

Knowledge and attitude of dyslipidemia among school teachers in Ahad Rufaidah, Aseer Region, Saudi Arabia

Mansoor Abdullah Al-Lajhar (1)

Mohammad S. Al-Shahrani (2)

Naif M. Alqahtani (3)

(1) Family Medicine Consultant, Ministry of Health, Saudi Arabia

(2) MBBS, SBFM, ABFM, Assistant Professor and Consultant of Family Medicine, Department of Family Medicine, College of Medicine, University of Bisha, Saudi Arabia

(3) Preventive and Community Medicine Physician, Ministry of Health, Aseer Region, Saudi Arabia

Corresponding Author:

Dr. Naif M. Alqahtani

Email: naif-454@hotmail.com

Received: March 2020; Accepted: April 2020; Published: May 1, 2020.

Citation: Mansoor Abdullah Al-Lajhar, Mohammad S. Al-Shahrani, Naif M. Alqahtani. Knowledge and attitude of dyslipidemia among school teachers in Ahad Rufaidah, Aseer Region, Saudi Arabia. World Family Medicine. 2020; 18(5): 26-37 DOI: 10.5742MEWFM.2020.93806

Abstract

Aim of Study: To assess teachers' knowledge and attitude toward dyslipidemia, its prevention, management and complications.

Subjects and Methods: Male teachers in Ahad Rufaidah schools constituted the study population. A total of 275 teachers were included in this study. The researcher constructed a data-collection questionnaire, which included five parts: Personal characteristics; Knowledge about dyslipidemia; Attitude toward dyslipidemia and its preventive measures; and Teachers' practices to control dyslipidemia.

Results: Most teachers (81%) claimed that they do not know about dyslipidemia. The main source for knowledge about dyslipidemia was the internet (10.9%). Physicians and nurses were the sources of knowledge for 2.9% of participants. More than two thirds of participant teachers (69%) had poor knowledge about dyslipidemia, while 30% had fair knowledge and 1% had good Knowledge; 71% of participant teachers had a positive attitude toward prevention of dyslipidemia and 29% had a negative attitude. Less than half of the teachers (44.4%) measured their body weight within the last month, while 49.5% had never assessed their lipid profile. Teachers' knowledge grades differed significantly according to their age groups and school levels ($p < 0.001$ for both). Teachers' attitude toward prevention of dyslipidemia differed significantly according to their age group ($p = 0.006$). Teachers' assessment of their serum lipid profile differed significantly according to their age ($p = 0.006$).

Conclusions: Teachers have insufficient knowledge about dyslipidemia. The internet is their main source for knowledge about dyslipidemia, while physicians and nurses are the least source. Teachers' attitude toward prevention and management of dyslipidemia is mostly positive. However, regular body weight monitoring and assessment of lipid profile are rarely practiced. Older teachers have less knowledge, yet a more positive attitude and more frequent lipid profile assessment.

Recommendations: Awareness programs should be conducted to promote teachers' knowledge about dyslipidemia. They should be advised to regularly monitor their body weight and check their lipid profile.

Key Words: Dyslipidemia, School teachers, knowledge, Attitude, Saudi Arabia

Introduction

Dyslipidemia is a disorder of lipoprotein metabolism, including lipoprotein over-production or deficiency. Dyslipidemia may be manifested by elevated blood levels of total cholesterol, the “bad” low-density lipoprotein (LDL) cholesterol and the triglyceride concentrations, and the decrease in the “good” high-density lipoprotein (HDL) cholesterol concentrations(1).

Globally, dyslipidemia is one of the most important risk factors for many chronic non-communicable diseases (NCDs) resulting in serious morbidity and mortality, and medical costs (2-4). In recent decades, dyslipidemia has become apparent in the Kingdom of Saudi Arabia (KSA), as a result of economic growth and associated sociodemographic, dietary, and lifestyle changes coupled with a reduced burden of infectious diseases(5).

Epidemiologically, dyslipidemia varies according to the ethnic, socio-economic, and cultural characteristics of distinct population groups(6). Assessing the prevalence, awareness of risk factors, and predictors of this condition is of high importance for preventing and controlling the disease and its sequelae(6). Several studies have addressed epidemiology, prevalence and predictors of this problem in the KSA (7-10). However, no studies have assessed the awareness of the general population regarding the problem.

Due to the rapid increase in prevalence of both obesity and type 2 diabetes mellitus, which are linked to changes in lifestyle associated with modernization and socioeconomic development, adverse changes in the profile of blood lipids are well expected (6).

Although dyslipidemia by itself does not directly cause symptoms, it can lead to symptomatic vascular diseases, including coronary artery disease, stroke, and peripheral arterial disease(14). High levels of triglycerides (>1000 mg/dL [> 11.3 mmol/L]) may lead to acute pancreatitis. High levels of LDL can cause corneal arcus and tendinous xanthomas at the Achilles, elbow, and knee tendons and over metacarpophalangeal joints (15).

Moreover, patients with the homozygous form of familial hypercholesterolemia may have the above findings plus planar or tuberous xanthomas. Planar xanthomas are flat or slightly raised yellowish patches. Tuberous xanthomas are painless, firm nodules typically located over extensor surfaces of joints. Patients with severe elevations of triglycerides can have eruptive xanthomas over the trunk, back, elbows, buttocks, knees, hands, and feet. Patients with the rare dysbetalipoproteinemia can have palmar and tuberous xanthomas (16).

Severe hypertriglyceridemia (> 2000 mg/dL [> 22.6 mmol/L]) can give retinal arteries and veins a creamy white appearance (lipemia retinalis). Extremely high lipid levels also give a lactescent (milky) appearance to blood plasma. Symptoms can include paresthesias, dyspnea, and confusion(17).

The diagnosis of dyslipidemia is achieved through laboratory tests by measuring the levels of lipids in the blood of an individual, (e.g., total plasma cholesterol levels, triglycerides, and the individual lipoproteins in the blood). Since the measurement of lipids are continuous, there is no exact numeric definition of dyslipidemia that can determine whether the level is normal or not. The linear relevance is probably coexistent between the levels of lipids and the risk for cardiovascular disease(17). Regular monitoring of lipid level is recommended to determine the activity in terms of its measurement, that is, predetermining of dyslipidemia (18).

