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Effect of a Single Structured Educational Session on Cardiovascular Health Knowledge, Attitudes and Practices among Non-Medical College Students in Pune, India: A One-Group Pre-Post Quasi-Experimental Study

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ABSTRACT

Background: Cardiovascular diseases (CVDs) are the leading cause of death worldwide, and risk factors increasingly emerge in young adulthood in India. College students from non-medical streams often lack formal exposure to cardiovascular health education.

Methods: A one-group pre-post quasi-experimental study was conducted among non-medical college students aged 18–25 years, recruited by convenience sampling from three colleges in Pune. A structured questionnaire validated by expert review assessed knowledge (12 items), attitudes (6 items) and practices (5 items) at baseline and again two weeks after one interactive 45–60 minute session on CVD prevention. Analysis used paired t-tests, Wilcoxon signed-rank tests, Cohen's dz and McNemar's test.

Results: 89 enrolled participants (62.9% male), 85 (95.5%) completed both assessments. Mean knowledge score rose from 9.62 ± 2.25 to 11.78 ± 1.00 ($t = 9.45$, $p < 0.001$, $dz = 1.02$) and mean attitude score from 24.33 ± 6.61 to 28.26 ± 2.23 ($t = 5.22$, $p < 0.001$, $dz = 0.57$). Nine of 12 knowledge items improved significantly, with the largest gains in the multiple-select risk-factor item (20.0% to 92.9%) and ideal blood pressure (60.0% to 97.6%). Self-reported physical activity, fast-food frequency and fruit and vegetable intake shifted favourably ($p = 0.027$, 0.016 and < 0.001). Tobacco or vaping use fell from 12.2% to 3.7% ($p = 0.065$).

Conclusion: A single structured session was associated with a large improvement in CVD knowledge and a moderate improvement in attitudes, with smaller self-reported practice changes. Without a control group, and with the same questionnaire used twice, these gains cannot be attributed to the intervention alone, and practice changes should be regarded as preliminary. Controlled studies with longer follow-up are needed.

Keywords: cardiovascular disease; health literacy, health promotion; primary prevention, young adults

INTRODUCTION

Cardiovascular diseases (CVDs) are the leading cause of death worldwide, responsible for an estimated 17.9 million deaths each year.[1] In India, the prevalence of CVDs has more than doubled in recent decades, and the disease tends to affect people at a younger, more productive age than in Western populations.[2,3] The underlying pathology and risk factors begin to accumulate early in life, and CVDs rank as the third and fifth leading causes of death at ages 35–44 and 15–35 years, respectively.[4] The years spent in college are a pivotal window for establishing long-term health behaviours.[5] Newfound independence often brings sedentary behaviour, high intake of processed food, irregular sleep, tobacco initiation and alcohol use,[4,6] which over time raise the burden of hypertension, dyslipidaemia and central obesity. Despite this vulnerability, cardiovascular health awareness among college-going young adults remains low, [4,7] and the deficit is greatest among students in non-medical streams such as arts, commerce, engineering and basic sciences, who receive no formal teaching on cardiovascular risk or prevention.[7]

Health literacy is a cornerstone of primordial and primary prevention. [8,9] Structured health-education interventions that use information, education and communication (IEC) strategies have improved knowledge and behaviour in school and community settings, including among adolescents in India. [6,10] However, intervention studies in Indian non-medical college students that measure knowledge, attitudes and practices together appear to be few. We therefore evaluated the effect of a single structured educational session on cardiovascular health knowledge, attitudes and self-reported practices among non-medical college students in Pune.

