Sri Lanka Journal of Medicine **SLJM**

Original Research

Citation: Nandasena HMRKG Tennakoon SUB & Ralapanawa DMPUK, 2022. Behavioral risk factors for cardiovascular diseases among adults: Results from a community-based study in Sabaragamuwa province, Sri Lanka. Sri Lanka Journal of Medicine, pp 45-51
DOI: http://doi.org/10.4038/sljm.v31i1.313

Behavioral risk factors for cardiovascular diseases among adults: Results from a community-based study in Sabaragamuwa province, Sri Lanka

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Abstract

Background: Smoking, alcohol consumption, unhealthy diet and physical inactivity are behavioural risk factors of cardiovascular diseases. These risk factors can be easily changed or modified.
Objective: The objective of this study was to estimate the prevalence of behavioural risk factors of cardiovascular diseases and identify their correlates.
Methods: A descriptive cross-sectional study was conducted among adults aged between 30-60 years in Sabaragamuwa province, Sri Lanka. Three stage random sampling method was used to select the participants. WHO STEPS wise interviewer administered questionnaire was used to collect data. Chi square test was used to assess the associations between risk factors and their correlates. P value <0.05 was considered as statistically significant.
Results: A total of 366 adults participated. Among males 28.4% and 34.3% were current smokers and alcohol users, respectively. Females neither smoked nor consumed alcohol. Only 16.9% of the participants met the WHO recommendations of fruit and vegetable consumption. Approximately two third were physically inactive (63.4%). Women were significantly physically inactive than men (p=<0.001). Men in younger age group smoked than men in older age group (p=0.012).
Conclusion: Higher prevalence of behavioural risk factors reported in this study emphasizes the urgent need of adopting healthy lifestyle in this population.

Keywords: Behavioural risk factors, cardiovascular diseases, Adults, Sri Lanka

INTRODUCTION

Cardiovascular diseases (CVDs) account 17.9 million deaths annually in the world which is close to 43.7% of deaths due to NCD [1, 2]. A major portion of the CVDs are contributed by a few important risk factors such as high blood pressure, cholesterol, overweight or obesity, tobacco use, low levels of - physical activity, harmful use of

Received: 2021-10-22 **Accepted revised version: 2022-06-05** **Published: 2022-XX-XX**

alcohol and diabetes which can be prevented, controlled, modified, or treated. Out of these modifiable risk factors cessation of tobacco use, reduction of salt in the diet, consuming fruits and vegetables, practice of regular physical activities and avoiding harmful use of alcohol are behavioral risk factors which, can be modified at a personal level.

Smoking is considered as one of the main risk factors for CVDs and it increases the risk of coronary thrombosis and myocardial infarctions [3]. It is considered as one of the biggest threats in the world because it kills more than 8 million people per year [4]. In Sri Lanka, according to the results of 2015 STEPs survey tobacco smoking prevalence among those aged between 18 and 69 years was 15.0% with a daily smoking prevalence rate of 10.2 [5].

Globally harmful use of alcohol consumption contributes to three million deaths as well as disabilities and poor health of millions of people each year [6]. Avoiding harmful use of alcohol have been shown to reduce the risk of cardiovascular diseases. In Sri Lanka about 65 people die due to alcohol related deaths daily [6].

Fruit and vegetable consumption has consistently been associated with beneficial effects on health [7, 8]. According to the WHO, 1.7 million deaths in worldwide are related to low fruit and vegetable consumption [9]. According to the results published by STEPS survey in Sri Lanka 72.5% of the adults were not consuming the recommended amount of fruit and/or vegetable [10]. Therefore, it should be a substantial fact that despite the wide availability of the fruits and vegetables in the country still the consumption rates are very low.
Reducing CVD risk is one of the greatest health benefits of proper physical activities [11]. Even though it provides huge benefits to an individual person, globally one in four adults is physically inactive [12]. Furthermore it is considered as fourth leading risk factor for global mortality followed by high blood pressure, smoking and high blood glucose level [13].

Although the prevalence of behavioral risk factors of CVDs is very high all over the world by promoting the individual level lifestyle modifications the burden associated with this risk factors can be reduced considerably.

In this backdrop assessment of the prevalence of behavioral risk factors of CVDs and their association with the socio-demographic characteristics are timely and valuable. Since no study has been conducted to estimate the prevalence of CVD risk factors among adults in Sabaragamuwa province, present study has given an opportunity to identify the status of behavioral risk factors of CVDs and it can be used in planning to identify more specific interventions to reduce the prevalence of behavioral risk factors of CVDs in Sabaragamuwa province.

