

Osteoporosis Knowledge, Perception and Preventive Behaviours of In-School Adolescents In Ibadan Metropolis, Nigeria

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ABSTRACT

Background: Up to 90 percent of peak bone mass is acquired within 18-20 years, which makes adolescence the best time to invest in bone health. Having the right knowledge and perception is likely to influence preventive behaviours.

Objective: This study was designed to assess the osteoporosis knowledge, perception and preventive behaviors of in-school adolescents in selected LGAs in Ibadan metropolis.

Methodology: The study was descriptive and cross-sectional in design. A total of 350 respondents were selected using multi-stage sampling technique. A structured questionnaire was used to elicit information on respondents' osteoporosis knowledge, health belief model constructs and preventive behaviours. Descriptive and inferential statistics were used to analyze the variables

Results: Results showed that 48.9% of the respondents had poor osteoporosis knowledge. More than half of them had low perception towards osteoporosis risks (52.3%), severity (72.0%), barriers (59.1%) and benefits (63.1%) of preventive behavior. A preponderance of physical activity engagement was reported during school break periods (75.7%) than at home (35.1%). Study reported a daily consumption of bone health promoting foods like milk, egg, leafy vegetables, fish and meat by 42.6%, 36.9%, 38.0%, 56.9% and 59.1% of the respondents. Significant association between osteoporosis knowledge and some preventive behaviour variables were observed.

Conclusion: This study revealed a poor knowledge, low perception and mild osteoporosis preventive behaviours of the respondents. A conducive school environment aimed at mitigating osteoporosis risks through provision of facilities and increase in time allotted for physical activity awareness/participation should be advocated.

Keywords: Osteoporosis, knowledge, preventive behavior, in-school adolescents, Ibadan Nigeria

INTRODUCTION

Osteoporosis is a progressive metabolic skeletal disease characterized by the porous bones due to bone mass reduction. From a diagnostic point of view, it is defined as a bone mineral density (BMD) that lies 2.5 SD or more below the average value for young healthy individual (a t-score of < -2.5

SD) (1). Bone strength is compromised, increasing susceptibility to fractures and diminishing the health related quality of life (2-4). Osteoporosis has been described as a silent disease by National Osteoporosis Foundation as people are not aware of constant loss of their

bone mass until they experience a fragility fracture (5-6).

Global reports revealed that there are 9.1 million women with osteoporosis and an additional 26 million with low bone mass and also an estimated 2.8 million men with osteoporosis and 14.4 million men with low bone mass (7-8). Furthermore, one in three women over age 50 will experience osteoporotic fractures, as will 1 in 5 men aged over 50 (8).

The perception that osteoporosis is an older person's disease is an erroneous one. Osteoporosis does not discriminate by age; in fact, it is a geriatric disease with an adolescent onset. During childhood and adolescence, much more bone is deposited than withdrawn, so the skeleton grows in both size and density. Up to ninety percent of peak bone mass is acquired by age 18 in girls and by age 20 in boys, which makes youth the best time to "invest" in one's bone health (9).

Risk factors causing primary and secondary osteoporosis are classified as modifiable and non-modifiable. Modifiable risk factors are those which can be changed or the risk of occurrence of the disease such as low calcium and vitamin D intake, drinking carbonated drinks, low BMI, sedentary work and prolonged immobilization can be reduced. The non-modifiable are family history, menopause and aging (10-12).

Thus, the dynamics of human behavior is how they react in case of sickness or perceived risk of illness (13). For seeking health care, people must consider the symptoms a health threat and have resources available (14). When an individual makes a decision in relation to their health, they weigh up the potential risks or benefits of a particular behavior, but they do so in a way that is mediated by their immediate practical environment, their social rootedness and their whole outlook on life more generally (15). This study aimed to investigate the osteoporosis knowledge, perception and preventive behaviour of in-school adolescent in Ibadan Metropolis.

Materials and Methods

Study Design

The study was descriptive and cross sectional in design

Study Area

This study was conducted in Ibadan Metropolis. The city covers a total area of 3,080km², the largest in Nigeria. With a population of over 3 million, it is the third most populous city in Nigeria after Lagos and Kano (16).

