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Original Research Article

Expert opinion on the multivitamin deficiencies observed in day-to-day practice in Indian settings

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ABSTRACT

Background: Although there is an array of empirical evidence regarding vitamin deficiencies in isolation, there is a dearth of particular data regarding multivitamin use in Indian contexts. So, the present survey-based study aims to gather clinicians' opinions regarding the multivitamin deficiencies noted in day-to-day practice in Indian settings.

Materials and Methods : The cross-sectional, multi-response study employed an 18-item questionnaire to collect current feedback, clinical observations, and the clinical experience of specialists regarding multivitamin deficiencies observed in routine practice within Indian settings.

Results: Out of 191 participants, 53.93% opined that only a few patients have folic acid deficiency in most of the patients. More than half (51.83%) of patients have vitamin B12 deficiency. About 53% of the clinicians reported that zinc deficiency was seen in a few patients. Around 43% of the clinicians reported that 11 to 12 patients with diabetes using metformin were more likely to have a multivitamin deficiency.

Conclusion: This study offered valuable insights into the multivitamin deficiencies observed by clinicians in their daily practice among Indian patients. The survey also underscored the importance of regular monitoring of vitamin B12 levels in diabetic patients using metformin to reduce the risk of deficiency.

1. Introduction

As per the World Health Organization (WHO), essential vitamins and minerals are lacking in the diets of over 2 billion individuals worldwide.[1] The WHO also reported that between 2000 and 2005, approximately 190 million preschool children and 19 million pregnant women experienced vitamin A deficiency. Cui A et al. reported that approximately 16% of the world's population has a vitamin D deficiency.[2]These deficiencies could be attributed to inadequate dietary intake, malabsorption disorders, and socio-economic issues.[3–5]

India, with its diverse population and dietary patterns, faces major challenges related to multivitamin deficiencies, especially among urban populations. Vitamin B12 deficiency is also a significant concern, affecting both vegetarians and non-vegetarians due to dietary factors and malabsorption issues.[6] Garg et al. noted that the highest prevalence of vitamin D deficiency was among rural women (69.94%), followed by urban women (57.72%), and men (46.99%).[7]

According to the National Family Health Survey-4 (NFHS-4), India bears the highest burden of anemia globally. As per the 2016 estimates, anemia affected 58.6% of children, 53.2% of non-pregnant women, and 50.4% of pregnant women.[4] Moreover, folic acid deficiencies were observed in 23% of preschool children and 37% of adolescents. Vitamin B12, vitamin A, and vitamin D deficiencies (VDDs) were prevalent, affecting between 14% and 31% of preschool children and adolescents.[4] Among

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these deficiencies, the highest prevalence was observed for vitamin D in pregnant women (61%), followed by iron deficiency (54%), and vitamin B12 deficiency (53%).[4]

The National Health and Nutrition Examination Survey (NHANES) conducted from 1999-2000 revealed that 52% of adults reported taking a dietary supplement, with 35% reporting regular use of a multivitamin-multimineral (MVMM) product.[8] In a Comprehensive National Nutrition Survey of children (CNNSC) in India, conducted in 2019, it was found that 19% of preschool children and 32% of adolescents were observed to have zinc deficiency.

While there is abundant real-world evidence on deficiencies in individual vitamins, specific data on multivitamins in Indian settings is lacking. The present cross-sectional survey-based study aims to gather clinicians' perspectives on multivitamin deficiencies in Indian settings.

2. Materials and Methods

The cross-sectional, multiple-response questionnaire-based survey was conducted between June 2022 and December 2022 among clinicians in major Indian cities. The questionnaire booklet named IMPACT (Identification of Multivitamin deficiencies in day-to-day PrACTice) was sent to the doctors who were willing to participate. The questionnaire consisted of 18 items focusing on current feedback, clinical observations, and the clinical experience of specialists regarding multivitamin deficiencies. The study was conducted after receiving approval from Bangalore Ethics, an Independent Ethics Committee which is recognized by the Indian regulatory authority, Drug Controller General of India.

An invitation was sent to leading medical practitioners in the month of March 2022 for participation in this Indian survey. Participants were given the option to skip questions they did not wish to answer and were instructed to complete the questionnaire independently, without consulting their colleagues. Prior to the study's initiation, written informed consent was obtained from all participants. Any unanswered questions were considered as not attempted.

Descriptive statistics were used to analyze the data, and the distribution of the categorical variables was shown as percentages. The distribution of each variable was shown by the frequency of occurrence and the associated percentage. The distribution of categorical variables was represented visually with bar charts made with Microsoft Excel 2013 (version 16.0.13901.20400).

