JMPF Vol. 12 No. 4 : 234-244
ISSN-p : 2088-8139
ISSN-e : 2443-2946

Knowledge of Cardiovascular Disease and its Association Among General Population in Indonesia

Bella Anggelina[1*], Susi Ari Kristina[2], Chairun Wiedyaningsih[2]
[1] Management Pharmacy Graduate Program, Faculty of Pharmacy, Universitas Gadjah Mada
[2] Department of Pharmaceutics, Faculty of Pharmacy, Universitas Gadjah Mada
Submitted: 29-09-2022 *Revised: 02-12-2022* *Accepted: 30-12-2022*
Corresponding : Bella Anggelina; Email : bella.anggelinaa@gmail.com

ABSTRACT

Knowledge of cardiovascular disease is essential for providing information about healthy behavior and to be proactive in reducing modifiable risk factors, control prevention, and improving early recognition. The existing study about knowledge of CVD in Indonesia is still limited. Hence, this study aimed to describe knowledge of CVD among general population in Indonesia and its association. A cross-sectional survey was conducted in 34 provinces in Indonesia from November-December 2021. Data were retrieved using a self-administered questionnaire. The Chi-Square analysis was performed to determine the association that contributes to overall knowledge of CVD. Among the 694 participants, 32.1% originated from Java, with the median age was 24 years and dominated by women (72.5%). The mean score of overall CVD knowledge was 59.6%, and only 39.1% of the participants had good knowledge of CVD. Cerebrovascular disease (94.7%) was the most identified various type of CVD. Likewise, unhealthy diet (77.2%), obesity (74.6%), and lack of exercise (72.5%) were the most identified risk factors. More than 50% of the participants recognized heart attack symptoms such as chest pain (77.1%) and shortness of breath (66.1%). Meanwhile, numbness or weakness (84.7%), trouble speaking (76.9%), and loss of balance (72.3%) were recognized as stroke symptoms. Gender, age, education level, working status, healthy food, smoking status, family history of CVD, ever checked blood pressure, fasting blood glucose, and total cholesterol were associated with overall knowledge of CVD. The disparity between level of CVD knowledge is not prominent among general population in Indonesia and further study need to establish.
Keyword: Cardiovascular disease; Heart attack; Knowledge; Risk factors; Stroke.

INTRODUCTION

Non-communicable diseases (NCDs) are the leading cause of death globally and one of the major health challenges in the 21st century. In 2016, NCDs were responsible for 71% of the 57 million deaths that occurred globally. One of the diseases that contribute to the high mortality and morbidity rate in NCDs is cardiovascular disease (CVD)[1]. CVD is a group of diseases that occur due to disorders of the heart and blood vessels. The World Health Organization (WHO) reported that 17.9 million people died from CVD, representing 32% of all global deaths by 2019. Of these, 85% were caused by heart attacks and strokes[2]. In 2018, it was reported by Riset Kesehatan Dasar (Riskesdas) the prevalence of heart and blood vessel disease in Indonesia is increasing yearly. At least 15 of 1000 people, or about 2,784,064 individuals, suffer from CVD. Cardiovascular disease is more common in urban areas (1,6%) compared to rural areas (1.3%). The prevalence of obesity in adults >18 years has increased from 14.8% in 2013 to 21.8% in 2018[3].

Cardiovascular disease is associated with a process called atherosclerosis. Atherosclerosis is a chronic condition that causes the arteries to narrow due to the buildup of plaque[4]. Atherosclerosis is closely related to modifiable and nonmodifiable risk factors. However, modifiable risk factors are preventable such as smoking, obesity, consumption of unhealthy food, lack of physical activity, stress, alcohol intake, hypertension, diabetes, and dyslipidemia[5]. Prevention can be accomplished by assessing the population's knowledge. Knowledge of cardiovascular disease and its risk factors is essential for providing information about healthy behavior and to be proactive in reducing modifiable risk factor[6]. Good knowledge leads to the recognition of stroke and heart attack symptoms, which can

improve medical care awareness and quality of life[7]. Studies have assessed the knowledge of CVD, its symptoms and risk factors in various populations worldwide. However, the results have shown similarity, that the participants have poor knowledge regarding CVD [8,9,10].

