A Dual Evaluation of Dietary Habits and Depression Severity Among Patients Using HAM-D at S.M.M.H Medical College Saharanpur U.P

Dt. Priyanka Sharma[1], Dr Mridula Pandey[2], Dr. Anu Agrawal[3], Dr. Anshuman Tiwari[4], Dr Sudhir Rathi[5] Dr Santosh Kumar Verma[6].

[1]*Ph.D. Scholar Quantum University Roorkee and Senior dietician, Govt. Medical College Saharanpur.
[2]Assistant Professor of food and nutrition Quantum University Roorkee.
[3]Nutritionist and founder of One Diet Today.
[4]Associate Professor and HOD Dept. of Psychiatry, Govt Medical College.
[5]Principal of Govt medical collage Saharanpur.
[6]Assistant Professor and Principal of, Quantum school of health sciences Quantum University.

Abstract

Background: -Depression is a growing global health concern, particularly in low- and middle-income countries like India. Despite increasing interest in nutritional psychiatry, there is limited research exploring the relationship between dietary habits and depression severity in semi-urban and rural Indian populations.

Aim: -This study aimed to assess the dietary patterns of psychiatric outpatients and analyse their association with the severity of depression, as measured by the Hamilton Depression Rating Scale (HAM-D), at S.M.M.H. Medical College, Saharanpur.

Methods: -A cross-sectional observational study was conducted involving 162 adult patients attending the psychiatry outpatient department. Participants were selected through convenience sampling. Data were collected using structured interviews, a dietary questionnaire, and the HAM-D scale.

Results: -More than half of the participants (54.32%) exhibited moderate depression. Healthier dietary behaviours, especially higher frequency of fruit intake and less meal skipping, were associated with lower HAM-D scores. Among the dietary factors analysed, only fruit intake frequency and meal skipping showed statistically significant associations with depression severity.

Conclusion: -The findings suggest that certain dietary habits, particularly regular fruit consumption and consistent meal patterns, may be linked to lower depression severity. These results highlight the importance of integrating nutritional counselling into mental health care. Further longitudinal studies are needed to better understand the causal pathways and to inform public health interventions.

Keywords: -Depression, Dietary Habits, Hamilton Depression Rating Scale, Nutrition, cross-sectional study.

Introduction
Context and Global Relevance of Depression
Depression is a critical global health issue that affects individuals irrespective of age, gender, or location. According to the World Health Organization (WHO), more than 280 million people worldwide currently suffer from depression, making it the leading cause of disability and a major contributor to the overall burden of disease (WHO, 2023). This mental health condition significantly disrupts daily functioning and incurs substantial economic losses, with an estimated annual productivity loss of approximately US$1 trillion (WHO, 2017).

India mirrors the global pattern, with mental health emerging as a pressing public health concern. Findings from the National Mental Health Survey conducted by NIMHANS indicate that about 15% of Indian adults require active clinical intervention for mental health issues, while nearly one in twenty individuals lives with depression (WHO, 2017). The impact of mental disorders in India is quantified at 2,443 disability-adjusted life years (DALYs) per 100,000 population, and the country's age-adjusted suicide rate is as high as 21.1 per 100,000 (WHO, 2023).

Despite these alarming figures, mental health care remains critically underfunded. Globally, mental health receives only around 3% of public health budgets, and this figure drops below 1% in low-income countries (WHO, 2017). Such underinvestment exacerbates the treatment gap, limiting access to essential care. In response, the WHO advocates for integrating mental health services into primary health care systems through community-based models that promote accessibility and affordability. Addressing this shortfall is essential for nations like India, where the need for scalable and sustainable mental health infrastructure is both urgent and undeniable.

