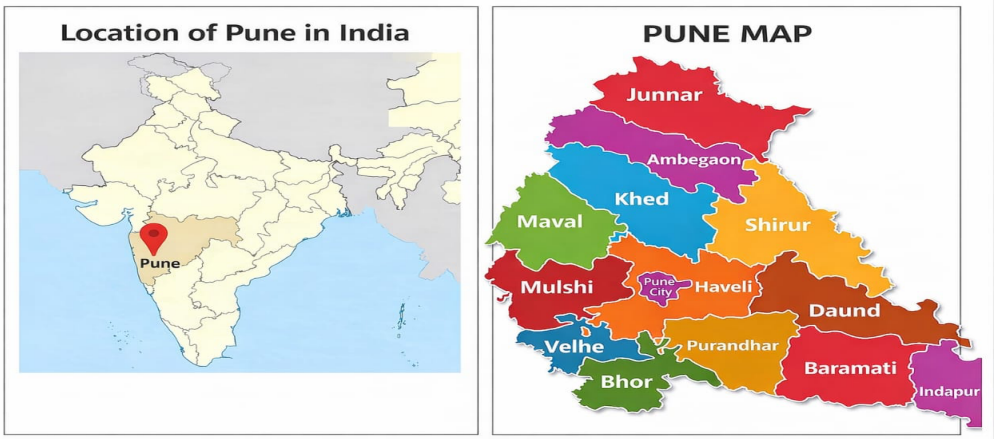

Fig. 2. Geographical location of Pune District, Maharashtra, India.

The map shows the study area where research on depression was conducted. Data were collected from both rural and urban areas to ensure a representative sample of the population.

2.8 Data Collection

Data was collected using a structured questionnaire to collect information on socio-demographic characteristics, behavioral factors, and indicators of depression. The questionnaire included viz., social support, physical activity pattern, stress level and anxiety, and the socioeconomic conditions of the participants.

Data was collected from rural and urban areas of Pune District between November 2025 and March 2026. Participants were approached and educated about the purpose of the study. Participants chose to take part without any pressure. They can withdraw from participating in study at any time, for any reason.

The completed questionnaires were fully checked for completeness and accuracy before compilation for analysis. Accordingly, the data was organized and prepared for using statistical analysis.