Indonesia was classified as a lower-middle-income country by the World Bank in 2021. According to WHO, more than three-quarters of deaths from CVD occur in lower-middle-income countries, and the existing study about knowledge of CVD in Indonesia is still limited. Hence, this study aimed to describe knowledge of CVD among general population in Indonesia and to identify the factors that contribute to the knowledge.

METHODS

This observational, cross-sectional survey was conducted in 34 provinces in Indonesia from November-December 2021. The sample size was calculated using a single proportion sample formula with a 95% confidence level and 5% margin of error. The estimated minimum sample required in this study was 384, and due to several considerations, the number of minimal samples was deemed to be 400. Convenience sampling technique was used in this study to recruit the eligible participants. Data were retrieved via self-administered questionnaire and distributed in electronic formats to age ≥18 years old, not illiterate, can operate gadgets and access the internet. The question "are you willing to be a respondent in this study?" was added at the beginning of the questionnaire and will be taken as informed consent. The questionnaire was guided by WHO CVD fact sheet and previous validated studies to identify appropriate items for study instruments that previously used in Jordan, Kuwait, Cameroon, and Saudi Arabia[2,6,8,9,10]. The content validity of this study was established through depth consultation within a group and experts in the field of social pharmacy. Additionally, the questionnaire was translated into Indonesian with a forward and backward translation process and modified to ensure the accuracy of statements and there were no sentences had multiple interpretations for Indonesian population. Prior to the survey, the questionnaire was piloted to 30 non-sample populations for readability and comprehension of the content and modification can be made as necessary.

The questionnaire was divided into three sections, and it contains close-ended questions. The first section was socio-demographic characteristics which consisted of seven items (gender, age, education level, residence, distance from health facilities, working status, and monthly income). Section two was clinical characteristics of participants which consisted of thirteen items (height, weight, central obesity, lifestyle, healthy food, exercise, smoking status, alcohol intake, participants history of CVD, family history of CVD, ever checked on blood pressure, fasting blood glucose, and total cholesterol). Height and weight were calculated using formula: *weight [kg] / height [m]*^{2} to get body mass index (BMI). Section three was assessment of knowledge about CVDs, risk factors and symptoms of stroke and heart attack which consisted of twenty-five items (six questions regarding types of CVDs, nine questions regarding risk factors, five question each about heart and stroke warning symptoms). Each question in section three was scored one point for correct answer and zero otherwise. The scoring of knowledge was expressed as a percentage by summing up all the points and dividing by the total number of questions (i.e., 25), and multiplied by 100. A score of < 50% was classified as low knowledge; 50–69% moderate knowledge and ≥ 70% good knowledge[11,12,13]. This study was approved by the Medical and Health Research Ethics Committee, Faculty of Medicine, Public Health and Nursing, Gadjah Mada University, Yogyakarta (approval number: KE/FK/1142/EC/2021).

Data was entered into the Statistical Package for Social Sciences (SPSS) version 26. Descriptive analysis was conducted and

presented continuous variables as median (minimum-maximum) and categorical variables as frequencies (percentages). The Chi-square analysis was used to determine the association between socio-demographic characteristics and clinical characteristics with knowledge of CVD. A *P* value < 0.05 was considered statistically significant.

RESULTS AND DISCUSSION

Results

Socio-demographic characteristics

A total of 694 participants were enrolled in this study. Among 694 participants, predominantly originated from Java (32.1%). Table I displays the socio-demographic characteristics of study participants. The median age was 24, with a range of 18-65 years, and more than half (58,6%) of participants were aged 18-24 years. Of the participants, 72.5% were female, and 68.6% attained high education. Majority, 66.9% resided in urban areas and nearly two-fifth of participants (48.8%) had distance of 1–5 km from health facilities. Over 85.4% of the participants worked in health-related sites with income less than 1 million each month (35.0%)

Clinical characteristics

The median BMI of the study was 21.8, with a range of 13.3-43.2 kg/m^2. Most of the participants had normal weight (47.6%) according to BMI category for Asian population, and 73.3% indicated negative central obesity. The participants considered their lifestyle was free from stress (56.5%) and 60.8% reported sometimes eating healthy food. Approximately four-fifth (81.1%) of the participants had exercised 0-2 times a week. 91.4% and 92.2% were never smoked and non-alcohol drinkers, respectively. About 96.8% of the participants had negative personal history of CVD as well as 79.3% had negative family history of CVD. Of 694 participants, 92.2%, 55.6%, and 65.9% ever checked their blood pressure, fasting blood glucose, and total cholesterol, respectively, as shown in Table II.

