Assessment and Evaluation of Knowledge, Attitude and Practice Regarding risk of cardiovascular diseases in patients attending a tertiary care hospital

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ABSTRACT

Background: Cardiovascular diseases (CVD) are a major cause of morbidity and mortality globally. Understanding patient knowledge, attitudes, and practices regarding CVD risk factors is crucial, particularly in a tertiary care hospital setting.

Objectives: 1. To determine and compare the current level of knowledge of participants, regarding cardiovascular diseases, their risk factors, and preventive measures. 2. To evaluate the attitude and practices of participants towards lipid profile, BP, diet plan, adherence to treatment, and maintenance of normal body weight and exercise.

Methods: A cross-sectional, questionnaire-based study was conducted among 200 patients from January 2024 to May 2024 in a tertiary care hospital. Data on demographics, education, knowledge, attitudes, and practices regarding CVD were collected and analyzed.

Results: Of the 200 participants, 61.5% were male, and 38.5% were female. Educational levels varied, with 38% having completed up to 10th grade and 4% being illiterate. Among 10th Pass patients, 65.5% were aware of CVD, 5.5% did not know, and 29% were unsure. Degree holders were more aware, with 37% recognizing higher risk in men. High blood pressure and excess body weight were identified as risk factors by 90.5% and 88% of 10th Pass patients, respectively. Regular exercise was not considered harmful by 74.5%, and 92.5% disagreed that CVDs are unpreventable. However, 79% of 10th Pass patients lacked knowledge about BMI. Regular medication and follow-ups were emphasized by 97.5% and 99%, respectively. Regarding practice, 92.5% of 10th Pass patients adhered to prescribed medication and follow-ups, 87.5% followed a healthy diet, and 95% had recent blood pressure checks. Significant associations were found between education levels and knowledge, attitudes, and practices, and between age and medication adherence.

Conclusion: The study highlights the importance of education in influencing patients' knowledge, attitudes, and behaviors about CVD risk factors in a tertiary care context.

Keywords: Cardiovascular diseases, risk factors, patient awareness, medication adherence.

1. Introduction

In the 1950s, surveys measuring knowledge, attitude, and practice (KAP) were first introduced in the fields of population research and family planning. KAP surveys are becoming a commonly used approach for examining behaviors associated with health and practices connected to obtaining health care. Even though there is a positive correlation between attitude and practice,it is just a moderate relationship showing that practice could be increased when the attitude is better (Ibrahim et al., 2016). Studies on knowledge, attitude, and practice can be valuable for public health to help develop targeted educational programs and assess the effectiveness of intervention programs (Sharma, 2024). According to W.H.O. cardiovascular diseases are the disorders of the heart and blood vessels, they include coronary heart disease, cerebrovascular disease, peripheral arterial disease, rheumatic heart disease, congenital heart failure, deep vein thrombosis, and pulmonary embolism (Koohi et al., 2021). These diseases are the main cause ofdeath in the United States and each year about 30% of deaths in this country occur due to these diseases (Winham & Jones, 2011). CVDs are one of the most important common causes of death in most countries (Malkzadh M., 2013). 17.7 million deaths worldwide are attributed to CVD, according to the World Health Organization. The burden of CVDs in India is expected to double inthe next two decades. In addition, because of urbanization and machine-dependent lifestyles, shortly the prevalence of these diseases will increase (Tavakoli et al., 2016).

Major risk factors include hypertension, cigarette smoking, hypercholesterolemia, diabetes mellitus (DM), obesity, and physical inactivity. The minor contributing risk factor includes stress (Heart Disease Risk Factors for Adults., 2015). Tobacco smoking also raises blood pressure and heart rate, which increases the risk of CHD development (Hassan et al., 2023). Individuals who have diabetes or insulin resistance along with one or more of these risk factors are more vulnerable to heart disease and stroke. By controlling their risk factors, people with diabetes can prevent or postpone heart and blood vessel damage (Leon, 2015).Being overweight or obese predisposes one to several cardiac issues, including congestive heart failure, heart attack, and sudden death (Poirier et al., 2006). Blood pressure and total serum cholesterol, as well as body mass index (BMI), have a substantial positive association. A significant number of individuals are unaware that its occurrence is rising, and those who do are usually not taking any action. Mental stress can aggravate CAD and is frequently a major cause of angina (Esch et al., 2002).

