Original Article

DOI: 10.7860/JCDR/2026/84327.22549

Public Health Section

Perceived Role of Vitamin D in Individuals with Depression: A Qualitative Analysis

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ABSTRACT

Introduction: Depression is a complex mental health condition with multifactorial origins, including psychological, social, and biological factors. Recent evidence suggests that Vitamin D_3, a micronutrient traditionally associated with bone and calcium regulation, may also influence neurological functions and mood regulation. However, the role of Vitamin D in mental health remains underexplored, particularly in relation to depression severity.

Aim: To explore perceptions and beliefs, among individuals with varying levels of depression and serum Vitamin D_3.

Materials and Methods: The present qualitative study was conducted in Unique health Private hospital in Ernakulam, Kerala, India, between April and May 2025. A purposive sample of eleven adults (n=11), both males and females aged 20-45 years, was selected based on documented depression scores (moderate to severe) and serum Vitamin D_3 levels. Data were collected through in-depth semi-structured interviews conducted in private settings using a pretested interview guide. The researcher, trained in qualitative methods with a background in psychology and public health, maintained reflexivity throughout the process. The study evaluated participants' depression severity and Vitamin D_3 status to explore perceptions and experiences related to mental health and nutrition. Data were analysed manually using Braun and Clarke's six-phase thematic analysis framework, with Microsoft Excel 2021 used for organising codes and sociodemographic details.

Results: Five major themes were identified: (1) Lack of awareness about the link between Vitamin D_3 and mental health; (2) Patterns of deficiency among individuals with severe depression; and (3) Clinical neglect of Vitamin D_3 screening in routine psychiatric assessments; (4) Emotional and social impacts of limited knowledge; and (5) Hopes for holistic and multidisciplinary care. Sub-themes revealed misconceptions about depression, inadequate nutritional education, and limited adoption of integrative care practices.

Conclusion: The present study highlights limited awareness among study subjects about the role of Vitamin D_3 in mental health and a lack of Vitamin D screening in clinical practice. Findings advocate for a holistic, interdisciplinary approach to depression management, bridging biological and psychosocial models. Broader public health initiatives are needed to increase awareness, reduce stigma, and improve clinical practices surrounding the role of micronutrients in mental health.

Keywords: Health literacy, Mental health, Psychological well-being

INTRODUCTION

Depression remains one of the most pressing global mental health challenges, with multifactorial origins encompassing psychological, social, and biological components [1]. The World Health Organisation (WHO) identifies depression as a leading cause of disability worldwide, affecting over 280 million people globally [2]. Despite advancements in psychopharmacology and psychotherapy, a large portion of individuals with depressive symptoms do not attain full remission [3]. In light of this, recent research has expanded its lens to investigate the biological and nutritional contributors to mental health. Depression is a leading cause of disability, with multifactorial origins involving psychological, social, and biological components. Despite medical advances, treatment resistance and underdiagnosis remain common [4]. Recently, interest has grown in the role of nutritional biomarkers particularly Vitamin D_3 as potential contributors to mood regulation.

Vitamin D_3, traditionally recognised for its role in calcium regulation and bone metabolism [5], has emerged as a potential modulator of neurological functions. It is implicated in the synthesis of neurotransmitters such as serotonin and dopamine, which play key roles in mood regulation [6]. Deficiency in Vitamin D has been associated with a variety of psychiatric conditions, including depression, seasonal affective disorder, and cognitive decline [7,8]. However, its role in clinical assessments remains underemphasised. Vitamin D_3 influences brain health through its role in serotonin production, immune modulation, and inflammation control [9]. While the correlation between Vitamin D deficiency and depressive disorders has been studied quantitatively, limited research explores the lived experiences and interpretations of individuals affected by both conditions [10].