METHODS

A descriptive cross-sectional study was conducted among selected adults aged between 30-60 years in Sabaragamuwa province of Sri Lanka, one of 9 provinces, who were registered in the 2018 electoral list which registers all permanent citizens' resident withing an area for electoral purposes. All pregnant women, individuals who were mentally unfit and physically too frail were excluded. Sample size was calculated based on the prevalence of "low HDL" of 53% from a previous study in Kandy, Sri Lanka [14]. For a prevalence of 53% of low HDL at a 95% confidence level and a precision of 5% a minimum sample of 384 was required (WHO, 1999). For contingencies, the sample was inflated by 10% to 420. Participants were selected using a three-stage random sampling method.

The WHO STEPS wise interviewer administered questionnaire was used to collect data on behavioural risk factors. Since the original version of WHO STEP wise approach questionnaire was in English language, it was translated into Sinhala and Tamil language to use in this study. Forward-translations and back-translations were done to produce a locally understandable country-specific instrument adhering to guidelines on translating questionnaires/tools from one to another language, and a pretest was carried out to check the semantics, understandability and acceptability. To collect data on tobacco use, all participants were questioned about whether they consume

tobacco at the time of study and they were categorized as current smokers and non-smokers. Similarly, the participants who had consumed alcohol during past 30 days were classified as current drinkers and who had never consumed alcohol during their life, were classified as lifetime abstainers. A food frequency questionnaire was used to assess the fruit and vegetable consumption of the study participants. According to the WHO recommendations all the participants were categorized in to two categories as those who consume ≥ 5 servings of fruit and/ or vegetables and those who consume ≤ 4 servings of fruit and/ or vegetables per day [15]. To assess the salt consumption, participants were questioned about the use of ordinary table salt, unrefined salt such as sea salt, iodized salt, salty stock cubes and powders, and salty sauces such as soya sauce or fish sauce. Participant's self-perception on their salt intake was questioned. The Global physical activity questionnaire developed by the WHO was used to assess the level of physical activity among the participants. It collects information on physical activity involved in three main domains like activity at work, travel to and from places and recreational activities. A person's overall energy expenditure was calculated using metabolic equivalents (METs) assigning 4 METs to the time spent in moderate intensity activities and assigning 8 METs to the time spent in vigorous intensity activities. WHO recommends 150 minutes of moderate intensity activities or 75 minutes of vigorous intensity activities or an equivalent combination of moderate and vigorous intensity physical activity achieving at least 600 MET minutes throughout a week, including activities of working, transporting and leisure time [16]. Participants with > 600 MET min per week was considered as physically active.
Weight of the participant was measured using an electronic weighing scale and stadiometer was used to measure the height. Body mass index (BMI) was calculated and categorized according to the Asian cutoff [17]. A BMI <18.5kg/m^2 was considered underweight, 18.5–22.9 kg/m^2 ideal weight and 23–27.5 kg/m^2 overweight. BMI value above 27.5 kg/m^2 was considered as obese [17].

SPSS version 26 was used to analyze data. Results were calculated based on 95% confidence level (alpha=0.05) and descriptive statistics used to describe the findings and the Chi square test was used to find the associations. Ethical clearance was obtained from the ethics review committee in Faculty of Medicine, University of Peradeniya with the number of 2018/EC/06 on 06.09.2018. Informed, written consent was a prerequisite to be included in this study. Participation was made voluntarily rather than imposition thus, individuals were given the right to or not to take part in the study. Participant was informed that, they can withdraw from the study at any stage of this study and it does not cause any problem to them. All information was mentioned in the information sheet and participants were asked to read it before taking the decision to participate into the study. Only consented individuals were chosen to be interviewed.

RESULTS

A total of 366 (87% of the total invited 250 women and 166 men) participated in the study. Mean time of education spent in years was 10.7 (SD=3.7) (Table 1).

Females neither smoked nor consumed alcohol. Among males, 28.4% (n=33) were current smokers (Table 2). Close to 60% of current smokers were daily smokers. Of them eleven were smoking cigarettes and three smoked beedi and five smoked both types. Younger men were smoking more than older men (p=0.005).

More than half of the male participants (56.9 %, n=66) had ever consumed alcohol. Out of the participants who have ever consumed alcohol, 86.4% (n=57) had consumed in the past 12-month period and of them only 9.1% (n=6) had stopped drinking alcohol due to a health reason. None of the socio-demographic factor of males were associated with the habit of alcohol consumption.
Mean number of days of fruit consumption was 3.6 (SD=2.1) and majority of them (68.9%, n=252) consumed fruits 1-4 days per week. Two-point five percent had not consumed fruits at least one time per week. Mean number of servings of fruit consumed per day was 1.3 (SD=0.7) and majority of them (91.8%, n=336) consumed 1-2 servings of fruits per day. Mean number of days of vegetable consumption was 6.8 (SD=0.8) and majority of them (96.7 %, n=354) consumed fruits 5-7 days per

week. Mean number of servings of vegetable consumed per day was 2.7 (SD=0.7) and half of them (52.2%, n=191) consumed 3-4 servings of vegetables per day. Study found that only 16.9 % (n=62) of them were consuming ≥ 5 servings of fruit and/ or vegetables per day meeting the WHO recommendations of fruit and vegetable consumption. Participants with monthly income > 25,000 rupees and with higher level of education were consuming the recommended amount of fruit and or vegetable than who had monthly income < 25,000 rupees and low levels of education (p=0.001 for income and p=0.008 for education).