Sample Size Determination

$$n = \frac{z^2 pq}{d^2}$$

where n = sample size

z = 1.96 (constant)

d = tolerance/error

p = Global prevalence of persons who suffered from fragility fracture in their life time = 30% (17).

p = 1-p

$$n = \frac{1.96^2(0.3)(0.7)}{0.05^2} \cong 350 \text{ respondents}$$

Sampling and Respondents

A multi-stage sampling procedure was adopted. Two Local Government Areas were purposively selected from the five urban LGAs in Ibadan. Four schools (two public and two private schools) were randomly drawn from the selected LGAs. A stratified sampling technique was used to select strata/classes, after which the respondents in each stratum were selected using random (balloting without replacement) sampling technique

Ethical Considerations

This study was conducted in accordance with the guidelines laid down in the Declaration of Helsinki. The study was approved by University of Ibadan and University College Hospital, Ibadan Ethics Committee (UI/EC/18/0630). Approval was also sought from the school authorities to gain access to the students. Verbal informed consent was obtained

from the respondents. The objectives of the study, assurance of no harm, confidentiality and freedom to participate were clearly communicated to them.

Data Collection

Data were collected using an interviewer administered structured questionnaire. This was used to elicit information on the respondents'

- a) Socio demographic characteristics
- b) Osteoporosis awareness and knowledge
- c) Perceived osteoporosis susceptibility, severity, barrier and benefits of preventive behaviours
- d) Preventive behaviours– Physical activity and food consumption patterns

Data analysis

Osteoporosis Knowledge: Each of the correctly answered knowledge questions was scored 2. A composite score was calculated for each respondent. A perfect score is 14 which represents 100%. The scores were divided into 3 as follows: 0-5 denotes poor knowledge; 6-10 - fair/average knowledge and 10-14 -good knowledge.

Health Belief Model constructs: The questions about perceived susceptibility/risk, severity, barriers and benefits were based on a 3-level likert scale. Responses for all perception questions were scored; Agree -2; Do not know -0; Disagree -0, except for perceived severity question 5 and perceived benefits question 3 where only "disagree" response was assigned a score of 2. The categorized scores for perceived susceptibility and severity ranged from 0-5 for low perception and 6-10 for high perception while perceived barriers and benefits grades were 0-4 - low perception and 5-10 - high perception.

Physical activity pattern

There are many ways of measuring PA patterns in children with different limitations, but no specific method has been identified as the best option for all studies (17). Details of this survey instrument were modified from self-designed questionnaires of three previous studies (18-20) on

pattern/levels of physical activity in adolescents and young adults. This assessed the usual type, frequency and duration of physical activity in school, active transportation to and from school and household leisure times

Food consumption frequency

A validated structured 11- item food frequency questionnaire (FFQ) was used to elicit information on respondents' consumption pattern of key osteoporosis preventive/bone health promoting foods as described by Sahni et al., (21). The FFQ comprised 11 food items/groups and the frequency of consumption was represented by 5 categories namely: daily, 4-6 times/week, 1-3 times/week, rarely and never. Furthermore, consumption of foods items/groups less than 4times (<4x) per week was categorized as low frequency while intake of 4 times/weekly and above was denoted as regular/high consumption frequency.

Statistical analysis

All statistical analyses were done using statistical package for social sciences (SPSS) for windows version 22. Descriptive statistics (mean, frequency and percentage) were computed for the categorized and continuous variables. Regression analysis was used to determine the association between respondents' knowledge of osteoporosis and their preventive behaviours.

Results

Table 1 shows the socio-economic characteristics of respondents. This study reported a preponderance of boys (52.6%), Christians (50.6%), persons within 13-15 years (69.7%), and respondents with 4-6 household size (41.4%). A good number of the respondents' parents had tertiary education qualification (father – 48.1%; mother -43.1%). Traders and civil servants dominated the occupational status of respondents' fathers (Traders – 40.9%; civil servant -23.1) and mothers (Traders – 62.3%; civil servant -16.9%). The mean of the estimated household income was 84,888 ± 9879.91.