The present study was motivated by the observation that individuals with severe depressive symptoms frequently exhibit deficient serum Vitamin D levels [11]. A deeper exploration was thus warranted to uncover the subjective experiences, beliefs, and knowledge systems that may mediate this association. By using thematic analysis on data derived from a sample of eleven individuals with documented Vitamin D and depression scores, the current study attempted to generate insights into how physiological and psychological factors intersect. The current study draws inspiration from prior qualitative frameworks, such as Aljefree N et al., who analysed sociocultural influences on Vitamin D status in Saudi Arabia [2]. By adapting a similar approach, the study aimed to explore the perception about the role of vitamin D in depression.

MATERIALS AND METHODS

The present qualitative study was conducted in Unique health private hospital of Ernakulam, Kerala, India, between April and May 2025. Ethical clearance was obtained from the Institutional Ethics Committee (Approval No: 0040/IEC/2023). All participants were informed about the study aims, procedures, and confidentiality

measures, and provided written consent. They were informed of their right to withdraw from the study at any stage without providing a reason.

Sample size selection: A purposive sample of eleven adults (n=11), both males and females aged 20-45 years, was selected based on documented depression scores (moderate to severe) and serum Vitamin D_3 levels. Data were collected through in-depth semi-structured interviews conducted in private settings using a pretested interview guide. The researcher, trained in qualitative methods with a background in psychology and public health, maintained reflexivity throughout the process. The study evaluated participants' depression severity and Vitamin D_3 status to explore perceptions and experiences related to mental health and nutrition. Data were analysed manually using Braun and Clarke's six-phase thematic analysis framework, with Microsoft Excel 2021 used for organising codes and sociodemographic details.

Inclusion criteria:

- Adults aged 18 years and above.
- Diagnosed depression (moderate to severe) as per the Beck Depression Inventory (BDI) [12].
- Available laboratory data on serum Vitamin D_3.

Exclusion criteria:

- Individuals currently undergoing Vitamin D therapy.
- Participants with other medical or psychiatric co-morbidities that may influence depression levels (e.g., bipolar disorder).

Study Procedure

Data collection was conducted over a two-month period (April-May 2025). This time frame allowed for flexible scheduling, rescheduling when necessary and ensuring participants were interviewed in private hospital of Ernakulam.The interview lasted approximately 20-30 minutes, with additional probing used when clarification or elaboration was needed.

A semi-structured interview guide was developed from existing literature (1-2) in nutritional psychiatry and mental health research. Core questions included: "Can you describe your understanding of Vitamin D's role in health?" and "What factors do you think contribute to your mood changes?" The guide was pilot tested with two individuals for clarity, and open-ended probes were incorporated to explore lifestyle, medical advice, and coping strategies.

Field notes were systematically maintained to capture non-verbal cues, emotional tone, and environmental context, while also serving as reflexive records of researcher impressions. With consent, audio recordings were obtained for seven participants; for four participants who declined recording, detailed written notes and post-interview reflections were used to ensure accuracy.

Participants were recruited through clinic records and referrals, and were first contacted by telephone or during routine visits by a researcher not directly involved in their clinical care. The study's aims, methods, and confidentiality protocols were explained, and written informed consent was obtained prior to participation. Each participant was interviewed once, and no outsiders were present during interviews to safeguard privacy.

Data saturation was closely monitored. By the sixth interview, recurring themes such as limited awareness of Vitamin D's role in mental health and the absence of nutritional screening in psychiatric care began to emerge. Interviews 7-9 reaffirmed these patterns with little new information, while interviews 10 and 11 confirmed thematic redundancy, indicating that saturation had been reached.

To ensure rigor, the research team met weekly to review transcripts, compare codes, and resolve discrepancies in thematic interpretation. This collaborative approach strengthened the trustworthiness and consistency of the findings.