Diet and Mental Health Connection
Nutritional psychiatry, an emerging domain within mental health research, focuses on the complex relationship between dietary habits and psychological well-being, particularly in the context of depressive disorders. Empirical evidence

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increasingly supports that adherence to the Mediterranean diet—characterised by a high intake of fresh fruits, vegetables, legumes, whole grains, nuts, and olive oil—is associated with a reduced risk of developing depression. Recent randomized controlled trials have demonstrated that individuals who consistently follow this dietary pattern exhibit significant improvements in depressive symptoms compared to those consuming less structured or nutrient-deficient diets (Bizzozero-Peroni et al., 2024, as cited in Mesas, 2024). Conversely, the Western dietary model—marked by frequent consumption of processed foods, refined sugars, and saturated fats—has been linked to heightened levels of depressive symptomatology. Swainson et al. (2023) observed that individuals adhering to Western eating patterns were more likely to experience elevated rates of depression. Mechanistically, dietary influence on depression is mediated by several physiological pathways. As outlined by Das, Kundu, and Hossain (2023), systemic inflammation is a central mechanism; diets rich in inflammatory components exacerbate depressive outcomes, whereas anti-inflammatory diets such as the Mediterranean model may exert a protective effect by modulating inflammatory markers and promoting neurochemical balance.

Need for Regional and Contextual Studies

The study of diet and lifestyle factors alongside mental health requires research at a local level because distinct areas of India have unique interactions between these elements. Significant research evidence shows dietary differences and physical activity disparities and weight issues between rural and urban populations thus requiring local intervention strategies (Cheng et al., 2024). The mental health situation in rural areas becomes more complex because these areas have restricted healthcare access and different cultural traditions.

The semi-urban and rural areas of Northern India including Saharanpur have insufficient research about how dietary patterns affect depression severity (Tripathi et al., 2016). The present research gap stops scientists from developing mental health strategies which account for local dietary patterns and healthcare systems that are available to the community members. The development of culturally appropriate depression intervention strategies requires immediate attention because it will help reduce depression burden in these communities.

Objective of the study

1. To assess dietary patterns—including vegetarian or non-vegetarian preferences, meal frequency, and the intake of fruits, vegetables, processed foods, and caffeinated beverages—using a structured and validated dietary assessment questionnaire.

2. To measure the severity of depression among participants utilizing the Hamilton Depression Rating Scale (HAM-D).

Methodology
Research Design

The research design used a cross-sectional observational approach at S.M.M.H. Government Medical College in Saharanpur. The research design aimed to assess the connection between nutritional patterns, & depression intensity among hospital patients.

Study Population& Sampling Technique

The research recruited participants by choosing patients who visited the outpatient clinic at the medical college during the study period. This study comprised individuals visiting the medical college's psychiatric outpatient department (OPD). 162 participants were enrolled for the study based on their availability and willingness to participate.

Data Analysis: -

In this research analyzed the gathered data to determine how participants distributed across various sociodemographic data and dietary information and depression levels, as gender and meal patterns. To examine the relationship between dietary habits and depression severity as measured by HAM-D scores, Karl Pearson's correlation coefficient will be employed. The Chi-square test will be used to analyze differences between categorical variables, such as gender and meal patterns. Additionally, independent t-tests or one-way ANOVA will be applied to compare depression scores across different dietary groups. A p-value of less than 0.05 will be considered statistically significant for all analyses.

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Result and Discussion
Result

Table 1: Demographic Profile of Study Participants

Variable	Category	Frequency	Percentage (%)
Age Group	18–30	34	20.98
	31–40	43	26.54
	41–50	42	25.92
	51–60	25	15.43
	61–70	18	11.11
Gender	Female	90	55.55
	Male	72	44.45
Area of Residence	Rural	83	51.23
	Urban	80	49.77
Education Level	Graduate	42	25.92
	Uneducated	35	21.60
	High School Education	31	19.13
	Primary Education	27	16.66
	Post Graduate	6	3.70
	Intermediate	21	12.96
Occupation	Home Maker	68	41.97
	Professional	35	21.60
	Self-Employed	19	11.72
	Student	10	6.17
	Labor	19	11.72
	Other	11	6.79
Depression Level	Moderate	88	54.32
	Severe	37	22.83
	Mild	37	22.83

The demographic profile of the study participants reveals that the majority were between 31–50 years of age, accounting for over 52% of the sample. Females (55.55%) slightly outnumbered males.

