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KNOWLEDGE AND ATTITUDE REGARDING PREVENTION OF VITAMIN D DEFICIENCY AMONG HIGH SCHOOL STUDENTS IN SELECTED SCHOOLS OF KAMRUP (RURAL), ASSAM : A DESCRIPTIVE STUDY.

Knowledge and attitude regarding prevention of vitamin D deficiency among High school students

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ABSTRACT

Background: Vitamin D is a fat soluble vitamin.. The nutritionally important forms of vitamin D are vitamin D_2 (Calciferol) and D_3 (Cholecalciferol). Calcium is one of the main building blocks of bone that plays a major role in the nervous, muscular, and immune systems.

Objectives: To assess the level of knowledge regarding prevention of vitamin D deficiency , to assess the level of attitude regarding prevention of vitamin D deficiency and to find out the correlation between knowledge and attitude among high school students regarding prevention of vitamin D deficiency.

Methods & Materials: A Quantitative Descriptive research design using convenience sampling technique to select 310 high school students studying in Class 8th to Class 10th students in in selected schools on the basis of inclusion criteria. Knowledge assessed using self-structured Knowledge Questionnaire and Attitude assessed using 5-point Likert scale.

Results: In assessing Knowledge, majority i.e, 190 (61.3%) had moderately desired Knowledge, 70 (22.6%) had inadequate Knowledge and 50 (16.1%) had adequate Knowledge. The mean level of Knowledge score was 9.11(±3.30). In assessing Attitude, 211 (68.1%) had moderately desirable attitude, 79 (25.4%) had adequate attitude and 20 (6.5%) had inadequate attitude . The mean level of Attitude score was 38.78 (±10.39).

Conclusion: Based on the analysis of the findings of the study , it has been indicate that High school students have some level of awareness, there is a need for improvement in both knowledge and attitude.

Keywords: **Knowledge , Attitude , Prevention of Vitamin D deficiency , High school students , School. INTRODUCTION**

Vitamin D deficiency is a common vitamin deficiency when body is not getting enough vitamin D to stay healthy. Calcium is one of the main building blocks of bone that plays a major roles in nervous, muscles and immune systems. [1]

Severe lack of vitamin D deficiency can leads to loss of bone density, osteoporosis and fractures (broken bones). In children can cause rickets and in adults can cause osteomalacia. Sign and symptoms in children includes incorrect growth patterns , muscles

weakness, bone pain, deformities in joints and in adults includes fatigue, bone pain, muscle weakness, muscle cramp and depression. [2]

IAP Guidelines of vitamin D and calcium deficiency (2020) , less than 10% of vitamin D is derived from the diet while 90% is synthesized in skin with sunlight exposure . Socio-cultural practices, darker pigmentation, low calcium diet and high in phytates and oxalates depletes the vitamin D and fortification with vitamin D genetic factors. It increased 25(OH)D-24-hydroxylase which degrades 25(OH)D to inactive metabolites and geographical location of various places in the country (India extends from 8 to 38 degrees north latitude). Environmental pollution are also some reasons proposed for vitamin D deficiency in Indian children such as changing lifestyles with sedentary behavior in children and indoor lifestyle (avoiding optimal hours of sun exposure between 10 am to 3 pm, best time to form vitamin D in the skin), reduces the sunlight exposure and thus increase the tendency for vitamin D deficiency. [3]

According to National Library of Medicine (2023) , in India overall prevalence of vitamin D deficiency in preschool children (1-4 years), school-age children (5-9 years), and adolescents (10-19 years) are 13.7%, 18.2%, and 23.9% respectively. [4]

According to MDPI (2023) , highest prevalence of vitamin D deficiency was observed in Europe (60.0%), Australia (30.1%), Asia (27.9%), Africa (25.0%) and North America (20.4%). [5]

NEED OF THE STUDY

Vitamin D deficiency is a global public health issues in all age groups. Every individual must know about vitamin D deficiency and its prevention to ensure getting enough vitamin D in diet and sun exposure. Vitamin D deficiency is very important in children mainly because of its profound effect on growth and development. Since approximately 40%-60% of total skeletal mass at maturity is accumulated during childhood and adolescence. Vitamin D deficiency also has a major implications on adult bone health, which regulates calcium and phosphorus balance for bone mineralization and remodeling.

Rickets is a severe form of vitamin D deficiency in childrens. It manifests as bone deformities, bone pain and weakness, effect bone health, calcium homeostasis, effect on body's endocrine system, immune system, cardiovascular system, neuropsychological functioning and neuromuscular performance .

According to Indian pediatric study (2025) , in India vitamin D deficiency is considered to be the most common nutritional deficiency and also one of the most common un diagnosed medical condition. The prevalence of vitamin D deficiency is 50-90 % attributed to insufficiency and decreased calcium intake or high phytate combine to induce vitamin D deficiency and rickets along with skin color and changing lifestyle.

This study aims to bridge knowledge and attitude gap regarding prevention of Vitamin D deficiency among high school students through health awareness and promotion.

OBJECTIVES OF THE STUDY

1. To assess the level of knowledge regarding prevention of vitamin D deficiency among high schools students in selected schools of Kamrup (Rural),Assam.

2. To assess the level of attitude regarding prevention of vitamin D deficiency among high schools students in selected schools of Kamrup (Rural), Assam.

3. To find out the correlation between knowledge and attitude among high school students regarding prevention of vitamin D deficiency in selected schools of Kamrup (Rural), Assam.