STATISTICAL ANALYSIS

Following Braun and Clarke's (2006) six-phase method, data were manually coded to extract key patterns [4]. Themes were validated through peer discussion and reflexive journaling. The collected data were analysed using thematic analysis, following the six-step approach proposed by Braun V and Clarke V (2006):

- **Familiarisation with data:** The researcher read through all the data repeatedly to become immersed and intimately familiar with its content.
- **Generating initial codes:** Key observations were labelled, particularly focusing on the co-occurrence of severe depression and Vitamin D deficiency.
- **Searching for themes:** Patterns across the data were identified. For example, consistent Vitamin D deficiency among those with higher depression scores emerged as a key theme.
- **Reviewing themes:** Themes were refined, checked against the dataset, and validated for consistency and relevance.
- **Defining and naming themes:** Themes were given specific labels that reflected the core ideas emerging from the data (e.g., "biological marker of mood dysregulation").
- **Producing the report:** Themes were organised and presented in the findings, along with descriptive analysis.

Manual coding using highlighters and tables ensured a structured qualitative exploration. To ensure the credibility and trustworthiness of this qualitative analysis, the following strategies were applied:

- **Triangulation:** Data were reviewed by multiple academic peers for validation of emerging themes.
- **Reflexivity:** The researcher maintained a reflective journal to minimise personal biases during analysis.
- **Transparency:** Clear documentation of the analytical process was maintained to ensure dependability.

Transcripts were not returned to participants for comment or correction, which is acknowledged as a limitation of the study. Data coding was performed independently by two members of the research team, with regular meetings to resolve discrepancies and reach consensus. An initial coding tree was developed inductively from the first few transcripts, grouping similar codes into broader categories. This tree was refined iteratively as new data were analysed, ultimately leading to the final themes and sub-themes.

RESULTS

Eleven participants were interviewed (6 female, 5 male). Eleven individual interviews were conducted. Nine consented to audio-recording and two consented to only note-taking. Participant characteristics are shown in [Table/Fig-1].

Characteristics	N (%) or mean±SD	Median (range)
Gender	Male: 5 (45.5%)	–
	Female: 6 (54.5%)	
Age (years)	32.45±5.50	32 (20-45)
Occupation	Student: 2 (18.2%)	–
	Teacher: 2 (18.2%)	
	Professional: 1 (9.1%)	
	Homemaker: 1 (9.1%)	
	Researcher: 1 (9.1%)	
	Engineer: 1 (9.1%)	
	Marketing: 1 (9.1%)	
	Driver: 1 (9.1%)	
	Artist: 1 (9.1%)	
Vitamin D Level (ng/mL)	16.73±4.54	16 (10–25)

[Table/Fig-1]: Socio demographic details of participants.

The thematic analysis revealed five main themes, each encompassing distinct patterns and participant observations regarding the association between Vitamin D_3 levels and depression. [Table/Fig-2] outlines themes identified, with examples of participant supporting quotes. Despite the small sample size, the diversity in Vitamin D status and depression severity allowed rich exploration of individual perceptions and clinical insights. Direct quotations from participants are presented in italics within the results to illustrate key themes and maintain the authenticity of participant voices.

Theme	Subtheme	Participant Verbatim
Unawareness of Vitamin D's role in mental health	Depression is viewed solely as psychological or social stress	"I never thought vitamins had anything to do with depression. I always assumed it was because of my work pressure and sleep issues."
	Lack of education on nutrition and mental health link	"Nobody in my family or friend circle connects vitamins to feelings. We just talk about stress or sadness, not health."
	Ignorance of biological and biochemical factors influencing mood	"No doctor ever mentioned checking my vitamins when I said I was feeling low; it was always about anxiety or life problems."
Pattern of deficiency among severe depression Cases	Biochemical imbalance in severe depression. Vitamin D levels are inversely related to depression score.	"I've been feeling so tired and gloomy, and now it makes sense that my Vitamin D is low too. No one checked that before."
Clinical neglect of Vitamin D screening	Focus on psychopharmacology with minimal biochemical assessment	"I've been taking medication for depression for more than a year. No one asked me about my diet or tested any vitamins."
	Lack of integrative or multidisciplinary care approaches	"My doctor started me on antidepressants without discussing other possible causes for my symptoms."
Emotional and social impacts of limited knowledge	Self-blame and guilt due to a lack of understanding of biological causes	"I blamed myself for being weak until I found out it could be a vitamin deficiency."
	Social isolation and stigma from misinterpretation of depression causality	"My family thought I was simply stressed or lazy, not realizing there's a biological component."
Hopes for Holistic and Multidisciplinary Care	Openness to combining nutritional, psychological, and pharmacological treatments	"I wish clinics would routinely check Vitamin D levels when someone comes in with depression."
	Calls for routine nutritional screening and awareness campaigns	"We need better information and awareness about how nutrition affects mental health."