Knowledge regarding cardiovascular disease

Table III summarizes participants' knowledge about cardiovascular disease types, risk factors, heart attack, and stroke symptoms. Overall, the mean CVD knowledge score was 59.6%, with a majority of 271 (39.1%) had good knowledge, 173 (24.9%) had moderate knowledge, and 250 (36.0%) had poor knowledge about CVD.

Concerning types of cardiovascular diseases. 94.7% and 79.8% can identify cerebrovascular disease and coronary heart disease as various types of CVD, respectively. While less than 50% of the participants identified peripheral arterial disease (45.8%), rheumatic heart disease (45.7%), congenital heart disease (40.9%), deep vein thrombosis and pulmonary embolism (39.9%) as types of CVD. The mean score regarding knowledge about CVD types was 57.5% on a total of 6 points.

The most common CVD risk factors that participants acknowledged were unhealthy diet (77.2%), obesity (74.6%), and lack of exercise (72.5%), followed by smoking (67.7%), stress (60.8%), and high level of LDL cholesterol (60.5%). On the contrary, diabetes mellitus (48.7%) and family history of CVD (43.5%) were barely recognized by the participants as risk factors for CVD. The mean score regarding knowledge about CVD risk factors was 63.4% on a total of 9 points.

Furthermore, regarding heart attack symptoms, chest pain or discomfort (77.1%), followed by difficulty in breathing or shortness of breath (66.1%), was the commonest symptoms identified by participants, whereas only 40.6% and 32.7% identified feeling weak, light-headed, or faint and pain or discomfort in arms or shoulder as the warning symptoms of heart attack, respectively. Moreover, only 28.8% of participants recognized pain or discomfort in the jaw, neck, or back. The mean score regarding knowledge about heart attack symptoms was 49% on a total of 5 points.

Table I. Socio-demographic characteristics (n=694)

Characteristics	Frequency (%)
Age, median (min-max)	24.0 (18-65)
Age (category)	
18-24	407 (58.6)
25-34	212 (30.5)
35-44	49 (7.1)
45-60	24 (3.5)
>61	2 (0.3)
Gender	
Male	190 (27.4)
Female	504 (72.6)
Education level	
Low-intermediate education	218 (31.4)
High education	476 (68.6)
Residence	
Rural	230 (33.1)
Urban	464 (66.9)
Distance from health facilities	
<1 km	248 (35.7)
1–5 km	339 (48.8)
>5–10 km	69 (9.9)
>10 km	38 (5.5)
Working status	
Health related sites	101 (14.6)
Non-health related sites	593 (85.4)
Monthly income	
< 1 million	243 (35.0)
1 million – 3 million	226 (32.6)
> 3 million – 5 million	128 (18.4)
> 5 million – 10 million	86 (12.4)
> 10 million	11 (1.6)

Regarding stroke symptoms, the most known symptoms were sudden numbness or weakness of the face, arm, or leg (84.7%), sudden confusion or trouble speaking or understanding others (76.9%), and sudden dizziness, trouble walking, or loss of balance or coordination (72.3%). Unfortunately, the participants barely recognized other stroke symptoms, such as sudden trouble seeing in one or both eyes (49.1%) and severe headaches with no known cause (44.8%). The mean score regarding knowledge about stroke symptoms was 65.6% on a total of 5 points and exceeded participants' knowledge about types of CVD, risk factors, and heart attack symptoms.

