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Nutritional indicators regarding osteoporosis among female non-medical college students at KSA: A cross sectional study

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Abstract: **Background: Osteoporosis is a metabolic bone disorder and it is the most common chronic bone disease, which affected women more than men .Aim :The aim of the study was to investigate nutritional indicators regarding osteoporosis among female non-medical college students at Qassim university .Methods: A cross – sectional descriptive research design was used for conducted this study on 414 female non-medical college students at Qassim university using 5 adapted self-administered tools as sociodemographic data ; knowledge assessment about osteoporosis which consisted of 20 items , nutritional habits consisted of 33 items ; 7 items concerning pattern of exercise and final tool towards anthropometric measurements which includes 5 items related to Height, weight, wrist circumference, arm circumference, chest circumference. Results: revealed that (91.5%) of students performed regularly exercises. Also, there are a statistically significance relation between student's age and their weight and wrist circumstance and between student's marital status and their weight while a highly statistically significance relation were found between student's residence and their height, chest and wrist circumstance. Conclusion: More than two-third of students has a good knowledge regarding osteoporosis and preventive measures especially nutritional aspects as an indicator of osteoporosis. About half of student's have ideal anthropometric measurements as weight; height; a chest; arm circumference and Wrist circumference. Recommendations: Further research studies should be undertaken on the effect of nutritional adequacy for women on occurrence of osteoporosis on large sample size to generalize the result of study to improve women preventive attitude regarding preventive diet, exercises, and ambulation as a nutritional indicators in many geographical areas to investigate the confounding factors that hinder women's optimal health.**

Keywords: **Nutritional indicators, osteoporosis, female, non-medical college students.**

1. INTRODUCTION

Osteoporosis is considered as a skeletal disease that can construct the bone mineral density, deteriorate the bone fragility leading to increasing the risk of bone fractures which Bone fractures are one of the leading causes of morbidity which leads to a decrease in quality of life Elnaem et al.,2017 . Osteoporosis leads to reduced bone power which can increase risk of fracture. Worldwide osteoporotic fractures are health burden .Thus ,it is a very important to identifying individuals at high risk of osteoporosis and preventing osteoporosis-related mortality . (Tanaka et al .,2017)

Because increased the prevalence of dietary supplements consumption was high among Saudi female students and had a significant impact on their lifestyle which the consumption ratio of dietary supplement use was 76.6% and could also

suffer from deficiency of healthy bone (Alfawaz et al., 2017). Osteoporosis statistics showed an estimated 8.9 million fractures occurred each year globally with the silent pattern of this chronic bone disease that patient may not experience any pain till the first fracture occur (Elnaem et al.,2017).

In Saudi Arabia bone health is considering a major phenomena with a high incidence of osteoporosis, as an analysis showed that 34% of healthy Saudi women and 30.7% of men, 50-79 years of age are osteoporotic, and the prevalence is expected to increase as the life expectancy in the kingdom is increased (Alshareef et al., 2018) However, in China adults with diabetes have high suffering of oestoprosis . (Ha et al .,2014)

A gold stone for osteoporosis prevention is the maintenance of a constructive nutritional status , a lot of people think that for increasing bone mass, dairy products is a very important nutritional material which considered as one of the major calcium sources and other elements that the body needs, along with vitamin D (Arazi et al.,2018) .

From corner to corner the last two generations, no illness has caught the attention globally, like osteoporosis. The struggle is challenging because it is a quiet illness with a high incidence among the elderly. The situation in KSA is similar. Some studies results showed that 34% of healthy Saudi women and 30.7% of men were osteoporotic. With a recorded frequency increase in Saudi Arabia from 45-67 years in 1960 to 75.7 years in 2013, osteoporosis incidence is expected to greater than before. Life style pattern are an important part in this disease's huge incidence, poor consumption of Calcium, lack of exercise, and bone health status has always been a real problem in the KSA as an endemic area of vitamin D deficiency (Alwahhabi et al., 2015) .

On the other hands, risk factor for osteoporosis between universities students contain; dietary habits, life style background, weight and height were calculated. Dietary and capability of calcium intake. close to dietary reference intake (DRI), and knowledge has significant relation to bone health and osteoporosis in Egypt especially among Alexandria University female students used insufficient intakes of vitamin D, magnesium and potassium; and excess intakes of protein, sodium and phosphorus almost all of the female students carry out the dietary supplements which may be believed to be a dietary risk factors for osteoporosis (Dalia et al , 2013)

However, exercise is one of the main modifiable factors associated with enhanced bone health outcomes, such as high bone mineral density (BMD) and endurance. Individuals who practice regular exercise are also more likely to prevent age-related bone loss and experience less falls and fractures as a result of the development of stronger muscles and bones. On the other hands, exercise can afford a "rejuvenating effect" and, as a result, the capacity to diminish bone loss, enhanced bone health outcomes, such as high bone mineral density (BMD) and diseases associated with age . (Santos& Sale, 2017) .