3. Results

The survey involved 191 participants. According to 42% of the clinicians, around 25 to 50 patients are being treated for multivitamin deficiencies every month in routine practice. Majority (59.16%) of the participants indicated that more females were diagnosed with multivitamin deficiencies than males (21.99%). Approximately 40% of the clinicians reported that multivitamin deficiencies are not exclusive to vegetarian diets, while 56% of them suggested that deficiencies might be related to vegetarian diets.

Nearly 48% of the respondents reported an increased incidence of multivitamin deficiencies in the age group of 40 to 55 years. About 64% of clinicians identified fatigue as a common symptom of multivitamin deficiencies. Approximately 70% of the clinicians reported that they prefer both multivitamin supplements and dietary changes for treating vitamin deficiencies. It was reported by 64% of clinicians that they recommend multivitamin deficiency tests to very few patients. Approximately 54% of clinicians stated that only a few patients have folic acid deficiency in routine practice (Figure 1).

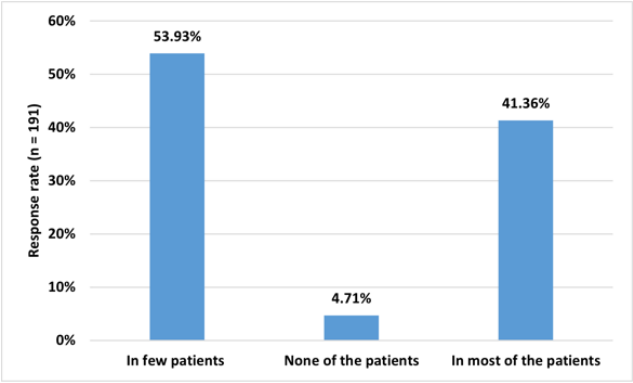

Figure 1: Distribution of responses on patients observed with folic acid deficiency in daily practice

About 52% of the participants stated that vitamin B12 deficiency was frequent in most of the patients (Figure 2). Around 58% of the clinicians reported that vitamin B6 deficiency was present in a few patients. More than half (53.4%) of the clinicians reported that zinc deficiency was observed in a few patients (Table 1).

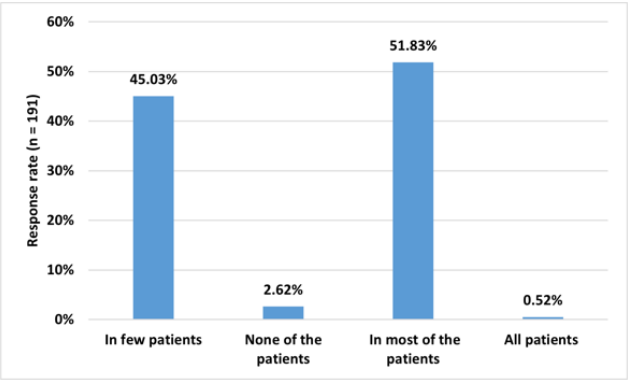

Figure 2: Distribution of responseto vitamin B12 deficiency noted in patients presenting to routine settings

Table 1: Distribution of response on zinc deficiency noted in patients presenting to routine practice

Zinc deficiency	Response rate (n = 191)
Few patients	102 (53.4%)
None of the patients	7 (3.66%)
In most of the patients	81 (42.41%)
All patients	1 (0.52%)

Approximately 57% of the clinicians reported prescribing antioxidants sometimes to boost patients' immunity. About 40% of the clinicians preferred prescribing liquid dosage multivitamin supplements to pediatric subjects. Majority (65.45%) of the clinicians stated that there might be an increase in geriatric patients compared to the younger adult population with reference to multivitamin deficiency. Around 43% of the clinicians reported that 11 to 12 patients with diabetes using metformin were more likely to have a multivitamin deficiency (Table 2).

Table 2: Distribution of response on the prevalence of multivitamin deficiency noted in diabetic patients usingmetformin

Multivitamin deficiency in diabetic patients	Response rate (n = 191)
<10 patients	58 (30.37%)
11-25 patients	82 (42.93%)
25-50 patients	51 (26.7%)

Approximately 65% of the clinicians stated that they prescribe a combination of multivitamins to most patients with vitamin deficiency. Nearly 45% of the clinicians opined that the symptoms of night blindness were common in patients with vitamin A deficiency. About 64% of the clinicians responded that they use clinic posters in regional languages to create more awareness about multivitamin deficiency and its associated problems.