[Table/Fig-2]: Themes and example quotes for each theme described.

Theme 1: Unawareness of Vitamin D_3's Role in Mental Health

Most participants were unaware that Vitamin D_3 levels could affect their mental health. The prevailing assumption was that depression arises purely from emotional or social stressors. The lack of education on micronutrient mental health links was evident. A striking pattern across participants was the lack of knowledge or awareness regarding the potential impact of Vitamin D_3 on mood and emotional well-being. Most individuals attributed their depressive symptoms solely to psychosocial stressors, such as academic pressure, interpersonal conflicts, or economic challenges. Few had ever received any information- either from health providers or public health campaigns- linking micronutrient deficiencies to mental health.

"I never thought vitamins had anything to do with depression. I always assumed it was because of my work pressure and sleep issues."

This theme underscores a crucial gap in health education, where mental health is discussed in isolation from nutritional well-being. The absence of integrated health information may hinder early interventions.

Sub-themes Identified:

- Perception of depression as purely psychological.
- Lack of health education on nutrition and mood.
- Ignorance of biochemical causes of mental health decline.

Theme 2: Pattern of Deficiency Among Severe Cases

Analysis of the depression scores and Vitamin D_3 levels showed that individuals with severe depression were more likely to have deficient Vitamin D_3 levels (<20 ng/mL). While causality cannot be confirmed in a qualitative framework, the pattern suggests a possible correlation. Analysis of the depression scores and Vitamin D_3 levels showed that individuals with severe depression were more likely to have deficient Vitamin D_3 levels (<20 ng/mL). While causality cannot be confirmed in a qualitative framework, the pattern suggests a possible correlation, echoed in existing literature. Participants who exhibited lower Vitamin D_3 levels consistently had higher depression scores, suggesting the possibility that biological deficiencies may compound psychological distress. Some participants retrospectively connected their fatigue, irritability, and low mood to poor nutrition or lack of sun exposure once they were informed of their deficiency.

"I've been feeling so tired and gloomy, and now it makes sense that my Vitamin D is low too. No one checked that before."

This theme reflects the intertwining of biological and psychological domains and emphasizes the need for a more integrative assessment approach in clinical mental health.

Sub-themes Identified:

- Biochemical imbalance among severe depression.
- Vitamin D levels inversely related to depression score.
- Association stronger in untreated or chronic cases.

Theme 3: Clinical Neglect of Vitamin D Screening

None of the participants reported undergoing Vitamin D testing as part of their routine depression evaluation, unless specifically referred by a physician with nutritional awareness. Even those with chronic or recurring depressive episodes were prescribed antidepressants or counselling, with no mention of biochemical testing. None of the participants reported undergoing Vitamin D testing as part of their routine depression evaluation, unless specifically referred by a physician with nutritional awareness. Even those with chronic or recurring depressive episodes were prescribed antidepressants or counselling, with no mention of biochemical testing.

"I've been taking medication for depression for more than a year. No one asked me about my diet or tested any vitamins."

This theme reflects a systemic issue in mental health care, where psychological treatment often excludes physical health assessments. The findings suggest that Vitamin D screening should be standardised in depression evaluations, especially in populations at risk for deficiency.

Sub-themes Identified:

- Focus on pharmacological treatment.
- Absence of integrative assessments.
- Over-reliance on symptom-based diagnosis.