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Participants were almost evenly distributed between rural (51.23%) and urban (49.77%) areas. Educational backgrounds varied, with the largest group being graduates (25.92%), followed by individuals with no formal education (21.60%). Homemakers constituted the highest occupational group (41.97%), with professionals (21.60%) and labourers (11.72%) following. In terms of depression severity assessed by the Hamilton Depression Rating Scale, moderate depression was most common, affecting 54.32% of participants, while both mild and severe depression were equally reported at 22.83% each. These findings offer a comprehensive overview of the socio-demographic and clinical characteristics of the population studied.

Table 2: Distribution of Dietary Patterns and Lifestyle Factors Among Patients

Variable	Category	Frequency (%)
Dietary Habit	Non-Vegetarian	103 (63.58%)
	Vegetarian	52 (32.09%)
	Eggetarian	7 (4.32%)
Meal Frequency	Two meals/day	86 (53.08%)
	Three meals/day	70 (43.20%)
	One meal/day	6 (3.70%)
Skipping Meals	Yes	100 (61.73%)
	No	62 (38.27%)
Fruits Intake	Sometimes	68 (42.23%)
	Never	45 (27.92%)
	Rarely	30 (18.63%)
	Daily	19 (12.11%)
Vegetables Intake	Daily	79 (49.68%)
	Sometimes	68 (42.23%)
	Rarely	8 (2.52%)
	Never	7 (5.57%)
Fast Food Intake	Sometimes	70 (44.03%)
	Rarely	50 (31.45%)
	Weekly	26 (16.35%)
	Never	16 (8.17%)
Fish Consumption	Never	95 (58.64%)
	Rarely	34 (20.98%)
	Occasionally	21 (12.96%)
	Weekly	4 (2.46%)
	Daily	8 (4.93%)
Caffeine/Sugar Beverage Intake	Yes	152 (94.42%)
	No	10 (5.58%)
Water Intake	8 Glasses/day	65 (40.12%)
	4–5 Glasses/day	49 (30.25%)
	6–7 Glasses/day	22 (13.96%)
	<4 Glasses/day	26 (16.67%)
Nutrition Guidance Received	No	153 (95.03%)
	Yes	9 (5.97%)
Physical Exercise	No	128 (79.50%)
	Yes	34 (21.50%)
Sleep Duration	<5 Hours	47 (29.19%)
	5–6 Hours	72 (44.72%)
	7–8 Hours	33 (20.50%)
	>8 Hours	10 (6.59%)

The analysis of dietary and lifestyle patterns among patients reveals encouraging habits that may positively influence mental health outcomes. A majority of individuals (63.58%) follow a non-vegetarian diet, ensuring a variety of essential nutrients. Daily vegetable consumption was reported by nearly half (49.63%) of the participants, an important dietary behavior associated with better mood regulation. About 40% of individuals maintained adequate water intake, supporting hydration and overall brain function. While meal skipping was noted among 61.73% of participants, a

significant portion adhered to two or three regular meals per day, offering consistency in nutrient supply. Although daily fruit intake remains modest (11%), it provides a foundation for future improvements through dietary counseling. High caffeine or sugary beverage consumption was common, highlighting an area for health education.

Around 20% of participants engaged in regular physical exercise, which is beneficial for both physical and mental well-being. These patterns suggest that many patients have already adopted positive dietary habits that could be further strengthened to support emotional resilience.

Table 3: Distribution of Depression Levels Among Participants (HAM-D Scale)

Depression Level	Frequency	Percentage (%)
Mild	37	22.83
Moderate	88	54.32
Severe	37	22.83

The depression severity distribution indicates that nearly half of the participants (49.61%) fall under the moderate depression category, making it the most common level observed. Mild depression accounts for 25.69% of the participants, while severe depression is reported in 25.69% of cases. This suggests that a significant portion of the study population is experiencing moderate to severe levels of depression, prompting the necessity for embattled mental health interventions.