4. To find out the association between knowledge regarding prevention of vitamin D deficiency among high school students with selected demographic variables.

5. To find out the association between attitude regarding prevention of vitamin D deficiency among high school students with selected demographic variables.

SCOPE OF THE STUDY

1. This study will help to check the knowledge and attitude among high schools students regarding prevention of vitamin D deficiency.

2. The study will help to know the opinion of the high schools students regarding prevention of vitamin D deficiency.

DELIMITATION

This study is delimited to high school students in selected English medium schools of Kamrup (Rural), Assam.

HYPOTHESIS

- H_1= There is a correlation between Knowledge and Attitude regarding prevention of vitamin D deficiency among high school students in selected schools of Kamrup (Rural), Assam.

- H_2=There is a significant association between Knowledge regarding prevention of vitamin D deficiency among high school students in selected schools of Kamrup (Rural), Assam with their selected socio- demographic variables.

- H_3=There is a significant association between Attitude regarding prevention of vitamin D deficiency among high school students in selected schools of Kamrup (Rural), Assam with their selected socio- demographic variables.

3.1 Population and sample

In this study, the population referred to high schools students who is studying in class 8^{th} to class 10^{th} of selected schools of Kamrup (Rural), Assam and who fulfilled the inclusive criteria. Using Cochran's formula: $\mathbf{N} = \frac{Z^2pq}{2}$

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A non-probability convenience sampling technique was used to select high school students will be selected based on their availability and consent to participate in the study.

3.2 Data and sources of data

To ensure the content validity, problem statement, objectives of the study, operational definitions, demographic data, self-structured questionnaire, 5-point Likert scale on knowledge and attitude regarding prevention of vitamin D deficiency content scoring key was given to as follows:

- 2 Medical experts in the field of Medicine and Pediatric Department.
- 2 experts in the field of Medical Surgical Nursing.
- 1 experts in the field of Child Health Nursing.
- 2 experts in the field of Community Health Nursing.

The experts were requested to provide their valuable suggestion in the remarks for the relevancy, clarity and appropriateness of the content

Modification was done and tool was reframed according to various experts and consulting with the guide.

For the present study, reliability of the tool was done by Split half method using Spearman Brown's formula

Reliability of self- structured knowledge questionnaire for Vitamin D deificency was r'=0.78 and reliability of 5-point Likert scale was r'= 0.91, so it was found to be statistically reliable to proceed with main study.

The data collection process was scheduled from 11.08.2025 to 06.09.2025.A formal written application was obtained from the respective Human Resource Department, the Medical Superintendent and Nursing Superintendent of the selected hospitals for conducting the research study by the investigator before the collection of the data.

3.3 Theoretical Framework

In the present study, modified Nola J Pender's Health Promotion model (1982) is used as the investigator aimed to assess the Knowledge and Attitude regarding prevention of Vitamin D deficiency among the high school students in selected Schools of Kamrup (Rural), Assam. According to Pender's, the Health promotion model, in its current form, identifies cognitive- perceptual factors in the individual that are modified by situational, personal and interpersonal characteristics to result in promoting behaviours in the presence of cue to action.

The following elements are common in system:

I. COGNITIVE PERCEPTUAL FACTORS: In this study, it refers to the assessment of knowledge and Attitude regarding prevention of vitamin D deficiency among high school students after using self- structured questionnaire and 5 point Likert scale.

II. MODIFYING FACTORS: In this study, modifying factors include demographic variables such as- Age (in years), Gender, Class, Religion, Family monthy income, Educational qualification of father, Educational qualification of mother, Occupation of the father, Occupation of the mother, Types of family, Family history of vitamin D deficiency, Previous knowledge regarding prevention of vitamin D deficiency, Source of information about prevention of vitamin D deficiency.

III. ASSESSMENT: In this study, assessment means to find out the level of knowledge by using Structured Knowledge Questionnaire consisting of 20 question and Attitude by using 5- Point Likert scale consisting of 14 statements.

IV. PROBABLE OUTCOME: In this study, it refers to adequate, moderately adequate and inadequate Knowledge of the high school students and desirable Attitude, moderately desirable Attitude and undesirable Attitude regarding prevention of vitamin D deficiency among high school students.

V. LIKELIHOOD OF ACTION: The investigator conducted a study to assess the Knowledge and Attitude regarding prevention of vitamin D deficiency among high school schools of Kamrup (Rural), Assam. The probable positive outcome will lead to improve Knowledge and Attitude regarding prevention of vitamin D deficiency. The probable negative outcome will lead to decrease in Knowledge and Attitude regarding prevention of vitamin D deficiency among high school students.

RESEARCH METHODOLOGY

Research approach: Quantitative research approach **Research design:** Descriptive research design **Variables:** Variables included

in this study were

- **Research Variables:** In this study, research variables were Knowledge and Attitude regarding Prevention of vitamin D deficiency among high school students.

- **Socio-demographic variables:** In this study, demographic variables are age (in years), gender, class, religion, family monthly income, educational qualification of father, educational qualification of mother, occupation of the father, occupation of the mother, types of family, family history of vitamin D deficiency, previous knowledge regarding prevention of vitamin D deficiency, source of information regarding prevention of vitamin D deficiency.

Study setting: The study was conducted in four (4) selected High schools of Kamrup (Rural), Assam.

Population: The population in this study referred to Schools Students.

Target population- In this study, the target population were high school students from classes 8^{th} to 10^{th} of Kamrup (Rural), Assam.