Modifiable risk factors include lifestyle-related factors such as physical activity, diet, smoking, and alcohol consumption. By eliminating any of the mentioned factors, the probability of cardiovascular diseases will be decreased. Ninety percent of cardiovascular illnesses may be prevented if risk factors are managed, but there is complete treatment that can guarantee a 100% cure. (Akshay et al., 2021). The World Health Organization advocates diet and exercise as the "best buys" for enhancing cardiovascular health behaviors.

Patients attending a tertiary care hospital are particularly vulnerable to CVD, So, it is important to understand how much patients know about CVD risk factors and how they behave whenit comes to their health. Healthcare professionals may create focused interventions and educational initiatives to enhance patient outcomes and lessen the burden of CVD by knowing their degree of

knowledge and behavior. Ultimately the goal of our is to reduce the burden of CVD and promote better heart health for patients attending a tertiary care hospital.

2. Patients and Methods

Study Design and Sample

This cross-sectional study questionnaire-based study was conducted on a convenience sample of 200 patients who attended a tertiary care hospital (Shrimann Superspeciality Hospital, Jalandhar, Punjab). The Institutional Ethics Committee approved the protocol for the study. The study was carriedout after obtaining permission from the Institutional Ethics Committee of the Punjab Instituteof Medical Sciences (Ref. no.: IEC/PIMS/24/05).
Inclusion criteria comprised participants older than 18 years of age, having t h e cognitive capacity to understand and respond to the questionsbeing asked, and participants with or without any history of CVD.
Exclusion criteria included individuals who were unable to give consent for the study.

Data Collection

Before their participation, all patients were provided with detailed information about the study, and written informed consent was obtained from each participant. The informed consent process ensured that participants were fully aware of the study's purpose, procedures, potential risks, and benefits before voluntarily agreeing to take part in the research.

A self-administered, semi-structured questionnaire was used to collect data from the participants fulfilling the requirements of inclusion criteria. The questionnaire used in this research was adapted from previously conducted research (Manisha Shrestha, 2020). The demographic section and the overall structure were retained without modifications to ensure consistency. However, the content of the questions was altered to align with the objectives of this study. These modifications were made as recommended by the Institutional Ethics Committee to better address the specific research questions The original questionnaire provided a robust framework, while the tailored questions allowed for a focused exploration of the research.

Statistical Analysis

For descriptive analysis, frequency or count with percentages was used to describe and summarize the variables. All the scales and independent numerical variables w e r e converted into categories using transformation and visual binning through SPSS (Statistical Package of Social Sciences) software version 27.0.1. The Chi-Square test was used to determine if there were significant associationsbetween categorical variables. It is particularly useful when dealing with large sample sizes and when the expected frequencies in each cell of the contingency table are sufficiently large (generally 5 or more). The Fisher Exact test was employed when the sample sizes were small or when the expected frequencies were low. This test provides aexact p-value and is more accurate in such situations.

3. Results

Demographic Detail

The total number of participants in the study is 200. The mean (average) age of the participants is 56 years. This provides a measure of the central tendency, indicating that on average, participants are in their mid-50s. Skewed sex distribution indicated 61.5% males and 38.5% females participated in the study. Regarding the smoking behavior of the participants, 95% of them were non-smokers and only 5 % were smokers.

Most participants in the study had completed education up to the 10th grade, making up 38% of the sample. In contrast, only a small portion of participants, 4%, were illiterate. Those who had attained a degree, diploma, or other higher education constituted a moderate 23.5% of the participants. Additionally, 12.5% of the participants had completed education up to the 12th grade, while 22% had an education level up to the 5th grade.
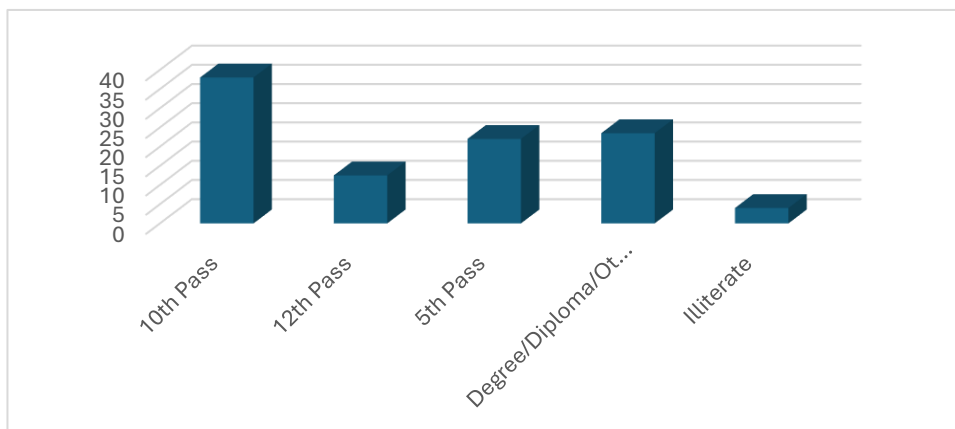

Fig 1.Bar graph showing distribution of education level in participants.