The treatment of dyslipidemia is dependent on the age and overall health condition of an individual including manifested symptoms and signs. The treatment is mainly about a lifestyle change to help stabilize the levels of lipids. Pharmacological treatment can only be determined and prescribed by a doctor. These pharmacological medications may include statins, cholesterol-absorption inhibitors, bile acid and nicotinic acid 19.

Teachers are responsible for educating the young generations. Therefore, conducting this study among teachers is of great importance due to their essential role in transferring their knowledge and experience to their students who actively participate in increasing the awareness of the whole community. Therefore, this study aimed to assess teachers' knowledge and attitude toward dyslipidemia, its prevention, management and complications.

Subjects and Methods

This study followed a cross-sectional design. It was conducted in Ahad Rufaidah City, Aseer region, Saudi Arabia. All participants were interviewed at their schools. Data collection started on January 2018 and was completed by March 2018.

Male teachers in Ahad Rufaidah schools constituted the study population. Setting the confidence interval of 95% and a sample error of 5%, using the Raosoft sample size calculator program, (17) the minimal sample size was 259 teachers. However, the sample was increased to 275 to compensate for possible missing data or dropouts.

In Ahad Rufaidah, there are 52 schools for male students (29 elementary, 13 intermediate and 10 secondary). A random sample was followed to select 15 schools (8 elementary, 4 intermediate and 3 secondary). All teachers in the selected schools (primary, intermediate and secondary) in all levels of education were invited to participate in this study till the required sample size was reached.

Based on thorough review of relevant literature, the researchers constructed a study questionnaire. It included the following four parts:

1. Personal characteristics: age, nationality, qualification, years since graduation, and marital status.

2. Knowledge about dyslipidemia (definition, level of cholesterol, food rich in cholesterol, risk factors and associated diseases)

3. Attitude toward dyslipidemia and its preventive measures. Responses were measured according to a 5-point Likert scale, i.e., strongly agree, agree, not sure, disagree, and strongly disagree.

4. Teachers' practices to control dyslipidemia (weight measurement and lipid profile periodic evaluation)

The study questionnaire was validated by two Family Medicine consultants and one Internal Medicine consultant. A score of "1" was assigned to a correct response to a knowledge item, while a score of "0" was assigned to a wrong or "do not know" response. The knowledge of those who obtained 80% or more correct responses was considered as "good"; 60-79% was considered as "fair" while those who had <60% were considered as "poor".

Teachers' attitude was classified to "positive" attitude or "negative" attitude depending on the mean of the total score of the five questions assessing the attitude. Those with scores equal to the mean score or more were considered as having a "positive" attitude", while those with less than the mean score were considered as having a "negative" attitude.

A pilot study was carried out on a purposive sample of 20 teachers in Ahad Rufaidah City, whose data were not included in the main study. The purpose of this pilot study was to test the wording and reliability of questions. Accordingly, some questions were removed or modified and hence, the final form of the questionnaire was adopted.

Before start of data collection, the objectives of the present study as well as the data collection tool were fully explained to all participant teachers. It was clearly emphasized that each participant was totally free to accept or to refuse to participate in the study. Teachers were advised to keep their identity anonymous, and collected data were used only for research purposes. They were assured that the results of this study can never cause any harm to them. By the end of data collection, the researcher addressed a mini-lecture to all teachers about dyslipidemia.

The Statistical Package for Social Sciences (SPSS, version 23.0) was used for data entry and analysis. Descriptive statistics (number, percentage for categorical variables and mean, standard deviation and range for continuous variables) and analytic statistics using Chi Square (χ^2) test to assess for the association and/or the difference between two categorical variables were applied. P-values <0.05 were considered as statistically significant.

Results

Figure 1 shows that about one third of participants were primary school teachers (92, 33.5%), one third were intermediate school teachers (91, 33.1%), while 92 (33.5%) were secondary school teachers.

Table 1 shows that more than half of participant teachers (58.2%) were aged 30-40 years. The majority were married (93.8%). About two thirds of participants had 10-20 years of experience in teaching.

Figure 2 shows that 81% of participant teachers claimed that they do not know about dyslipidemia.

Table 2 shows that 10.9% of participants obtain their knowledge about dyslipidemia from the internet, 9.1% from their own university education, 5.1% from lectures or symposia while 4% of participant teachers obtain their knowledge from newspapers and magazines or mass media. Physicians and nurses were the sources of knowledge for 2.9% of participants.

Figure 3 shows that more than two thirds of participant teachers (69%) had poor knowledge about dyslipidemia, while 30% had fair knowledge and 1% had good knowledge.

Table 3 shows that, generally, participants' knowledge regarding different aspects related to dyslipidemia is poor. Participants' knowledge regarding prevention of dyslipidemia had the highest percentage of correct responses, e.g., regular physical exercise (95.3%) and walking (87.3%). On the other hand, only 4% of participants knew the highest normal blood level for total cholesterol and 10.2% knew that diabetes can be a risk factor for dyslipidemia.

Table 4 shows that almost all participants agreed on the importance of regular assessment of blood lipids (71.6% strongly agreed while 25.1% agreed). However, some participants believed that this is needed only for obese persons (7.3% strongly agreed while 13.5% agreed). Most participants agreed that dyslipidemia disturbs life (40.4% strongly agreed and 46.4% agreed). Most participants believed that proper nutrition and regular exercise can prevent development of dyslipidemia (54.2% strongly agreed and 34.2% agreed). Few participants thought that dyslipidemia is not a problem in the Kingdom of Saudi Arabia (5.5% strongly agreed and 6.2% agreed).

Figure 4 shows that 71% of participant teachers had a positive attitude toward prevention of dyslipidemia while 29% had a negative attitude. Table 5 shows that 44.4% of participant teachers measured their body weight within the last month, while about one quarter of participants (25.5%) did not measure their body weight during the last year. Almost half of participants (49.5%) have never assessed their serum lipid profile, while about one quarter of them (23.6%) had their serum lipid profile assessed during the last year.