Table 4: Association Between Dietary Behaviours and Average Depression Scores Among Patients

Variable	Dietary Behaviour	Average Depression Score	Participants (n)
Meal Skipping	Yes	1.96	100
	No	1.52	62
Fast Food Intake	Sometimes	1.81	57
	Rarely	1.74	50
	Weekly	NA	45
	Never	1.77	10
Fruits Intake	Daily	1.61	18
	Sometimes	1.79	68
	Rarely	1.84	30
	Never	1.93	46
Vegetable Intake	Daily	1.72	79
	Sometimes	1.82	68
	Rarely	1.50	8
	Never	1.57	7
Caffeine/Sugar Beverage Intake	Yes	1.76	152
	No	1.77	10
Fish Consumption	Daily	NA	29
	Weekly	1.00	4
	Rarely	1.79	34
	Never	1.78	95
Physical Exercise	Yes	1.69	34
	No	1.78	128
Nutrition Guidance Received	Yes	1.25	9
	No	1.79	153

The analysis demonstrates notable associations between dietary behaviors and depression severity among participants. Individuals who did not skip meals showed a lower average depression score (1.52) compared to those who skipped meals (1.96), suggesting the stabilizing effect of regular meal patterns. Daily fruit and vegetable consumers exhibited reduced depression scores (1.61 and 1.72 respectively), highlighting the mental health benefits of a nutrient-rich diet. Participants who engaged in regular physical exercise also reported lower depression scores (1.69) compared to non-

exercisers (1.78), emphasizing the positive role of physical activity in emotional well-being. Although high caffeine or sugary beverage intake was prevalent, the difference in depression scores between consumers and non-consumers was minimal. Additionally, those who received nutrition guidance from healthcare professionals had significantly lower depression scores (1.25), indicating the potential value of dietary education in managing depression. These findings collectively underscore the importance of structured dietary habits and lifestyle interventions in supporting mental health outcomes.

Table 5: Chi-Square Test Results for Categorical Variables vs. Depression Level

Variable	Chi-square	p-value	Degrees of Freedom
Gender	6.802	0.0333	2
Area	3.989	0.1361	2
Education Level	10.338	0.4113	10
Occupation	12.613	0.2461	10
Meal Skipping	1.507	0.4706	2

The chi-square analysis shows a statistically significant association among gender & depression level, with p-value of 0.0333, suggesting gender may influence depression severity. However, other variables, including area of residence, education level, occupation, and meal skipping, do not show significant associations, as all their p-values are above 0.05. Education and occupation, despite having higher chi-square values, also have large degrees of freedom, which may dilute their statistical impact. These findings indicate that while gender might play a role in depression differences, other factors examined in this dataset do not demonstrate a meaningful correlation with depression severity.

Table 6: One-Way ANOVA – Comparison of Depression Scores Across Dietary Behavior Groups

Variable	Source	SS	df	MS	F	p-value
Fast Food Consumption	Between Groups	0.272	3	0.091	0.192	0.9018
	Within Groups	74.592	158	0.472		
	Total	74.864	161			
Fruit Intake Frequency	Between Groups	4.206	3	1.402	3.135	0.0272
	Within Groups	70.658	158	0.447		
	Total	74.864	161			
Vegetable Intake Frequency	Between Groups	1.208	5	0.242	0.512	0.7673
	Within Groups	73.656	158	0.466		
	Total	74.864	161			

The analysis using one-way ANOVA examined the relationship between dietary behaviors and depression severity among patients. No significant difference in depression scores was observed across different fast food consumption groups (p = 0.9018), suggesting that frequency of fast food intake alone may not substantially influence depression severity in this sample. In contrast, fruit intake frequency demonstrated a statistically significant association with depression scores (p = 0.0272). Participants with higher fruit consumption tended to report lower depression levels, highlighting the protective role of nutrient-dense foods against mood disorders. Vegetable intake frequency, however, did not show a significant difference in depression severity across groups (p = 0.7673). These results emphasize that while general diet quality is important, specific components like fruit intake might have a more direct and measurable impact on mental health. Overall, the findings support the importance of promoting fruit-rich dietary patterns as part of comprehensive strategies for depression management.

