Knowledge about Hypertension and its Associated Risk Factors among Saudi University Students in Riyadh City

Zeyad Kurdee[1], Ahmed Mujamammi [1], Omar Alfawzan [2], Saleh Mahjoub [2], Abdullah Alangari [2], Rakan Alghonaim [2], Saad Altweirqi [2], Ahmed Al-Rikhaimi [2]

(1) PhD in Molecular medicine
(2) Graduate

Corresponding author:
Omar Alfawzan
Email: o.m.alfawzan@gmail.com

Received: May 2023. Accepted: June 2023; Published: July 1, 2023.
Citation: Zeyad Kurdee at al. Knowledge about Hypertension and its Associated Risk Factors among Saudi University Students in Riyadh City. .World Family Medicine. July 2023; 21(6): 46-55 DOI: 10.5742/MEWFM.2023.95256126

Abstract

Objectives: To determine the level of knowledge of hypertension and its associated risk factors among Saudi undergraduate students in the universities of Riyadh City.

Methods: A cross-sectional study was conducted among the students from 11 universities in Riyadh City. Convenience sampling was used, and the survey was not validated. The survey was distributed manually but collected electronically. It consisted of four sections: socio-demographics, risk factors, complications, and general statements.

Results: We analyzed 605 participants' data; the highest participation percentage was from King Saud University (14.1% of the total); 42.1% of the participants were from the health track, and 69.8% of the participants who had heard about hypertension described the source as their families. The highest level of knowledge was on the general statement section where 45% had good knowledge, and the lowest was on the complications section where 30% had good knowledge. The total level of good knowledge was 31.1%.

Conclusion: This study identifies some gaps in the knowledge of hypertension among undergraduate university students. Further research is advised to reach conclusive and more accurate data.

Key words: knowledge hypertension, risk factors, undergraduate students, Riyadh, Saudi Arabia

Introduction

Hypertension or high blood pressure is a consistent elevation in blood pressure. It is a result of two forces. The first is systolic pressure (left ventricle contraction) and the second is diastolic pressure (rest period between beats)(1). Hypertension is considered as a systolic pressure equal to or higher than 140 or diastolic pressure equal to or higher than 90 on more than two separate check-ups. Some physicians may consider a systolic pressure between 130 to 139 or a diastolic pressure between 80 and 89 to be hypertensive if there are other cardiac risk factors(2).

There are two main types of hypertension: primary (essential) hypertension and secondary hypertension(2). Essential hypertension is the most frequent type of hypertension in adults (95%) and is diagnosed when there is sustained elevation of BP greater than 140/90 mm Hg and when no etiology can be determined for the hypertension(3). Secondary hypertension (SH) is defined as "a form of hypertension with an identifiable cause and is generally considered to affect approximately 5–10% of all hypertensive patients"(4). An extensive review of the literature from multiple countries found a wide variation in secondary hypertension's estimated prevalence (2-20%). This variation could be due to the underlying causes, and the availability of adequate diagnostic resources (laboratory or imaging)(4).

A 2013 study found that the most common causes of secondary hypertension in adolescents were renal parenchymal, renovascular diseases and aortic coarctation. The same causes were thought to be the most common for adults as well, and recent studies showed that obstructive sleep apnea is more common. Endocrine disorders are also associated with hypertension, and the most common were primary aldosteronism, thyroid disorders, Cushing's syndrome and pheochromocytoma(5).

Hypertension has many associated risk factors which can be categorized into modifiable and non-modifiable risk factors. Non-modifiable risk factors include aging, gender (male) and race(6). Modifiable risk factors include smoking, obesity, unhealthy lifestyle and diet(7). Sufficient knowledge about some risk factors such as smoking and diet could lead to effective prevention of hypertension(8). There is relatively little research studying undergraduate students' knowledge about hypertension. One of these studies was done in Japan and found that there is a generational difference in the knowledge of hypertension and its risk factors between adolescents and elderly, favoring the latter(9). Another study found that young men have low levels of knowledge in Mongolia(10). A Polish study demonstrated that even when schools teach about hypertension and its risk factors, the level of awareness is still low and random(11). The levels of knowledge among adolescents is alarming worldwide particularly in the Middle East.