Factors associated with overall knowledge of CVD

As shown in Table IV, variables were found to be significantly associated with knowledge of CVD, included gender, age, education level, working status, healthy food, smoking status, family history of CVD, ever checked blood pressure, fasting blood glucose, and total cholesterol ($P < 0.05$). Males were more likely to have poor knowledge of CVD

Table II. Clinical characteristics of participants (n=694)

Characteristics	Frequency (%)
Body mass index. median (min-max)	21.8 (13.3-43.1)
Body mass index (category)	
Underweight	105 (15.1)
Normal weight	330 (47.6)
Overweight	188 (27.1)
Obese	71 (10.2)
Central obesity	
Yes	185 (26.7)
No	509 (73.3)
Lifestyle	
Very stressful	26 (3.7)
Stressful	276 (39.8)
Free from stress	392 (56.5)
Healthy food	
Always	193 (27.8)
Sometimes	422 (60.8)
Rare	79 (11.4)
Exercise	
0-2 times a week	563 (81.1)
3-4 times a week	103 (14.8)
5 times or more a week	28 (4.0)
Smoking status	
Yes	48 (6.9)
No	634 (91.4)
Previously smoker	12 (1.7)
Alcohol intake	
Yes	54 (7.8)
No	640 (92.2)
Personal history of CVD	
Yes	22 (3.2)
No	672 (96.8)
Family history of CVD	
Yes	144 (20.7)
No	550 (79.3)
Ever checked blood pressure	
Yes	640 (92.2)
No	54 (7.8)
Ever checked fasting blood glucose	
Yes	308 (44.4)
No	386 (55.6)
Ever checked total cholesterol	
Yes	237 (34.1)
No	457 (65.9)

Table III. Knowledge of CVD types. risk factors. and symptoms of heart attack and stroke among general population in Indonesia (n=694)

Category	Frequency (%)
Types of cardiovascular diseases	
Cerebrovascular disease	657 (94.7)
Coronary heart disease	554 (79.8)
Peripheral arterial disease	318 (45.8)
Rheumatic heart disease	317 (45.7)
Congenital heart disease	284 (40.9)
Deep vein thrombosis and Pulmonary embolism	277 (39.9)
Risk factors of cardiovascular diseases	
Unhealthy diet	536 (77.2)
Obesity	518 (74.6)
Lack of exercise	503 (72.5)
Smoking	470 (67.7)
High blood pressure	455 (65.6)
Stress	422 (60.8)
High level of LDL cholesterol	420 (60.5)
Diabetes mellitus	338 (48.7)
Family history of CVD	302 (43.5)
Heart attack symptoms	
Chest pain or discomfort	535 (77.1)
Difficulty in breathing or shortness of breath	459 (66.1)
Feeling weak, light-headed, or faint	282 (40.6)
Pain or discomfort in arms or shoulder	227 (32.7)
Pain or discomfort in the jaw, neck, or back	200 (28.8)
Stroke symptoms	
Sudden numbness or weakness of the face, arm, or leg	588 (84.7)
Sudden confusion or trouble speaking or understanding others	534 (76.9)
Sudden dizziness, trouble walking, or loss of balance or coordination	502 (72.3)
Sudden trouble seeing in one or both eyes	341 (49.1)
Severe headache with no known cause	311 (44.8)

compared to female (70.0% vs 57.5% $P = 0.003$). Participants with age > 24 had a higher chance of having good knowledge of CVD compared to individuals with age < 24 (55.9% vs 31.2%, $P < 0.001$). Likewise, participants were more knowledgeable about CVD if they attained high education than individuals with low-intermediate education (23.9% vs 46.0%, $P < 0.001$). Participants who worked in health-related sites possessed a higher rate of good CVD knowledge compared to non-health-related sites (74.3% vs 33.1%, $P < 0.001$). Furthermore, the participants with eating healthy food everyday showed good knowledge of CVD compared to those not eating healthy food everyday (49.2% vs 35.1, $P = 0.001$). Smoker displayed a higher chance of having poor knowledge of CVD compared to non-smokers (83.3% vs 59.3%, $P = 0.001$). Participants with a family history of CVD had

Table IV. Association between overall CVD knowledge and participants' characteristics (n=694)