Themes 4: Emotional and Social Impacts of Limited Knowledge

Participants frequently described the emotional burden and social consequences stemming from their limited understanding of the biological aspects of mental health. Many expressed feelings of self-blame and guilt, interpreting their depressive symptoms as personal weakness or failure rather than a physiological imbalance. This internalised stigma often delayed help-seeking and reinforced negative self-perceptions.

A recurring sentiment was that the absence of accurate information about biological causes-such as Vitamin D_3 deficiency led to misinterpretations by family and peers. Participants recounted experiences of being dismissed, misunderstood, or even judged by others who attributed their symptoms to laziness, lack of discipline, or excessive stress. This social misunderstanding often resulted in isolation and reduced emotional support, deepening their psychological distress.

"I blamed myself for being weak until I found out it could be a vitamin deficiency."

"My family thought I was simply stressed or lazy, not realising there's a biological component."

This theme highlights the intertwined nature of knowledge, stigma, and emotional resilience. Limited awareness not only exacerbates self-stigma but also perpetuates social misconceptions, creating barriers to both empathy and effective treatment.

Sub-themes Identified:

- Self-blame due to ignorance of biological factors.
- Stigmatisation and misunderstanding by family and community.
- Emotional distress from social isolation and delayed recognition.

Themes 5: Hopes for Holistic and Multidisciplinary Care

Across interviews, participants voiced strong support for an integrated approach to mental health care-one that recognises the biological, psychological, and social dimensions of well-being. Many participants emphasised the need for routine nutritional screening, including Vitamin D_3 testing, in mental health assessments. They felt that healthcare systems often overlook basic biochemical contributors to depression, focusing primarily on emotional or pharmacological management. There was a clear openness to multidisciplinary treatment models, combining dietary interventions, psychological counseling, and, where necessary, medication. Participants viewed this holistic perspective as essential for addressing both the root causes and manifestations of depression.

"I wish clinics would routinely check Vitamin D levels when someone comes in with depression."

"We need better information and awareness about how nutrition affects mental health."

This theme underscores a growing recognition among individuals that effective mental health care must bridge the gap between nutrition and psychology. Integrating these disciplines could foster earlier detection, reduce relapse, and enhance overall quality of life.

Sub-themes Identified:

- Desire for integrated (biological, psychological, and social) care.
- Need for routine nutritional and biochemical screening.
- Advocacy for public awareness on nutrition-mental health links.

DISCUSSION

The findings of this study revealed a significant lack of awareness among participants regarding the role of Vitamin D_3 in mental health. Most individuals believed that depression resulted purely from emotional, social, or environmental stressors, without recognising the possible biological or nutritional factors involved. Many participants with moderate to severe depressive symptoms were found to have low Vitamin D_3 levels, suggesting an association between deficiency and mood disturbance. Despite this, none of the participants had ever been advised or screened for Vitamin D_3 deficiency during psychiatric consultations, indicating a major gap in clinical practice. This lack of knowledge and screening contributed to emotional distress, self-blame, and social stigma, as participants often internalised their symptoms as personal weakness rather than a potentially biological condition. Overall, the thematic analysis highlighted a critical gap in awareness, education, and clinical integration of nutritional factors in mental health care. The findings emphasise the need for routine Vitamin D_3 testing, public health awareness campaigns, and multidisciplinary management strategies to improve early detection and holistic treatment of depression.

