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“A STUDY TO ASSESS THE EFFECTIVENESS OF SELF INSTRUCTIONAL MODULE ON KNOWLEDGE REGARDING VITAMIN B12 DEFICIENCY AMONG DIABETIC CLIENTS IN SELECTED RURAL AREA OF MEHSANA DISTRICT, GUJARAT”.

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Abstract:

A community-based quasi-experimental study was conducted to assess the effectiveness of a structured teaching Programme on knowledge regarding adolescent mental health among adolescents in selected rural areas of Mehsana district, Gujarat. Data were collected using a structured questionnaire covering socio-demographic variables and knowledge related to mental health, including stress, depression, anxiety, and coping strategies. The findings revealed that a considerable proportion of adolescents had inadequate knowledge regarding mental health in the pre-test. Factors such as educational level, family environment, and exposure to health information significantly influenced knowledge levels. Following the structured teaching Programme, a significant improvement in knowledge was observed among adolescents. The study concluded that structured educational interventions are effective in enhancing awareness and understanding of adolescent mental health, thereby promoting early identification and prevention of mental health problems. INTRODUCTION: Vitamin B₁₂ deficiency is a prevalent but often overlooked condition among diabetic patients, particularly those on long-term metformin therapy. This study evaluated the effectiveness of a Self-Instruction Module (SIM) in improving knowledge regarding vitamin B₁₂ deficiency among diabetic clients in a rural area of Mehsana district. Using a pre-experimental one-group pre-test and post-test design, knowledge was assessed before and after the intervention. The findings revealed a significant improvement in post-test knowledge scores, demonstrating the effectiveness of the SIM. The study concludes that SIM is a simple, cost-effective, and practical educational strategy that can enhance awareness and support the prevention of vitamin B₁₂ deficiency-related complications among diabetic clients in rural communities. DESIGN: A quasi-experimental research design was used to assess the effectiveness of the Self Instructional Module PARTICIPANTS: 60 Diabetic Clients were selected using a non-probability Purposive sampling technique from selected rural areas of Mehsana district., INTERVENTION: A Self Instructional Module on Vitamin B₁₂ Deficiencies was administered. TOOL: A self-structured knowledge questionnaire was used to assess knowledge levels. RESULT: The post-test means knowledge score (23.17) was higher than the pre-test mean score (8.28). The calculated t-value (34.50) showed that the Self Instructional

module was effective. Chi-square test revealed association between knowledge and selected demographic variables.

KEYWORDS: *Assess, Effectiveness, Self-Instructional Module, Knowledge, Vitamin B12 Deficiencies, Diabetic Client.*

INTRODUCTION:

Vitamin B₁₂, also known as cobalamin, is a vital water-soluble vitamin that plays an indispensable role in numerous physiological processes essential for maintaining overall health. It is crucial for DNA synthesis, ensuring proper cell division and genetic stability. In addition, Vitamin B₁₂ is actively involved in fatty acid metabolism and energy production, helping the body convert food into usable energy. One of its most important functions lies in the maintenance of neurological health, where it supports the formation of the myelin sheath that insulates nerve fibers, facilitating efficient nerve signal transmission. A deficiency in Vitamin B₁₂ can lead to megaloblastic anemia, fatigue, weakness, and neurological disturbances such as numbness, memory loss, and cognitive decline.¹

Diabetes mellitus is a chronic, progressive metabolic disorder characterized by elevated blood glucose levels (hyperglycemia), which occur due to either insufficient insulin production by the pancreas or the body's inability to effectively utilize the insulin it produces. Insulin, a hormone secreted by the β -cells of the islets of Langerhans in the pancreas, plays a central role in regulating glucose metabolism. It facilitates the uptake of glucose into cells, where it is converted into energy necessary for various physiological functions. When insulin secretion or action is impaired, glucose accumulates in the bloodstream, leading to persistent hyperglycemia. If left uncontrolled, diabetes can cause widespread metabolic disturbances and lead to serious long-term complications affecting multiple organ systems.² Among individuals with diabetes mellitus, the risk of vitamin B₁₂ deficiency is notably higher, particularly due to the long-term use of metformin, which remains the firstline pharmacological therapy for type 2 diabetes management. While metformin is highly effective in improving insulin sensitivity, lowering hepatic glucose production, and promoting glycemic control, several studies have demonstrated that its chronic administration can interfere with vitamin B₁₂ absorption in the gastrointestinal tract. The proposed mechanisms include altered intestinal motility, bacterial overgrowth, and impaired calcium-dependent uptake of the vitamin-intrinsic factor complex at the terminal ileum. As a result, patients on long-term metformin therapy are at an increased risk of developing subclinical or overt vitamin B₁₂ deficiency.³

NEED OF THE STUDY:

India exhibits one of the highest national burdens of vitamin B₁₂ deficiency globally. One North Indian study reported a prevalence of nearly 47% in a tier-3 city population. Another community-based study in rural South India found 55% of pregnant women were deficient. National estimates indicate adult deficiency rates ranging from 47% to 71%. These levels underscore the critical need for interventions targeting micronutrient awareness and prevention across the country.⁴

Global Overview (Type 2 Diabetes Patients on Metformin) A comprehensive metaanalysis involving over 52,000 individuals with type 2 diabetes found that approximately 29% of patients were deficient in vitamin B₁₂. Metformin use was highlighted as a key contributing factor.⁵

At an American Diabetes Association presentation, it was noted that 10–30% of patients on long-term, high-dose metformin had vitamin B₁₂ deficiency. In an Indian cohort, 35% of diabetic patients on metformin were deficient, a condition that correlated with peripheral neuropathy. A Chennai-based study reported a prevalence of 15.72%, with deficiency strongly associated with longer metformin duration (>5 years) and higher dosage (>1 g/day).⁶

STATEMENT OF THE PROBLEM:

“A STUDY TO ASSESS THE EFFECTIVENESS OF SELF INSTRUCTIONAL MODULE ON KNOWLEDGE REGARDING VITAMIN B12 DEFICIENCY AMONG DIABETIC CLIENTS IN SELECTED RURAL AREA OF MEHSANA DISTRICT GUJARAT”.

