



Research Brief

Prevalence of cardiovascular health risk behaviors in college-going women in a major metropolis in India

Vaishnav Natarajan, Tharani Sekar, Priya Chockalingam*

Cardiac Wellness Institute, Chennai, India

ARTICLE INFO

Article history:

Received 14 May 2020

Accepted 17 August 2020

Available online 22 August 2020

Keywords:

Cardiovascular disease

Risk factors

College-going women

ABSTRACT

There is an increasing incidence of cardiovascular disease (CVD) in Indian men and women of younger ages but research related to CVD risk behaviors in college-going women in India is limited. A cross-sectional questionnaire-based survey conducted among 554 students from two women's colleges in Chennai showed that there was an alarmingly high prevalence of unhealthy diet and inadequate exercise, a moderately high prevalence of psychosocial risk and a low prevalence of tobacco use and alcohol consumption. It is imperative to increase awareness and provide targeted interventions to help our young women adopt a heart-healthy lifestyle.

© 2020 Cardiological Society of India. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Cardiovascular disease (CVD) is currently the leading cause of death and disability across the globe. CVD is the primary killer in India as well, accounting for 28% of all deaths annually. There has been an alarming increase in the prevalence of CVD in the past three decades in our country, with a higher mortality in the younger population.¹ Interestingly, pre-menopausal women are at a much higher risk of succumbing to CVD now but are largely under-represented in CVD-related research studies.^{2,3}

While there is sufficient evidence to prove the role of health-related behavioral risk factors such as unhealthy diet, inadequate exercise, psychosocial factors, smoking and harmful use of alcohol in the causation of CVD,⁴ the knowledge about their prevalence in college students in India is limited.^{5–10} This study aims to understand the prevalence of cardiovascular health risk behaviors in college-going women in Chennai, a major metropolis in India.

2. Methods

A cross-sectional survey-based study was conducted in September 2019 as part of a World Heart Day initiative to understand the risk behaviors of college-going women and to

conduct a workshop targeted at helping them adopt a heart-healthy lifestyle. Students from two allied health disciplines, Nutrition and Dietetics, and Psychology, from two women's colleges in Chennai participated in the study. A pre-tested anonymized self-administered questionnaire distributed online was used to collect demographic data and CVD risk behaviors pertaining to dietary consumption, exercise routine, sedentary behavior, psychosocial factors, sleep pattern, tobacco use and alcohol consumption. Daily intake of at least 5 portions of vegetables and fruits, weekly performance of at least 150 min of brisk aerobic exercise and abstinence from tobacco and harmful use of alcohol were considered healthy cardiovascular behaviors, as per the international guidelines.

A PubMed search was performed to identify all previous publications pertaining to cardiovascular health risk behaviors in college students in India and the prevalence of risk behaviors across student populations was compared. Prevalence of health behaviors is depicted as numbers and percentages. Fischer's exact test was used to test association between behaviors; $p < 0.05$ was considered statistically significant.

3. Results

Of the 554 women who participated in the study, 512 (92%) were in the 15–20 years age group and 42 (8%) were in the 21–30 years age group. Most of the subjects were single ($n = 542$, 98%); 12 (2%) were married. Table 1 provides information pertaining to the cardiovascular health risk behaviors in the study population.

* Corresponding author. Cardiac Wellness Institute, No.21, 5th Avenue, Besant Nagar, Chennai, 600090, India.

E-mail address: priyachockalingam@cardiacwellnessinstitute.com (P. Chockalingam).

Table 1
Prevalence of cardiovascular health risk behaviors in the study population.

Risk Behaviours (N = 554)	n (%)
Diet	
Vegetable intake	
Less than 2 cups/day	261 (47)
2–3 cups/day	252 (45)
4–5 cups/day	41 (8)
Fruit Intake	
Rarely	190 (34)
3–4 cups/week	189 (34)
1–2 cups/day	175 (32)
Whole grain products	
Rarely/Never	220 (40)
Most days	243 (44)
Everyday	91 (16)
Exercise	
Frequency (days/week)	
Rarely/Never	231 (41)
1–2 days	138 (25)
3–4 days	103 (19)
5 or more days	82 (15)
Duration of exercise per day	
Less than 30 min	319 (58)
30–44 min	120 (22)
45–60 min	72 (13)
More than 1 h	43 (7)
Chronic stress	
Number of hours of sleep per day	
Less than 6 h	103 (19)
More than 8 h	52 (9)
6–8 h	399 (72)
Number of hours of leisure screen time per day	
More than 3 h	158 (29)
2–3 h	267 (48)
About 1 h	129 (23)
Smoking/Tobacco use	
Smoke currently	4 (1)
Use other forms of chewable tobacco/snuff/e-cigarettes	5 (1)
Had unsuccessful attempts at quitting smoking	6 (1)
Alcohol consumption	
Consume everyday	2 (0.5)
Consume alcohol few times in a week	3 (0.5)
Consume alcohol occasionally	26 (5)

3.1. Dietary behavior

Majority of subjects ($n = 399$, 72%) consumed a mixed diet; 155 (28%) were vegetarian. The healthy eating recommendation of at least 5 portions of vegetables and fruits per day was noted in 114 (21%) subjects. Daily intake of whole grain foods was reported by 91 (16%) subjects. Pre-packed snacks and readymade foods high in sodium content and unhealthy fats were consumed regularly by 180 (33%) subjects.