Nearly half of them (53.3%, n=195) stated that they never add salt or salty sauce to food right before consumption or while eating whereas 2.7% (n=10) always used to do so. The study assessed the participant's self- perception on the amount of salt or salty sauce they consume. Nearly half of them (53%, n=194) stated that they use just the right amount while 15.6% (n=57) estimated to use too much or far too much compared to the recommended amount.

Close to 37% of the participants were physically active. On average participants were physically active for 387.5 min (SD=601.1) per week. Women were significantly physically inactive than men (p=<0.001). Majority of the physically inactive participants (74.1%) had higher level of education than physically active participants. This difference was statistically significant (p=0.001).

Table 1: Socio-demographic characteristics of the participants

Socio-demographic characteristic		N	%
Age (Years)	30-40	128	35.0
	41-50	114	31.1
	51-60	124	33.9
Sex	Male	116	31.7
	Female	250	68.3
Education Level	No formal education	10	2.7
	Grade 1 to Grade 5	36	9.8
	Grade 5 to Grade 10	121	33.1
	Pass O/L	91	24.9
	Pass A/L	85	23.2
	Graduate/Diploma	23	6.3
Occupation	Government Sector	51	13.9
	Private Sector	44	12.0
	Self-Employed	106	29.0
	House- Wife	160	43.7
	Retired	2	0.5
	Unemployed	3	0.8
Monthly Income (LKR)	<10,000	27	7.4
	11,000-20,000	97	26.5
	21,000-30,000	92	25.1
	31,000-40,000	69	18.9
	>41,000	81	22.1

Table 2: Prevalence of behavioral risk factors by socio-demographic characteristics

Socio-demographic characteristic	Smoking (Only males)		Alcohol consumption (Only males)		Fruit and/or vegetable		Physically activity	
	Yes N (%)	No N (%)	Yes N (%)	No N (%)	Consume < 5 servings N (%)	Consume > 5 servings N (%)	Active N (%)	Inactive N (%)
Sex								
Male	33 (28.4)	83 (71.6)	66 (56.9)	50 (43.1)	100 (32.9)	16 (25.8)	76 (56.7)	40 (17.2)
Female					204 (67.1)	46 (74.2)	58 (43.3)	192 (82.8)
p value					0.274		<0.001	
Age group (Years)								
30-45	21 (63.6)	29 (34.9)	29 (43.9)	21 (42)	146 (48)	31 (50)	62 (46.3)	16 (40)
46-60	12 (36.4)	54 (65.1)	37 (56.1)	29 (58)	158 (52)	31 (50)	72 (53.7)	24 (60)
p value	0.005		0.835		0.777		0.543	
Employability status								
Employed	32 (28.4)	78 (71.6)	63 (57.8)	46 (42.2)	173 (86.1)	28 (13.9)	104 (51.7)	97 (48.3)
Unemployed	2 (28.6)	5 (71.4)	3 (42.9)	4 (57.1)	131 (79.4)	34 (20.6)	30 (18.2)	135 (81.8)
p value	0.994		0.439		0.09		<0.001	
Income								
< 25,000	6 (18.2)	20 (24.1)	12 (18.2)	14 (28)	114 (37.5)	10 (16.1)	43 (32.1)	81 (34.9)
>25,000	27 (81.8)	63 (75.9)	54 (81.8)	36 (72)	190 (62.5)	52 (83.9)	91 (67.9)	151 (65.1)
P value	0.491		0.209		0.001		0.582	
Education (Years)								
0-10	13 (39.4)	30 (36.1)	27 (40.9)	16 (32)	106 (34.9)	11 (17.7)	57 (42.5)	60 (25.9)
>11	20 (60.6)	53 (63.9)	39 (59.1)	34 (68)	198 (65.1)	51 (82.3)	77 (57.5)	172 (74.1)
P value	0.744		0.325		0.008		0.001	

DISCUSSION

Current smoking prevalence among males reported in this study was slightly lower than the prevalence reported in STEPS survey in 2015 (28.4% in present study and 29.4% in STEPS 2015) [18]. Moreover, the overall prevalence of smoking has declined over the years from 2003 to 2019 (16.6% in 2003, 11.5% in 2006, 10.2% in 2015 and 9% in present study). A higher proportion of men in younger age group (30-40 years) smoked than men in older age group (50-60 years). Similar findings were reported by few other investigators in Sri Lanka [19, 20].