Most patients (94) have a normal or overweight (67) BMI, and there is a significant presence of obesity, particularly in Obese Class 1 (37). The smaller numbers in Obese Classes 2 (5) and 3 (1) suggest fewer patients with severe obesity. Understanding this distribution is crucial for assessing the overall health profile of the patient population.
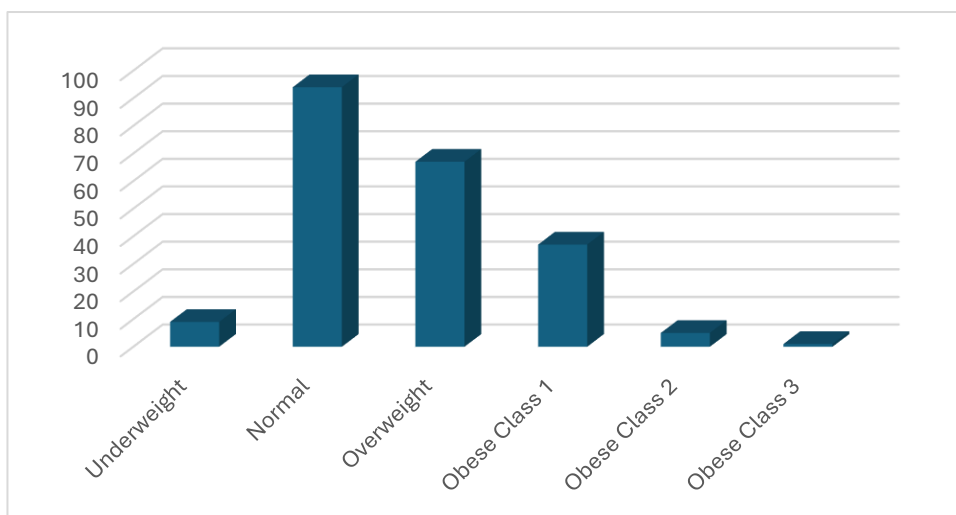
Fig 2. Bar graph showing the distribution of Body Mass Index (BMI) in participants

(n=200)

Table 1: Knowledge Evaluation

Questions		Response % (n)	DemographicParameters (Maximum)			DemographicParameters (Minimum)		
			Age	Gender	Education Level	Age	Gender	Education Level
Q1. Do you knowabout cardiovascular disease (CVD)?	a) Yes	65.5%(131)	66Y (9)	M (84)	10th Pass(51)	20Y(1)	F (47)	Illiterate(2)
	b) No	5.5% (58)	63Y (4)	M (33)	10th Pass(23)	19Y(1)	F (25)	12th Pass, Degree, Illiterate(5)
	c) Not Sure	29.0% (11)	40Y (1)	M (6)	12th Pass(4)	20Y(1)	F (5)	5th Pass, Illiterate(1)
Q2. Men are athigher risk of CVDs as compared to women.	a) Yes	37.0% (74)	44Y (6)	M (51)	Degree(30)	19Y (1)	F (23)	Illiterate(1)
	b) No	9.0% (18)	47Y (2)	M, F(1)	10th Pass(6)	22Y (1)	M, F(1)	Illiterate(1)
	c) Not Sure	54.0%(108)	66Y (8)	M(63)	10th Pass(44)	30Y (1)	F (45)	Illiterate(6)
Q3. Smoking does not increase	a) Yes	24.5% (49)	76Y (3)	M(28)	10th Pass (22)	30Y (1)	F (21)	Illiterate (2)
	b) No	64.5%(129)	66Y (8)	F (83)	10th Pass (48)	19Y (1)	F (46)	Illiterate (1)
	c) Not Sure	11.0% (22)	65Y (2)	M (12)	10th Pass, 5th Pass (6)	19Y (1)	F (10)	12th Pass (1)