Table 1. Socio-economic characteristics of respondents

Parameters	Frequency (N=350)	Percentage
Sex		
Male	184	52.6
Female	166	47.4
Age (in years)		
<10 years	3	0.9
10-12	55	15.7
13-15	244	69.7
16-18	43	12.3
>18	5	1.4
Family size		
1-3	81	23.1
4-6	145	41.4
7-9	87	24.9
>9	37	10.6
Father's educational status		
No formal education	24	6.9
Primary education	27	7.7
Secondary education	131	37.4
Tertiary education	168	48.0
Mother's educational status		
No formal education	30	8.6
Primary education	42	12.0
Secondary education	127	36.3
Tertiary education	151	43.1
Father's occupation		
Civil servant	81	23.1
Trader	143	40.9
Farmer	17	4.9
Artisan	32	9.1
Teacher	18	5.1
Transporter	23	6.6
Others	36	10.3
Mother's occupation		
Civil servant	59	16.9
Trader	218	62.3
Farmer	8	2.3
Artisan	17	4.9
Teacher	22	6.3
Others	26	7.5
Mean family income	84,888 + 9879.91	

Table 2 revealed the respondents' knowledge of osteoporosis. Results showed that more than half of the respondents correctly defined osteoporosis(51.4%), identified persons at risk (50.6%) and nature of osteoporosis occurrence

(65.7%).However, osteoporosis risk factors (41.4%), sign/symptoms (0.9%) and preventive measures (8.3%) were poorly described.

Table 2: Respondents' knowledge of osteoporosis

Parameters	Correct responses		Mean \pm S.D
	Frequency	%	
Definition of osteoporosis	180	51.4	
Risk factors of osteoporosis	145	41.4	
Persons at risk of osteoporosis	177	50.6	
Signs/symptoms suggestive of osteoporosis	3	0.9	
Nature of osteoporosis occurrence	230	65.7	
Preventive measures for osteoporosis	29	8.3	
Categorized knowledge score	F	%	
Poor (0-5)	171	48.9	4.36 \pm 2.53
Average (6-10)	163	46.6	
Good (10-14)	16	4.6	

Table 3. Respondents' perception towards susceptibility of osteoporosis

Parameters	Agree		Do not know		Disagree	
	F	%	F	%	F	%
Susceptible to osteoporosis due to;						
Lack of exercise	251	71.7	79	22.6	19	5.4
Age	163	46.6	133	38.0	54	15.4
Gender	137	39.1	126	36.1	87	24.9
Caffeine and soft drink	151	43.1	135	38.6	64	18.3
Family history	155	44.3	122	34.8	73	20.9
Perception status	F	%	4.79 \pm 2.52			
Low perception (0-5)	183	52.3				
High perception (6-10)	167	47.7				
Total	350	100.0				

Table 4. Respondents' perception towards severity of osteoporosis

S/N Parameters	Agree		Do not know		Disagree	
	F	%	F	%	F	%
1 Osteoporosis will affect my future career/business	118	33.7	125	35.7	107	30.6
2 If I have osteoporosis I would be crippled	125	35.7	150	42.9	75	21.4
3 If I get osteoporosis I would lose hope	104	29.7	146	41.7	100	28.6
4 If I get it osteoporosis it will be costly to manage	150	42.9	133	38.0	67	19.1
5 There are other diseases to be more concerned about than osteoporosis	180	51.4	116	33.1	54	15.4
Perception status	F	%	3.67 \pm 2.52			
Low perception (0-5)	252	72.0				
High perception (6-10)	98	28.0				
Total	350	100.0				

Information on the respondents' perception towards osteoporosis risk is shown in table 3. The respondent reported that the following factors increases ones susceptibility to osteoporosis – lack of exercise (71.7%); age (46.6%), gender (39.1%), caffeine and soft drink intake (43.1%), family history (44.3%).

Table 4 showed the respondents' perception towards the severity of hypertension. Some of the respondents were in agreement with the fact osteoporosis will affect their future career/business (33.7%), make them crippled (35.7%) or lose hope (29.7%). A good number

(42.9%) of the respondents perceived that osteoporosis will be costly to manage, more than half of (51.4%) them believed that other disease poses more threat than osteoporosis.

Results on respondents' perception towards barriers of osteoporosis preventive behavior are shown in table 5. Most of the respondents agreed that factors like parents' socio-economic status (49.1%), high cost of adequate meals (45.5%), poor school playground (44.6%), teachers' disciplinary measures to dirty uniforms (55.1%) will hinder them from practices/behaviors that are preventive of osteoporosis

Table 5. Respondents' perception towards barriers of osteoporosis preventive behaviors

S/N	Parameters	Agree		Do not know		Disagree	
		F	%	F	%	F	%
1	Parents socio-economic background prevents attaining peak bone mass	172	49.1	117	32.6	61	17.4
2	Foods to eat to achieve optimal bone health are expensive	159	45.4	101	28.9	90	25.7
3	Poor school playground prevents me from getting active exercise	156	44.6	107	28.3	87	24.9
4	Get punished by parents/teachers if I get dirty while playing	193	55.1	74	21.2	83	23.7
	Perception status	F	%	3.97 ± 2.56			
	Low perception (0-4)	207	59.1				
	High perception (5-8)	143	40.9				
	Total	350	100.0				