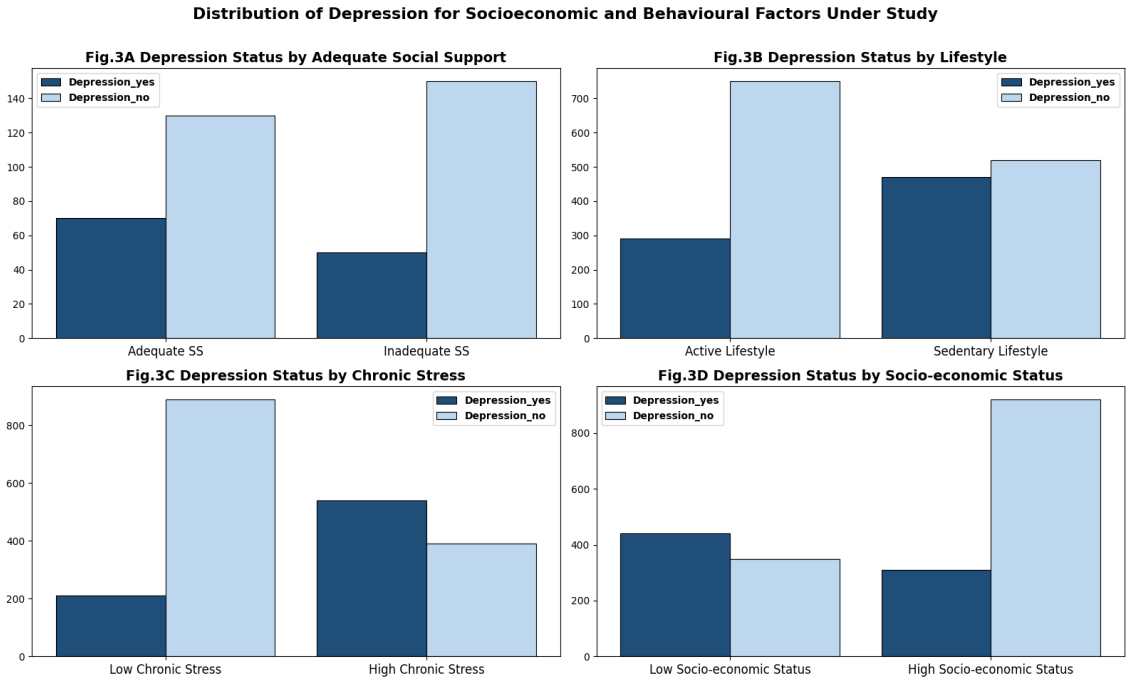

Fig. 3. Distribution of depression according to selected socio-demographic and behavioural factors included in the study.

Results and Analysis

The hypothesis is framed for the following environmental factors:

1. Adequate, Inadequate Social Support and Depression (Table 1)
2. Active, Sedentary Lifestyle and Depression. (Table 1)
3. Low, High Levels of Stress & Anxiety and Depression (Table 1)
4. Low, Medium/High Socioeconomic Status and Depression (Table 1)

1. Observed Frequencies

Social Support	Depression (Yes)	Depression (No)	Total
Adequate	40	100	140
Inadequate	310	50	360
Total	350	150	500
Sedentary Lifestyle	**Depression (Yes)**	**Depression (No)**	**Total**
Active Lifestyle	86	140	226
Sedentary Lifestyle	189	85	274
Total	275	225	500
Stress & Anxiety Level	**Depression (Yes)**	**Depression (No)**	**Total**
Low stress	77	125	202
High stress	223	75	298
Total	300	200	500
Socioeconomic Status	**Depression (Yes)**	**Depression (No)**	**Total**
Low SES	280	40	320
Medium/High SES	100	106	206
Total	380	146	526

Table 1: Cross-tabulation of depression status with socio-demographic and behavioural variables (observed frequencies).

2.9 Data Analysis

The collected data were systematically organized, coded, and entered into a statistical software package for analysis. Descriptive statistics were initially used to summarize the socio-demographic characteristics of the participants and the distribution of the study variables.

To examine the association between depression and the selected socio-demographic and behavioral factors, the chi-square test of independence was applied.

The chi-square test is appropriate for examining associations between categorical variables by comparing observed frequencies with expected frequencies under the assumption of independence among variables.

The analysis was conducted to examine whether inadequate social support, sedentary lifestyle, chronic stress and anxiety, and socioeconomic status were significantly associated with depression among the study participants. A significant level of 0.05 ($p < 0.05$) was taken. If the calculated chi-square value was greater than the tabulated value, then the null hypothesis of independence was rejected, indicating a statistically significant association between the variables.

The results were presented in tabular form and interpreted to identify the key determinants associated with depression within the population under study.

2.10 Hypothesis Testing

Hypothesis 1: Social Support versus Depression

H_0 (Null Hypothesis): There is no significant association between social support and depression.

H_1 (Alternative Hypothesis): There is a significant association between social support and depression.

Hypothesis 2: Sedentary Lifestyle versus Depression

H_0 (Null Hypothesis): There is no significant association between sedentary lifestyle and depression.

H_1 (Alternative Hypothesis): There is a significant association between sedentary lifestyle and depression.

Hypothesis 3: Stress & Anxiety versus Depression

H_0 (Null Hypothesis): There is no significant association between stress & anxiety and depression.

H_1 (Alternative Hypothesis): There is a significant association between stress & anxiety and depression.

Hypothesis 4: Socioeconomic Status versus Depression

H_0 (Null Hypothesis): There is no significant association between socioeconomic status and depression.

H_1 (Alternative Hypothesis): There is a significant association between socioeconomic status and depression.