Q4. High blood pressure is a risk factor of CVD.	a) Yes	90.5%(181)	66Y (9)	M (112)	10th Pass (70)	28Y (1)	F (69)	Illiterate (8)
	b) No	5.5% (11)	73Y (2)	F (6)	10th Pass, 5th Pass (4)	33Y (11)	M (5)	12th Pass (1)
	c) Not Sure	4.0% (8)	82Y (1)	M (6)	10th Pass, 12th Pass, 5th Pass, Degree (2)	28Y (1)	F (2)	--
Q5. Stress increases one's risk of acquiring CVD?	a) Yes	93.5%(187)	66Y (9)	M (112)	10th Pass (67)	20Y (1)	F (75)	Illiterate (8)
	b) No	3.5% (7.0)	73Y (1)	M (6)	10th Pass (5)	53Y (1)	F (1)	Degree (2)
	c) Not Sure	3.0% (6.0)	82Y (1)	M (5)	10th Pass (4)	19Y (1)	F (1)	Degree (2)
Q6. Having excess body weight increases one's risk of CVD.	a) Yes	88.0%(176)	66Y (8)	M (110)	10th Pass (71)	19Y (1)	F (66)	Illiterate (3)
	b) No	3.0% (6.0)	81Y (1)	M, F (3)	10th Pass (3)	46Y (1)	M, F (3)	Degree (1)
	c) Not Sure	9.0% (18)	82Y (1)	M(10)	5th Pass (5)	20Y (1)	F (8)	10th Pass (2)
Q7. Diabetes increases one's risk of CVD.	a) Yes	73.0%(146)	66Y (8)	M (95)	10th Pass (63)	19Y (1)	F (51)	Illiterate (1)
	b) No	6.5% (13)	81Y (1)	F (7)	10th Pass(5)	22Y (1)	M (6)	12th Pass (1)
	c) Not Sure	20.5% (41)	75Y (2)	M (22)	Degree (12)	20Y (1)	F (19)	12th Pass (4)
Q8. Consumption of too much salt is a risk of CVD.	a) Yes	89.0%(178)	66Y (9)	M(109)	10th Pass (66)	22Y (1)	F (69)	Illiterate (4)
	b) No	1.0% (2)	62Y (1)	M, F (1)	10th Pass, 5th Pass (1)	59Y (1)	M, F (1)	10th Pass (1)
	c) Not sure	10.0% (20)	63Y (2)	M (13)	10th Pass (9)	19Y (1)	F (7)	12th Pass (1)
Q9. Exercising regularly is harmful to cardiovascular health.	a) Yes	24.5% (49)	66Y (3)	M (28)	10th Pass (19)	28Y (1)	F (21)	Illiterate (1)
	b) No	74.5%(149)	65Y (8)	M (94)	10th Pass (57)	19Y(1)	F (55)	Illiterate (7)
	c) Not Sure	1.0% (2)	53Y (1)	M, F (1)	12th Pass, Degree (1)	40Y (1)	M, F (1)	12th Pass (1)
Q10.Cardiovascular diseases are not preventable.	a) Yes	3.0% (6)	63Y (2)	F (4)	10th Pass (3)	32Y (1)	M (2)	Illiterate (1)
	b) No	92.5%(185)	66Y (8)	M (116)	10th Pass (72)	19Y (1)	F (69)	Illiterate (4)
	c) Not Sure	4.5% (9)	70Y (2)	M (5)	5th Pass (3)	28Y (1)	F (4)	10th Pass (1)

Q11. Do you know about body mass index (BMI)?	a) Yes	12.5% (25)	44Y (3)	M (14)	10th Pass (12)	22Y (1)	F (11)	10thPass(12)
	b) No	79.0%(158)	66Y (7)	M (100)	10th Pass (57)	20Y (1)	F (58)	Illiterate (7)
	c) Not Sure	8.5% (17)	63Y (2)	M (9)	10th Pass (7)	19Y (1)	F (8)	Illiterate (1)
Q12. Do you know about good and bad cholesterol.	a) Yes	49.5% (99)	66Y (5)	M (65)	10th Pass (37)	19Y (1)	F (34)	Illiterate (1)
	b) No	44.0% (88)	66Y (5)	M (54)	10th Pass (33)	22Y (1)	F (34)	Illiterate (5)
	c) Not Sure	6.5% (13)	63Y (3)	F (9)	10th Pass (6)	32Y (1)	M (4)	Degree (1)

In the assessment of knowledge among patients, 65.5% of those with a 10th Pass education were aware of CVD, whereas 5.5% had no knowledge and 29% were unsure. Among degree holders, 37% believed men are at higher risk of CVD, contrasting with 54% of 10th Pass patients and a few illiterate patients who were uncertain.