Accessible population- In this study, the accessible population are the high schools students who are studying in class 8th , class 9th and class 10th in selected schools of Kamrup (Rural), Assam.

Sample: In this study, samples were high school students who were studying in classes 8th to 10th of selected schools of Kamrup (Rural), Assam and who fulfilled the inclusion criteria.

Sample size: The sample size consisted of 310 school students.

Sample technique: The sampling technique was a non-probability convenience sampling technique.

TOOLS AND TECHNIQUES

Tools:

Tool for data collection:

a) Section-I: Demographic variables

b) Section-II: Structured Knowledge Questionnaire to assess the Knowledge regarding prevention of vitamin D deficiency

c) **Section-III:** 5-point Likert scale to assess the Attitude regarding prevention of vitamin D deficiency.

Technique-The Self-reporting technique.

DATAANALYSIS

The data collected were analyzed using descriptive and inferential statistical measures and presented in the form of tables and graphs.

Result and discussion

MAJOR FINDINGS OF THE STUDY

The major findings of the study were as follows:

SECTION I: SOCIO-DEMOGRAPHIC VARIABLES

1. AGE (in years): Out of 310 High school students , majority i.e , 202 (65.2%) of the respondents were between the age group 14- 16 years , 75 (24.2%) of the respondents were in the age group of less than 14 years , and 33 (10.6%) of the respondents were in the age group of more than 16 years.

2. GENDER: Out of 310 High school students, majority i.e , 171 (55.2%) of the respondents were male and 139 (44.8%) of the respondents were female.

3. CLASS: Out of 310 High school students , majority i.e , 105 (33.9%) of the respondents were class 8th students , 103 (33.2%) of the respondents were class 9th students and 102 (32.9%) of the respondents were class 10th students.

4. RELIGION: Out of 310 High school students , majority i.e , 237 (76.5%) of the respondents were Hinduism , 60 (19.4%) of the respondents were Islam , 8 (2.5%) of the respondents were Christianity and 5 (1.6%) of the respondents were others religion.

5. FAMILY MONTHLY INCOME: Out of 310 High school students , majority i.e , 98 (31.6%) of the respondents had family monthly income between Rs. 20,000- 40,000 , 4 (1.3%) of the respondents had family monthly income Rs. ≤10,000 , 51(16.5%) of the respondents had family monthly income between Rs. 10,000- 20,000 , 70 (22.5%) of the respondents had family monthly income between Rs. 40,000-60,000 , and 87 (28.1%) of the respondents had family monthly income between Rs. 60,000 and above.

6. EDUCATIONAL QUALIFICATION OF FATHER: Out of 310 High school students fathers , majority i.e , 121 (39.0%) of the respondent father were Graduate and above , 101 (32.6%) of the respondents father were Higher secondary , 52 (16.8%) of the respondents father were Secondary school , 22 (7.1%) of the respondents father were Primary school and 14 (4.5%) of the respondents father were No formal education qualification.

7. EDUCATIONAL QUALIFICATION OF MOTHER: Out of 310 High school students mothers , majority i.e , 147 (47.4%) of the respondents mother were Graduate and above , 96 (31.0%) of the respondents mother were Higher secondary , 43 (13.9%) of the respondents mothers were Secondary school , 16 (5.2%) of the respondents mother were Primary school and 8 (2.5%) of the respondents mother were No formal education.

8. OCCUPATION OF THE FATHER: Out of 310 High school students fathers , majority i.e , 114 (36.7%) of the respondents father were Self employed , 87 (28.1%) of the respondents father were Private job , 91 (29.4%) of the respondents father were Govt. employee and 18 (5.8%) of the respondents father were Unemployed.

9. OCCUPATION OF THE MOTHER: Out of 310 High school students mothers , majority i.e , 224 (72.3%) of the respondents mother were Homemaker , 12 (3.9%) of the respondents mother were Unemployed , 30 (9.6%) of the respondents mother were Self employed , 18 (5.8%) of the respondents mother were Private job , 26 (8.4%) of the respondents mother were Govt. Employee.

10. TYPE OF FAMILY: Out of 310 High school students , majority i.e, 228 (73.5%) of the respondents belongs to Nuclear family , and 82 (26.5%) of the respondents belongs to Joint family.

11. FAMILY HISTORY OF VITAMIN D DEFICIENCY: Out of 310 High school students , majority i.e , 223 (71.9%) of the respondents had no family history of vitamin D deficiency , and 87 (28.1%) of the respondents had family history of vitamin D deficiency.

12. PREVIOUS KNOWLEDGE REGARDING PREVENTION OF VITAMIN D DEFICIENCY: Out of 310 High school students , majority i.e , 172 (55.5%) of the respondents had previous knowledge regarding prevention of vitamin D deficiency , and 138 (44.5%) of the respondents does not had previous knowledge regarding prevention of vitamin D deficiency.

12.1 IF YES, SPECIFY THE SOURCES OF INFORMATION: Out of 172 High school students , majority i.e , 100 (58.1%) of the respondents obtained information from Social media , 16 (9.3%) of the respondents obtained information from Health professionals , 40 (23.3%) of the respondents obtained information from Family members, friends , 7 (4.1%) of the respondents obtained information from T.V and Radio , and 9 (5.2%) of the respondents obtained information from Newspaper.