Each hypothesis was tested using the chi-square test of independence at a 5% level of significance ($p < 0.05$). The results of the statistical tests determined whether the null hypotheses were rejected or accepted based on the observed relationships between the variables

2. Calculation of expected frequency

Below are the **Expected Frequency Tables for all four factors** using the formula:

Social Support	Depression (Yes)	Depression (No)	Row Total
Adequate	$E_{11}=\frac{140\times350}{500}=98$	$E_{12}=\frac{140\times150}{500}=42$	140
Inadequate	$E_{21}=\frac{360\times350}{500}=252$	$E_{22}=\frac{360\times150}{500}=108$	360
Column Total	350	150	500

Sedentary Lifestyle	Depression (Yes)	Depression (No)	Row Total
Active Lifestyle	$E_{11}=\frac{226\times275}{500}=124.3$	$E_{12}=\frac{226\times225}{500}=101.7$	226
Sedentary Lifestyle	$E_{21}=\frac{274\times275}{500}=150.7$	$E_{22}=\frac{274\times225}{500}=123.3$	274
Column Total	275	225	500

Stress/Anxiety	Depression (Yes)	Depression (No)	Row Total
Low	$E_{11}=\frac{202\times300}{500}=121.2$	$E_{12}=\frac{202\times200}{500}=80.8$	202
Medium/High	$E_{21}=\frac{298\times300}{500}=178.8$	$E_{22}=\frac{298\times200}{500}=119.2$	298
Column Total	300	200	500

Socioeconomic Status	Depression (Yes)	Depression (No)	Row Total
Low	$E_{11}=\frac{320\times380}{526}=231.18$	$E_{12}=\frac{320\times146}{526}=88.82$	320
Medium/High	$E_{21}=\frac{206\times380}{526}=148.82$	$E_{22}=\frac{206\times146}{526}=57.18$	206
Column Total	380	146	526

Table 2: Expected frequencies for the association between depression versus socio demographic and behavioural factors.

3. Calculation of χ^2 statistic

Caption: (1) Adequate Social Support – Depression, (2) Adequate Social Support – No Depression, (3) Inadequate Social Support – Depression, (4) Inadequate Social Support – No Depression, (5) Calculated value for Chi-square for first association

Calculated Chi-square	(1)	(2)	(3)	(4)	(5)
$\chi^2=\sum_{i=1}^{n}\sum_{j=1}^{k}\frac{(O_{ij}-E_{ij})^2}{E_{ij}}$	34.33	80.10	13.35	31.15	158.93

Caption: (1) Active Lifestyle – Depression, (2) Active Lifestyle – No Depression, (3) Sedentary Lifestyle – Depression, (4) Sedentary Lifestyle – No Depression, (5) Calculated value for Chi-square for first association

Calculated Chi-square	(1)	(2)	(3)	(4)	(5)

$\chi^2 = \sum_{i=1}^{n}\sum_{j=1}^{k}\frac{(O_{ij}-E_{ij})^2}{E_{ij}}$	11.80	14.42	9.73	11.9	47.85

Caption: (1) Low Stress & Anxiety – Depression, (2) Low Stress & Anxiety – No Depression, (3) High Stress & Anxiety – Depression, (4) High Stress & Anxiety – No Depression, (5) Calculated value for Chi-square for first association

Calculated Chi-square	(1)	(2)	(3)	(4)	(5)
$\chi^2 = \sum_{i=1}^{n}\sum_{j=1}^{k}\frac{(O_{ij}-E_{ij})^2}{E_{ij}}$	16.12	24.18	10.93	16.39	67.62

Caption: (1) Low Socioeconomic Status – Depression, (2) Low Socioeconomic Status – No Depression, (3) Medium/High Socioeconomic Status – Depression, (4) Medium/High Socioeconomic Status – Depression, (7) Calculated value for Chi-square for first association

Calculated Chi-square	(1)	(2)	(3)	(4)	(5)
$\chi^2 = \sum_{i=1}^{n}\sum_{j=1}^{k}\frac{(O_{ij}-E_{ij})^2}{E_{ij}}$	10.31	26.83	16.02	41.68	94.84

Table 3: Chi-square (χ^2) statistics for associations between depression versus socio- demographic and behavioural factors.