Preventive health care aims to prevent disease from occurring (primary prevention), reduce progression of disease by identifying it before it becomes symptomatic (secondary prevention), and decrease the impact of disease if it does occur (tertiary prevention). Data about the clinical utility of primary and secondary prevention services are multiple and often conflicting, with various recommendations for use by health care providers (Kelling et al., 2016)

Research Significance

Osteoporosis is a worldwide health problem leading to an increased susceptibility to fractures and even more other complications. Awareness and perceptions of susceptibility and belief in the seriousness of a disease can help in its prevention and control (Abdulmohsen et al., 2016). A recent studies of female university students ranged from (20-24 years of age) found that this young population could suffer from deficiency of healthy bone . Because increased the prevalence of dietary supplements consumption was high among Saudi female students and had a significant impact on their lifestyle which the consumption ratio of dietary supplement use was 76.6% and could also suffer from deficiency of healthy bone (Alfawaz et al., 2017). Otherwise, more than (33%) suffered osteoporosis disease showed significant higher soft drinks consumption, reduced exercise, low intake of milk and dairy products, calcium and vitamin D supplementation compared to the healthy group (Hammad & Benajiba, 2017) .

Research Problem

Osteoporosis is considered as one of the developing health-care troubles in Saudi Arabia. Besides, there is a speedy grown relationship worldwide between the composition of food intake and bone health which osteoporosis could be caused by

diverse factors as metabolic disorders, genetic history, behavior, nutrition, and use of medication (Elnaem et al , 2017 & Sozen & Calik ,2017) . However , there are a relationship between dietary nutritional content and bone because increase use of fat and sugar in diet have diverse effects on bone health .Consequently , the majority studies have suggest that there are should be given more attention for dietary compositions which can be a means of advantaging bone development and preventing fractures (Tian & Yu, 2017)

Aims of the Study is to

Investigate nutritional indicators regarding osteoporosis among female non-medical college students at Qassim University.

Research questions:

1. What are the nutritional habits among non medical student college regarding osteoporosis at Qassim university ?
2. What are the nutritional indicators regarding osteoporosis among non medical student college at Qassim university ?
3. Is there are a relationship between student's sociodemographic characteristic and their nutritional indicators regarding osteoporosis ?
4. Is there are a relationship between student's sociodemographic characteristic and their nutritional habits regarding osteoporosis?

Conceptual Model for osteoporosis prevention

The Health Belief Model (HBM) stay behinds one of the nearly all broadly distinguished conceptual frameworks for understanding health attitude. The HBM involves four factors that influence the likelihood of preventive health behavior: perceived susceptibility; seriousness ; benefits and barriers (***Subramanian et al, 2013***) .Therefore, the constitutions of the HBM model include perceived severity, susceptibility, benefits, and barriers, modifying variables, prompts to action, and self-efficacy. (***Tan, 2016***)

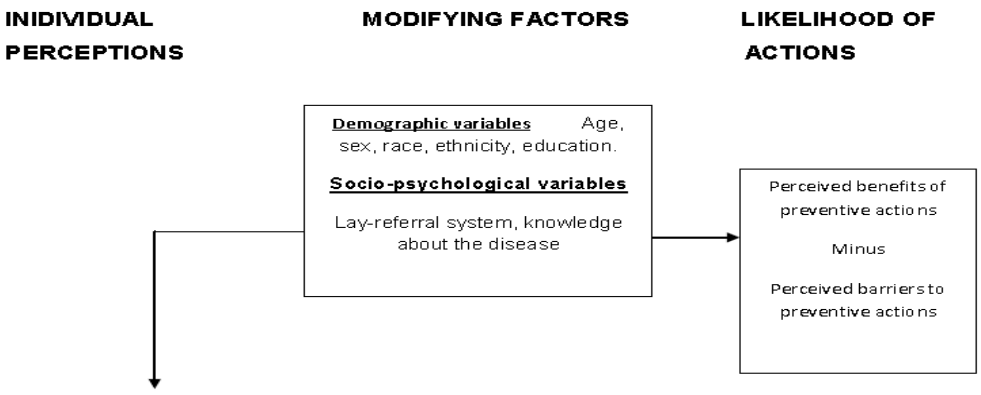

Figure 1.1: Conceptual framework of the Health Belief Model (HBM)