TABLES AND FIGURES

SECTION-II

Table-1: FREQUENCY AND PERCENTAGE DISTRIBUTION OF LEVEL OF KNOWLEDGE REGARDING PREVENTION OF VITAMIN D DEFICIENCY AMONG HIGH SCHOOL STUDENTS.

n = 310

LEVEL OF KNOWLEDGE	FREQUENCY	PERCENTAGE (%)
Inadequate knowledge ≤33% (0 – 6)	70	22.6
Moderately desired knowledge 34-66% (7 – 12)	190	61.3
Adequate knowledge ≥67% (13 – 20)	50	16.1

TOTAL	**310**	**100**

Table 2 shows that out of 310 High school students, 190 (61.3%) moderately desired knowledge, 70 (22.6%) had inadequate knowledge and 50 (16.1%) possessed adequate knowledge regarding prevention of vitamin D deficiency among high school students.

n=310

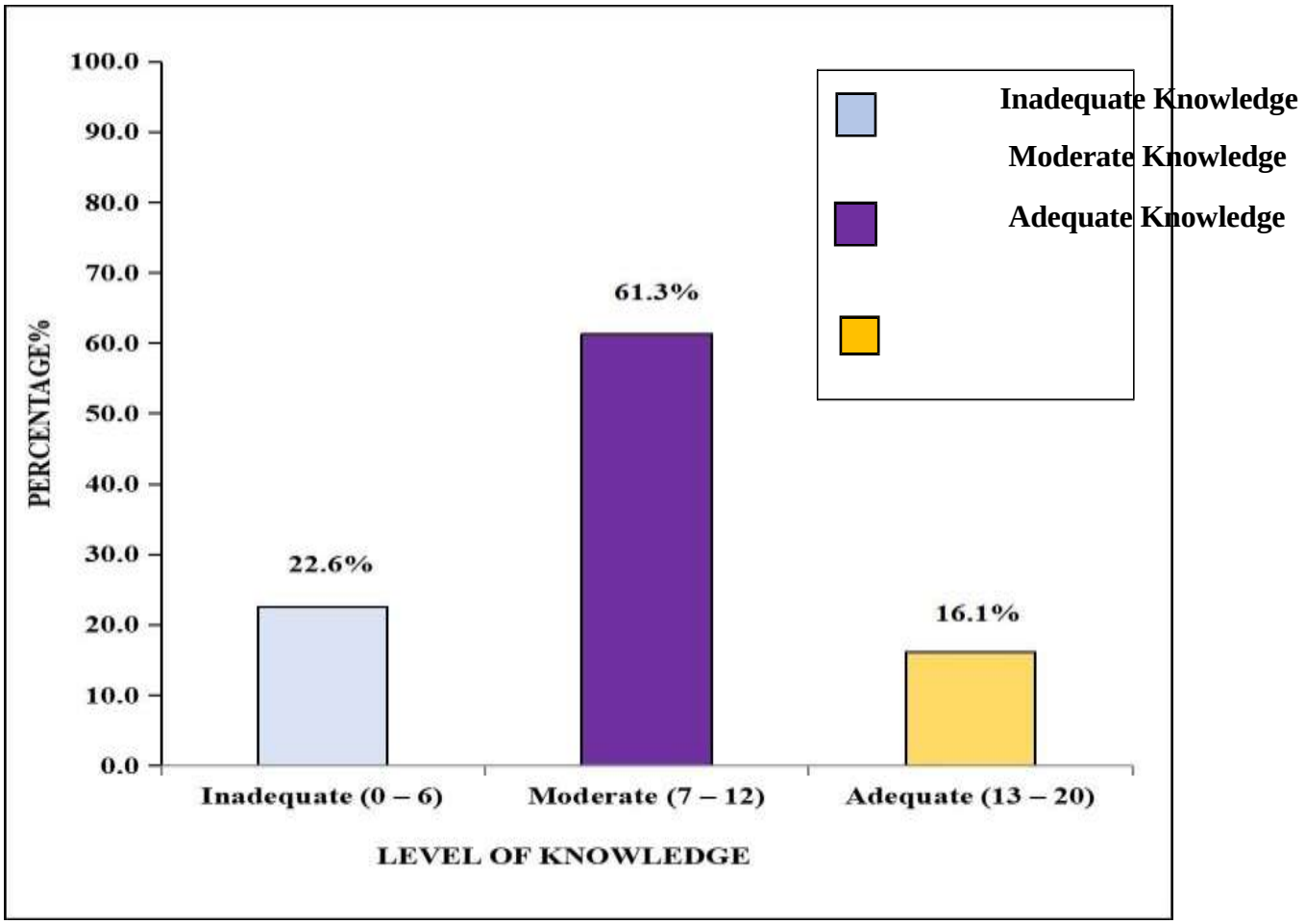

FIGURE 1: BAR DIAGRAM SHOWING PERCENTAGE DISTRIBUTION OF LEVEL OF KNOWLEDGE REGARDING PREVENTION OF VITAMIN D DEFICIENCY AMONG HIGH SCHOOL STUDENTS.