Table 6. Respondents' perception towards benefits of osteoporosis preventive behaviors

S/N	Parameters	Agree		Do not know		Disagree	
		F	%	F	%	F	%
1	Drinking milk often can help achieve peak bone mass	202	57.7	113	32.3	35	10.0
2	Participating actively in school games will increase having bone fractures later	180	51.4	104	29.7	66	18.9
3	Self-medication and herbal therapies more effective than hospital treatment	144	41.1	103	29.8	102	29.1
4	Healthy bones implies better strength to earn a living, if free from osteoporosis	194	55.4	115	32.9	41	11.7
	Perception status	F	%	3.87 ± 2.30			
	Low perception (0-4)	221	63.1				
	High perception (5-8)	129	36.9				
	Total	350	100.0				

Results on the respondents' perceived benefits of preventive behaviors towards osteoporosis are shown in table 6. Results showed that more than half of the respondents were in agreement that; consuming milk helps in peak bone mass attainment (57.7%), healthy bones increases

productivity chances (55.4%), active participation in school games will increase bone fractures risks later in life (51.4%). Some (29.1%) of them claimed that self-medication and local/herbal therapies are more effective than hospital treatment.

Table 7. Physical activity pattern the respondents

Parameters	Frequency (N=350)	Percentage
Means of transportation		
Public transport	243	69.5
Dad/mum's car	68	19.4
Trek to school	40	11.4
Duration of school break period (in minutes)		
Less than 10	21	6.0
10- 20	102	29.2
21- 30	159	45.4
31- 45	48	13.7
>45	20	5.7
Type of physical activity engaged in during break period		
None	85	24.3
Skipping	64	18.3
Playing football/ volleyball/ basketball	122	34.9
Running	45	12.9
Jumping	5	1.4
Aerobics	14	4.0
Jogging	15	4.3
Reasons for not engaging in physical activity at break time		
No response	265	75.7
The break period is not enough	26	7.4
Break period is mainly for eating lunch meals/ snacks	13	3.7
I prefer to chat with my friends	14	4.0
I sleep during break period	4	1.1
The break period is also a time to study/do assignment	18	5.1
Special days allotted for P. E. in the school		
Yes	275	78.6
No	75	21.5
Number of times P.E is conducted in school		
No response	75	21.5
Twice in a week	241	42.3
Once in a week	93	26.6
2-3 times monthly	34	9.7
Favorite recreational activity engaged in at home		
Watching television/play computer games	155	44.3
Walking	32	9.1
Social media use	72	20.6
Running/jogging	29	8.3
Playing football	16	4.6
Others	46	13.1

Results from table 7 showed the physical activity pattern of the students. Results revealed that few (11.4%) of the respondents trekked to school while the others used public transport (69.5%) or their parents' car (19.4%). Break periods mainly lasted for 10-20 (29.2%) or 21-30 (34.0%) minutes in schools. About three-quarter of the students engaged in physical activities such as playing football/volleyball (34.9%), skipping

(18.3%) running (12.9%) etc. at break. Some of them however used their school break time to study (5.1%), chat (4.0%) and eat (3.7%). More than half (68.9%) of the schools held their physical education (P.E) days at least once a week. At home, most of the students preferred to utilize their leisure time in inactive/sedentary activities (watching television/playing computer games-44.3%; social media use-20.6%).

Table 8. Food consumption pattern of respondents

	Daily		4-6x/week		1-3x/week		Rarely		Never	
	F	%	F	%	F	%	F	%	F	%
Milk	149	42.6	72	20.6	57	16.3	71	20.3	1	0.3
Yoghurt	76	21.7	78	22.3	87	24.9	101	28.9	8	20.3
Egg	129	36.9	90	25.7	88	25.1	38	10.9	5	1.4
Bread	112	32.0	110	31.4	59	16.9	60	17.1	9	2.6
Cereals	103	29.4	83	23.7	58	16.6	83	23.7	23	6.6
Fish	199	56.9	78	22.3	38	10.9	26	7.4	9	2.6
Meat	207	59.1	73	20.9	37	10.6	26	7.4	7	2.0
Leafy Vegetables	133	38.0	98	28.0	67	19.2	39	11.1	13	3.7
Soy beans	73	20.9	80	22.9	87	24.9	80	22.9	30	8.6
Beans	75	21.4	130	37.1	89	25.4	53	15.1	3	.9
Fruits	92	26.3	68	19.4	110	31.4	70	20.0	10	2.9