Source: Glanz, Rimer and Lewis 2002:52

2. SUBJECTS AND METHODS

A cross-sectional descriptive research design was used for carried out this study on 414 female non-medical college students at Qassim university .The data was collected by using 5 self-administered tools adapted from (***El-Said Hossien, 2014, Dehghankar et al., 2019, Elsabagh et al , 2015 & Ahmed et al, 2013***) after some modifications was carried out which the first tool included 8 items regarding sociodemographic data as age , college , level , social status , is there a family member who has a osteoporosis and family income . the second tool towards knowledge assessment about osteoporosis which consisted of 20 items regarding osteoporosis leads to an increased risk of bone fractures, osteoporosis usually causes symptoms (e.g. pain) before fractures, osteoporosis is more common occur in men, by age 80, the majority

of women have osteoporosis, an adequate calcium intake can be achieved from two glasses of milk a day, etc…. .The third tool towards nutritional habits 33 items related to how many times drink cola-type beverage, caffeine, milk, how many time eat chicken, and red meat. The fourth tool for assess pattern of exercise which includes 7 items related to pattern of practice regular exercise , importance of exercise , type of physical exercise was practice , How many times practicing exercises per week , Duration of exercise . The fifth and final tool towards anthropometric measurements which includes 5 items related to Height, weight, wrist circumference, arm circumference, chest circumference. Study participants were individually participated after informed them that their participation will voluntary and they could withdraw at any time without consequences. The participants will assure that their responses will be treated confidentially through the use of strict coding system. A pilot study was carried out 10% of students to test the clarity of questions and to estimate the time required for using the tools and to determine the time needed to fill the tool. Students included in the pilot study excluded from the study sample. The tools was tested for their content validity by a jury of three experts in the Medical surgical nursing, psychiatric mental health, pediatrics nursing specialists. The required modifications were carried out accordingly. Study participants were individually participated after informed them that their participation was voluntary and they could withdraw at any time without consequences. The participants were assured that their responses were treated confidentially through the use of strict coding system. Data was collected and entered into a database file. Statistical analysis was performed using the SPSS 20 computer software statistical package. Data was described by summary tables and figures, Chi-2 was used to test the association between two qualitative variables and t test were used to compare between two or more proportion and person test for correlation coefficient between variables. Statistical significance was considered at P-value <0.05 and highly significance at P-value <0.00.

3. RESULTS

Table (1): Shows that (47.3%) of students in age group 18-21 and (90.6) of them single (46.7%) study in Sciences and Arts college. About (16.6%) of them in level one; (85.0%) were lived in city ;(89.4%) have enough family income; (17.1%) of them notify that health care team as a mean source for information to them. finally (82.6 %) of them haven't any history of osteoporosis.

Table (2): Shows that (91.5%) of students performed regularly exercises and (54.1%) of them performed physical exercises; (39%) of them practice exercises 3 times weekly with (40.3%) of them equally practice duration of exercises for 15 or 30 minutes.

Table (3) : Shows that (94.5%) of students preferred eaten fish/ sea foods, cheese, Arabic & French bread, biscuits while (59%) of them preferred eaten nuts , cream & butter.

Table (4): Shows that (60.5%) of student's have ideal weight ; (57.5%) of them have hight150-160 cm and (53.4%) of them have 50-70 kg weight ; (46.6%) have a chest circumference ; (50.2%) of arm circumference less than 35 cm and (59.7%) of Wrist circumference between 60-70 cm.

Table (5) : Shows a statistically significance relation between student's age and their weight and wrist circumstance and between student's marital status and their weight while a highly statistically significance relation were found between student's residence and their height, chest and wrist circumstance.

Table (6) : Shows that there are a statistically significance relation between student's residence and their drinking tea , Liver/kidney ; Caffeine as a preferred food (Ps=0.047 , 0.009) respectively ;and between student's age and their eaten chicken &fish /sea foods , Walnut , Dates fruit , Honey / jam Ps= (0.003 , 0.008 , 0.047 , 0.050) respectively ; while between student's marital status and their eaten Fish/sea food, Boiled pasta, Potatoes, Apple, Honey / jam (Ps=0.020 , 0.014, 0.044 , 0.009, 0.024, 0.022) respectively and a highly statistically relation between student's residence and their eaten Canned juices(ps= 0.000).

Figure (1): Illustrated that (77.8%) of students have a good knowledge regarding osteoporosis.

Figure (2): shows that (43.7%) of students drink cola-type beverage and (46.4%) eaten Fish / seafood; (43.2%) eaten Liver / kidneys; (45.7%& 43.2%) of them eaten apple and orange once a week respectively. while (40.3%) of students never eaten Walnut (43.2%) never eaten Banana.

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Table (1): Distribution of the studied sample according to demographic data (n=414)

Variables	n	(%)
Age group (years)		
18-21	196	47.3
21-24	181	43.7
>25	37	8.9
Marital status		
Single	375	90.6
married	39	9.4
College *		
Sciences and Arts	191	46.7
Computer	41	10.0
Business and Economics	43	10.5
Sharia and Islamic studies	26	6.4
Designs	14	3.4
other	94	23.0
Level*		
One	68	16.6
Two	22	5.4
Three	43	10.5
Four	38	9.3
Five	57	13.9
Six	37	9.0
Seven	58	14.2
Eight	55	13.4
Preparatory year	31	7.6
Residence		
City	352	85.0
Village	62	15.0
Family income		
Enough	370	89.4
Not enough	44	10.6
Source of information		
health care team	71	17.1
-family member	50	12.1
friends	4	1.0
TV & media	205	49.5
other	84	20.3
family history osteoporosis		
Yes	72	17.4
No	342	82.6