Nearly two thirds of the study participants were physically inactive. This is much higher than the prevalence of physical inactivity reported by STEPS surveys in Sri Lanka (15.6% in 2003, 25% in 2006 and 30.4% in 2015) [10]. This finding implies that the adults in Sri Lanka have become more sedentary over the years. Furthermore, more women (76.8%) were physically inactive than men (34.5%). Similar studies done in Sri Lanka and other countries support this finding [21-24]. Higher proportion of unemployed participants (58.2%) were physically inactive than employed participants (22.4%). Possible reason for higher prevalence of physical inactivity reported in this study may be due to the higher number of females with higher level of unemployability. Proportion of physical inactivity increased with the years of education in this study and similar finding was reported by studies in Sri Lanka as well as in other Asian countries [21, 22]. It is probable that in Sri Lanka people with higher levels of education work in office environments, while people with lower educational background engage in farming and other forms of manual labor which encourage physical activity. Physical inactivity was found to increase with increasing BMI level among both men and women and this finding was consistent with the findings of other studies [21, 24]. A possible explanation for this finding could be that the overweight and obese people tend to live a more sedentary life compared to others [25, 26]. On the other hand, being sedentary promotes people to become overweight and obese [27].

Majority of the study participants (83.1%) did not meet the WHO recommendation of fruit and vegetable consumption similarly to the results published by STEPS survey in 2003 and 2015 (96.9% and 72.5% respectively) [10]. Therefore, the current finding is lower than the findings of 2003 and higher than the finding of 2015. In contrast to these findings a study done in 2018 among rural adult population in dry zone, Sri Lanka found only 0.8% of the studied population met WHO recommendations of fruit and vegetable consumption [28]. Findings reported by Jayawardhane *el al* in 2005-06 also reported that only 3.5% of the adults met WHO recommendations of fruit and vegetable consumption [29]. According to the findings reported by other countries the proportion of adults who met the WHO recommendations of fruit and vegetable consumption were higher than the findings reported by similar studies in Sri Lanka (77% in Canada, 50% in China and) [30, 31]. Therefore these findings emphasize the need for proper nutrition education and policies influencing price or availability of fruits and vegetables to improve the fruit and vegetable consumption among adults in Sri Lanka [32, 33]. Furthermore compared to other south Asian countries, Sri Lanka reported the lowest fruit servings consumption per day (0.43 servings per day) [34]. In the present study mean fruit servings consumption per day was 1.27 (SD=0.2), but 2.5 % were not consuming fruits at least one time per week. Therefore, further studies will be needed to critically analyze the fruit and vegetable consumption in this group.

Limitations of the study

Due to the cross-sectional nature of this study design, temporal relationship between exposure and outcome cannot be explained. Since it took only a snapshot of the population if another timeframe is chosen differing results may possible. Although the study aimed to assess the relationship between certain socio-demographic characteristics such as marital status, religion and different occupational categories and prevalence of CVD risk factors, comparisons were not possible due to the small number of participants represented in those subcategories. Risk factors were assessed using subjective responses given by the participants. Therefore, the related information was affected by the short-term memory and recall ability of the participants. Furthermore, though the male to female ratio in Sabaragamuwa province is 1: 1 this study could capture in a ratio of 1: 2.1. Because of that, the limitations could occur when the findings are projecting to the total population.

CONCLUSIONS AND FUTURE DIRECTIONS

Higher prevalence of behavioural risk factors reported in this study emphasizes the urgent need of adopting healthy lifestyle in this population. Public health interventions should be planed considering the socio-demographic characteristics

which are associated with the behavioral risk factors.

Author declaration

Acknoledgement

We gratefully acknowledge Dr. Rasika Illeperuma, Senior Lecturer, Department of Medical Laboratory Sciences, Faculty of Allied Health Sciences in University of Peradeniya and Dr. Damayanthi Dassanayaka, Senior Lecturer, Department of Nursing, Faculty of Allied Health Sciences in University of Peradeniya for being collaborators to receive the funds from Peradeniya university research grant-2018 (URG/2018/05/AHS).

Author's contribution:

1.Conception or design of the work, data collection, analysis, or interpretation of data for the work, wrote the original manuscript.

2. Conception or design of the work, analysis, or interpretation of data for the work, revising the draft manuscript and provided final approval for the version to be submitted.

3. Conception or design of the work, analysis, or interpretation of data for the work, revising the draft manuscript and provided final approval for the version to be submitted

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Statement on ethical clearance and consent for participation:

Ethical clearance was obtained from the ethics review committee in Faculty of Medicine in University of Peradeniya. Informed written consent was obtained from each participant prior to the data collection.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Funding

This study was funded by Peradeniya University Research Grant 2018 [URG/2018/05/AHS].

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