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Table 7: Chi-Square Test Results – Dietary Factors vs Depression Level

Dietary Factor	Chi-square	p-value	df
Meal Skipping	16.392	0.0003	2
Fast Food Consumption Frequency	1.205	0.9766	6
Fruit Intake Frequency	9.588	0.1431	6
Vegetable Intake Frequency	7.484	0.6791	10
Fish Consumption Frequency	43.754	0.3969	42

The chi-square analysis explored the association between various dietary behaviors and depression severity among patients. A significant relationship was identified between meal skipping and depression levels (p = 0.0003), suggesting that individuals who frequently skip meals are more likely to experience higher severity of depression. This finding highlights the importance of maintaining regular eating patterns as part of mental health management. However, fast food consumption, fruit intake, vegetable intake, and fish consumption frequencies did not demonst.

rate statistically significant associations with depression severity, as all corresponding p-values exceeded the 0.05 threshold. Although trends were observed in the data, particularly for fruit intake, the lack of significance suggests that these dietary factors alone may not directly influence depression levels within this sample. The results emphasize the potential impact of irregular meal patterns over specific food types, underscoring the role of consistent and structured eating habits in mitigating depression severity.

Discussion

Demographic Profile of Study Participants
The demographic data shows that the majority of respondents fall among 31–50 years of age, aligning with findings that mid-life is a critical period for depression onset due to life transitions and stressors (Igwe et al., 2021). Females made up a larger proportion of the sample (55.56%), supporting epidemiological trends where women exhibit higher depression rates than men, possibly due to hormonal, psychosocial, and cultural factors (Albert, 2015). Participants were nearly evenly split between rural and urban settings, allowing for balanced insight into geographic disparities. Education levels varied, with a considerable number being graduates (29.17%) and a significant portion uneducated (24.31%), emphasizing the need to consider health literacy in mental health interventions. Occupation data highlighted homemakers as the largest group (47.22%), suggesting the influence of unpaid domestic work and associated stress on mental health (Salk et al., 2017). Depression level data revealed a high burden, with 48.61% suffering moderate depression and over 50% experiencing either moderate or severe levels.

Distribution of Dietary Patterns
Dietary behaviors in the sample reflect a predominantly non-vegetarian population (66.45%), with most participants consuming two meals per day (55.48%). However, meal skipping remains prominent, reported by 61.73% of the participants. Daily fruit intake was low, with only 11.11% consuming fruits regularly, while 49.68% reported daily vegetable consumption. This pattern raises concerns, as insufficient intake of micronutrient-rich foods is associated with adverse mental health outcomes (Liu et al., 2016). Fast food consumption was frequent, with 44.03% consuming it sometimes, and caffeine or sugary beverage intake remained exceedingly high at 94.42%, mirroring global patterns where processed food intake correlates with higher depression risks (Gill et al., 2019). Fish consumption was notably limited, with a majority (61.64%) never consuming it, suggesting inadequate omega-3 fatty acid intake, a nutrient vital for mood regulation and serotonin balance (Chibanda, D., 2018). Overall, these findings highlight dietary inadequacies that could negatively influence mental health among the study population.

Depression Severity Levels
Depression levels as measured by the HAM-D scale show that nearly half (48.61%) of the participants fall under moderate depression, followed by 25.69% with severe depression. This distribution reflects a high mental health burden and aligns with Indian studies where moderate to severe depression frequently goes underdiagnosed (Sagar et al., 2020). Given that only 25% were mildly depressed, the data underline the importance of timely screening and structured mental health interventions in outpatient settings.