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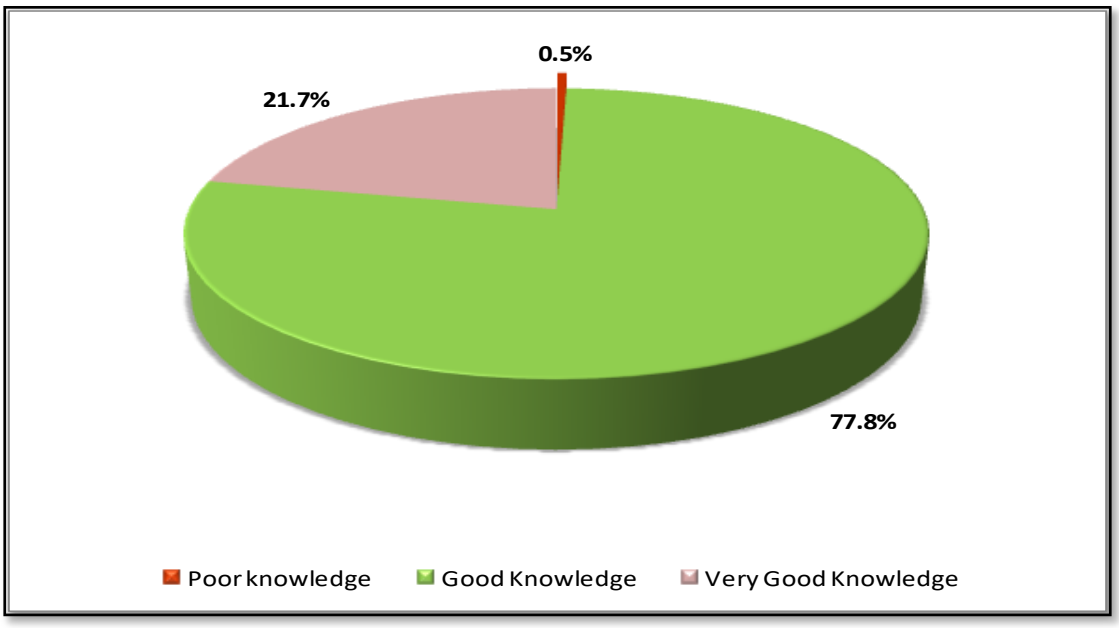

Figure 1: Level of student's Knowledge regarding Osteoporosis (n=414)

Table 2: Student's perceptions of exercise as a prevention of osteoporosis (n=414)

Regularly practice exercise	**n**	**(%)**
Yes	379	91.5
No	35	8.5
practicing physical exercise		
Yes	224	54.1
No	190	45.9
No. of times of exercising a week		
1 time	120	38.3
2 times	71	22.7
3 times	122	39.0
duration of exercise		
15 min	125	40.3
30 min	125	40.3
Over an hour	60	19.4

Table 3: Assessment of nutritional habits among non medical student college (n=414)

SN	**Type of food and drinks**	**Times eating or drinking**				
		Once a week (%)	**2-3) times every week** (%)	**(4-6) times every week** (%)	**7 times or over** (%)	**Never** (%)
1	Drink cola-type beverage	(43.7%)	(21.5%)	(8.0%)	(8.2%)	(18.6%)
2	Drink Arabic caffeine	(11.8/%)	(19.1%)	(18.6%)	(39.9%)	(10.6%)
3	Drink of tea	(24.2%)	(26.6%)	(22.7%)	(14.5%)	(12.1%)
4	Drink of milk	(26.6%)	(32.1%)	(17.4%)	(13.8%)	(10.1%)
5	Eat red meat	(37.0%)	(30.4%)	(9.7%)	(5.6%)	(17.4%)
6	Eat chicken	(13.5%)	(28.5%)	(29.2%)	(25.1%)	(3.6%)
7	Fish / seafood	(46.4%)	(9.2%)	(8.5%)	(2.9%)	(33.1%)

