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Original Research Article

A community-based study on the awareness and prevention of hypercholesterolemia in adults

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ABSTRACT

Background: Intake of unhealthy junk food results into long standing health issues and the research in this paper is focused towards analyzing the knowledge of non-medical population about hypercholesterolemia and to upgrade their education concerned with healthy lifestyle modifications and essential safety measures identified with elevated cholesterol levels and related diseases.
Methods: It was a prospective pre-and post-education interventional study carried out on 400 non-medical students at PES degree college Bangalore. A self-managed survey was conveyed to participants using a validated questionnaire during their usual college hours. The data analysis was done utilizing Microsoft excel tool.
Results: Out of 400 participants in pre-education interventional study awareness about hypercholesterolemia was found excellent in 129 subjects, average in 243 subjects and poor in 28 subjects, where as in post-education interventional study awareness about hypercholesterolemia was found to be excellent in 355 subjects average in 44 subjects and poor in 1 subject.
Conclusions: The significant increment was found in the degree of information among the participants. All over the study was an achievement and the objective of the examination was satisfied. Few participants showed lack of interest however spreading awareness and instructing about wellbeing viewpoints can bring the distinction just if the picked-up information is executed in everyday life.

Keywords: Hypercholesterolemia, Awareness, Nonmedical students, Education, Life-style modifications, Healthcare

INTRODUCTION

Hypercholesterolemia is elevated level of cholesterol in blood and is a significant risk factor for coronary diseases.[1] Individuals of youthful age are more inclined to have raised cholesterol levels. As per UCSF research individuals having raised cholesterol levels are more prone to have coronary artery calcium and atherosclerosis in further life. Examiners found that people with high LDL and low HDL during youthful ages all were probably going to have coronary calcium.[2] This study was directed to research the educational status about hypercholesterolemia among individuals aged between 17-30 years. This age-group was chosen since less concern is seen among the youths with respect to wellbeing and dietary patterns and accordingly it gets important to instruct individuals and spread mindfulness about precautionary measures and the management of cholesterol levels. Stroke, angina, heart attack, stones, numbness in legs, memory debilitation are different outcomes of elevated cholesterol levels in blood.[3] 272/100,000 is the death rate in India because of CVS diseases which is all the more than the worldwide average death rate that is 235/100,000 population and cholesterol being the one of the major etiological factor.[4] As indicated by US guidelines <200 mg/dl of cholesterol is considered as desirable, 200-239 mg/dl of cholesterol is ordered as marginal high and 240 mg/dl and >240 mg/dl is considered high.[5]

METHODS

This is a prospective study that was done on 400 non-clinical students of age between 17-30 years at PES degree college, Bangalore utilizing self-administered questionnaire in a time of a half year from September 2019 to February 2020. The poll was intended to such an extent that maximum data could be given to the participants and each and every basic point could be covered for keeping better degree of cholesterol in blood and the targets of the examination could be satisfied. The survey form was piloted for its validity and dependability among 50 subjects, bringing about Cronbach alpha score 0.6 reflecting admissible reliability and interior consistency of examination form. The sample size was determined with a finite populace of around 1200 students of PES degree college, Bangalore by using Microsoft excel tool. The formula used for calculation of sample size is as follows:

$$\text{Sample size}=\frac{Z^2 \text{ x p } (1-\text{p})/e^2}{1+(Z^2 \text{ x p}(1-\text{p})/e^2 N}$$

Where, Z=Z-score (1.959), p=population proportion (0.5), e=margin of error (0.04), N=population size (1200). The sample size was calculated as 400.01 which is approximately 400 samples with the confidence interval of 95% and 4% margin of error.

The study protocol was affirmed by institutional review board at PES college of pharmacy, Bangalore, Karnataka. The participants were approached by the research team. Each of the 400 subjects finished the survey in 8 rounds. The members were assured that their information is anonymous and will be utilized for research purpose.