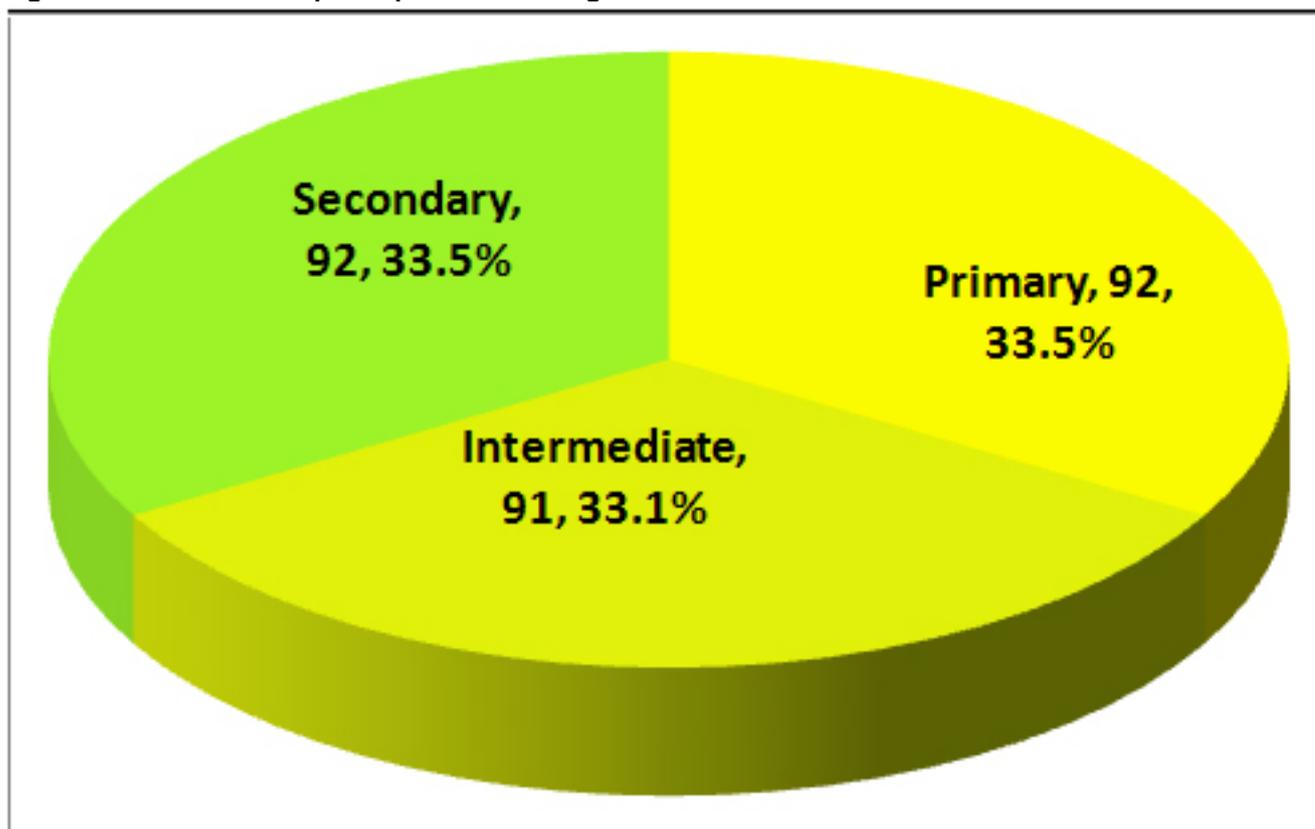
Table 6 shows that teachers' knowledge grades differed significantly according to their age groups ($p < 0.001$), with highest prevalence of poor knowledge among the age group > 40 years. Knowledge grades differed significantly

according to teachers' school levels ($p < 0.001$), with secondary school teachers having the best knowledge grades. Knowledge grades did not differ significantly according to teachers' marital status or experience in teaching.

Table 7 shows that teachers' attitude toward prevention of dyslipidemia differed significantly according to their age group ($p = 0.006$). Moreover, teachers' attitude toward prevention of dyslipidemia differed significantly according to their marital status ($p < 0.001$), with the highest prevalence of positive attitude among those who were married. Knowledge grades did not differ significantly according to teachers' school level or experience in teaching.

Table 8 shows that teachers' measurement of their body weight did not differ according to their personal characteristics.

Table 9 shows that teachers' assessment of their serum lipid profile differed significantly according to their age ($p = 0.006$), with the highest prevalence of practice among teachers within the age group > 40 years. However, teachers' assessment of serum lipid profile did not differ according to their marital status, school level or years of experience in teaching.

Figure 1: Distribution of participants according to their school levels**Table 1: Personal characteristics of study sample**

Personal characteristics	No.	%
Age groups		
• <30 years	34	12.4
• 30-40 years	160	58.2
• >40 years	81	29.6
Marital status		
• Married	258	93.8
• Single	17	6.2
Years of experience		
• <10 years	68	24.7
• 10-20 years	174	63.3
• >20 years	33	12.0

Table 2: Sources of information about dyslipidemia

Sources of knowledge	No.	%
Internet	30	10.9
University education	25	9.1
Lectures/symposia	14	5.1
Mass media	11	4.0
Newspapers and magazines	11	4.0
Physicians/nurses	8	2.9
Friends	8	2.9
Others	8	2.9