3. Choosing the level of significance α and determining the number of independent values in data that can vary [degrees of freedom (v)] (Table 4)

α = 5%, and degrees of freedom are: υ_1=1, υ_2=1, υ_3=1, υ_4 = 1

4. Calculation of $\chi^2_{\text{tabulated}}$, and its comparison with $\chi^2_{\text{calculated}}$ (Table 5)

To test the hypothesis at a 5% significance level (0.05),

Comparison of the calculated chi-square value with the tabulated value, with respective degrees of freedom, is as follows:

From the χ^2 distribution table,

df/LoS	$\chi^2_{.995}$	$\chi^2_{.990}$	$\chi^2_{.975}$	$\chi^2_{.950}$	$\chi^2_{.900}$	$\chi^2_{.100}$	$\chi^2_{.050}$	$\chi^2_{.025}$	$\chi^2_{.010}$	$\chi^2_{.005}$
1	0.000	0.000	0.001	0.004	0.016	2.706	3.841	5.024	6.635	7.879
2	0.010	0.020	0.051	0.103	0.211	4.605	5.991	7.378	9.210	10.597
3	0.072	0.115	0.216	0.352	0.584	6.251	7.815	9.348	11.345	12.838
4	0.207	0.297	0.484	0.711	1.064	7.779	9.488	11.143	13.277	14.860

Table 4: Critical values of the chi-square (χ^2) distribution for selected degrees of freedom and significance levels.

Caption: The table presents critical χ^2 values for degrees of freedom (d.f.) ranging from 1 to 4 across various significance levels. These values are used to compare with the calculated chi-square statistic to determine the rejection region and test the study hypotheses.

i. $\chi^2_{\text{tabulated, 1d.f, at 5\%}}\ \alpha = 3.841$ (Table 4)
$\chi^2_{\text{calculated}} = 158.93$ (Table 3)
$\chi^2_{\text{calculated}}\ 158.93 > \chi^2_{\text{tabulated}}\ 3.841$

ii. $\chi^2_{\text{tabulated, 1d.f, at 5\%}}\ \alpha = 3.841$ (Table 4)
$\chi^2_{\text{calculated}} = 47.85$ (Table 3)
$\chi^2_{\text{calculated}}\ 47.85 > \chi^2_{\text{tabulated}}\ 3.841$

iii. $\chi^2_{\text{tabulated, 1d.f, at 5\%}}\ \alpha = 3.841$ (Table 4)
$\chi^2_{\text{calculated}} = 67.62$ (Table 3)
$\chi^2_{\text{calculated}}\ 67.62 > \chi^2_{\text{tabulated}}\ 3.841$

iv. $\chi^2_{\text{tabulated, 1d.f, at 5\%}}\ \alpha = 3.841$ (Table 4)
$\chi^2_{\text{calculated}} = 94.84$ (Table 3)
$\chi^2_{\text{calculated}}\ 94.84 > \chi^2_{\text{tabulated}}\ 3.841$

5. Deduction of the conclusion (Fig. 4)

i. $\because \chi^2_{\text{calculated}}\ 158.93 > \chi^2_{\text{tabulated}}\ 3.841$

∴We reject H_{01}

∴ We conclude that there are significant associations observed between adequate & inadequate Social Support versus Depression.

ii.∵ $\chi^2_{calculated}$ 47.85 > $\chi^2_{tabulated}$ 3.841

∴ We reject $H_{02.}$

∴ We conclude that there are significant associations observed between Active & Sedentary Lifestyle Pattern versus Depression.

iii. ∵ $\chi^2_{calculated}$ 67.62 > $\chi^2_{tabulated}$ 3.841

∴ We reject $H_{03.}$

∴ We conclude that there are significant associations observed between Low, High Stress Levels versus Depression.

iv.∵ $\chi^2_{calculated}$ 94.84> $\chi^2_{tabulated}$ 3.841

∴ We reject $H_{04.}$

∴ We conclude that there are significant associations observed between Low, Medium/ High Socioeconomic Status versus Depression.