8	Liver / kidneys	(43.2%)	(11.4%)	(4.6%)	(3.1%)	(37.7%)
9	Eggs	(29.7%)	(29.5%)	(18.1%)	(10.1%)	(12.6%)
10	Condensed yoghurt	(34.5%)	(24.4%)	(14.7%)	(5.3%)	(21.0%)
11	Cheese	(23.9%)	(26.8%)	(28.3%)	(16.2%)	(4.8%)
12	Walnut	(34.1%)	(14.7%)	(6.0%)	(4.8%)	(40.3%)
13	Nuts	(43.0%)	(21.3%)	(9.9%)	(5.3%)	(20.5%)
14	Rice	(16.7%)	(21.7%)	(25.8%)	(29.7%)	(6.0%)
15	Arabic bread, French bread, rusk, etc.	(19.1%)	(25.1%)	(25.1%)	(26.8%)	(3.9%)
16	Red pasta (tomato sauce)	(33.8%)	(28.5%)	(15.9%)	(8.9%)	(12.8%)
17	Boiled pasta	(36.2%)	(23.9%)	(12.6%)	(6.0%)	(21.3%)
18	Potato's	(31.6%)	(34.8%)	(19.3%)	(8.9%)	(5.3%)
19	Apple	(45.7%)	(19.8%)	(12.6%)	(3.9%)	(18.1%)
20	Orange	(43.2%)	(23.4%)	(11.8%)	(3.6%)	(17.9%)
21	Banana	(42.2%)	(43.2%)	(43.2%)	(43.2%)	(43.2%)
22	Dates fruit	(42.5%)	(21.3%)	(11.6%)	(3.4%)	(21.3%)
23	Fruits	(43.2%)	(27.8%)	(14.7%)	(6.3%)	(8.0%)
24	Fresh juices	(45.7%)	(19.1%)	(8.9%)	(7.5%)	(18.8%)
25	Canned juices	(31.2%)	(24.9%)	(19.6%)	(8.2%)	(16.2%)
26	Boiled vegetables	(35.5%)	(18.1%)	(13.3%)	(5.6%)	(27.5%)
27	Salad	(31.4%)	(26.1%)	(21.0%)	(11.4%)	(10.1%)
28	Candy	(21.5%)	(23.4%)	(28.0%)	(22.9%)	(4.1%)
29	Biscuit	(34.8%)	(29.0%)	(18.4%)	(9.9%)	(8.0%)
30	Honey / jam	(36.5%)	(22.5%)	(11.1%)	(4.1%)	(25.8%)
31	Cream / ghee/butter]	(37.4%)	(23.9%)	(10.6%)	(5.8%)	(22.2%)
32	Milk Powder or Nido	(34.1%)	(17.4%)	(9.9%)	(5.8%)	(32.9%)
33	Drink caffeine]	(19.8%)	(20.0%)	(17.4%)	(34.1%)	(8.7%)

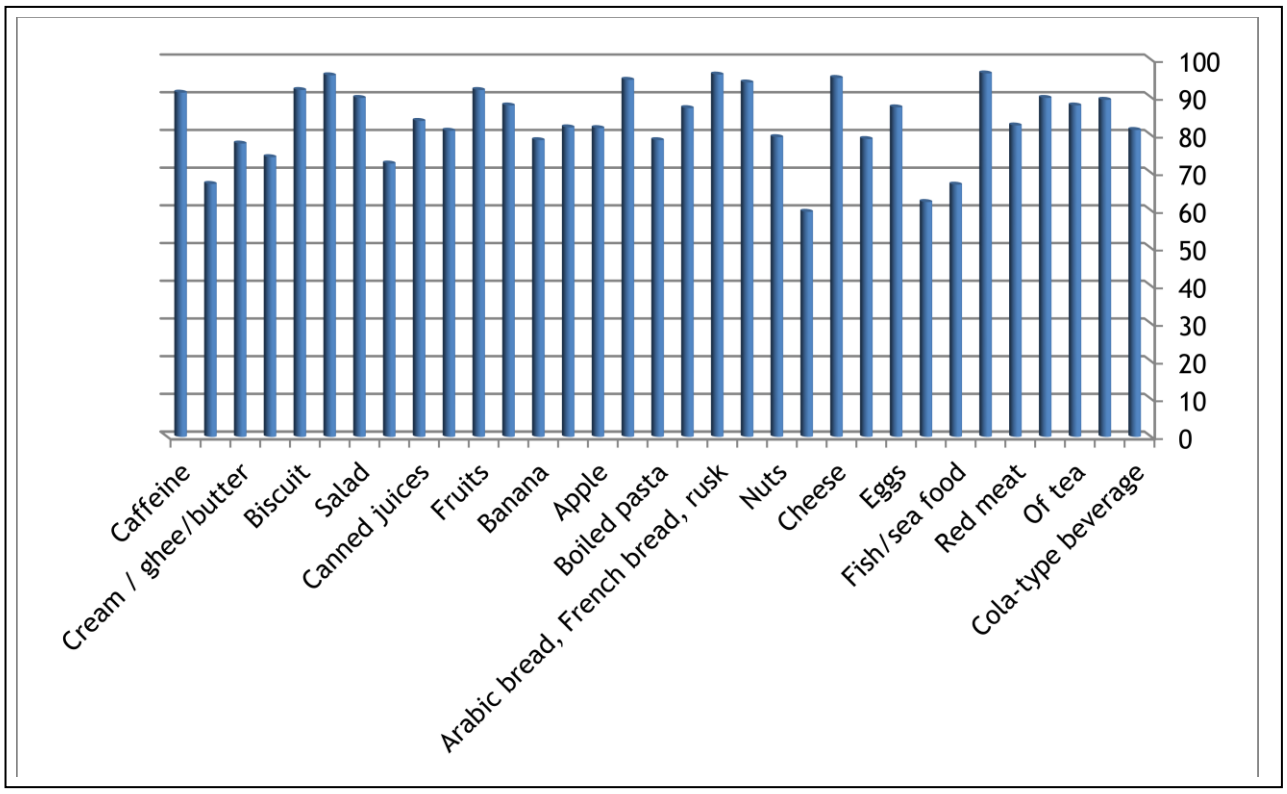

Figure 2: Assessment of preferred food Types among the study sample (n=414)