Figure 2: Having knowledge about dyslipidemia

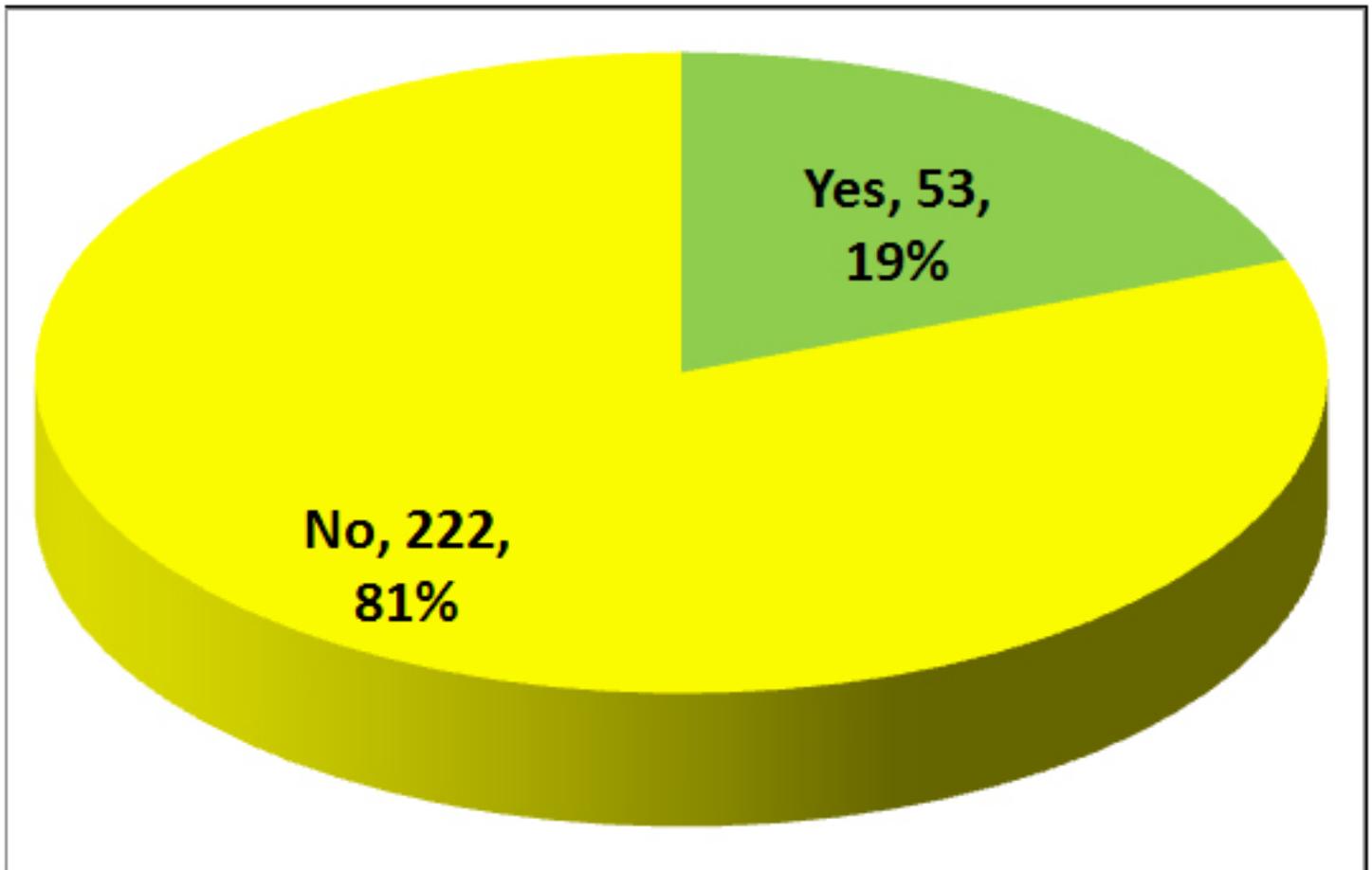


Figure 3: Teachers' grades of knowledge about dyslipidemia

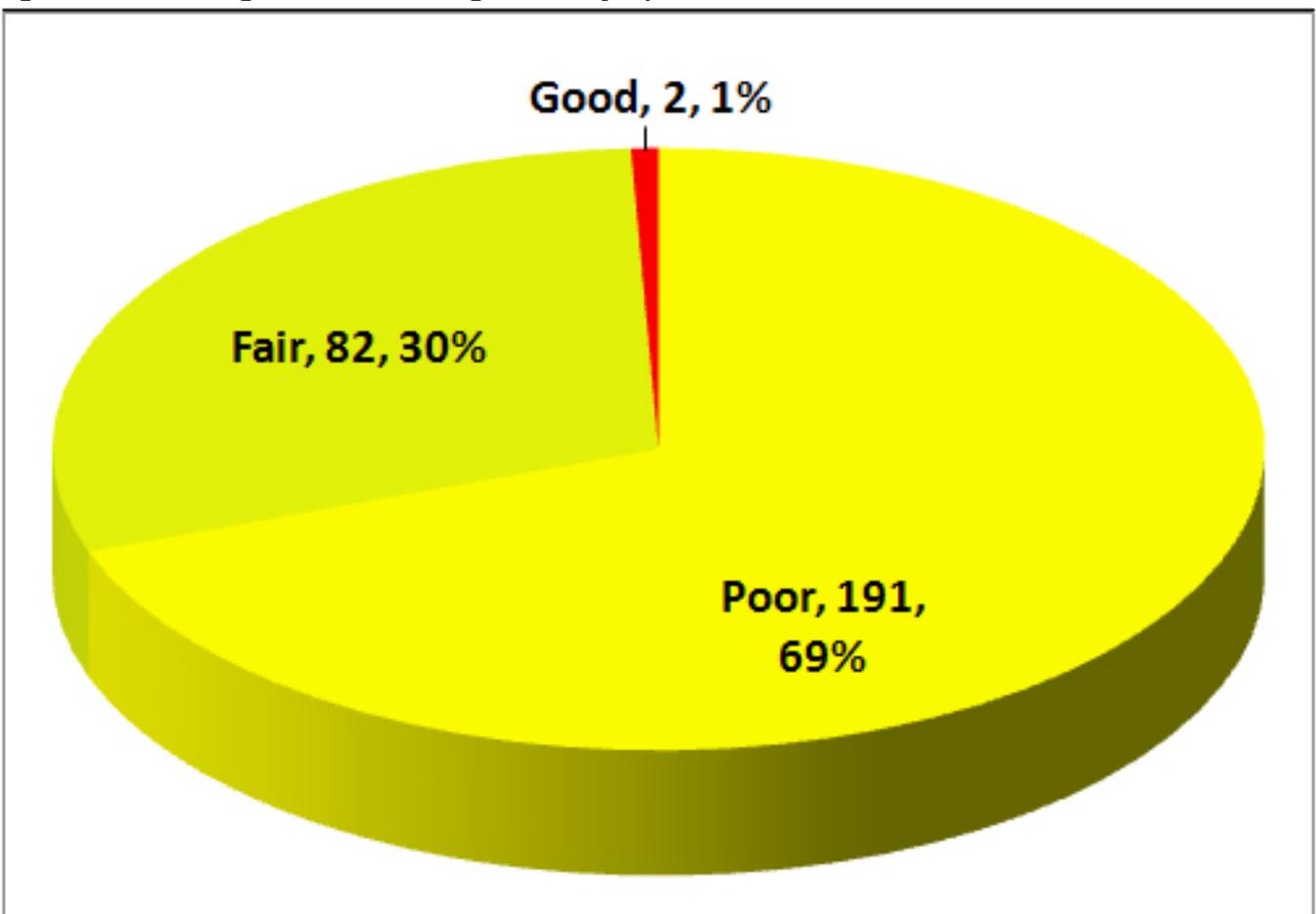


Table 3: Participants' responses regarding different knowledge items about dyslipidemia

Knowledge items	Correct		Incorrect		Do not know	
	No.	%	No.	%	No.	%
Definition of dyslipidemia	56	20.4	55	20.0	164	59.6
Highest normal blood level for total cholesterol	11	4.0	103	37.5	161	58.5
Food items rich in cholesterol	193	70.2	29	10.5	23	8.4
Risk factors for dyslipidemia						
• Smoking	137	49.8	52	18.9	86	31.3
• High carbohydrates diets	102	37.1	52	18.9	121	44.0
• Physical inactivity	227	82.5	4	1.5	44	16.0
• Diabetes	28	10.2	139	50.5	108	39.3
• Fresh juice	158	57.5	6	2.2	111	40.4
• Obesity	237	86.2	4	1.5	34	12.4
• Eating fish	148	53.8	20	7.3	107	38.9
• Genetic predisposition	126	45.8	28	10.2	121	44.0
Diseases caused by dyslipidemia						
• Brain cancer	91	33.1	9	3.3	175	63.6
• Ischemic heart disease	210	76.4	11	4.0	54	19.6
• Atherosclerosis	236	85.8	3	1.1	36	13.1
• Irritable bowel syndrome	44	16.0	79	28.7	152	55.3
• Hypertension	181	65.8	10	3.6	84	30.5