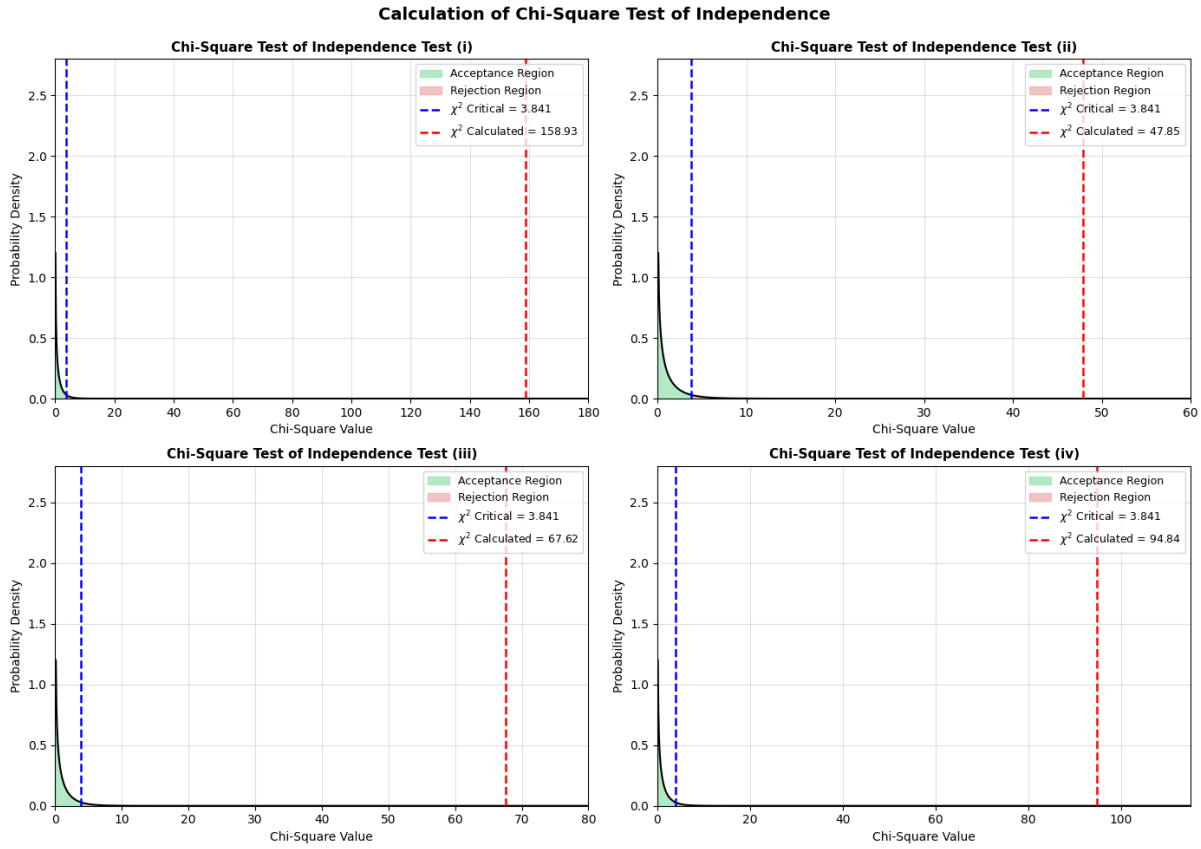

Fig.4. Rejection region for the chi-square (χ^2) test of independence used for decision-making.

Factors	χ^2 Calculated	Degree of Freedom	χ^2 Critical ($\alpha = 0.05$)	Result
Social Support	158.93	1	3.841	Significant
Lifestyle Pattern	47.85	1	3.841	Significant
Stress/Anxiety	67.62	1	3.841	Significant
Socioeconomic Status	94.84	1	3.841	Significant

Table.5: Result of Chi Square test of independence.