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Table 4: Distribution of student's anthropometric measurements as nutritional indicators

Variables	n	(%)
Are you overweight		
Yes	163	39.5
No	250	60.5
Underweight		
Yes	100	24.2
No	314	75.8
Height (cm)		
less than 140 cm	18	4.3
140-150 cm	75	18.1
150-160 cm	238	57.5
more than 160 cm	83	20.0
Weight (kg)		
less than 50 kg	117	28.3
50-70 kg	221	53.4
70-85 kg	53	12.8
more than 85 kg	23	5.6
Chest circumference (cm)		
less than 75 cm	193	46.6
75-85 cm	166	40.1
more than 85 cm	55	13.3
Arm circumference (cm)		
less than 35 cm	208	50.2
35-45 cm	178	43.0
45-55 cm	28	6.8
Wrist circumference (cm)		
60-70 cm	247	59.7
70-80 cm	100	24.2
80-90 cm	54	13.0
more than 90 cm	13	3.1

Table 5: relationship between student's socio-demographic characteristic and their anthropometric measurements as a nutritional indicators (n=414)

Variables	Height		Weight		Chest circumstance		Arm circumstance		Wrist circumstance	
	Chi-square	*P value*	*Chi-square*	*P value*	*Chi-square*	*P value*	*Chi-square*	*P value*	*Chi-square*	*P value*
Age	6.372	.383	21.998	.001**	3.923	.417	.431	.980	16.873	.010*
Marital status	1.385	.709	8.652	.034*	.690	.708	.641	.726	2.910	.406
Residence	14.498	.002**	3.439	.329	16.563	.000**	5.088	.079	7.918	.048*
Family income	1.766	.622	4.003	.261	3.502	.174	.688	.709	.731	.866

***significant at level .01, * significant at level .05*

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Table 6: relationship between student's socio-demographic characteristic and their nutritional habits and preferred foods (n=414)

Variables	Age		Marital status		Residence		Family income	
	Chi-square	*P value*	*Chi-square*	*P value*	*Chi-square*	*P value*	*Chi-square*	*P value*
Cola-type beverage	*4.504*	*0.809*	*4.454*	*0.348*	*6.480*	*0.166*	*1.695*	*0.792*
Arabic coffee	*9.799*	*0.279*	*3.668*	*0.453*	*2.260*	*0.688*	*6.583*	*0.160*
Tea	*14.663*	*0.066*	*2.887*	*0.577*	*9.620*	*0.047**	*3.027*	*0.553*
Milk	*6.003*	*0.647*	*3.285*	*0.511*	*1.635*	*0.802*	*.845*	*0.932*
Red meat	*15.336*	*0.053*	*9.192*	*0.056*	*3.643*	*0.457*	*3.925*	*0.416*
Chicken	*23.435*	*0.003***	*5.201*	*0.267*	*1.890*	*0.756*	*1.416*	*0.841*
Fish/sea food	*20.854*	*0.008***	*11.627*	*0.020**	*1.226*	*0.874*	*6.108*	*0.191*
Liver/kidney	*4.471*	*0.812*	*6.587*	*0.159*	*9.651*	*0.047**	*2.000*	*0.736*
Eggs	*4.502*	*0.809*	*6.824*	*0.145*	*.864*	*0.930*	*.358*	*0.986*
Condensed yoghurt	*7.376*	*0.497*	*4.849*	*0.303*	*1.253*	*0.869*	*2.498*	*0.645*
Cheese	*2.992*	*0.935*	*5.168*	*0.270*	*4.395*	*0.355*	*1.458*	*0.834*
Walnut	*15.697*	*0.047**	*3.866*	*0.424*	*3.262*	*0.515*	*1.417*	*0.841*
Nuts	*12.781*	*0.120*	*5.569*	*0.234*	*1.318*	*0.858*	*4.230*	*0.376*
Rice	*11.719*	*0.164*	*4.128*	*0.389*	*7.985*	*0.092*	*4.072*	*0.396*
Arabic bread, French bread, rusk	*7.251*	*0.510*	*.983*	*0.912*	*2.594*	*0.628*	*2.450*	*0.654*
Red pasta (tomato sauce)	*1.772*	*0.987*	*7.106*	*0.130*	*5.350*	*0.253*	*2.770*	*0.597*
Boiled pasta	*12.926*	*0.114*	*12.531*	*0.014**	*.412*	*0.981*	*7.474*	*0.113*
Potatoes	*13.626*	*0.092*	*9.789*	*0.044**	*.545*	*0.969*	*4.059*	*0.398*
Apple	*7.733*	*0.460*	*13.537*	*0.009***	*2.694*	*0.610*	*2.173*	*0.704*
Orange	*12.007*	*0.151*	*5.910*	*0.206*	*7.807*	*0.099*	*3.845*	*0.427*
Banana	*9.574*	*0.296*	*11.229*	*0.024**	*1.546*	*0.818*	*1.912*	*0.752*
(Dates fruit)	*15.703*	*0.047**	*1.042*	*0.903*	*1.473*	*0.831*	*4.181*	*0.382*
Fruits	*9.667*	*0.289*	*2.022*	*0.732*	*2.572*	*0.632*	*5.768*	*0.217*
Fresh juices	*9.069*	*0.337*	*4.132*	*0.388*	*1.164*	*0.884*	*2.148*	*0.708*
Canned juices	*13.160*	*0.106*	*4.769*	*0.312*	*4.369*	*0.358*	*22.505*	*0.000***
Boiled vegetables	*15.246*	*0.055*	*6.881*	*0.142*	*3.958*	*0.412*	*1.637*	*0.802*
Salad	*2.246*	*0.973*	*4.244*	*0.374*	*.971*	*0.914*	*6.987*	*0.137*
Candy	*6.479*	*0.594*	*2.431*	*0.657*	*.285*	*0.991*	*2.155*	*0.707*
Biscuit	*5.669*	*0.684*	*.639*	*0.959*	*2.215*	*0.696*	*2.901*	*0.574*
Honey / jam	*15.493*	*0.050**	*11.433*	*0.022**	*4.402*	*0.354*	*1.431*	*0.839*
Cream / ghee/butter	*5.160*	*0.740*	*5.101*	*0.277*	*1.994*	*0.737*	*.587*	*0.964*
Milk Powder or Nido	*13.999*	*0.082*	*4.593*	*0.332*	*9.163*	*0.057*	*1.822*	*0.768*
Caffeine	*6.744*	*0.565*	*1.975*	*0.740*	*13.629*	*0.009***	*12.551*	*0.014**