Characteristics	Knowledge of CVD		*P* Value
	Poor (<70%)	Good (≥ 70%)	
Gender			
Male	133 (70.0)	57 (30.0)	0.003*
Female	290 (57.5)	214 (42.5)	
Age			
Age <24	326 (68.8)	148 (31.2)	0.000*
Age >24	97 (44.1)	123 (55.9)	
Education level			
Low-intermediate education	166 (76.1)	52 (23.9)	0.000*
High education	257 (54.0)	219 (46.0)	
Residence			
Rural	150 (65.2)	80 (34.8)	0.105
Urban	273 (58.8)	191 (41.2)	
Distance from health facilities			
< 5 km	351 (59.9)	235 (40.1)	0.185
> 5 km	72 (66.7)	36 (33.3)	
Working status			
Health related sites	26 (25.7)	75 (74.3)	0.000*
Non-health related sites	397 (66.9)	196 (33.1)	
Monthly income			
< Rp5.000.000	362 (60.6)	235 (39.4)	0.674
> Rp5.000.000 – Rp10.000.000	61(62.9)	36 (37.1)	
BMI			
< 23	265 (60.9)	170 (39.1)	0.982
≥ 23	158 (61.0)	101 (39.0)	
Central obesity			
Positive	116 (62.7)	69 (37.3)	0.569
Negative	307 (60.3)	202 (39.7)	
Lifestyle			
Stress	177 (58.6)	125 (41.4)	0.267
Free from stress	246(62.8)	146 (37.2)	
Healthy food			
Everyday	98 (50.8)	95 (49.2)	0.001*
Not everyday	325 (64.9)	176 (35.1)	
Exercise			
0-2 times a week	340 (60.4)	223 (39.6)	0.531
> 3 times a week	83 (63.4)	48 (36.6)	
Smoking status			
Smokers	40 (83.3)	8 (16.7)	0.001*
Non-smokers	383 (59.3)	263 (40.7)	
Alcohol intake			
Current alcohol drinkers	34 (63.0)	20 (37.0)	0.752

superior knowledge of CVD than those without family history of CVD (61.8% vs 33.1%, $P < 0.001$). Additionally, participants who ever checked blood pressure, fasting blood glucose, and total cholesterol respectively had a higher likelihood of having good knowledge of CVD compared to those who never checked (40.5% vs 22.2%, $P = 0.008$), (51.9% vs 28.8%, $P < 0.001$), (50.2% vs 33.3%, $P < 0.001$).

Discussion

The focus of this study was to assess the current level of knowledge about CVD types, risk factors, heart attack, and stroke symptoms in 34 provinces in Indonesia and the factors that contribute to knowledge. The comparison of mean score knowledge showed participants were much better knowledgeable of stroke symptoms, followed by CVD risk factors. Despite this, the majority had good knowledge about CVD but were still not prominent enough to justify population knowledge. The current findings would be the first step to providing a quantitative assessment of CVD knowledge and help policymakers to utilize strategy by targeting public health promotion campaigns to enhance CVD knowledge.

This study about knowledge of CVD had been done by other countries such as Jordan, Kuwait, Cameroon, Bangladesh, and Saudi Arabia[6,8,9,10,14,]. The result reported that knowledge regarding CVD risk was better among other domains due to representatives in mass media or getting information from other people. In the current findings, gender, age, education level, working status, healthy food, smoking, family history of CVD, ever checked blood pressure, fasting blood glucose, and total cholesterol were associated with overall knowledge of CVD ($P < 0.05$). Knowledge about CVD was greater among female than male, which is consistent with study conducted by Attarchi et al. and Awad and Al-Nafisi[8,15]. Women have more attention when it comes to health behaviour and desire to obtain comprehensive and valid information, while men tend to be less interested in information about health around them[16]. The participants aged > 24 showed good knowledge of CVD compared to < 24 years. This study, similar to studies conducted in Iran, Kuwait, Saudi Arabia, and United Arab Emirates reported that as age increases, the knowledge is higher due to an increased intention to access health information[8,10,15,17]. Similar to previous studies in Jordan, Kuwait, Cameroon, and Ethiopia demonstrates that education level was associated with knowledge of CVD[6,8,9,18]. This findings in line with present study that participants who attained high education were more likely to have good knowledge of CVD compared to low-intermediate education. This may due to the higher level of education, the more capability to apprehend information, especially health information which is delivered through mass media and acquired from valid sources[8]. The study conducted by Liu et al. in China reported that high level of education easily implement healthy lifestyle and can reduce exposure to risk factors of CVD[19]. Education is one of the indicators in socio-economic status (SES) because it is related to the level of CVD knowledge and affect health literacy[20]. The findings of current study can emphasize the importance of targeting campaign to population with low-intermediate education and tailored to their level of understanding. The study participants who worked in health-related sites had good knowledge of CVD. This is support the previous findings that 86.2% of health workers at several hospitals in Nigeria have good knowledge of risk factors for coronary heart disease (CHD) and preventives[21]. In addition, study conducted in Singapore explains that the prevalence of modifiable CVD risk factors in non-health workers is higher than health workers due to CVD is part of the competence of health workers and access to valid information can be easily obtained and the existence of social interaction between fellow health workers makes the process of information exchange formed which will affect knowledge of CVD while non health workers have difficulty in understanding medical terms[22].