Since the calculated χ^2 values for all factors exceed the corresponding critical value at the 5% level of significance ($\alpha = 0.05$), the null hypothesis is rejected in each case. This indicates that all four factors show a statistically significant association with depression.

3. RESULTS

3.1 Descriptive Statistics

A total of **2,026 participants** from rural and urban areas of **Pune District, Maharashtra, India** were included in the present study.

The data were categorized based on four key socio-demographic and behavioral factors, and participants were classified according to their depression status.

Among the participants under study, 1305 individuals were identified as experiencing depression, while 721 were identified as not depressed. The observed variation in distribution across the selected factors suggests the presence of potential associations with depression status. Participants reporting a lack of social support exhibited higher depression compared to those with adequate support. Similarly, individuals with a sedentary lifestyle show a greater prevalence of depression than those with physically active lifestyles. Overwhelming anxiety and lower socioeconomic status were also associated with a greater frequency of depression.Higher depressions were observed among participants experiencing persistent tension and anxiety, as well as among those from lower socioeconomic groups, indicating potential associations with depression.

These findings show that socio-demographic and behavioral characteristics may be important determinants of mental health outcomes within the population under study.

3.2 Chi-Square Test Results

The Chi-square test of independence was applied to each contingency table to evaluate associations between depression and the socio-demographic and behavioral factors.

For all four factors, the calculated Chi-square values exceeded the critical value at $\alpha = 0.05$, leading to the rejection of the null hypotheses and indicating statistically significant associations.

The results show statistically significant associations between depression and socio-demographic and behavioral factors, viz., inadequate social support, sedentary lifestyle, chronic stress and anxiety, and socioeconomic status.

These findings indicate that limited social interaction, sedentary behavior, psychological stress, and lower socioeconomic status are associated with a higher likelihood of depression.

3.3 Summary of Findings

The analysis shows that the socio-demographic and behavioral factors are significantly associated with depression in the population under study. Among all variables, stress and anxiety exhibited the strongest association with depression, followed by sedentary lifestyle, socioeconomic status, and social support.

The results show the need for consideration of multiple interacting factors responsible for depression. The findings reveal that lifestyle patterns, mental stress, and socioeconomic factors are the main factors responsible for depression. This gives us an alarming situation to immediately reduce depression and improve the mental well-being of the community.

For all four variables, viz., inadequate social support, sedentary lifestyle, chronic stress and anxiety, and socioeconomic status, the calculated chi-square values exceeded the corresponding critical values at the 5% level of significance. Accordingly, the null hypotheses of independence between these variables and depression were rejected.

The findings show that lack of social support is associated with a higher likelihood of depression and poor health. Depression is indirectly caused by feelings of loneliness, social isolation, and lack of emotional support. The absence of supportive social networks may therefore increase exposure to depression.

A sedentary lifestyle was significantly associated with depression, with participants reporting lower physical activity exhibiting a higher prevalence of depressive symptoms than those leading more active lives. Reduced activity may contribute to fatigue, sleep disturbances, and declines in mental well-being. The analysis shows a significant association between chronic stress and anxiety versus depression. Prolonged exposure to psychological stress, viz., work-related and social pressures, may lead to emotional instability and mental overload, thereby increasing the risk of depression.Yue Zhao et al. (2025) declared that High-exhaustion emotional labour (surface acting and emotional dissonance) correlated significantly positively with overall negative mental health outcomes, including depression, anxiety, insomnia, and general mental health ($r = 0.213$, $P < 0.001$).

Lower socioeconomic status was significantly associated with depression, potentially due to financial stress, lack of healthcare access, and social opportunities, which can increase depression.