Depression Scores by Dietary Behavior
Although statistical significance was not observed, the trends in average depression scores reveal important patterns. Participants with healthier dietary practices—such as daily fruit intake (average score: 1.61) and daily vegetable intake (1.72)—reported lower depression severity compared to those consuming fruits (1.93) or vegetables (1.57) infrequently. Similarly, individuals engaging in regular physical exercise (1.69) and those who received nutritional guidance (1.25) demonstrated notably lower depression scores. These patterns

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align with prior research suggesting that diet quality exerts a substantial influence on mental well-being (Jayaprakash, R., & Sharija, S., 2017). In contrast to earlier findings, participants who skipped meals had slightly higher average depression scores (1.96) than those who did not skip meals (1.52), supporting the importance of structured meal patterns. Overall, while inferential significance was limited, the observed trends reinforce the positive association between consistent, nutrient-rich dietary habits and lower depression severity, highlighting avenues for targeted nutritional and behavioral interventions.

Chi- Square Test of Categorical Variables vs. Depression Level

Gender showed a significant association with depression level (p = 0.0333), consistent with prior evidence of gender disparities in depression prevalence (Kuehner, 2017). Other variables, including area of residence, education, occupation, and meal skipping, did not show significant associations. While education and occupation had relatively high chi-square values, the large degrees of freedom may have diluted their statistical power. These findings suggest that while sociodemographic variables are important, their direct correlation with depression may vary depending on sample characteristics and context.

ANOVA on Depression Scores Across Dietary Groups

The one-way ANOVA analysis revealed no significant differences in depression scores across dietary behavior categories for fast food consumption (p = 0.9018) and vegetable intake (p = 0.7673). However, a significant association was noted with fruit intake frequency (p = 0.0272), indicating that individuals with higher fruit consumption tended to have lower depression scores. This observation supports global research linking improved dietary patterns, particularly fruit-rich diets, with better mental health outcomes (Opie et al., 2015). Despite this significance in fruit intake, the lack of substantial differences in other dietary groups may be attributed to variability in dietary reporting or insufficient sample sizes in specific categories. Particularly, the relatively small number of participants engaging in daily fish consumption limits the ability to detect meaningful effects. These findings reinforce the growing evidence that specific components of diet, such as fruit intake, may have a more pronounced role in supporting mental health compared to broader dietary habits.

Chi- Square Test of Dietary Factors vs Depression level

Among the dietary factors examined, only meal skipping demonstrated a statistically significant association with depression severity (p = 0.0003), while all other variables—fast food consumption frequency, fruit intake, vegetable intake, and fish consumption—showed p-values greater than 0.05. Although trends were visible in the descriptive analysis, especially regarding fruit intake, statistical significance was not achieved for most factors. This finding supports the notion that while individual dietary components may contribute to mood regulation, their measurable impact may be more apparent in larger or longitudinal studies rather than cross-sectional analyses. Furthermore, the complex relationship between diet and depression may be influenced by additional factors not fully captured in this study, such as variations in physical activity, sleep duration, and socioeconomic pressures. These results underscore the importance of considering broader lifestyle and environmental variables alongside dietary habits when investigating the determinants of mental health outcomes.

Conclusion

This study provides a comprehensive assessment of the relationship between dietary patterns and depression severity among individuals attending the psychiatric outpatient department at S.M.M.H. Medical College, Saharanpur. The findings highlight a significant burden of moderate to severe depression, emphasizing the urgent need for early detection and holistic treatment strategies. While healthier behaviours, such as daily fruit and vegetable intake, showed trends toward lower depression scores, statistical analyses confirmed significant associations only with fruit intake frequency and meal skipping behaviours. Other dietary factors, including fast food and fish consumption, did not demonstrate strong statistical correlations. Gender remained an important socio-demographic variable influencing depression severity, reinforcing the value of gender-sensitive mental health strategies. Although education and occupation showed observable patterns, their associations were not statistically significant. The study revealed substantial nutritional inadequacies, suggesting an urgent need for targeted nutrition education and lifestyle interventions. Future longitudinal research and integrated public health policies are essential to establish causal relationships and enhance depression management frameworks in resource-limited settings.

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