Table 9 Relationship between respondents' osteoporosis knowledge and their preventive behaviours

Variable	Mean knowledge score	B	Std. Error	P-value
Trek to school	5.18 ± 2.10	0.763	0.440	.084
Engage in physical activity at break-time	4.24 ± 2.55	-0.283	0.325	.385
Weekly frequency of P.E programs organized in school	4.18 ± 2.55	0.600	0.298	.045*
Regular Milk intake	4.37 ± 2.31	-0.062	0.157	.695
Regular Yoghurt intake	4.41 ± 2.31	0.101	0.155	.514
Regular egg intake	4.60 ± 2.47	0.303	0.151	.046*
Regular bread intake	4.35 ± 2.55	-0.100	0.148	.501
Regular cereals intake	4.25 ± 2.40	-0.103	0.145	.477
Regular Fish intake	4.43 ± 2.53	0.133	0.178	.455
Regular Meat intake	4.46 ± 2.57	0.204	0.181	0.262
Regular leafy vegetable intake	4.35 ± 2.62	-0.046	0.153	.0762
Regular Soybeans intake	4.10 ± 2.51	-0.168	0.152	0.269
Regular Beans intake	4.34 ± 2.52	.015	.147	.921
Regular fruit/fruit juice intake	4.23 ± 2.48	-.083	.145	.567

Table 8 shows the food consumption pattern of osteoporosis preventive foods. Milk was consumed daily by a good number (42.6%) of the respondents. Yoghurt, egg, bread, cereals, fish, meat, leafy vegetables, soybeans, beans and fruits were often ($\geq 4x/\text{week}$) consumed by 44.0%, 62.6%, 63.4%, 53.1%, 79.2, 80.0%, 66.0%, 43.8%, 58.5% and 45.7% of the respondents respectively.

Results from table 9 revealed the relationship between respondents' osteoporosis knowledge on their preventive behaviours. Results revealed that osteoporosis knowledge of the respondents was significantly associated with the weekly participation of respondents' school in P.E programs/activities ($B = 0.600$; $p = 0.045$) and frequent egg consumption ($B = 0.30$; $p = 0.046$).

Discussion

The overall knowledge score of osteoporosis in this study was low with the average score on osteoporosis test below 50% (4.36 ± 2.53 of out of total score 14). This was not surprising, as similar studies on osteoporosis across adolescents were typically low (23-24). Thus while the adolescents are aware of the term - osteoporosis and its meaning, they lack an in-depth knowledge of the risk factors, signs and symptoms and preventive measures associated with osteoporosis.

In this study, almost half of the respondents (47.4%) had a high perception towards osteoporosis susceptibility with a mean score of 4.79 ± 2.52 . Contrary to other study reports, the perceived susceptibility in the studies conducted in Taiwan (25) and New Zealand (26) was low. Thus, these beliefs suggest that there is an opportunity to improve the effectiveness of osteoporosis prevention program through initiatives that will tackle or reduce the perceived risk of osteoporosis.

Results revealed that the majority (72.0%) of the respondents had a low perception towards the severity of osteoporosis. This was evident in their low level of agreement on the seriousness of

osteoporosis, the concerns of osteoporosis-related fractures or disability (35.7%), impact on life (loss of hope -29.7%) and career/business (33.7%)

This is consistent with findings which observed that college females perceive breast cancer and heart disease as greater threats than osteoporosis (27). Also another study reported that more than half of the respondents believed that osteoporosis impact is devastating and exerts little influence on their life and health in general (28).

One plausible explanation for this low level of perceived severity could be the absence of any symptoms of osteoporosis, as most individuals do not perceive themselves at risk of a disease until they begin to experience the clinical picture of the disease.

A good number (40.9%) of the respondents had high perception of the barriers to osteoporosis preventive behaviours. This was evident in the agreement of almost half of the students to perceptions that parents' socio-demographic factors, high cost of bone health promoting foods may influence dietary and lifestyle pattern related preventive behavior. Also poor school playground and punishment from teachers will deter them from physical activity participation. Given that some studies (28-29) have reported that perceived barriers were the most common factor impacting behavior, efforts should to be made to eliminate or reduce these perceived barriers to the barest minimum. This can achieved through educating them on making adequate meal choices from local/affordable options, construction of playgrounds and outdoor games facilities in schools, incorporating strategies for rewarding students' engagement/performance in sporting activities etc.