In summary, the findings show that depression is influenced by socio-demographic and behavioral factors rather than any single determinant. A comprehensive understanding of these associations is required for developing mental health interventions to reduce the burden of depression and promote overall community well-being worldwide.Xue Zhong et al. (2025) reported that in recent years, research has identified other promotive factors, including but not limited to mindfulness (Fitzgerald & Kawar, 2022; Mao et al., 2023) and intentional self-regulation (Jiang et al., 2025), which have been shown to mitigate the risk of depression.

3.5 Theoretical and Practical Implications

The study focuses on the factors responsible for depression. It is clear that depression is boosted by the socio-demographic and behavioral factors. From the analysis, depression and lack of social support, lifestyle, stress and anxiety, and socioeconomic status have significant associations. The study guides public health authorities to make policies for the communities to keep away from depression. They can enhance the community program and encourage physical activity through health campaigns to promote mental wellness. The study points out that there is a need to address factors responsible for stress and anxiety. Health departments can formulate strategies at both local and population levels worldwide so that mental health outcomes within the community can improve and, as a result, reduce depression.

3.6 Limitations and Further Directions

The cross-sectional nature of the research is limited to establishing causal relationships among the variables. While significant associations were identified between depression and factors such as social support, sedentary lifestyle, stress and anxiety, and socioeconomic status, it is not possible to determine whether these factors contribute to the development of depression.

Secondly, the study is based on questionnaire data, which may be subject to response bias. Participants might have understated or overstated their experiences related to stress, lifestyle behaviors, and depressive symptoms due to subjective perceptions or the tendency to present themselves in a socially desirable manner.

Thirdly, the study was confined to Pune District, which limits the generalizability of the findings to other regions with different cultural, socioeconomic, and environmental contexts. As the determinants of mental health can vary across populations, the results should be interpreted within the specific regional context of the study.

Fourthly, the study considered socio-demographic and behavioral factors; however, factors viz., genetic predisposition, parental behavior, and medical history may play an important role in the development of depression.

4. Discussion

The present research study has found that there exists an association between sociodemographic and behavioral factors versus depression. The findings point out that depression is mainly caused by a lack of social support and distress. The population under study reveals that lack of social support influences a high level of depression. It shows such community experiences loneliness and social isolation due to increased depression.

The study also identified a significant association between a sedentary lifestyle and depression. Physical activity is a crucial determinant of mental health, as it contributes to improved mood, enhanced sleep quality, and reduced psychological stress. Alexander L. Williams et al. (2025) said that Higher physical activity was associated with a lower likelihood of depression. Consequently, a sedentary lifestyle may adversely affect both physical and psychological well-being. Sivan Klil-Drori et al. (2022) expressed that Inactivity also increases the risk for late life depression and anxiety. Despite the known benefits of exercise and long-existing recommendations to promote physical activity, 60-85% of the world's population leads an inactive lifestyle.

Another important finding of the study is the significant association between chronic stress, anxiety, and depression. Participants who reported higher levels of stress and anxiety were more likely to exhibit depression.

Continuous exposure to stress due to housing, work, family responsibilities, and social challenges contributes to the increase of depression. Individuals belonging to poor economic conditions show higher depression as compared to middle and high-income groups. Also, factors like limited healthcare services and problems in accessing education as well as employment are responsible for an increase in stress and poor life satisfaction contributing to depression. Elizabeth Toledo et al. (2025) focus on Mental health literacy (MHL) research in young people has expanded significantly, demonstrating its importance for prevention and early intervention. Improvement in social support, physical activity will help in reducing depression. These results of the present study help policymakers and public health professional worldwide in developing strategies for improving mental health outcomes worldwide.

5. Conclusion

The results of the study examined the relationship between economic and behavioral factors versus depression. Significant associations were found between depression and main factors, viz., social support, level of physical activity, stress and anxiety, and socio-economic status. The results of the study also proved that depression is the main cause due to the following viz., less or no social support, less physical activity, maximum stress and anxiety, and economically poor family conditions. The result of the study is useful to policymakers of health departments by enhancing physical activity, reducing working stress, and reducing socioeconomic inequalities. The results of the study may assist healthcare professionals, policymakers, and community stakeholders in designing targeted and contextually relevant strategies to improve mental health outcomes and reduce the burden of depression. These practices are successful in reducing depression and improving the overall quality of life worldwide.