• Fatty liver	149	54.2	10	3.6	116	42.2
• Retinopathy	43	15.6	71	25.8	161	58.5
• Chronic renal failure	46	16.7	79	28.7	150	54.5
Measures to prevent dyslipidemia						
• Regular physical exercise	262	95.3	0	0.0	13	4.7
• Minimize intake of sweets	213	77.5	11	4.0	51	18.5
• Minimize carbohydrates intake	150	54.5	42	15.3	83	30.2
• Minimize drinking water	180	65.5	19	6.9	76	27.6
• Eating fresh vegetables	184	66.9	35	12.7	56	20.4
• Walking	240	87.3	6	2.2	29	10.5
• Limit playing computer games	180	65.5	14	5.1	81	29.5
• Taking medications	120	43.6	56	20.4	99	36.0

Table 4: Participants' attitudes toward dyslipidemia

Attitude aspects	Strongly agree		Agree		Neutral		Disagree		Strongly disagree	
	No.	%	No.	%	No.	%	No.	%	No.	%
Regular assessment of blood lipids is important	197	71.6	69	25.1	9	3.3	0	0.0	0	0.0
Obese persons only need lipids assessment	20	7.3	37	13.5	39	14.2	141	51.3	38	13.8
Dyslipidemia negatively affects life	111	40.4	128	46.5	32	11.6	4	1.5	0	0.0
Proper nutrition and regular exercise prevent dyslipidemia	149	54.2	94	34.2	26	9.5	5	1.8	1	0.4
Dyslipidemia is not a problem in KSA	15	5.5	17	6.2	46	16.7	120	43.6	77	28.0