3.2. Physical exercise and sedentary behavior

A total of 470 (84%) subjects reported performing some form of aerobic exercise like walking, cycling, swimming and gym exercises and 228 (42%) reported doing other exercises like weight training, body-weight exercises and yoga. However, the aerobic exercise recommendation of at least 150 min per week was met by only 66 (12%) subjects. Two or more hours was spent on leisure screen time per day by 425 (77%) subjects.

3.3. Psychosocial factors

Two hundred and fifteen subjects (39%) reported that they were chronically stressed and 155 (28%) subjects reported not getting the recommended 6–8 h sleep per day. There was a significant

association between being chronically stressed and not getting the recommended sleep ($p = 0.0001$). A small proportion of subjects ($n = 29$, 6%) reported that they had been diagnosed with mental health problems in the past.

3.4. Tobacco use and alcohol consumption

Tobacco use was reported by 15 (3%) subjects and regular (daily/weekly) consumption of alcohol by 5 (1%) subjects.

Table 2 provides a comparison of the CVD risk behaviors across the student populations reported in India. Variations among studies in dietary and exercise criteria are highlighted.

4. Discussion

To the best of our knowledge, this is the first study focusing exclusively on the prevalence of cardiovascular health risk behaviors in urban college-going women in India. The main findings of this study are that there was an alarmingly high prevalence of unhealthy dietary intake and inadequate exercise, a moderately high prevalence of psychosocial risk factors and a low prevalence of tobacco use and alcohol consumption in the study population. The women in the current study consumed a healthier diet and had a lower prevalence of tobacco use and alcohol consumption but fared poorer than their mixed gender counterparts in meeting the exercise recommendations. It is important to note that all previous studies focused on MBBS students (except one study which also included non-medical students), in whom awareness about behavioral risk factors is expected to be more than in a non-medical population.

Unhealthy diet is the biggest contributor to ischemic heart disease in the general Indian population with over 56% not meeting the healthy dietary requirements.¹ An almost equal proportion (54%) of individuals from Chandigarh, Jharkhand, Maharashtra and Tamil Nadu were found to be inactive and not meeting the global physical activity requirements. Inactivity was significantly higher in urban than in the rural population and in women than men.¹¹ While the prevalence of smoking has declined by about 30% in the last 3 decades, about 2% of women and 15% of men still continue to smoke.¹ Rapid westernization, lack of awareness, lack of support, and lack of access to quality healthcare are some of the factors contributing to the rise in CVD risk factors in India.

There is an increasing awareness of the role of psychosocial factors in the causation of CVD.¹² The self-reported prevalence of chronic stress in the present study (39%) is higher than that reported by Waghchavare et al¹³ who have shown that stress was commoner in college-going women (28%) than men (20%). While women are less likely than men to receive preventive treatment or guidance, such as lipid-lowering therapy, aspirin, and therapeutic lifestyle changes, the impact of modifying the risks are greater in women.^{2,14} Risk-based CVD prevention programs targeted at women and other at-risk cohorts in India have shown promise.^{15,16} The authors of the current study designed and delivered a workshop focused on improving CVD awareness and promoting a heart-healthy lifestyle amongst the study participants. A re-assessment of risk behaviors was planned after a period of 6 months; this has been postponed due to the COVID-19 pandemic.

The lack of a standardized and comprehensive questionnaire to assess the cardiovascular health risk behaviors in the Indian population is a major limitation. Future collaborative efforts are warranted between researchers from various geographical locations in the country to fill this gap.

Table 2
Cardiovascular Risk Behaviors among college students in India.

	Year	Place	Branch of Study	Female n (%)	Adequate vegetable and fruit intake n (%)	Adequate aerobic exercise n (%)	No tobacco use n (%)	No harmful use of alcohol n (%)
Current Study (N = 554)	2020	Chennai, Tamil Nadu	Nutrition & Dietetics, Psychology	554 (100)	116 (21)	66 (12)	539 (97)	549 (99)
Meenal ⁵ (N = 120)	2017	Nagpur, Maharashtra	MBBS	62 (52)	5 ^a (4)	40 ^b (33)	102 (85)	92 (77)
Ibrahmin et al ⁶ (N = 406)	2017	Salem, Tamil Nadu	MBBS	196 (48)	49 ^c (12)	123 ^d (30)	299 (74)	302 (75)
Nair et al ⁷ (N = 970)	2016	Mysuru, Karnataka	MBBS BDS Pharmacology Engineering Commerce	474 (49)	49 ^e (5)	165 ^f (17)	906 (93)	886 (91)
Nanjesh et al ⁸ (N = 500)	2014	Mangalore, Karnataka	MBBS	276 (55)	–	410 ^g (82)	442 (88)	365 (73)
Majra ⁹ (N = 176)	2013	South India	MBBS	82 (47)	–	43 (24)	130 (74)	99 (56)
Rustagi et al ¹⁰ (N = 430)	2011	New Delhi	MBBS	162 (38)	52 (12)	154 (36)	314 (73)	306 (71)

^a Consuming ≥ 3 servings of fruits per day.