Acknowledgements

We are thankful to the MIT WPU stakeholders for their support throughout the duration of the research.

Declaration

Author Contributions' Statement (Credit):

1. Conceptualization, Supervision, Writing- Review & Editing: Dubey, U.K.B.
2. Methodology, Data Curation, Original Draft: Mrunmayee Patil

Author Approval

All authors have reviewed the manuscript and approved the final version for publication.

Declaration of Interest

The authors declare no financial or non-financial conflicts of interest related to this study.

Data Availability Statement

The data supporting the findings of this study are available from the authors upon reasonable request.

Data linking

https://docs.google.com/spreadsheets/d/1BYvDuQlUfTiK-De8yqnjiSzbWfFy5wHg/edit?usp=sharing&ouid=115393774519034196684&rtpof=true&sd=true

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APPENDIX I

Questionnaire Used for Data Collection

Section A: Socio-Demographic Information

1. **Age Group**

☐ 18–25

☐ 26–35

2. ☐ 36–45
3. ☐ 46–60
4. ☐ Above 60
5. **Gender**

☐ Male

6. ☐ Female
7. ☐ Prefer not to say
8. **Area of Residence**
9. ☐ Urban
10. ☐ Rural

Section B: Social Support

6. **Do you receive adequate emotional support from family or friends?**
☐ Yes
7. ☐ No
8. **How frequently do you interact with family members or friends to seek emotional support?**
☐ Frequently
☐ Occasionally
☐ Rarely

Section C: Lifestyle Behavior
8. **How frequently do you participate in physical activity or exercise?**
9. ☐ Regularly
10. ☐ Sometimes
11. ☐ Rarely / Never
12. **On average, how many hours per day do you spend in sedentary activities, such as sitting or screen-based activities?**
☐ Less than 3 hours
13. ☐ 3–6 hours
14. ☐ More than 6 hours

Section D: Stress and Anxiety
10. **Do you frequently experience stress arising from work, family, or personal life?**
11. ☐ Yes
12. ☐ No
13. **Do you often feel anxious or worried about your daily activities?**
14. ☐ Yes
15. ☐ No

Section E: Socioeconomic Status
12. **Please indicate the highest level of education you have completed.**
13. ☐ Primary Education
14. ☐ Secondary Education
15. ☐ Undergraduate
16. ☐ Postgraduate
17. ☐ Other
18. What is your current occupation or professional status?
☐ Not currently working
☐ Casual worker
☐ Small business
☐ Private sector job
☐ Government job
19. **What is your total monthly household income?**
20. ☐ Less than ₹15,000
21. ☐ ₹15,000 – ₹30,000
22. ☐ ₹30,001 – ₹60,000
☐ ₹60,001 – ₹1,00,000
☐ Above ₹1,00,000

Appendix II: Calculation of Sample Size

To examine the associations between socio-demographic and behavioral factors and depression, the required sample size was computed using the following formula for population based on studies. Sample size was calculated by using the following formula.

$$n = \frac{\left(Z^2 \times p \times (1-p)\right)}{d^2}$$

Where:
- n = Required sample size
- Z = standard normal variate corresponding to the desired confidence level (for 95% confidence level, Z = 1.96)
- P = Estimated prevalence of depression in the population
- 1 – p = Complement of the prevalence
- d = Margin of error (precision level)

For the present study, the following values were considered:
- Confidence level = 95%
- Z = 1.96
- Estimated prevalence p = 0.30
- Margin of error d = 0.02

Substituting the values in the formula:

$$n = \frac{(1.96)^2 \times 0.30 \times (1-0.30)}{(0.02)^2}$$

$$n \approx 2017$$

By considering incomplete responses of the individuals, the sample size is increase up to 2026 individuals.

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