The form structure comprised of two sections, the primary segment contained demographic information which included age, gender, height, weight and BMI. The height and weight were recorded utilizing standard instruments and BMI was determined. The subsequent area comprised of questions that quantify the knowledge of participants about hypercholesterolemia. The questions were framed in multiple choice question pattern. Before starting the investigation, subjects were approached to give their composed assent for cooperation in the study. The demographic details were gathered. In pre-education interventional study the subjects were requested to mark the suitable option as per their knowledge, the time of 15-20 minutes was designated to each participant to fill the poll followed by collection of forms. After its fulfillment brief description about hypercholesterolemia was given utilizing a power-point presentation that incorporated its definition, etiology, complications, signs and manifestations, life-style modifications, treatment choices and diagnosis. Following the pre-education interventional schedule, the questionnaire having similar set of questions was re-administered and was posed to re-fill the information to get to the augmentation of information on subjects and the degree of beneficence of education provided. The post examination forms were gathered from all the subjects. After the data was collected, the entire information was collaborated in a Microsoft excel sheet. The subjects were categorized in three distinct classifications dependent on the score to get to the results of study which were: Excellent: >9 out of 12, average: 7 to 9 out of 12, poor: 6 and <6 out of 12**.**

The Microsoft excel tool was used for conducting descriptive and inferential statistical analysis in which paired t-test was used to compare the population means, the regression function of Microsoft excels and Med calc statistical software was used for determining the p value (level of significance). A $p<0.05$ and 95% confidence interval were used to report the statistical significance and precision of results.

RESULTS

Total 400 participants completed the questionnaire as shown in Table 1, 90.7% populace was 17-20 years old gathering which demonstrated 56.5% of augmentation in excellent category in the wake of giving the educational intervention whereas subjects in the average and poor classification declined by 49.6% and 6.9% respectively. 9% of population has a place with age-gathering of 21-24 years which demonstrated an augmentation of 58.3% in excellent class and after the education provided and there was 0% populace in poor classification of this age gathering. 0.25% of populace was in the 25-30 years old gathering which showed 100% response.

Furthermore, there was 49.5% of males and 50.5% of females in the examination whereas, females in the examination reacted superior to males and in excellent classification, the difference between the reaction of females and males was 12.3% in post education interventional study (94.5% and 82.2% respectively) as shown in Table 2.

The participants were accessed on the bases of their knowledge and the score was given out of 12 and each question carried 1 mark (Table 3).

In Figure 1 only 17.5% (70) of total population was having BMI more than 25 in which 11% (44) were male and 6.5% (26) were females whereas 82.5% (330) of total population was having BMI less than 25 amongst which 38.5% (154) were males and 44% (176) were females.

Subjects were categorized in three categories based upon there score as per their knowledge: Excellent: >9 out of 12, average: 7 to 9 out of 12, poor: 6 and <6 out of 12.

In pre-education interventional study awareness of about hypercholesterolemia was found to be excellent in 129 subjects, average in 243 subjects and poor in 28 subjects where as in post-education interventional study awareness of about hypercholesterolemia was found to be excellent

in 355 subjects, average in 44 subjects and poor in 1 subject as represented in Figure 2 and 3 respectively.

The population means were determined utilizing pared t test. The pre-education interventional study mean was determined as 292.5, where post-education interventional study mean was determined as 362.6. The t value 3.95 which was greater than the table t-value at an alpha level p=0.05, the R^2 in regression statistics was 0.7683 which demonstrated that there was a significant difference of 76.8% among pre-and post-education interventional study and p=0.000183 which was discovered to be under 0.05.

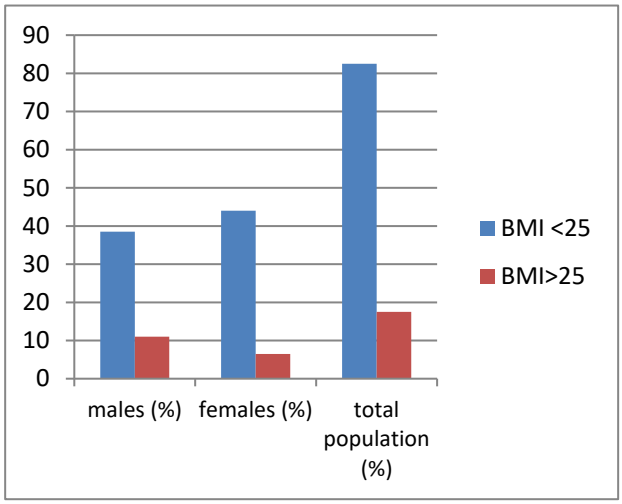

Figure 1: Distribution of BMI (kg/m^2) status amongst the research participants.