^b Performing at least 30 min of exercise per day for ≥ 3 days per week.

^c Consuming fruits and vegetables everyday.

^d Performing physical activity regularly for 30 min per day.

^e Consuming at least ≥ 5 servings of vegetables per day.

^f Performing physical activity on at least ≥ 5 days per week.

^g Criteria used for diet and exercise not clearly mentioned.

5. Conclusion

Modifiable cardiovascular risk behaviors, such as unhealthy diet, inadequate exercise and psychosocial stress, are widely prevalent among college-going women in the city of Chennai, India. While these results cannot be extrapolated to the entire country, it is clear that student populations in several parts of India are falling short of ideal cardiovascular health behavior. It is therefore imperative to improve awareness and provide targeted interventions to help students achieve a heart-healthy lifestyle.

Key message

Modifiable cardiovascular risk behaviors are widely prevalent among urban college-going women in India warranting a targeted intervention.

Declaration of competing interest

All authors have none to declare.

References

- India State-Level Disease Burden Initiative CVD Collaborators. The changing patterns of cardiovascular diseases and their risk factors in the states of India: the Global Burden of Disease Study 1990–2016. *Lancet Glob Health*. 2018;6:e1339–e1351.
- Garcia M, Mulvagh SL, Merz CN, et al. Cardiovascular disease in women: clinical perspectives. *Circ Res*. 2016;118:1273–1293.
- Prabhakaran D, Jeemon P, Roy A. Cardiovascular diseases in India: current epidemiology and future directions. *Circulation*. 2016;133:1605–1620.
- Yusuf S, Hawken S, Ounpuu S, et al. INTERHEART Study Investigators. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. *Lancet*. 2004;364:937–952.
- Kulkarni Meenal Vinay. Lifestyle disease risk behaviour among Medical Students in Central India. *Panacea J Med Sci*. 2016;6:92–95.
- Ibrahim RM, Priyadarsini SGP, Nayeem RA, et al. Prevalence of risk factors for obesity, hypertension, coronary artery disease and diabetes among undergraduate medical college students of Tamil Nadu. *Int J Community Med Public Health*. 2017;4:3250–3255.
- Nair, Lakshmi & B., Madhu & Srinath, et al. Magnitude of behavioural risk factors for cardiovascular diseases among college going young adults (18–25 years) in Mysuru, Karnataka, India. *International Journal Of Community Medicine And Public Health*. 4. 65. 10.18203/2394-6040.ijcmph20164713.
- Nanjesh KS, Hameed S, Alva ABR, Singh DK, et al. Study of coronary risk factors among medical students in coastal city of Karnataka. *Ntl J Community Med*. 2016;7:171–175.
- Majra J. Do our medical colleges inculcate health-promoting lifestyle among medical students: a pilot study from two medical colleges from southern India. *Int J Prev Med*. 2013;4:425–429.
- Rustagi N, Taneja D, Mishra P, Ingle G. Cardiovascular risk behavior among students of a medical college in Delhi. *Indian J Community Med*. 2011;36:51–53.
- Anjana RM, Pradeepa R, Das AK, et al. Physical activity and inactivity patterns in India - results from the ICMR-INDIAB study (Phase-1) [ICMR-INDIAB-5]. *Int J Behav Nutr Phys Act*. 2014;11:26.
- Chockalingam A, Chockalingam Priya, Chockalingam V. *Cardiometabolic and Mind-Heart Connection*. 2018. https://doi.org/10.5005/jp/books/14130_27.
- Waghachavare VB, Dhumale GB, Kadam YR, Gore AD. A study of stress among students of professional colleges from an urban area in India. *Sultan Qaboos Univ Med J*. 2013;13:429–436.
- Chomistek AK, Chiuve SE, Eliassen AH, et al. Healthy lifestyle in the primordial prevention of cardiovascular disease among young women. *J Am Coll Cardiol*. 2015;65:43–51.
- Chockalingam P, Chockalingam V, Chockalingam A. Time for a pan-India prevention plan for cardiovascular diseases. *Indian Heart J*. 2016;68:252–255.
- Pandey RM, Agrawal A, Misra A, et al. Population-based intervention for cardiovascular diseases related knowledge and behaviours in Asian Indian women. *Indian Heart J*. 2013;65:40–47.