Regarding smoking, 48% of 10th Pass patients disagreed that it increases CVD risk, while 22% agreed. A significant majority (90.5%) of 10th Pass patients and some illiterate individuals recognized high blood pressure as a risk factor, with only 5.5% in disagreement. Most 10th Pass and illiterate patients, including 112 males and 75 females, acknowledged stress as a risk factor, with a small 3.5% disagreeing.

Additionally, 88% of patients, predominantly 10th Pass males, understood that excess body weight heightens CVD risk, though 9% of 5th and 10th Pass patients were unsure. Regarding diabetes, 73% of 10th Pass patients agreed it increases CVD risk, with 20.5% of degree holders unsure and 6.5% of 10th and 12th Pass patients disagreeing.

A high percentage (89%) of 10th Pass patients, including 109 males and 69 females, recognized the risk associated with excessive salt consumption, with 10% unsure and 1% disagreeing. Most 10th Pass patients (74.5%) disagreed that regular exercise is harmful, while 24.5% agreed and 1% were unsure. On CVD prevention, 92.5% of 10th Pass patients disagreed that CVDs are not preventable, with 4.5% of 5th Pass and a few illiterate patients unsure, and 3% agreeing.

Concerning BMI knowledge, 79% of 10th Pass and some illiterate patients lacked awareness, 12.5% of 10th Pass patients were informed, and 8.5% were unsure. Lastly, 49.5% of patients knew about good and bad cholesterol, while 44% did not.

Table 2: Attitude Evaluation

Questions			Response % (n)	Demographic Parameters (Maximum)			Demographic Parameters (Minimum)		
				Age	Gender	Qualifications	Age	Gender	Qualifications
Q1. Do you think regular medication is important in cardiovascular disease?	a)	Yes	97.5% (195)	66Y (9)	M (2)	10th Pass (75)	19Y (1)	F (1)	Illiterate (8)
	b)	No	1.0% (2)	81Y (1)	M, F (1)	10th Pass (1) Degree (1)	46Y (1)	M, F (1)	10th Pass (1) Degree (1)
	c)	Do not know	1.5% (3)	28Y (1)	M (2)	Degree (2)	20Y (1)	F (1)	12th Pass (1)
Q2. Do you think regular follow-ups are important?	a)	Yes	99.0% (198)	66Y (9)	M (121)	10th Pass (75)	19Y (1)	F (77)	Illiterate (8)
	b)	No	0.5% (1)	81Y (1)	M (1)	10th Pass (1)	0	F (0)	10th Pass (1)
	c)	Do not know	0.5% (1)	20Y (1)	M (1)	12th Pass (1)	0	F (0)	12th Pass (1)
Q3. Do you think reducing salt intake can prevent high blood pressure?	a)	Yes	94.0% (188)	66Y (9)	M (115)	10th Pass (71)	19Y (1)	F (73)	Illiterate (7)
	b)	No	3.0% (6)	68Y (1)	M (4)	10th Pass (3) Degree (3)	28Y (1)	F (2)	10th Pass (3) Degree (3)
	c)	Do not know	3.0% (6)	77Y (1)	M (4)	10th pass (2)	20Y (1)	F (2)	12th Pass (1) 5th Pass (1) Degree (1) Illiterate (1)
Q4. Do you think regular checking of BP is important?	a)	Yes	82.5% (165)	66Y (8)	M (102)	10th pass (64)	19Y (1)	F (63)	Illiterate (6)
	b)	No	11.5% (23)	81Y (1)	M (14)	10th Pass (8)	20Y (1)	F (9)	12th Pass (4) 5th Pass (4)
	c)	Do not know	6.0% (12)	70Y (1)	M (7)	10th Pass (4)	48Y (1)	F (5)	Illiterate (2)
Q5. Do you think reading the nutrition facts for each product is important?	a)	Yes	27.5% (55)	46Y (4)	F (33)	Degree (24)	19Y (1)	M (22)	Illiterate (1)
	b)	No	48.0% (96)	63Y (5)	M (67)	10th Pass (35)	25Y (1)	F (29)	Illiterate (3)
	c)	Do not know	24.5% (49)	59Y (3)	M (34)	10th Pass (25)	20Y (1)	F (15)	Illiterate (4)
Q6. Do you think exercising regularly helps to maintain your health?	a)	Yes	96.5% (193)	63Y (9)	F (5)	10th Pass (74)	19Y (1)	M (2)	Illiterate (8)
	b)	No	3.5% (7)	60Y (1)	M (121)	Degree (3)	35Y (1)	F (72)	10th Pass (2) 12th Pass (2)