SECTION-III

TABLE-2 : FREQUENCY AND PERCENTAGE DISTRIBUTION OF LEVEL OF ATTITUDE REGARDING PREVENTION OF VITAMIN D DEFICIENCY AMONG HIGH SCHOOL STUDENTS.

n = 310

LEVEL OF ATTITUDE	FREQUENCY	PERCENTAGE %
Inadequate attitude ≤ 33% (0 – 23)	20	6.5
Moderately desirable attitude 34-66% (24 – 45)	211	68.1
Adequate attitude ≥ 67% (46 – 70)	79	25.4
TOTAL	**310**	**100**

Table 3 shows that out of 310 High school students, 211 (68.1%) had moderately desirable attitude, 79 (25.4%) had adequate attitude and 20 (6.5%) had inadequate attitude.

n=310

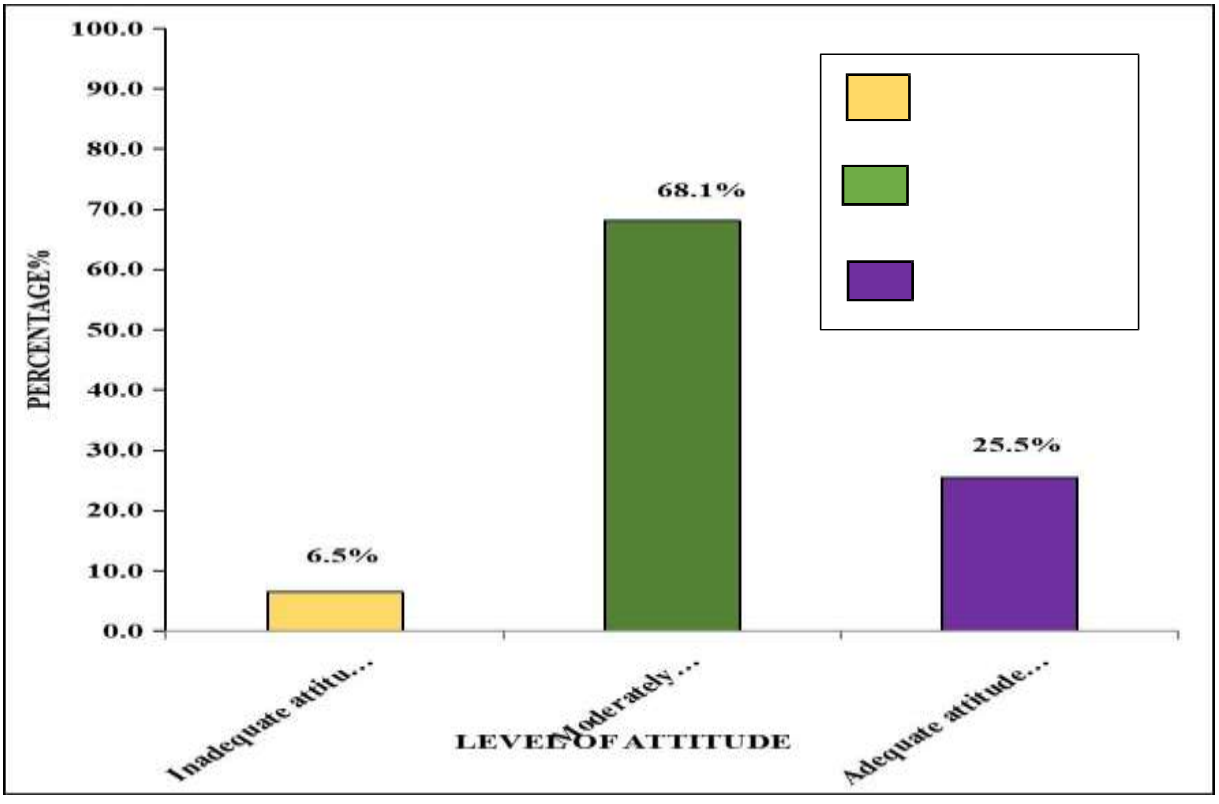

FIGURE 2: PERCENTAGE DISTRIBUTION OF LEVEL OF ATTITUDE REGARDING PREVENTION OF VITAMIN D DEFICIENCY AMONG HIGH SCHOOL STUDENTS.

SECTION-IV

TABLE 3: CORRELATION BETWEEN KNOWLEDGE AND ATTITUDE REGARDING PREVENTION OF VITAMIN D DEFICIENCY AMONG HIGH SCHOOL STUDENTS.

H_{01}: There is no significant correlation between Knowledge and Attitude regarding prevention of vitamin D deficiency among high school students in selected schools of Kamrup (Rural), Assam.

H_1**:** There is a significant correlation between Knowledge and Attitude regarding prevention of vitamin D deficiency among high school students in selected schools of Kamrup (Rural), Assam.

n= 310

Variables	Mean	S.D	Karl Pearson's Correlation "r" & p-value
Knowledge	9.11	3.30	**r = 0.324 p=0.0001, S***
Attitude	38.78	10.39	