A study in the United Arab Emirates found that the level of knowledge about the risk factors of hypertension was 60% in medical entry students, and Arab students scored lower than non-Arabs(12). A comparison could be made between the previous paper and another study performed in the Seychelles Islands where the percentage of participants who recognized the association between obesity and salt with hypertension, was 71% and 96%, respectively. The latter study's population was 25-64 years old. However, the population was entering medical students in the first study showing that even with a percentage such as 60%, the level is still lower relative to other communities(12)(13).

Two studies were published in Saudi Arabia regarding the prevalence of hypertension. The first was in 2007, which showed that 26.25% of the population were hypertensive(14). The other was in 2017, and the prevalence was 36%(15). In 10 years, there was almost a 10% increase in the prevalence of hypertension in Saudi Arabia.

Due to the limited literature about the knowledge of young adults towards hypertension and its risk factors in Saudi Arabia, we conducted a survey to measure the level of knowledge of students from different Riyadh City universities about hypertension and its associated risk factors. Determining the level of knowledge of Saudi undergraduate students about hypertension and its risk factors could increase the attention of stakeholders, thus increasing the knowledge about hypertension among the target group. This may help reduce the incidence of hypertension and its complications.

Methods

This study aimed to assess the level of knowledge among Saudi undergraduate university students in Riyadh City aged between 18 and 30 years. There were 11 universities included: Dar Al Uloom University (DAU), Al Faisal University (FU), Imam Muhammad ibn Saud Islamic University (IMAMU), King Saud University (KSU), King Saud bin Abdulaziz University for Health Sciences (KSAU-HS), Princess Nourah Bint Abdul Rahman University (PNU), Prince Sultan University (PSU), Riyadh Elm University (REU), Saudi Electronic University (SEU), Almaarefa University (UM), and Al Yamamah University (YU). One university was excluded because we did not receive a response for permission to conduct data collection (Arab Open University, Riyadh branch (AOU)). This study collected a representative sample via convenience sampling from 6/2/2020 until 22/2/2020, and the questionnaire was distributed either by giving the students an electronic device to complete on the spot or by giving them a QR code to scan and complete it on their devices. The population size was 256,203 based on data from the Ministry of Education for the academic year 2018-2019 (numbers for 2019-2020 were not ready). The total number of responses was 777, but 605 remained after applying the exclusion criteria: non-Saudis, those older than 30, those younger than 18, and those with contradictory answers such as choosing nothing from the above and another answer.

The survey was not validated, and a pilot study was done on 29 students from different universities and tracks to check for completion time and comprehensibility. A few questions were edited based on the feedback.

The questionnaire was split into four sections: socio-demographics, risk factors, complications, and general statements.

The socio-demographic questions consisted of sex, age, nationality, university, track, whether they changed their track or not, were they ever diagnosed with hypertension, and have they ever heard about hypertension and how. The risk factors section and complications section both consisted of multiple-choice questions with correct and incorrect choices. Wrong choices were categorized as wrong if there were no papers about it or if it was proven to have no correlation (14)(16)(17)(18)(19)(20). The general questions section was a three-way Likert scale and had predetermined answers; some were correct and others were false (16)(14).

The proposal was approved by the ethical committee of King Saud University on 08/09/2019, and the project number was E-19-4405. All participants were asked for their consent and their data was kept anonymous. Statistical analysis was performed by SPSS version 21.0. The statistical tests used were frequencies and chi-squared analysis. The confidence level was 95%, and the confidence interval was 4%.