***significant at level .01, * significant at level .05*

4. DISCUSSION

Osteoporosis is considered as a disease characterized by low bone mass and micro- architectural deterioration of bone tissue. The prevalence of osteoporosis among Saudi population was estimated at 34% in a review of the published articles up to 2011. The etiology for this high prevalence among Saudis is multi- factorial and possible causes include: lifestyle malpractices, vitamin-D deficiency and genetic factors.(Tlt et al., 2016)

Regarding student's sociodemographic characteristics, the present study revealed that the majority of them single and below half of students in age group 18-21 and study in Sciences and Arts college. Below one quarter of them in level one; and more than two-third were lived in city ; have enough family income; notify that health care team as a mean source for information to them and haven't any history of osteoporosis.

Regarding performance pattern of exercises the present study revealed that the majority of students performed regularly exercises and slightly more than half of them performed physical exercises; below half of them practice exercises 3 times weekly with equally practice duration of exercises for 15 or 30 minutes.these findings goes in the same line with Pinheiro et a., 2020 who necessitated on that physical activity is take part in the prevention of osteoporosis in older people. However, the level of confirmation is higher for lumbar spine BMD (than for femoral neck BMD) and programs involving multiple exercises types come out to be more efficient.

Regarding nutritional habits , the present study revealed that the majority of students preferred eaten fish/ sea foods, cheese, Arabic & French bread, biscuits while slightly more than half of them preferred eaten nuts , cream & butter. Addditionally , there are a statistically significance relation between student's residence and their drinking tea , Liver/kidney ; Caffeine as a preferred food ; between student's age and their eaten chicken &fish /sea foods , Walnut , Dates fruit , Honey / jam ; while between student's marital status and their eaten Fish/sea food, Boiled pasta, Potatoes, Apple, Honey / jam and a highly statistically relation between student's residence and their eaten Canned juices. Also, below half of students drink cola-type beverage and eaten Fish / seafood; eaten Liver / kidneys; eaten apple and orange once a week respectively. while below half of students never eaten Walnut and Banana. These findings goes in the same line with Nahm et al.,2017 Who investigated the Bone Power and found significantly better improvement over group in osteoporosis knowledge, self-efficacy/outcome expectations for calcium intake and exercise, and calcium intake and exercise behaviors and suggests that online health programs which can be efficient in improving older adults' knowledge, attitude .