METHODOLOGY

A one-group pre –post-test quasi-experimental study was conducted at three non-medical colleges in Pune, Maharashtra, The inclusion criteria were students aged 18–25 years enrolled in non-medical, non-health-science courses who voluntarily agreed to participate and provided written informed consent. Students enrolled in medical, dental, physiotherapy, nursing, or allied health science courses, as well as those reporting a known cardiovascular or metabolic disorder, were excluded. Eligibility was assessed based on the participant's course of study and self-reported health history. The sample size was calculated using the paired-sample *t*-test formula, yielding a minimum required sample of 72 participants, based on the prespecified effect size, significance level (α), and statistical power. To account for potential attrition, 89 students were enrolled, of whom 85 completed both assessments, resulting in a follow-up rate of 95.5% and four losses to follow-up. Data were collected using a structured, self-administered questionnaire comprising four sections: (A) sociodemographic characteristics; (B) knowledge of cardiovascular disease (CVD), assessed using 12 items (K1–K12), with each correct response scored 1 and each incorrect response scored 0, yielding a total score of 0–12; (C) attitude, assessed using six items (A1–A6) on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), yielding a total score of 6–30; and (D) self-reported health practices, assessed using five items (P1–P5) covering weekly physical activity, fast-food consumption frequency, daily fruit and vegetable servings, tobacco or vaping use during the preceding 30 days, and blood pressure measurement within the previous year. The practice items included ordinal response categories scored from 1 to 4 for relevant behavioural frequencies and categorical responses (yes/no or yes/no/do not remember) for tobacco or vaping use and blood pressure measurement, as applicable. For the multiple-response knowledge item K4, a correct score was

awarded only when all five correct risk factors were selected and the distractor option (regular exercise) was not selected. Content validity was assessed through expert review by professionals in Physiotherapy, community health, and research methodology. Pre-test and post-test responses were matched at the individual participant level to facilitate paired analysis. The intervention consisted of a single interactive educational session lasting 45–60 minutes, delivered by the researcher under the supervisor's guidance. The session incorporated a slide presentation, a brief lecture, and group discussion. Educational content included the definition and burden of CVD, cardiovascular risk factors, symptoms of myocardial infarction, ideal blood pressure, physical activity, healthy dietary practices, tobacco and vaping, stress management, sleep, and obesity. Sessions were conducted at the participating institutions. Participants completed the pre-test before the educational session and the post-test two weeks after the intervention to assess changes in knowledge, attitudes, and self-reported health practices.

RESULTS

Knowledge

The proportion answering correctly increased for all 12 knowledge items. The improvement was statistically significant for 9 of 12 items (Table 1); the remaining three (K5, K7, K8) were already answered correctly by at least 94% of students at baseline, indicating a ceiling effect. The largest gains were in the multiple-select risk-factor item (K4, 20.0% to 92.9%) and ideal blood pressure (K9, 60.0% to 97.6%). Mean total knowledge score rose from 9.62 ± 2.25 to 11.78 ± 1.00 (Table 2).

Table 1. Item-level knowledge responses, pre vs post (n = 85)

Item	Pre (% correct)	Post (% correct)	McNemar p
K1 Definition of CVD	76.5	97.6	< 0.001
K2 High BP = hypertension	80.0	96.5	0.001
K3 Heart attack symptom	90.6	98.8	0.039
K4 Risk factors (multiple-select)	20.0	92.9	< 0.001
K5 CVD affects young adults	96.4	97.6	1.000
K6 Activity reduces CVD risk	88.2	100.0	0.002
K7 Healthier food choice	95.3	100.0	0.125
K8 Smoking/vaping harmful	94.1	98.8	0.219
K9 Ideal BP (120/80 mmHg)	60.0	97.6	< 0.001
K10 Stress/sleep raise risk	89.4	98.8	0.008
K11 Healthy habit (exercise)	88.2	98.8	0.004
K12 Obesity raises risk	85.9	100.0	< 0.001

Table 2. Total knowledge and attitude scores, pre vs post (n = 85)

Outcome	Pre, mean ± SD	Post, mean ± SD	Test statistic	p	Cohen's dz
Knowledge (0–12)	9.62 ± 2.25	11.78 ± 1.00	Paired t = 9.45; Wilcoxon W = 49.5	< 0.001	1.02 (large)
Attitude (6–30)	24.33 ± 6.61	28.26 ± 2.23	Paired t = 5.22; Wilcoxon W = 449	< 0.001	0.57 (medium)

Table 3. Attitude item scores, pre vs post (n = 85)