Figure 4: Teachers' attitude toward prevention of dyslipidemia

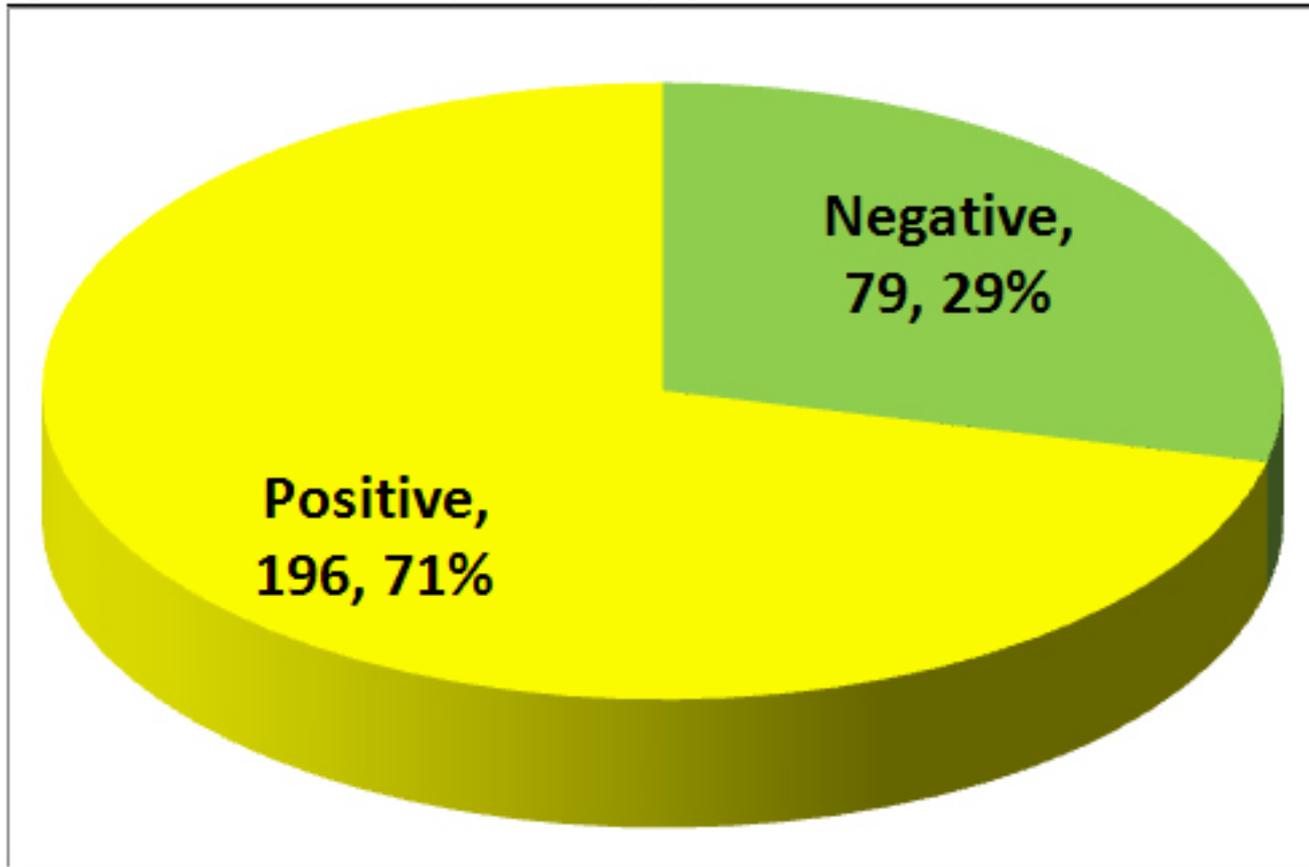


Table 5: Teachers' practices for prevention of dyslipidemia

Practices	No.	%
Last time body weight was measured		
• Last month	122	44.4
• 2-12 months	83	30.2
• >12 months	70	25.5
Last time serum lipid profile was assessed		
• Never	136	49.5
• During last year	65	23.6
• More than a year ago	74	26.9

Table 6: Teachers' knowledge grades according to their personal characteristics

Personal Characteristics	Poor (n=191)		Fair (n=82)		Good (n=2)		P Value
	No.	%	No.	%	No.	%	
Age groups							
• <30 years	20	71.4	6	21.4	2	7.1	$\chi^2=24.2$ <0.001
• 30-40 years	125	65.4	66	34.6	0	0.0	
• >40 years	46	82.1	10	17.9	0	0.0	
Marital status							
• Married	179	69.4	77	29.8	2	0.8	$\chi^2=0.14$ 0.934
• Single	12	70.6	5	29.4	0	0.0	
School level							
• Primary	79	85.9	13	14.1	0	0.0	$\chi^2=24.1$ <0.001
• Intermediate	62	68.1	29	31.9	0	0.0	
• Secondary	50	54.3	40	43.5	2	2.2	
Years of experience							
• <10 years	46	67.6	20	29.4	2	2.9	$\chi^2=6.3$ 0.180
• 10-20 years	121	69.5	53	30.5	0	0.0	
• >20 years	24	72.7	9	27.3	0	0.0	

Table 7: Teachers' attitude according to their personal characteristics

Personal characteristics	Negative (n=79)		Positive (n=196)		p-value
	No.	%	No.	%	
Age groups					
• <30 years	15	53.6%	13	46.4%	$\chi^2=10.1$ 0.006
• 30-40 years	52	27.2%	139	72.8%	
• >40 years	12	21.4%	44	78.6%	
Marital status					
• Married	67	26.0%	191	74.0%	$\chi^2=15.5$ <0.001
• Single	12	70.6%	5	29.4%	
School level					
• Primary	26	28.3%	66	71.7%	$\chi^2=0.30$ 0.859
• Intermediate	28	30.8%	63	69.2%	
• Secondary	25	27.2%	67	72.8%	
Years of experience					
• <10 years	21	30.9%	47	69.1%	$\chi^2=1.09$ 0.579
• 10-20 years	51	29.3%	123	70.7%	
• >20 years	7	21.2%	26	78.8%	

Table 8: Teachers' practice of body weight measurement according to their personal characteristics

Personal characteristics	Last month (n=191)		2-12 months (n=82)		>12 months (n=2)		P value
	No.	%	No.	%	No.	%	
Age groups							
• <30 years	12	42.9	7	25.0	9	32.1	0.658
• 30-40 years	87	45.5	55	28.8	49	25.7	
• >40 years	23	41.1	21	37.5	12	21.4	
Marital status							
• Married	116	45.0	76	29.5	66	25.6	0.580
• Single	6	35.3	7	41.2	4	23.5	
School level							
• Primary	47	51.1	24	26.1	21	22.8	0.054
• Intermediate	46	50.5	24	26.4	21	23.1	
• Secondary	29	31.5	35	38.0	28	30.4	
Years of experience							
• <10 years	30	44.1	19	27.9	19	27.9	0.837
• 10-20 years	80	46.0	52	29.9	42	24.1	
• >20 years	12	36.4	12	36.4	9	27.3	

Table 9: Teachers' assessment of serum lipid profile according to their personal characteristics

Personal characteristics	During last year (n=65)		> one year (n=74)		Never (n=136)		P value
	No.	%	No.	%	No.	%	
Age groups							
• <30 years	2	7.1	3	10.7	23	82.1	0.006
• 30-40 years	47	24.6	53	27.7	91	47.6	
• >40 years	16	28.6	18	32.1	22	39.3	
Marital status							
• Married	61	23.6	69	26.7	128	49.6	0.969
• Single	4	23.5	5	29.4	8	47.1	
School level							
• Primary	26	28.3	22	23.9	44	47.8	0.680
• Intermediate	19	20.9	24	26.4	48	52.7	
• Secondary	20	21.7	28	30.4	44	47.8	
Years of experience							
• <10 years	15	22.1	13	19.1	40	58.8	0.402
• 10-20 years	41	23.6	51	29.3	82	47.1	
• >20 years	9	27.3	10	30.3	14	42.4	

Discussion

Dyslipidemias are disorders of lipoprotein metabolism, including lipoprotein overproduction and deficiency, which may manifest as elevated total cholesterol, high low-density lipoprotein cholesterol, and low high-density lipoprotein cholesterol levels. There is a general increasing trend in dyslipidemia with increasing obesity (18).