Hence, if perceived barriers were low, this study population may likely engage in preventive behaviors. Study reports revealed that only a little above one-tenth (11.4%) of the respondents walked/treked to school while others used

cars/buses. Findings from this study corroborates with other studies (30-32) which identified replacement of brisk walk to school with school buses and other vehicles as the chief contributor to failing to meet the WHO, (33) recommended minimum of 60 min per day of moderate-to-vigorous physical activity in over 60% of the population. Brisk walking activities too within the school premises positively affects the physical activity level and the general health of the children (33-34).

A few (19.4%) of the respondents in this study reported their schools allotted a break period of >30min. This has refrained about a quarter (24.3%) of the respondents from engaging in physical activity during this break interval. Also, most of the respondents reported their schools assigned one (26.6%) or two (42.3%) days in a week for Physical Exercise (PE).

Inadequate (≤ 30 minutes) break time and insufficient weekly PE program observed in this study agrees with a school study by CDC (35) which reported that only 4% of elementary schools, 8% of middle schools, and 2% of high schools engaged in daily PE programs. This U.S study further revealed that fewer schools (only 16% of elementary schools, 10% of middle schools, and 4% of high schools) provide the opportunity for physical activity breaks within the classroom. Less than 30 minutes assigned for break period coupled with 1-2x weekly allocation for PE programs in this study will not meet up with the WHO recommendations of children getting at least 60 minutes of physical activity each day (36). Therefore efforts should be channeled towards making the school a central element for improving osteoporosis preventive behaviors among in-school adolescents. This can be achieved by increasing break periods and incorporating physical activities/exercise programs on a daily basis.

Milk was consumed daily by less than half (42.6%) of the respondents. Other dairy products such as yoghurts and egg were consumed daily by 21.7% and 36.9%. Dairy is the primary source of

calcium in children and adolescent. Dairy products are key dietary sources of vitamin D, a nutrient that is essential to efficient intestinal absorption of calcium (37).

The daily fish and meat intake by 56.9% and 59.1% of the respondents is in this study commendable. Many epidemiologic studies and clinical trials have found that higher protein intakes were associated with less bone loss and a reduced risk of hip fracture (38-41).

Furthermore some (38.0% and 26.3%) of respondents consumed fruits and vegetables daily. Low fruit consumption among respondents in this study may be attributed to the low availability/accessibility of fruits and leafy vegetables in the school as pastries, ice creams and soft drinks dominate the form of foods/snacks sold within the school environment. This is further supported by evidence which showed that children and adolescents do not consume the recommended daily intake of fruits and vegetables (42). Furthermore, prevalence of daily fruit intake in other studies was 10% among young American adults (43), 29% among students of a public school in Ghana (44), and 12% among adolescents in school in Ibadan, South-West Nigeria (45).

Osteoporosis knowledge of respondents was shown to be associated with the weekly frequency of PE programs organized in schools ($B = 0.600$; $p = 0.45$) and dietary (egg) intake ($B = 0.30$; $p = 0.46$). One plausible explanation for observed link between osteoporosis knowledge and weekly frequency of PE programs organized in schools may be that the some form of bone health related education may be conveyed to students during such programs to enable them value the importance of their participation in physical activity. Also, observed significant relationship between osteoporosis knowledge and food intake pattern in this study is supported by an interventional study on the effect of osteoporosis educational program on preventive behavior which revealed that educational program intervention improved their osteoporosis

knowledge and had a positive effect on their intake of healthy bone enriching nutrients (46).

Conclusion

The study revealed a poor knowledge and low perception of respondents towards osteoporosis. This study revealed that a significant relationship exist between respondents osteoporosis knowledge and their preventive behavior. Therefore awareness on bone health and osteoporosis should be created to improve their knowledge/perception of osteoporosis risk which will influence their bone health promoting behaviours. Furthermore, schools should create an enabling environment to improve bone health by establishing expanded sports arenas with adequate equipment for outfield activities, designing programs to encourage students' engagement in physical activity and replacing the sales of junks, pastries and soft drinks with healthy alternatives like fruits, milk and yoghurts.

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