The study participants who eating healthy food everyday had good knowledge of CVD. This findings agreed with previous studies in Jordan and Kuwait[6,8]. A survey conducted on university students in the United States reported that having good knowledge of dietary guidelines correlate with a positive impact on healthier eating patterns[23]. The participants showed that non-smokers achieved good knowledge of CVD compared to smokers. This present study is consistent with Mukattash et al. and Pallangyo et al.[6,13]. Aminde et al. revealed that former smokers have a moderate to high level of CVD knowledge due to their awareness of the hazards of smoking[9]. Another factors that contribute to knowledge of CVD is family history of CVD. The current study reported that a positive family history of CVD showed good knowledge of CVD. The good knowledge arises because of more real exposure among families and there was a tendency to comprehend knowledge about CVD, thereby more engaged in healthy behaviors[6,8,9,24]. Ever checked blood pressure, fasting blood glucose, and total cholesterol were significantly associated with good knowledge of CVD, which is consistent with a study in Tanzania[25]. Moreover, regular examination of blood pressure, blood glucose, and total cholesterol is an important step in preventing CVD risk factors because by doing an examination, an individual can obtain information about health and can increase awareness of the risk factors that occur. Individuals will attempt to change lifestyles and take preventive actions, as well as promote healthy behaviors[8,26]

However, several limitations of our study must be addressed. Because the survey was conducted online, there was an uneven distribution of participants from various provinces in Indonesia. Furthermore, the use of an online approach limits the survey to only populations that understand literacy, making the results less representative of the non-literate population.

CONCLUSION

According to the findings in this study, despite the majority having good knowledge regarding CVD, the difference between good, moderate, and low knowledge level were not prominent among the general population in Indonesia. Gender, age, education level, working status, healthy food, smoking status, family history of CVD, ever checked blood pressure, fasting blood glucose, and total cholesterol were associated with overall knowledge of CVD. A further comprehensive study should be established using knowledge, attitude, practice, (KAP) survey model in Indonesia to help policymakers initiate an effective preventive strategy toward cardiovascular disease.

REFERENCES

1. WHO. Noncommunicable-Diseases @ Www.Who.Int. Published online 2021. https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases
2. World Health Organization. Cardiovascular-Diseases-(Cvds) @ Www.Who.Int. Published 2017. https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds)
3. Kemenkes RI. Hasil Riset Kesehatan Dasar Tahun 2018. *Kementrian Kesehat RI*. 2018;53(9):1689-1699.
4. Bergheanu SC, Bodde MC, Jukema JW. Pathophysiology and treatment of atherosclerosis: Current view and future perspective on lipoprotein modification treatment. *Netherlands Hear J*. 2017;25(4):231-242.
5. Pearson TA, Palaniappan LP, Artinian NT, et al. American heart association guide for improving cardiovascular health at the community level, 2013 update: A scientific statement for public health practitioners, healthcare providers, and health policy makers. *Circulation*. 2013;127(16):1730-1753.