This study aimed to assess teachers' knowledge and attitude toward dyslipidemia, its prevention, management and complications.

Results of this study showed that the majority of participant teachers do not know about dyslipidemia. This claim proved to be correct since more than two thirds of participant teachers found to have poor knowledge about dyslipidemia, while less than one third had fair knowledge and only 1% of the teachers had good knowledge about dyslipidemia. The main participants' knowledge deficiencies were related to normal blood levels for total cholesterol and that diabetes is a risk factor for dyslipidemia.

Increasing the awareness about dyslipidemia among the population has a positive impact on cardiovascular disease prevention (19). Despite this, poor awareness and unsatisfactory treatment and control were revealed in many European countries (20).

In Bangladesh, Saleh et al. (21) reported that knowledge scores among hypercholesterolemic type 2 diabetic subjects were not satisfactory. In China, Li et al. (22) and He et al. (23) reported poor awareness regarding dyslipidemia among adults.

The main sources for teachers' knowledge about dyslipidemia were the internet, their university education, lectures or symposia, newspapers and magazines or mass media. Physicians and nurses were the sources of knowledge for only 2.9% of participants.

Cutilli (24), argued that, although the internet is utilized by most individuals, the most common and trusted source of information, yet not the most commonly used, is healthcare professionals. Other sources of health information (e.g., TV, radio, newspaper, magazines and family/friends/coworkers) can be used only to supplement information provided by healthcare professionals.

This study revealed that teachers' knowledge grades differed significantly according to their age groups and school levels, with highest prevalence of poor knowledge among the older age group (i.e. > 40 years old) and with secondary school teachers having the best knowledge grades.

This is in agreement with those of He et al. (23) and Fu et al. (25), who reported that the knowledge regarding dyslipidemia increased concomitantly with age. This finding can be explained by that, as people advance in age, they become more concerned about their health, particularly

being concerned about cardiovascular diseases, than younger individuals who are less likely to attach great importance to disease consciousness.

Most participant teachers in this study had positive attitude toward prevention of dyslipidemia. They mostly agreed on the importance of regular assessment of blood lipids, that dyslipidemia disturbs life, proper nutrition and regular exercise can prevent development of dyslipidemia and that dyslipidemia is a problem in the Kingdom of Saudi Arabia.

This finding is in agreement with that of Saleh et al. (21) in Bangladesh, who reported that participants had fairly good and positive attitude levels. Similarly, Hari et al. (26) reported positive attitudes among hyperlipidemic patients' attitude toward dyslipidemia.

Teachers' attitude toward prevention of dyslipidemia differed significantly according to their age group and marital status, with the highest prevalence of positive attitude among the older age group and those who were married. This can be explained by that, as teachers become married or become older, they become more responsible and more concerned about their health than single or younger individuals.

Results of this study showed that less than half of participant teachers measured their body weight within the last month, while about one fourth of them did not measure their body weight during the last year. Moreover, almost half of participants have never assessed their serum lipids, while about one fourth of them had their serum lipids assessed during the last year.

These findings are in agreement with those of Hari et al. (26) in India and Saleh et al. (21) in Bangladesh, who concluded that practices regarding dyslipidemia were poor, especially among hyperlipidemic patients. Moreover, Wadden et al. (27) and Akers et al. (28) stated that self-monitoring of weight is a feasible and effective approach for maintaining weight loss. Goldberg (29) noted that it is important to routinely monitor lipid profile. Dyslipidemia is suspected in patients with characteristic physical findings or complications of dyslipidemia.

This study showed that teachers' measurement of their body weight did not differ according to their personal characteristics, while teachers' assessment of their serum lipids differed significantly according to their age, with the highest prevalence of practice among teachers within the age group >40 years.

Again, this finding can be explained by that, as people advance in age, they become more concerned about their health than younger individuals, particularly being concerned about cardiovascular diseases, in addition to the favorable effect of health education and the frequently conducted screening for those above 40 years of age.

Based on results of the present study, it is concluded that teachers have insufficient knowledge about dyslipidemia. The internet is their main source for knowledge about

about dyslipidemia, while physicians and nurses are the least source. Teachers' attitude toward prevention and management of dyslipidemia is mostly positive. However, regular body weight monitoring and assessment of lipid profile are rarely practiced. Older teachers have less knowledge, yet more positive attitude and more frequent lipid profile assessment. Teachers of secondary schools have better knowledge regarding dyslipidemia.

It is recommended that awareness programs should be conducted to promote teachers' knowledge about dyslipidemia. They should be advised to regularly monitor their body weight and check their lipid profile. Further research is needed to identify knowledge and attitude toward dyslipidemia among female teachers and other populations within the Saudi community.