In this evaluation, 97.5% of patients agreed that regular medication is important for CVD management, and 99% emphasized the need for regular follow-ups, predominantly those with a 10th-grade education. Only 8 illiterate patients concurred. 82.5% (165) stressed the importance of regular BP checks, primarily among those aged 66. A significant 94% (188) believed reducing salt intake prevents high BP, mostly males with a 10th-grade education; 6% were unaware or disagreed. 48% (96) deemed reading nutritional facts unnecessary, particularly those with a 10th-grade education, while 24.5% were unaware of its importance. Regarding exercise, 96.5% (193) acknowledged its benefits for overall health, whereas 3.5% (7) did not.

Table 3: Practice Evaluation

Questions		Response % (n)	Demographic Parameters(Maximum)			Demographic Parameters(Minimum)		
			Age	Gender	Education Level	Age	Gender	Education Level
Q1. Do you take your prescribed medicine regularly?	a) Yes	92.5% (185)	65Y (9)	M (114)	10th Pass (73)	19Y(1)	F (71)	Illiterate(8)
	b) No	7.5 % (15)	44Y (3)	M (9)	Degree (7)	20Y (1)	F (6)	10th Pass (3)
Q2. Do you go for follow-up regularly?	a) Yes	92.5% (185)	66Y (9)	M (114)	10th Pass (71)	19Y(1)	F (71)	Illiterate(8)
	b) No	7.5 %(15)	44Y (2)	M (9)	Degree (7)	20Y(1)	F (6)	12th Pass(3)
Q3. Do you get involved in any physical exercise daily?	a) Always	42.0% (84)	66Y (6)	M (58)	10th Pass (33)	24Y (1)	F (26)	12th Pass (11)
	b) Frequently	26.0% (52.0)	59Y (4)	M (38)	10th Pass (19)	22Y (1)	F (14)	Illiterate (5)
	c) Rarely	17.5% (35.0)	53Y (3)	F (22)	10th Pass (14)	25Y (1)	M (13)	Illiterate (1)
	d) Never	14.5% (29)	55Y (3)	F (14)	10th Pass (10)	22Y (1)	M (15)	12th Pass (2) Illiterate (2)
Q4. Do you follow a healthy diet? (Fat-restricted, vegetables and fruit rich)	Always	87.5% (175)	66Y (9)	M (108)	10th Pass (69)	22Y (1)	F (67)	Illiterate (8)
	Frequently	10.5% (21.0)	47Y (2)	M (12)	Degree (10)	20Y (1)	F (9)	5th Pass (2)
	Rarely	2.0% (4)	42Y (1)	M (3)	10th Pass (2)	19Y (1)	F (1)	12th Pass (1) Degree (1)
Q5. When was the last time you had your blood pressure checked?	a) 1 or more than 1 month ago.	0.5 %(1)	62Y (1)	F (1)	12th Pass (1) Degree (1)	0	M (0)	12th Pass, Degree (1)
	b) Within the past day (anytimeless than24 hours ago).	95.0% (190)	66Y (4)	M(117)	10th Pass(74)	43Y(1)	F (73)	Illiterate(7)

	c) Within the past 2 days (more than1 day ago but less than 2 days ago).	4.5% (9)	67Y (3)	M (6)	Degree (4)	19Y(1)	F (3)	12th Pass, 5th Pass, Illiterate (1)
Q6. When was thelast time you had your cholesterol checked?	a) Within the past month (anytime less than 1 months ago).	37.0% (74)	66Y (4)	M (44)	10th Pass(24)	19Y(1)	F (30)	Illiterate(2)
	b) Within the past year	30.0% (60)	44Y (4)	M (33)	10th Pass (25)	0	F (27)	Illiterate (1)
Q7. Was it normal/high or low?	a) Normal	45.0 % (90)	59Y (5)	M (54)	10th Pass (30)	24Y (1)	F (36)	Illiterate (1)
	b) High	19.5% (39)	62Y (3)	M (21)	10th Pass (20)	52Y (1)	F (18)	Illiterate (1)
	c) Low	1.5% (3)	22Y (1)	F (2)	Degree (2)	22Y (1)	M (1)	Illiterate (1)
	d) Don't know.	34.0% (68)	46Y (5)	M (47)	10th Pass(26)	19Y (1)	F (21)	Illiterate(6)
Q8. Are you currently taking medicine for your high blood pressure?	a) Yes	42.0% (84)	31Y (1)	M (56)	10th Pass (36)	32Y (1)	F (28)	Illiterate (4)
	b) No	57.0% (114)	65Y (6)	M (65)	10th Pass (40)	19Y (1)	F (49)	Illiterate (4)