*p<0.05, S – Significant

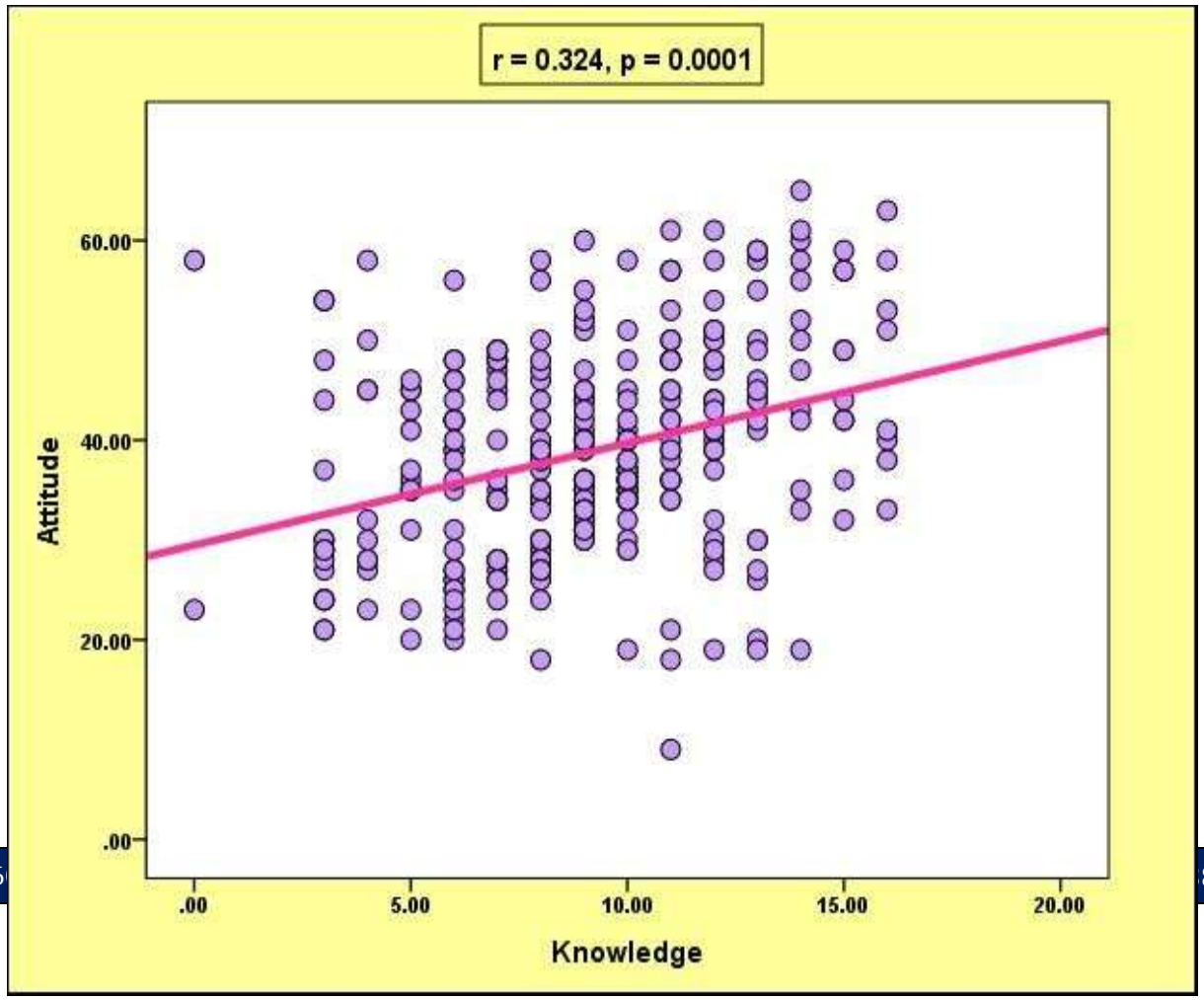

Figure 3: Scatter diagram showing the correlation between knowledge and attitude regarding prevention of vitamin D deficiency among high school students.

Table 4 shows that, In correlation, the result showed that the mean score of knowledge was 9.11±3.30 and the mean score of attitude was 38.78±10.39. The calculated Karl Pearson's Correlation value of r=0.324 shows a fair positive correlation between knowledge and attitude statistically significant at $p<0.05$ level which clearly infers that when knowledge regarding prevention of vitamin D deficiency among high school students improves or increases then their attitude towards it also improves or increases adequately.

SECTION-IV

Table 4: Association of level of knowledge regarding prevention of vitamin D deficiency among high school students with their selected demographic variables.

Chi-square test is used to assess the association between Knowledge regarding prevention of vitamin D deficiency with selected Socio-demographic variables.

H_{02}: There is no significant association between Knowledge regarding prevention of vitamin D deficiency among high school students in selected schools of Kamrup (Rural), Assam with their selected Socio-demographic variables.

H_2: There is significant association between Knowledge regarding prevention of vitamin D deficiency among high school students in selected schools of Kamrup (Rural), Assam with their selected Socio-demographic variables.

n= 310

Demographic Variables	**Inadequate**		**Moderately a Desired**		**Adequate**		**Chi-Square Test / Fisher Exact test & p-value**
	F	**%**	**F**	**%**	**F**	**%**	
Age (in years)							χ^2=2.587 d.f=4 p=0.629 (N.S)
<14 years	19	6.1	43	13.9	13	4.2	
14 – 16 years	45	14.5	123	39.7	34	11.0	
>16 years	6	1.9	24	7.7	3	1.0	
Gender							χ^2=0.037 d.f=2 p=0.982 (N.S)
Male	38	12.3	105	33.9	28	9.0	
Female	32	10.3	85	27.4	22	7.1	
Class							χ^2=5.800