In Saudi arabia , Hammad & Benajiba ., 2017 Concluded that high consumptions of drink intake, lack of exercising and restricted calcium and vitamin D supplementation are the mutual lifestyle factors most important to occurrence of osteopenia and osteoporosis among young Saudi females. These findings might give out as a basis of nutritional education needs to promote healthy bones among female. Also, Elhabiby et al., 2020 added that foods contains magnesium is important in calcium and potassium hemostasis. various biochemical and physiological processes require magnesium, including energy production, protein syntheses, muscle contraction and vascular tone. Copper and magnesium levels are significantly lower in postmenopausal women and men with osteoporosis. Optimizing levels of those trace minerals in old people is beneficial in prevention of osteoporosis. Daily exercises and ingestion of food containing trace minerals is highly recommended for this age group. These findings goes in the same line with Alamri et al.,2015 who stressed on that awareness levels and the main sociodemographic determinants were significantly associated factors with oestoprosis and recommended that health authorities and physicians should have enhanced involvement in patient education to develop and preserve the information twards osteoporosis.

Concerning anthropometric measurements as a nutritional indicators , the present study revealed that more than half of student's have ideal weight ; hight150-160 cm and have 50-70 kg weight ; arm circumference less than 35 cm and Wrist circumference between 60-70 cm. in addition to, there are a statistically significance relation between student's age and their weight and wrist circumstance and between student's marital status and their weight while a highly statistically significance relation were found between student's residence and their height, chest and wrist circumstance. These findings goes in the same line with Sridharan et al.,2020 who found that there are appositive correlation between all anthropometric measurements and body mass index among Indian women with remarked Weight as the best correlation ($r = 0.482$ for NOF and 0.412 for LS; $P < 0.001$) which these indicators may serve as proxy markers for osteoporosis and as a result be used to predict postmenopausal women for referral .

In Iran Soltani et al., 2014 proved that the weight, BMI and age had the strongest correlation with the BMD rates. While age is negatively correlated with BMD in all the studied people, a positive association was reminded between weight, height and BMI and BMD parameters ($P<0.01$) . Also, concluded that those certain anthropometric parameters (BMI and weight) can greatly affect one's risk of developing osteoporosis. Additional study is needed on the effect of these variables on the association of weight and BMD .

Regarding student's knowledge regarding preventive measures of osteoporosis , the current study revealed that more than two-third of students have a good knowledge regarding osteoporosis. This finding goes in the same line with Alamri et al.,2015 who reportedthat the majority of Saudi students were more knowledgeable regarding osteoporosis. Also, Age was negatively correlated with the level of awareness.

In contrast with Tlt et al., 2016 who stressed on that osteoporosis knowledge is low among the Saudi population and as a result the attitude and practices towards this disease are also below normal. Thus, a good knowledge and awareness of a disease are pre-requisites for achievement of preventive measures, changes in life styles and treatment adherence.

Also , Alshareef et al., 2018 reported that young Saudi female college students do not have sufficient knowledge which take part in a major role in preventing osteoporosis , therefore, efforts should be prepared to encourage health awareness regarding osteoporosis.

While , In Malysia , Elnaem et al.,2017 stressed on the significant gap of knowledge regarding osteoporosis among students in various health occupations academic programs. Also, Pharmacy students mostly need alert learning related to both exercise and nutrition in preventing osteoporosis during their academic program.

From another points of views, Gheita et al., 2018 highlighted on that restricted reports regarding the recognized prevalence of osteoporotic fractures and require of guidelines for prevention and management in order to develop bone health, preventive measures , Increase awareness and preventive towards osteoporosis

While Sedlak et al., 2017 found poorly on the knowledge measure and no significant findings for osteoporosis health beliefs and Perceptions of bone health revealed two essential elements, knowing and doing and concluded that decisive TIs' bone health perception is significant because healthcare providers need to be aware of TIs' bone health needs to help enhance TIs' OP knowledge, health beliefs, andattitude

In Saudi Arabia , AlHarth et al., 2017 found a good level of knowledge about osteoporosis in Riyadh, the majority of subjects obtained their knowledge from relatives and physicians. Consequently, authorities should create educational programs at all health care facilities to evaluate a preventive programs for osteoporosis.

5. CONCLUSION

More than two-third of students has a good knowledge regarding osteoporosis and preventive measures especially nutritional aspects as indicators of osteoporosis. About half of student's have ideal anthropometric measurements as weight; height; a chest; arm circumference and Wrist circumference. Additionally, There are a statistically significance relation between student's age and their weight and wrist circumstance and between student's marital status and their weight while a highly statistically significance relation were found between student's residence and their height, chest and wrist circumstance.

6. RECOMMENDATIONS

1. Increased awareness and intervention programs regarding consumption of Calcium and vitamin D supplementation in the dietary as well as the obvious needs of regular weight-bearing exercise, ambulation and activity tailored to the needs and abilities of the women.

2. Further research studies should be undertaken on the effect of nutritional adequacy for women on occurrence of osteoporosis on large sample size to generalize the result of study to improve women preventive attitude regarding preventive diet, exercises, and ambulation as a nutritional indicators in many geographical areas to investigate the confounding factors that hinder women's optimal health.

3. Encourage mass media program to help women in the preventive measures of osteoporosis

4. The health institutions should conducted programs for women on proper nutrition and exercises as indicators of osteoporosis.

Competing interests

The authors declare that they have no competing interests.

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