In the practice assessment, 92.5% of patients, including 114 males, 71 females, and 73 with a 10th-grade education, regularly take prescribed medication, while 7.5%, including 7 with degrees, do not. Similarly, 92.5% attend regular follow-ups, predominantly those with a 10th-grade education. Regarding physical activity, 42% always exercise, 26% frequently, 17.5% rarely, and 14.5%, including 10 with 10th-grade education, never exercise.

A healthy diet is always followed by 87.5%, while 10.5% do so frequently, and 2% rarely. Blood pressure checks within the past day were reported by 95%, mainly those with a 10th-grade education, whereas 4.5% had it checked within the past two days and 0.5% over a month ago. For cholesterol, 37% had it checked within the past month, 33% never or don't know, and 30% within the past year. Cholesterol levels were reported as normal by 45%, high by 19.5%, low by 1.5%, and 34% were unsure. Lastly, 57% are not taking BP medication, 42% are, and 1% are unsure.

Statistical Results:

The Chi-Square and Fisher Exact tests were conducted to compare the education level of patients with their knowledge, attitudes, and practices towards the risk of cardiovascular disease (CVD).

Table 4: Association of education level of Participant with their current level of knowledge, attitude and practice regarding risk of CVD.

Questions	Statistical tests	Value	Degrees of freedom	Asymptomatic significance (2-sided)	Significance
High blood pressure is a risk factor of CVD?	Pearson Chi-Square	3.637	8	.888	.911
	Likelihood Ratio	4.067	8	.851	.920
	Contingency Coefficient	.134	-	-	.911
Stress increases one's risk of acquiring CVD?	Pearson Chi-Square	9.285	8	.319	.287
	Likelihood Ratio	13.585	8	.093	.115
	Contingency Coefficient	.			.287
Having excess body weight increases one's risk of CVD?	Pearson Chi-Square	34.148	8	<.001	<.001
	Likelihood Ratio	22.431	8	.004	.004
	Fisher-Freeman-Halton Exact Test	21.462			<.001
	Contingency Coefficient	.382			<.001
Do you think reading the nutrition facts for each product is important?	Pearson Chi-Square	37.912	8	<.001	.000

	Likelihood Ratio	38.116	8	<.001	<.001
	Fisher-Freeman-Halton Exact Test	36.688			.000
Do you getinvolved in anyphysical exercise daily?	Pearson Chi-Square	14.500	12	.270	.274
	Likelihood Ratio	16.837	12	.156	.208
	Fisher-Freeman-Halton Exact Test	14.795			.226
. When wasthe last time you had your cholesterol checked?	Pearson Chi-Square	18.509	12	.101	
	Likelihood Ratio	20.377	12	.060	
	Fisher-Freeman-Halton Exact Test	17.808			

Interpretation:

The Chi-Square and Fisher Exact tests were conducted to compare the education level of patients with their knowledge, attitudes, and practices towards the risk of cardiovascular disease (CVD).

a. Knowledge Level:

 Significant associations were found between education levels and knowledge about highblood pressure, stress, and body weight as risk factors for CVD. The p-values indicated that education level played a crucial role in determining theknowledge about these risk factors.

b. Attitude Towards Risk of CVD:

 Education levels were significantly associated with attitudes towards stress, body weight,and

 smoking as risk factors. Patients with higher education levels had more accurate perceptions

 regarding these riskfactors.

c. Practices Regarding Risk of CVD:

There were significant differences in practices, such as regular exercise and cholesterol check, based on education levels.

Table 5: Association of age group and adherence to treatment practices.