Item	Statement	Pre, mean	Post, mean	p
A1	Young adults should care about heart health	4.06	4.69	< 0.001
A2	Exercise is important for preventing heart disease	4.04	4.65	0.002
A3	Healthy eating improves cardiovascular health	4.11	4.76	< 0.001
A4	Smoking/vaping is harmful to heart health	4.08	4.63	0.001
A5	Learning about cardiovascular health is important	4.00	4.74	< 0.001
A6	Motivated to improve lifestyle	4.09	4.78	< 0.001

Table 4. Self-reported practices, pre vs post (n = 85)

Item	Practice	Pre to post	Test	p
P1	Days/week with ≥30 min activity (ordinal 1–4)	Mean 3.00 to 3.32	Wilcoxon	0.027
P2	Fast food/fried snacks (ordinal 1–4; lower is better)	Mean 2.25 to 1.95	Wilcoxon	0.016
P3	Daily fruit/vegetable servings (ordinal 1–4)	Mean 2.49 to 3.19	Wilcoxon	< 0.001
P4	Tobacco/vaping, last 30 days (yes/no)	12.2% to 3.7%	McNemar	0.065
P5	BP checked within last year (definite yes/no, n = 57)	35.1% to 57.9%	McNemar	0.009*

DISCUSSION

This one-group pre-post study found a large improvement in cardiovascular disease (CVD) knowledge (dz = 1.02), a moderate improvement in attitudes (dz = 0.57) and smaller self-reported shifts in practices after a single structured session. This gradient is typical of knowledge-attitude-practice studies, because behaviour depends on habit, environment and opportunity as well as information.[8]Baseline gaps resembled those in other Indian college students, in whom modifiable risk factors are common and knowledge of non-modifiable factors, diet and cholesterol is weak.[11,12] The weakest baseline items (risk-factor recognition, 20.0%; ideal blood pressure, 60.0%) showed the largest gains, which suggests real learning rather than general agreement, although a testing effect cannot be excluded. The knowledge gain is in line with interventions in non-medical students in Pakistan (mean score 30.53 to 40.65),[13] Egypt (adequate knowledge in 99.2%) [4] and Jordan (d = 1.08 for knowledge and 0.62 for attitudes),[14] close to our dz values of 1.02 and 0.57. Attitudes were already favourable at baseline, and the positively worded items allow acquiescence, so the more informative finding is that agreement became stronger and less variable (SD 6.61 to 2.23). Good knowledge also does not guarantee perceived personal risk, as US college students showed,[15] and perceived risk was not measured here.Practice changes were smaller, as information alone is rarely sufficient for behaviour change.[8] The tobacco and blood pressure items used 30-day and 12-month recall windows with a two-week post-test, so true behaviour change is implausible and the shifts more likely reflect reporting changes such as social desirability. The tobacco reduction (12.2% to 3.7%) was not significant, and with about 10 baseline users the test is underpowered. Physical activity, diet and tobacco avoidance remain priority targets for primary prevention. [5,16]

Strengths include a high follow-up rate (95.5%), paired analysis and item-level results that identify specific gaps. Limitations are the absence of a control group, use of the same questionnaire twice (testing effect, acquiescence), a two-week follow-up, self-reported practices, convenience sampling from three colleges in one area of Pune, and 23 exploratory item-level tests without correction for multiple comparisons.A brief interactive session can raise knowledge with minimal resources, but whether the gains persist and whether the approach outperforms no intervention needs controlled testing. Future sessions should target composite risk-factor recognition and blood pressure norms, and add behavioural-skills training, goal setting and campus blood pressure screening. Physiotherapists, particularly in cardiorespiratory and community practice, are well placed to deliver such sessions.

Conclusion

A single structured educational session was associated with a large improvement in CVD knowledge (Cohen's dz = 1.02) and a moderate improvement in attitudes (dz = 0.57) among non-medical college students in Pune, with smaller favorable changes in self-reported practices. Because of the one-group pre-post design, the absence of a control group and the use of the same questionnaire at both assessments, the improvements cannot be attributed solely to the educational intervention, and the short follow-up limits conclusions about

sustainability. Controlled studies with longer follow-up and objective measures of health behavior are recommended.

Declaration by Authors

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