References

- 1- Ahmed SM, Clasen ME, Donnelly JF. Management of dyslipidemia in adults. *Am Fam Physician*. 1998; 57(9):2192-2204
- 2- World Health Organization, "Quantifying Selected Major Risks to Health," World Health Organization, Geneva, 2002.
- 3- Smith D. Epidemiology of Dyslipidemia and Economic Burden on the Healthcare System. *American Journal of Managed Care* 2007; 13(S3) :S68-S71.
- 4- Zhang D, Wang G, Fang J, Mercado C. Hyperlipidemia and medical expenditures by cardiovascular disease status in US adults. *Med Care* 2017; 55(1): 4-11.
- 5- WHO. Country Cooperation Strategy for WHO and Saudi Arabia 2006-2011, 2012. Available at: http://www.who.int/countryfocus/cooperation_strategy/ccs_sau_en.pdf
- 6- Al-Kaabba AF, Al-Hamdan NA, El Tahir A, Abdalla AM, Saeed AA, Hamza MA. Prevalence and Correlates of Dyslipidemia among Adults in Saudi Arabia: Results from a National Survey. *Open Journal of Endocrine and Metabolic Diseases* 2012; 2: 89-97
- 7- Al-Nozha MM, Arafah MR, Al-Maatouq MA, Khalil MZ, Khan NB, K. Al-Marzouki K, et al. Hyperlipidemia in Saudi Arabia. *Saudi Medical Journal* 2008;29(2): 282-287.
- 8- Al-Hassan YT, Fabella EL, Estrella E, Aatif M. Prevalence and Determinants of Dyslipidemia: Data from a Saudi University Clinic. *The Open Public Health Journal* 2018; 11:416-424.
- 9- Al-Shehri SN, Saleh ZA, Salama MM, Hassan YM. Prevalence of Hyperlipidemia among Saudi School Children in Riyadh. *Annals of Saudi Medicine*. 2004;24(1): 6-8.
- 10- Basulaiman M, El Bcheraoui C, Tuffaha M, et al. Hypercholesterolemia and its associated risk factors-Kingdom of Saudi Arabia, 2013. *Ann Epidemiol* 2014; 24(11): 801-8.
- 11- American Heart Association. Symptoms, Diagnosis & Monitoring of High Cholesterol. Available at: http://www.heart.org/HEARTORG/Conditions/Cholesterol/SymptomsDiagnosisMonitoringofHighCholesterol/Symptoms-Diagnosis-and-Monitoring-of-High-Cholesterol_UCM_001214_Article.jsp.
- 12- The Hormone Foundation. Dyslipidemia. Available at: <http://www.hormone.org/diseases-and-conditions/heart-health-and-metabolism>. Accessed 4 October 2011.
- 13- US Department of Health and Human Services, National Heart, Lung and Blood Institute. Coronary artery disease. Available at: <http://www.nhlbi.nih.gov/> Accessed 5 August 2019.
- 14- Zech LA Jr, Hoeg JM. Correlating corneal arcus with atherosclerosis in familial hypercholesterolemia. *Lipids Health Dis*. 2008 Mar 10;7:7
- 15- Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III): Final Report. Bethesda, MD: National Heart, Lung, and Blood Institute. National Institutes of Health Publication No. 02-5215. September 2002.
- 16- Ferdinand K C. The importance of aggressive lipid management in patients at risk: evidence from recent clinical trials. *Clin. Cardiol*. 2004;27: 12–15.
- 17- Online Roasoft sample size calculator. Available at: <http://www.raosoft.com/samplesize.html>.
- 18- Saeed AA. Anthropometric predictors of dyslipidemia among adults in Saudi Arabia *Epidemiology Biostatistics and Public Health* 2013; 10(1): E8733-1-11.
- 19- Janus ED, Tideman PA, Dunbar JA, Kilkkinen A, Bunker SJ, Philpot B, Tirimacco R, Mc Namara K, Heistaro S, Laatikainen T. Dyslipidaemia in rural Australia: prevalence, awareness, and adherence to treatment guidelines in the greater green triangle risk factor study. *Med J Aust* 2010, 192(3):127-132.
- 20- Alkerwi A, Pagny S, Lair ML, Delagardelle C, Beissel J. Level of unawareness and management of diabetes, hypertension, and dyslipidemia among adults in Luxembourg: findings from ORISCAV-LUX study. *PLoS One* 2013; 8(3): e57920.
- 21- Saleh F, Mumu SJ, Afnan F, Ali L, Chaudhury HS, Akhter A, Ahmed KR, Akter S. Knowledge, Attitude And Practice Of Hypercholesterolemic Type 2 Diabetic Subjects On Dyslipidemia. *Ibrahim Med. Coll. J*. 2011; 5(2): 37-41.
- 22- Li JH, Wang L, Mi SQ, Zhang M, Jiang Y, Xu Y, Dai M, Wang L. Awareness rate, treatment rate and control rate of dyslipidemia in Chinese adults, 2010; *Chin J Prev Med* 2012, 46(8):687-691.
- 23- He H, Yu YQ, Li Y, Kou CG, Li B, Tao YC, Zhen Q, Wang C, Kanu JS, Huang XF, Han M, Liu YW. Dyslipidemia awareness, treatment, control and influence factors among adults in the Jilin province in China: a cross-sectional study. *Lipids Health Dis*. 2014 3;13:122.
- 24- Cutilli CC. Seeking health information: what sources do your patients use? *Orthop Nurs*. 2010;29(3):214-9.
- 25- Fu YY, Yu JM, Wang JH, Sun YH, Liu HF, Hu DY. Factors associated with dyslipidemia awareness among residents in Beijing: results from CCEIP. *Chin J Practical Intern Med* 2010, 30(01):38-40.
- 26- Hari BR, Nagaraju R, Prasad KVSRRG, Sureshwar R. Knowledge, Attitude and Practices of Hyperlipidaemia patients in a Tertiary care setting. *International Journal of Innovative Pharmaceutical Research*. 2012; 3(2),208-211.
- 27- Wadden TA, Neiberg RH, Wing RR, et al. Four-year weight losses in the look AHEAD study: factors associated with long-term success. *Obesity*. 2011; 19(10):1987–1998.
- 28- Akers JD, Cornett RA, Savla JS, Davy KP, Davy BM. Daily self-monitoring of body weight, step count, fruit/vegetable intake, and water consumption: a feasible and effective long-term weight loss maintenance approach. *J Acad Nutr Diet*. 2012;112(5):685-692.e2.
- 29- Goldberg AC. Dyslipidemia (Hyperlipidemia). *MSD Manual Professional Version*. <http://www.msmanuals.com/professional/endocrine-and-metabolic-disorders/lipid-disorders/dyslipidemia>. (Accessed on 15 August, 2019).