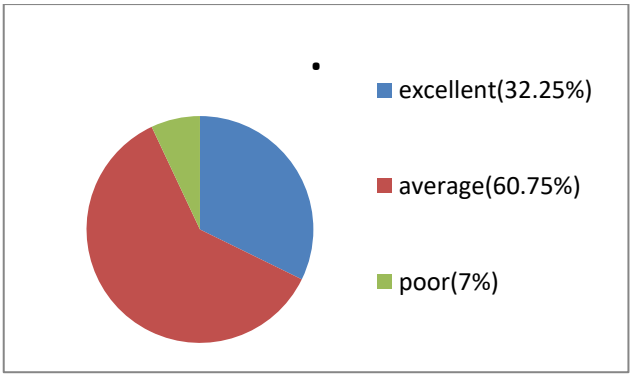

Figure 2: Graphical distribution of pre-education interventional study.

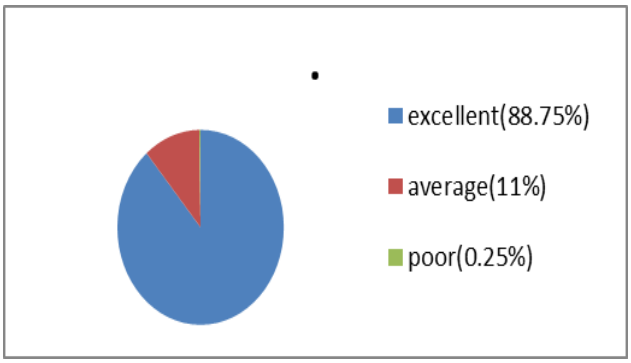

Figure 3: Graphical distribution of post-education interventional study.

Table 1: Distribution of study subjects on the bases of age group.

Categories (n=400)		Excellent		P value	Average		P value	Poor		P value
		Pre	Post		Pre	Post		Pre	Post	
Age (years)										
17-20		116	321	<0.001	221	41	<0.001	26	1	<0.001
Total	363									
%	90.75	31.9	88.4		60.8	11.2		7.1	0.2	
21-24		12	33	<0.001	22	3	<0.001	2	0	<0.001
Total	36									
%	9	33.3	91.6		61.1	8.3		5.5	0	
25-30		1	1		0	0		0	0	
Total	1									
%	0.25	100	100		0	0		0	0	

Table 2: Distribution of study subjects on the bases of gender.

Categories (n=400)		Excellent		P value	Average		P value	Poor		P value
		Pre	Post		Pre	Post		Pre	Post	
Gender										
Male		46	164	<0.001	131	34	<0.001	21	0	<0.001
Total	198									
%	49.5	23.2	82.2		66.1	17.1		10.6	0	
Female		83	191	<0.001	112	10	<0.001	7	1	0.3022
Total	202									
%	50.5	41	94.5		55.4	4.9		3.46	0.49	

Table 3: Represents the total score of all the subjects for each question.

Ques no.	Questions	Pre-education interventional study score (X)	SD	Post education interventional study score (Y)	SD	Y-X
1.	Does unhealthy and high fat content diet can lead to increased cholesterol level in your body? a. Yes b. No	358	0.306	387	0.177	29
2.	High cholesterol may lead to stroke, heart attack, chest pain, chronic kidney disease. a. True b. False	387	0.177	396	0.099	09
3.	Is family history linked to high cholesterol? a. Yes b. No	98	0.430	318	0.404	220
4.	Eating citrus fruits like lemon, orange, etc. will help in reducing cholesterol. a. True b. False	350	0.331	381	0.212	31
5.	Blockage in blood vessels is a disease which is result of cholesterol buildup in blood vessels. a. True b. False	297	0.437	383	0.201	86
6.	Does good cholesterol exist? a. Yes b. No	295	0.440	363	0.290	68
7.	The normal cholesterol level in blood is greater than 200 mg/dl. a. True b. False	190	0.5	318	0.404	128
8.	The warning signs of blocked arteries are shortness of breath, chest pain. a. True b. False	339	0.359	383	0.201	44
9.	Alcohol and smoking increase cholesterol level. a. True b. False	242	0.489	357	0.310	115
10.	Almond, cabbage, green beans, oats are beneficial for reducing the cholesterol in body. a. True b. False	355	0.316	383	0.196	28
11.	Physical activity is of significance to maintain cholesterol level. a. Yes b. No	383	0.201	390	0.156	7
12.	What will you do, if doctors say that your blood cholesterol is high? a. Eat fewer high fat foods b. Control your weight or lose weight c. Exercise d. Take prescribed medications e. All of the above	216	0.499	293	0.443	77

Table 4: Subject knowledge distribution in excellent, average and poor.