OBJECTIVES OF THE STUDY:

1. To Assess knowledge regarding on vitamin B12 deficiency among diabetic client's in selected rural area of Mehsana district.
2. To Assess the effectiveness of Self Instruction Module on knowledge regarding on vitamin B12 deficiency among diabetic client's in selected rural area of Mehsana district.

3. To Find out the association of pre-test knowledge score with their selected demographic variables.

HYPOTHESIS:

H₀: There is no a significant association between demographic variables and the knowledge score regarding vitamin B12 deficiency among diabetic client in the selected rural area of Mehsana district.

H₁: There is a significant association between demographic variables and the knowledge score regarding vitamin B₁₂ deficiency among diabetic client in the selected rural area of Mehsana district.

METHODS AND MATERIAL:

Quantitative Pre-experimental one group. pre-test post-test Research design was used. By using non-probability Purposive sampling technique. This study also done on 60 Sample data was Counting by Structure questionnaires with used pre-test and posttest to assess knowledge about Vitamin B12 Deficiencies.

RESULTS:

Regarding age, the majority of participants 24 (40.00%) belonged to the 41–50 years' age group, followed by 20 (33.33%) above 51 years, 13 (21.67%) in 31–40 years, and only 3 (5%) in 20–30 years, indicating most respondents were middle-aged and older adults. In terms of gender, more than half of the participants 34 (56.67%) were male, while 26 (43.33%) were female, and none identified as transgender, showing a slightly higher representation of males in the study. With respect to marital status, the majority 57 (95.00%) were married, while only 2 (3.33%) were single and 1 (1.67%) was widowed, with none divorced, indicating most respondents were living with a spouse. Considering educational status, more than half 32 (53.33%) had primary education, followed by 18 (30.00%) with secondary education, 6 (10.00%) with higher secondary education, and 4 (6.67%) who were illiterate, with none being graduates or above, reflecting a generally low level of formal education. Regarding occupation, 20 (33.33%) participants were engaged in business, 19 (31.67%) were housewives, 9 (15.00%) were in other occupations, 8 (13.33%) worked in private jobs, and only 4 (6.67%) were government employees, indicating business and homemaking as the most common occupations. In relation to monthly income, none of the participants earned less than ₹10,000, while equal proportions 22 (36.67%) earned between ₹10,000–20,000 and ₹20,000–40,000, and 16 (26.66%) earned above ₹40,000, showing that most belonged to lower-middle and middle-income groups. With regard to duration of Diabetes Mellitus (DM), more than half 34 (56.66%) had diabetes for 1–5 years, followed by 16 (26.67%) for less than 1 year and 10 (16.67%) for 6–10 years, with none having it for more than 10 years, indicating most were in early to mid-stage duration of the disease. Concerning dietary pattern, the majority 44 (73.33%) followed a vegetarian diet, while 12 (26.67%) were non-vegetarian and 4 (6.66%) had a mixed diet, with none being eggitarian, indicating vegetarian diet predominance. Regarding current treatment, most participants 49 (81.67%) were taking oral tablets, while 11 (18.33%) were on insulin injections, with none using combined or other therapies, showing oral medication as the primary treatment mode. Finally, in terms of family history of diabetes, 36 (60.00%) participants had a family history of diabetes while 24 (40.00%) did not, indicating a significant hereditary predisposition among respondents.

Finding related to pre and post knowledge score:

Level of Knowledge	Pre-test		Post-test	
	Frequency	Percent (%)	Frequency	Percent (%)
Poor (0-10)	51	85%	01	1.67%
Average (11-20)	09	15%	11	18.33%
Good (21-30)	00	0%	48	80%

Pre-test, only 51 (85%) of Diabetics Client had Poor level (0-10 score) of knowledge on Vitamin B12 Deficiencies, 09 (15%) of Diabetics Client had average (11-20 score) level of knowledge Vitamin B12 Deficiencies and no one had good knowledge (21-30 score) on Vitamin B12 Deficiencies

During **Post-test**, No one of Diabetics Client had Poor level (0 - 10 score) of knowledge on Vitamin B12 Deficiencies, 11 (18.33%) Diabetics Client had average (11-20 score) level of knowledge on

Vitamin B12 Deficiencies and 48(80%) had good knowledge (21-30 score) on Vitamin B12 Deficiencies.

It was inferred from the above table that the Self Instructional Module was effective in improving knowledge Vitamin B12 Deficiencies among Diabetics Client

Finding related to effectiveness of structured teaching programme:

Distribution of subject on paired 't' test between pretest and posttest knowledge score regarding B12 Deficiency among Diabetics Client	Mean	Standard deviation	t'value
Pre-test	8.28	2.70	34.50
Post-test	23.17	3.09	

Finding related to association between pretest knowledge score of Adolescents with selected demographic variables:

Table show that the association between the Pretest level of Knowledge and socio demographic Variable. Based on the Third objectives used to chi-square test to associate the level of knowledge of Vitamin B12 Deficiencies show that there is a significant. The calculated Chi-square was less than the table value at the 0.05 level of significance.

CONCLUSION:

The present study aims to evaluate the effectiveness of Self Instructional Module on Vitamin B12 Deficiencies. The study was conducted by using Pre-experimental one group pre-test post-test research design. Mehsana district was selected for conducting the study. The sample size was 60 Diabetic Client using Non-Probability Purposive Sampling method.

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