8th	29	9.4	63	20.3	13	4.2	d.f=4 p=0.215 (N.S)
9th	25	8.1	62	20.0	16	5.2	
10th	16	5.2	65	21.0	21	6.8	
Demographic Variables	**Inadequate**		**Moderately a Desired**		**Adequate**		**Chi-Square Test / Fisher Exact test & p-value**
	F	**%**	**F**	**%**	**F**	**%**	
Religion							p=0.386 (N.S)
Hinduism	51	16.5	149	48.1	37	11.9	
Islam	15	4.8	34	11.0	11	3.5	
Christianity	1	0.3	6	1.9	1	0.3	
Others	3	1.0	1	0.3	1	0.3	
Family monthly income							χ^2=9.694 d.f=8 p=0.287 (N.S)
Rs ≤10,000	2	0.6	2	0.6	0	0	
Rs 10,000-20,000	15	4.8	33	10.6	3	1.0	
Rs 20,000-40,000	21	6.8	60	19.4	17	5.5	
Rs 40,000-60,000	11	3.5	46	14.8	13	4.2	
>Rs 60,000 and above	21	6.8	49	15.8	17	5.5	
Educational qualification of mother							p=0.812
No formal education	2	0.6	6	1.9	0	0	
Primary school	4	1.3	9	2.9	3	1.0	

Secondary school	9	2.9	29	9.4	5	1.6	(N.S)
Higher secondary	23	7.4	53	17.1	20	6.5	
Graduate and above	32	10.3	93	30.0	22	7.1	
Demographic Variables	**Inadequate**		**Moderately a Desired**		**Adequate**		**Chi-Square Test / Fisher Exact test & p-value**
	F	**%**	**F**	**%**	**F**	**%**	
Educational qualification of father							
No formal education	5	1.6	9	2.9	0	0	
Primary school	4	1.3	15	4.8	3	1.0	p=0.709
Secondary school	9	2.9	32	10.3	11	3.5	(N.S)
Higher secondary	25	8.1	60	19.4	16	5.2	
Graduate and above	27	8.7	74	23.9	20	6.5	
Occupation of the father							
Govt. employee	17	5.5	59	19.0	15	4.8	χ^2=5.233
Private job	21	6.8	55	17.7	11	3.5	d.f=6
Self-employed	25	8.1	67	21.6	22	7.1	p=0.514 (N.S)
Unemployed	7	2.3	9	2.9	2	0.6	
Occupation of the mother							
Govt. employee	8	2.6	14	4.5	4	1.3	
Private job	2	0.6	12	3.9	4	1.3	p=0.836

Self-employed	8	2.6	16	5.2	6	1.9	(N.S)
Unemployed	3	1.0	7	2.3	2	0.5	
Homemaker	49	15.8	141	45.5	34	11.0	

Demographic Variables	Inadequate		Moderately a Desired		Adequate		Chi-Square Test / Fisher Exact test & p-value
	F	%	F	%	F	%	
Type of family							χ^2=8.734 d.f=2 p=0.013 (S*)
Nuclear family	42	13.5	146	47.1	40	12.9	
Joint family	28	9.0	44	14.2	10	3.2	
Family history of vitamin D deficiency							χ^2=2.473 d.f=2 p=0.290 (N.S)
Yes	15	4.8	59	19.0	13	4.2	
No	55	17.7	131	42.3	37	11.9	
Previous knowledge regarding prevention of vitamin D deficiency							χ^2=0.647 d.f=2 p=0.723 (N.S)
Yes	36	11.6	107	34.5	29	9.4	
No	34	11.0	83	26.8	21	6.8	
If yes, Specify the sources of information							p=0.832 (N.S)
Newspaper	1	0.6	7	4.0	1	0.6	
T.V and Radio	3	1.7	4	2.3	0	0	
Family members, friends	10	5.7	24	13.8	6	3.4	
Health professionals	2	1.1	11	6.3	3	1.7	
Social media	21	12.1	61	35.1	20	11.5	

*p<0.05, S – Significant N.S – Not Significant, p>0.05

Table 6: Association of level of attitude regarding prevention of vitamin D deficiency among high school students with

their selected demographic variables.

n = 310

Demographic Variables	Inadequate		Moderately Desired		Adequate		Chi-Square Test / Fisher Exact test & p-value
	F	%	F	%	F	%	
Age (in years)							
<14 years	5	1.6	47	15.2	23	7.4	p=0.290 (N.S)
14 – 16 years	13	4.2	145	46.8	44	14.2	
>16 years	2	0.6	19	6.1	12	3.9	
Gender							χ^2=3.051
Male	11	3.5	123	39.7	37	11.9	d.f=2 p=0.217 (N.S)
Female	9	2.9	88	28.4	42	13.5	
Class							χ^2=5.671
8th	8	2.6	71	22.9	26	8.4	d.f=4 p=0.225 (N.S)
9th	9	2.9	73	23.5	21	6.8	
10th	3	1.0	67	21.6	32	10.3	
Religion							
Hinduism	15	4.8	162	52.3	60	19.4	p=0.897 (N.S)
Islam	4	1.3	39	12.6	17	5.5	
Christianity	1	0.3	6	1.9	1	0.3	
Others	0	0	4	1.3	1	0.3	

Demographic Variables	Inadequate		Moderately Desired		Adequate		Chi-Square Test / Fisher Exact test & p-value
	F	%	F	%	F	%	
Family monthly income							
Rs ≤10,000	0	0	3	1.0	1	0.3	
Rs 10,000-20,000	4	1.3	34	11.0	13	4.2	p=0.943 (N.S)
Rs 20,000-40,000	7	2.3	70	22.6	21	6.8	
Rs 40,000-60,000	4	1.3	44	14.2	22	7.1	
>Rs 60,000 and above	5	1.6	60	19.4	22	7.1	
Educational qualification of mother							
No formal education	0	0	4	1.3	4	1.3	
Primary school	1	0.3	12	3.9	3	1.0	p=0.669 (N.S)
Secondary school	1	0.3	31	10.0	11	3.5	
Higher secondary	6	1.9	62	20.0	29	9.0	
Graduate and above	12	3.9	102	32.9	33	10.5	
Educational qualification of father							
No formal education	0	0	10	3.2	4	1.3	
Primary school	1	0.3	17	5.5	4	1.3	p=0.579 (N.S)
Secondary school	1	0.3	37	11.9	14	4.5	
Higher secondary	5	1.6	68	21.9	28	9.0	
Graduate and above	13	4.2	79	25.5	29	9.4	