6. Mukattash TL, Shara M, Jarab AS, Al-Azzam SI, Almaaytah A, Al Hamarneh YN. Public knowledge and awareness of cardiovascular disease and its risk factors: A cross-sectional study of 1000 Jordanians. *Int J Pharm Pract*. 2012;20(6):367-376.
7. Yoon SS, Heller RF, Levi C, Wiggers J. Knowledge and perception about stroke among an Australian urban population. *BMC Public Health*. 2001;1:1-6.
8. Awad A, Al-Nafisi H. Public knowledge of cardiovascular disease and its risk factors in Kuwait: A cross-sectional survey. *BMC Public Health*. 2014;14(1):1838-1842.
9. Aminde LN, Takah N, Ngwasiri C, et al. Population awareness of cardiovascular disease and its risk factors in Buea, Cameroon. *BMC Public Health*. 2017;17(1):1-10.
10. Chowdhury S, Chakraborty P pratim. Universal health coverage - There is more to it than meets the eye. *J Fam Med Prim Care*. 2017;6(2):169-170.
11. Akintunde A, Akintunde T, Opadijo O. Knowledge of heart disease risk factors among workers in a Nigerian University: A call for concern. *Niger Med J*. 2015;56(2):91.
12. Amadi CE, Lawal FO, Mbakwem AC, Ajuluchukwu JN, Oke DA. Knowledge of cardiovascular disease risk factors and practice of primary prevention of cardiovascular disease by Community Pharmacists in Nigeria: a cross-sectional study. *Int J Clin Pharm*. 2018;40(6):1587-1595.
13. Pallangyo P, Misidai N, Komba M, et al. Knowledge of cardiovascular risk factors among caretakers of outpatients attending a tertiary cardiovascular center in Tanzania: A cross-sectional survey. *BMC Cardiovasc Disord*. 2020;20(1):1-8.
14. Awad A, Al-Nafisi H. Public knowledge of cardiovascular disease and its risk factors in Kuwait : A cross-sectional survey. *BMC Public Health*. 2014;14(1):1-11.
15. Attarchi M, Mohammadi S, Nojomi M, Labbafinejad Y. Knowledge and practice assessment of workers in a pharmaceutical company about prevention of coronary artery disease. *Acta Med Iran*. 2012;50(10):697-703.
16. Wellstead P. Information behaviour of Australian men experiencing stressful life events: The role of social networks and confidants. *Inf Res*. 2011;16(2).
17. Kazim MN, AbouMoussa TH, AL-Hammadi FA, et al. Population awareness of cardiovascular disease risk factors and health care seeking behavior in the UAE. *Am J Prev Cardiol*. 2021;8(June):100255.
18. Negesa LB, Magarey J, Rasmussen P, Hendriks JML. Patients' knowledge on cardiovascular risk factors and associated lifestyle behaviour in Ethiopia in 2018: A cross-sectional study. *PLoS One*. 2020;15(6):1-15.
19. Liu Q, Huang YJ, Zhao L, et al. Association between knowledge and risk for cardiovascular disease among older adults: A cross-sectional study in China. *Int J Nurs Sci*. 2020;7(2):184-190.
20. Kollia N, Panagiotakos DB, Georgousopoulou E, et al. Exploring the association between low socioeconomic status and cardiovascular disease risk in healthy Greeks, in the years of financial crisis (2002–2012): The ATTICA study. *Int J Cardiol*. 2016;223:758-763.
21. Awosan K, Sabir A, Ibrahim M, Ibrahim T, Bello-Baura M, Ibrahim Z. Knowledge of Coronary Heart Disease and Practices on Detection and Management of Its Risk Factors among Primary Health Care Workers in Sokoto, Nigeria. *J Adv Med Med Res*. 2017;24(7):1-10.
22. Leong L, Chia SE. Prevalence of cardiovascular risk factors among healthcare staff in a large healthcare

institution in Singapore. *Singapore Med J*. 2012;53(8):517-521.

23. Kolodinsky J, Harvey-Berino JR, Berlin L, Johnson RK, Reynolds TW. Knowledge of Current Dietary Guidelines and Food Choice by College Students: Better Eaters Have Higher Knowledge of Dietary Guidance. *J Am Diet Assoc*. 2007;107(8):1409-1413.
24. Ahmed AAA, Mohammed A, Al-Shami, et al. Awareness of the risk factors for heart attack among the general public in pahang, malaysia: A cross-sectional study. *Risk Manag Healthc Policy*. 2020;13:3089-3102.
25. Muhihi AJ, Anaeli A, Mpembeni RNM, et al. Public knowledge of risk factors and warning signs for cardiovascular disease among young and middle-aged adults in rural Tanzania. *BMC Public Health*. 2020;20(1):1-12.
26. Andsoy II, Tastan S, Iyigun E, Kopp LR. Knowledge and attitudes towards cardiovascular disease in a population of North Western Turkey: a cross-sectional survey. *Int J Caring Sci*. 2015;8(1):115-124.