4. Discussion

The survey findings reflect the varying prevalence of multivitamin and mineral deficiencies in Indian patients, thereby highlighting the importance of awareness, monitoring, and intervention in addressing such nutritional issues. The survey findings also emphasize the importance of regular monitoring of vitamin B12 levels in diabetic patients using metformin. Majority of the current survey participants reported that only a few patients were present with folic acid deficiency in routine practice. In line with this finding, Sundarakumar et al. observed that the deficiency of folic acid was lower as compared to other micronutrients.[9]

More than half of the respondents in the current study reported that vitamin B12 deficiencies were common in patients. Patel et al., in their case study, also observed a significant increase in vitamin B12 deficiencies.[10] In a prospective study conducted in North India, Singla et al. reported that the prevalence of vitamin B12 deficiency is approximately 47%.[11] In another cross-sectional study, Chakraborty et al. noted that vitamin B12 deficiency was higher among rural school-going adolescents, with boys exhibiting a higher B12 deficiency compared to girls (rural: 43.9% versus urban: 30.1%, P <0.001; male: 34.4% versus female: 31.0%, P <0.05).[12] Similarly, Sivaprasad et al. reported that the overall prevalence of B12 deficiency was significantly higher among adults in the age group of 41 to 60 years (44%) in the urban population. It was also observed to be higher among vegetarians (54%).[13] Venkatesh et al., in a systematic review and meta-analysis conducted for Indian studies, observed that the overall prevalence of vitamin B12 deficiency was about 57%.[4]

In the present survey, majority of the respondents indicated that only a few cases present zinc deficiency in routine practice. However, this finding appears to contradict previous literature findings. In a Delhi-based cross-sectional study, Kapil et al. reported that a total of 49.4% of children had zinc deficiency. The deficiency among adolescent boys and girls was 50.8% and 48.2%, respectively.[14] Similarly, in another study by Menon et al. the prevalence of zinc deficiency has been reported to be approximately 52% to 58% among tribal women in Central India.[15] Studies conducted by Mahanta et al. among pregnant women in Assam reported zinc deficiency in 12% of the women, while Herbst et al. reported a lower prevalence of zinc deficiency, around 18%, in children aged six months to five years in Punjab.[16,17] In a community-based cross-sectional study by Kapil and Jain, it was stated that the prevalence of zinc deficiency was highest in Orissa (51.3%), followed by Uttar Pradesh (48.1%), Gujarat (44.2%), Madhya Pradesh (38.9%), and Karnataka (36.2%).[18]

Several previous studies have reported an association between metformin use and vitamin B12 deficiency. In agreement with these findings, the current survey participants reported significant vitamin B12 deficiency in diabetic patients using metformin. DeJager et al. found that long-term metformin use increased the risk of vitamin B12 deficiency, leading to elevated homocysteine levels. The study reported a 19% decrease in vitamin B12 levels associated with metformin use.[19] Similarly, Almatrafi et al. in a cross-sectional study, observed that vitamin B12 deficiency occurred in 17.5% of the patient's using metformin. There was a significant difference according to diabetes duration (P = 0.002) between patients showing deficiencies and those with normal ranges of vitamin B12.[20] Khan et al. observed a high prevalence (30.7%) of vitamin B12 deficiency in patients with type-2 diabetes receiving metformin.[21] A cross-sectional study in the sub-Himalayan region of India by Nand et al. reported that there is a significant deficiency of vitamin B12 in type-2 diabetes patients. The mean vitamin B12 level was significantly low (176.23±60.96 pg/ml) in individuals who used metformin

for >10 years (p<0.001), indicating borderline deficiency.[22]

The survey results provide valuable insights into the varying prevalence of multivitamin and mineral deficiencies noted in patients presenting to the Indian settings. One of the major strengths of the study was the use of a well-designed and validated questionnaire to gather data from clinicians. It was critical to recognize some of the shortcomings of the current survey. Relying on expert judgment in the study introduced the potential for bias, as various perspectives and preferences may have influenced the reported results. It was essential to consider these limitations when interpreting the findings and to conduct further research to validate and expand upon the conclusions.

5. Conclusion

This cross-sectional survey underscored the diverse prevalence of multivitamin and mineral deficiencies noted among patients presenting to routine Indian settings, underscoring the importance of increased awareness, diligent monitoring, and timely intervention in addressing these nutritional challenges. The survey also highlights the need for regular monitoring of vitamin B12 levels in diabetic patients using metformin to mitigate the risk of deficiency.

6. Source of Funding

None

7. Conflict of Interest

None.

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