Demographic Variables	Inadequate		Moderately Desired		Adequate		Chi-Square Test / Fisher Exact test & p-value
	F	%	F	%	F	%	
Occupation of the father							χ^2=5.735 d.f=6 p=0.454 (N.S)
Govt. employee	6	1.9	62	20.0	23	7.4	
Private job	4	1.3	64	20.6	19	6.1	
Self-employed	9	2.9	70	22.6	35	11.3	
Unemployed	1	0.3	15	4.8	2	0.6	
Occupation of the mother							p=0.317 (N.S)
Govt. employee	0	0	19	6.1	7	2.3	
Private job	1	0.3	10	3.2	7	2.3	
Self-employed	4	1.3	17	5.5	9	2.9	
Unemployed	0	0	11	3.5	1	0.3	
Homemaker	15	4.8	154	49.7	55	17.7	
Type of family							χ^2=1.716 d.f=2 p=0.424 (N.S)
Nuclear family	16	5.2	158	51.0	54	17.4	
Joint family	4	1.3	53	17.1	25	8.1	
Family history of vitamin D deficiency							χ^2=0.721 d.f=2 p=0.697 (N.S)
Yes	4	1.3	61	19.7	22	7.1	
No	16	5.2	150	48.4	57	18.4	

Demographic Variables	Inadequate		Moderately Desired		Adequate		Chi-Square Test / Fisher Exact test & p-value
	F	%	F	%	F	%	
Previous knowledge regarding prevention of vitamin D deficiency							χ^2=5.664 d.f=2 p=0.059 (N.S)
Yes	6	1.9	120	38.7	46	14.8	
No	14	4.5	91	29.4	33	10.6	
If yes, Specify the sources of information							
Newspaper	1	0.6	4	2.3	4	2.3	
T.V and Radio	0	0	7	4.0	0	0	p=0.995 (N.S)
Family members, friends	1	0.6	27	15.5	12	6.9	
Health professionals	1	0.6	12	6.9	3	1.7	
Social media	3	1.7	71	40.8	28	16.1	

N. S – Not Significant, p>0.05

In association, the result showed that demographic variable type of family **(χ^2=8.734, p=0.013)** had statistically significant association level of knowledge regarding prevention of vitamin D deficiency among high school students and the other demographic variables did not show statistically significant association with knowledge regarding prevention of vitamin D deficiency among high school students at p<0.05 level.

CONCLUSION

Based on the analysis of the following study, the following inferences were drawn:

In assessing Knowledge, majority i.e, 190 (61.3%) had moderately desired Knowledge, and 70 (22.6%) had inadequate Knowledge and 50 (16.1%) had adequate Knowledge. The mean level of Knowledge score was 9.11 with standard deviation of 3.30.

In assessing Attitude, majority i.e, 211 (68.1%) had moderately desirable attitude, 79 (25.4%) had adequate attitude and 20 (6.5%) had inadequate attitude . The mean level of Attitude score was 38.78 with standard deviation of 10.39.

The mean score of Knowledge was 9.11±3.30 and the mean score of Attitude was 38.78±10.39. The calculated Karl Pearson's Correlation value of r=0.324 shows a fair positive correlation between Knowledge and Attitude which was found statistically significant at p<0.05 level which clearly infers that when knowledge regarding prevention of vitamin D deficiency among the high school students increases or decreases then their Attitude towards it also increase or decrease adequately.

The association was statistically tested by Chi-square test and analysis depicted that their Socio-demographic variables type of family **(χ^2=8.734, p=0.013)** had statistically significant association with level of Knowledge regarding prevention of vitamin D

deficiency among high school students and the other demographic variables did not show statistically significant association with knowledge regarding prevention of vitamin D deficiency among high school students at $p<0.05$ level.

From this study, it was observed that the majority of High school students had moderate Knowledge and a moderately desired Attitude regarding the prevention of Vitamin D deficiency, which indicates that High school students have some level of awareness; there is still a need for improvement in both knowledge and attitude. Hence, the investigator concluded that the best way to prevent vitamin D deficiency is to impart Knowledge and Awareness about it. The present study recommends that a similar study can be done on a larger sample, a similar study can be conducted on Knowledge and Attitude, a similar study can be done on Knowledge and practice, and a comparative study can be conducted on Knowledge and Attitude regarding the prevention of vitamin D deficiency among high school students.

LIMITATION

As non-probability technique was used to collect the samples, so generalization of the findings can not be done.

RECOMMENDATIONS FOR FURTHER RESEARCH

Based on the findings of the study, the following recommendations were made by the researcher

1. A similar study can be replicated on a larger sample for generalization of the findings.

3. A similar study can be conducted on Knowledge and Attitude regarding prevention of vitamin D deficiency among high school students.

4. A similar study can be conducted on Knowledge and practice regarding prevention of vitamin D deficiency among high school students.

5. A comparative study can be conducted on Knowledge and Attitude regarding prevention of vitamin D deficiency among high school students.

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