Question	Statistical Tests	Value	Degrees of freedom	Asymptotic Significance (2- sided)	Significance
Q1. Do youtake your prescribed medicine regularly?	Pearson Chi-Square	83.541[a]	58	.016	.033
	Likelihood Ratio	58.686	58	.450	.024
	Fisher-Freeman-Halton Exact Test	63.225	-	-	.068
	Contingency Coefficient	.543			

Interpretation:

These results suggest a significant association between age and regular medication adherence. The significant Pearson Chi-Square and Monte Carlo tests indicate that age may influence whether individuals take their prescribed medication regularly. The moderate contingency coefficient further supports this association, although the Fisher-Freeman-Halton exact test is only close to significance.

4. Discussion:

This study's findings demonstrate a strong correlation between patients' knowledge, attitudes, and practices (KAP) on cardiovascular disease (CVD) risk factors and their educational attainment. These correlations emphasize how important education is for promoting health behaviour and health literacy.
Knowledge Evaluation: Patients with greater levels of education showed a noticeably greater understanding of the risk factors for CVD, including stress, obesity, and high blood pressure. Uncertainty and misunderstandings were evident among patients with lower levels of education on gender variations in CVD risk and the effects of smoking, indicating that there are still gaps in knowledge. This suggests that specialized educational initiatives are required to fill in certain

knowledge gaps. The findings that patients with higher education levels have a better understanding of CVD risk factors, such as stress and high blood pressure, align with results from the study by (Mulugeta et al., 2020).

Attitudes Evaluation: Patients' perceptions of CVD risk factors were similarly impacted by education. Greater levels of education were associated with stress reduction, maintaining a healthy weight, and giving up smoking. The discrepancy in views across educational levels raises the possibility that educational interventions might help less educated populations adopt better attitudes and change their perspectives. The observation that educated patients show more positive attitudes toward stress reduction, weight management, and smoking cessation is consistent with the findings of (Abegaz et al., 2021). They found that individuals with higher education levels are more likely to acknowledge the importance of reducing salt intake and other preventive measures to manage hypertension.

Practices Evaluation: Based on educational attainment, the study discovered substantial variations in health behaviours. Patients with higher levels of education were also more likely to regularly exercise and get medical examinations, including blood pressure and cholesterol checks. These behaviours are crucial for managing and preventing CVD. Less educated patients are less likely to engage in these behaviours, which suggests a possible obstacle to effective CVD prevention and emphasizes the need for policies that support healthy lifestyle choices and routine checkups for patients of all educational backgrounds. This study's interpretation that higher educational attainment is linked to healthier practices, such as regular exercise and medical check-ups, parallels findings by (Bayisa et al., 2016).

The significant association between age and regular medication adherence suggests that age-related factors, such as health awareness, cognitive ability, and compliance behaviour, may play a crucial role in whether individuals adhere to their prescribed medication regimens. This finding is important for tailoring interventions to improve medication adherence among different age groups.

5. Conclusion:

The importance of education in influencing patients' knowledge, attitudes, and behaviours about CVD risk factors in a tertiary care context is highlighted by this study. The noteworthy correlations that have been identified indicate that increased education is associated with improved knowledge, more optimistic outlooks, and healthier habits for the prevention and treatment of CVD.

The evidence provided by the study, which demonstrates that there are statistically significant differences in the levels of knowledge, attitude, and practice regarding CVD risk factors among patients with different educational backgrounds leads to the conclusion that the null hypothesis is rejected. Specifically: Patients with higher education levels showed significantly better knowledge, more positive attitudes, and healthier practices related to CVD risk factors.

These results provide credence to the idea of using educational interventions that are customized for various educational backgrounds to raise general cardiovascular health outcomes and literacy. The study also highlighted the significant association between age and medication adherence. Therefore, age-specific interventions, such as simplifying medication schedules and using

reminder systems, are crucial for enhancing medication adherence. Healthcare practitioners can encourage more successful preventive practices and lessen the burden of CVD by addressing the knowledge gaps and misunderstandings that have been observed, especially among groups with lower levels of education. Thus, focused health education initiatives should be a key component of public health plans to prevent cardiovascular disease as they guarantee that everyone, regardless of educational attainment, has the information and resources needed to reduce their risk.

Conflicts of Interests
The authors declare that there are no conflicts of interests.

Informed Consent
Written informed consent was obtained from all individual participants included in the study and all the information regarding this is included in this paper.

Ethical approval
The study was approved by the Institutional Ethics Committee of the Punjab Institute of Medical Sciences, Jalandhar-Punjab (PIMS) (Ref. no.: IEC/PIMS/24/05).

Data and materials availability
All data associated with this study are present in the paper.

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