Multiple studies have highlighted poor public and patient awareness regarding the relationship between Vitamin D and mental health, consistent with the findings of the current study [3-5]. A Saudi Arabian qualitative study by Aljefree N et al., reported that most participants associated Vitamin D only with bone and calcium metabolism, showing minimal understanding of its neurological or psychological roles [2]. Limited sun exposure, cultural practices, and lack of education on nutrition contributed to this gap in knowledge. Similarly, a study from the USA by Penckofer S et al., observed that individuals diagnosed with depression seldom received advice about Vitamin D screening or supplementation from mental-health professionals [13]. Patients expressed surprise upon learning that Vitamin D deficiency could contribute to fatigue, low mood, and cognitive dullness. Further, US and Canada studies (Bertone-Johnson ER et al.,; Anglin RE et al., studies found that even when patients were aware of Vitamin D's general health importance, very few recognised its role in neurotransmitter synthesis, serotonin regulation, or inflammatory pathways relevant to depression [3,14]. This indicates a persistent global gap in health literacy concerning the biological-nutritional determinants of mental health. Collectively, these studies demonstrate that knowledge about Vitamin D's role in mental well-being remains limited, and that mental-health care systems rarely include nutritional education or biochemical assessment as routine practice.

In this study also, most of the participants were unaware of the potential relationship between Vitamin D_3 levels and mood regulation, perceiving depression as purely psychological. This lack of awareness aligns with findings from Aljefree N et al., who reported low public knowledge regarding Vitamin D's broader health functions beyond bone health [2]. Participants with moderate to severe depression exhibited lower Vitamin D_3 levels (<20 ng/mL), supporting earlier quantitative findings that demonstrated an inverse association between Vitamin D status and depression severity Anglin RE et al., [3].

Participants' narratives revealed pervasive gaps in awareness about the role of micronutrients in mental health and limited exposure to integrative assessment approaches- findings consistent with prior qualitative work that documented low public knowledge and sociocultural barriers regarding vitamin D [2]. The persistence of compartmentalised care (separate handling of mental and physical health by different providers) emerged as a systemic barrier to identifying and addressing modifiable biological contributors to depression; integrative and multidisciplinary strategies have been advocated in the literature as a means to address such gaps [6,10].

The presence of stigma and reluctance to discuss mental health issues noted in this study further complicates detection of potentially relevant biological factors; public education and de stigmatisation efforts that include information about nutritional and biological contributors may therefore improve both recognition and help-seeking [2,12]. While randomised supplementation trials [15,16] have produced mixed findings, the accessibility, low cost and ease of measurement of vitamin D make it a pragmatic candidate for routine screening in at-risk populations and for targeted trials as part of multimodal treatment strategies [1,17,18].

In summary, these findings support a more holistic, biopsychosocial approach to depression care that incorporates biochemical assessment where appropriate and fosters collaboration between mental health professionals, primary care clinicians and nutrition specialists [4,10]. These findings also promotes routine Vitamin

D testing in individuals presenting with depressive symptoms, especially in high-risk groups, develop culturally sensitive awareness campaigns to reduce mental health stigma and promote holistic health approaches and introducing policy measures encouraging the integration of mental and nutritional health in primary care.

Limitation(s)

The present study results were based on a single setting which limits the generalisation of findings. The limited sample size represents a potential constraint of the current study. Absence of triangulation with external data (e.g., interviews or surveys) may limit contextual validity.

CONCLUSION(S)

The present study explored the perceptions and experiences of individuals with clinically diagnosed depression about Vitamin D_3 deficiency. The findings revealed limited awareness about the role of Vitamin D_3 in mental health, a pattern of low Vitamin D_3 levels among those with severe depression, and a lack of Vitamin D screening in clinical practice. These results highlight the need for an integrated approach that combines biochemical and psychological assessments in depression management. Addressing nutritional factors such as Vitamin D_3 deficiency may enhance treatment outcomes and promote holistic mental health care. Early screening and correction of Vitamin D_3 deficiency should be considered an important adjunct in the assessment and management of depression, emphasising the value of a multidisciplinary, nutrition-inclusive approach to mental health.

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PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Sep 26, 2025
- Manual Googling: Nov 27, 2025
- iThenticate Software: Nov 29, 2025 (5%)

ETYMOLOGY: Author Origin

EMENDATIONS: 8

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **Sep 16, 2025**
Date of Peer Review: **Oct 17, 2025**
Date of Acceptance: **Dec 02, 2025**
Date of Publishing: **Mar 01, 2026**