Subject knowledge category	P value	Pre-study no. of subjects	Subjects (%)	Post-study no. of subjects	Subjects (%)
Excellent	<0.001	129	32.25	355	88.75
Average	<0.001	243	60.75	44	11
Poor	<0.001	28	7	1	0.25
Total		400	100	400	100

DISCUSSION

It is been stated that "In India, dyslipidemia has become very common among individuals of age above 20 years, and therefore the modifications in lifestyle become a major priority to thwart and manage this significant CVS risk factor".[6]

The aim of this study is to create awareness and spread health education about hypercholesterolemia among the young non-medical subject population and to access the knowledge-based difference between pre- and post-education interventional study subjects.

The questionnaire was developed which consisted of 12 questions related to high cholesterol and cardiovascular health and data were analyzed using Microsoft excel tool in which 67.7% of the population showed 75% awareness about cardiovascular health, whereas in a community based cross-sectional descriptive study which was conducted on 300 non-medical students aged between 16-32 years enrolled from different universities of Pakistan to assess the awareness and behavior in young non-medical students. In this study data analysis was performed using SPSS-16 and it was found that 22% of participants showed 75% awareness about hypercholesterolemia among non-medical students.[7]

The study was conducted about the awareness of CVD risk factors in the US young adults aged 18-39 years. 11083 subjects participated in the study and it was found that being the prevailing CVD risk-factors only 56.9% of subjects were aware of hypercholesterolemia.[8]

Among university students (mean age: 20.6 years) from the countries of association of south-east Asian nations (ASEAN) which had responded to the survey poll for investigation of preponderances of behavioral risk-facet of cardiovascular diseases. The results stated that 27.5% of men and 16.9% of women were obese. 2.5% of women and 6.9% of men had less physical activity status whereas, in this study, 11% of males and 6.5% of females were having BMI more than 25 kg/m^2 which according to centers for disease control and prevention considered as the overweight or obese range.[9]

In a cross-sectional study in which the study subjects were 136 first-year medical students in the 18-23 years age group, a large proportion of them belongs to the 20-21 years age group. There were 71 (52.50%) males and reaming 65 (47.80%) were females. Out of 136 study subjects, there were 110 (80.88%) from an urban area and 26 (19.12%) from rural areas. This study found that 90% of the population was aware of high cholesterol, alcohol consumption, smoking, high-fat diet, as the risk factor of hypercholesterolemia and related CVD factors whereas, in this study 400 non-medical subjects aged between 17-30 years in which maximum participants belonged to 21-24 years age group.[10] There were 50.5 and 49.5% of the female and male population respectively. The awareness rate among the total population before the educational intervention was 32.25% about high cholesterol, alcohol consumption, smoking, high-fat diet, as the risk factor of hypercholesterolemia and related CVD which was increased to 88.75% in a post-educational study in the excellent category.

When pre-education interventional status was concluded it was found that many subjects were unaware of the risk of high-fat content in their diet. They were unaware that high cholesterol in the blood may lead to severe heart diseases like heart attack chronic kidney diseases, atherosclerosis, etc. It had to be explained that family history plays an important role and is linked to high cholesterol therefore; they could be at the risk of developing heart diseases linked to high cholesterol in their diet. Some subjects were also unaware that good cholesterol does exist and should be in a higher proportion in order to attain a healthy body and life. Similarly, the normal level of cholesterol in the blood should be less than 200 mg/dl. Pre-study results showed that many non-medical subjects did not know these facts.

A study conducted in 2008-2010 mentioned that hypercholesterolemia cognizance and treatment rates were essentially low in youthful grown-ups and early screening, education, and appropriate management ought to be pushed in public general wellbeing arrangements to lessen the expanding burden of CVD in a young adult population with undiagnosed hypercholesterolemia.[11]

There was a constraint of our investigation. The sample size doesn't abstractly address the entire population.

CONCLUSION

All over, the study was a success and the aim of the study was fulfilled. Spreading awareness and educating about aspects related to hypercholesterolemia and other CVS disorders can bring the difference in healthy living only if the gained knowledge is implemented in day-to-day life. We recommend that more community surveys about lipid

profiles ought to be led, including distinctive local gatherings. More spotlights ought to be given on non-medical students so as to build their insight about cardiovascular well-being. Health advancement camps about lipid profile screening to improve well-being training in everyone.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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