Results

There were 777 total responses, and 605 remained after following the exclusion criteria. Table I shows sociodemographic results. There were more male than female participants and the highest number of responses came from KSU (14.2% of the total responses). Students from the health track made up 42.1% of the responses. 8.1% of the total students were diagnosed as hypertensives. We found that 97.4% of the students had heard of hypertension, and 69.8% of them heard about it from their families.

Tables II, III, and IV show the frequency of each answer on the risk factors, complications, and general statement sections, respectively. The highest correct choice from each section was as follows: age (61.3%) as a risk factor, arrhythmia (62.6%) as a complication, and that you can prevent hypertension by exercising and losing weight (85.3%) as general knowledge. Among the wrong choices, the most frequent were panic attacks and anger (44.1%) as a risk factor, anemia as a complication (20.7%), and that a hypertensive must present with symptoms or else does not have the disease (36.9%).

Figures 1, 2, and 3 show the level of knowledge for each of the sections: risk factors, complications, and general statements section. The categorization was based on a 50% cut-off point. If the correct choices were more than 50% and the wrong choices were less than 50%, then they were considered to have good knowledge in that section. On the other hand, if they had fewer than 50% of the correct choices or more than 50% of the wrong choices, then they were considered to have poor knowledge. The highest level of knowledge was in the general statements section where 45% of the participants had good knowledge. The highest level of poor knowledge was in the complications section (65%).

To be considered knowledgeable in general, one should show good knowledge in two out of three sections, i.e., more than 50%. In total, 31.1% of the total students had good knowledge. Table V shows the levels of knowledge and how it was distributed by gender and track. Males were more knowledgeable than females, but this comparison was not significant. Track-based differences were highly significant. Students studying in the health track were more knowledgeable than their peers in the humanitarian and science tracks. Humanitarian students were the least knowledgeable with 84.4% of them having poor knowledge.

Table I: Sociodemographic section	N (%) 605 (100)
Gender	
Male	365 (60.3)
Female	240 (39.7)
University	
DAU	45 (7.4)
FU	32 (5.3)
IMAMU	82 (13.6)
KSU	86 (14.2)
KSAU-HS	67 (11.1)
PNU	54 (8.9)
PSU	47 (7.8)
REU	66 (10.9)
SEU	30 (5.0)
UM	53 (8.8)
YU	43 (7.1)
Track	
Humanitarian	109 (18.0)
Health	255 (42.1)
Science	241 (39.8)
Were you diagnosed with hypertension?	
No	556 (91.9)
Yes	49 (8.1)
Have you heard of hypertension?	
No	16 (2.6)
Yes	589 (97.4)
If yes, what was the source? *	
Family	422 (69.8)
Social media	298 (49.3)
School	289 (47.8)
Traditional media	153 (25.3)
Self-learning	250 (41.3)
From a doctor	151 (25.0)
Nothing (unanswered)	26 (4.3)

*Indicates that it is a multiple-choice question, so answers are not complementary.

Table II: Risk factors section	N (%)
Ethnicity (Caucasian, Asian)	119 (19.7)
Diabetes mellitus	225 (37.2)
Vascular diseases	261 (43.1)
Age	371 (61.3)
Smoking	313 (51.7)
Obesity	367 (60.7)
Kidney problems	122 (20.2)
Thyroid diseases	100 (16.5)
Pregnancy	101 (16.7)
Low physical activity	261 (43.1)
Gene and family history of hypertension	314 (51.9)
Excessive eating of salt	353 (58.3)
Drinking caffeine§	204 (33.7)
Insomnia§	131 (21.7)
Drinking excessive amounts of water§	19 (3.1)
Fever§	30 (5.0)
Panic attacks and anger§	267 (44.1)
Urine retention§	84 (13.9)
Nothing from the above	6 (1.0)

§ indicates that the choice is wrong

Table II: Risk factors section	N (%)
Ethnicity (Caucasian, Asian)	119 (19.7)
Diabetes mellitus	225 (37.2)
Vascular diseases	261 (43.1)
Age	371 (61.3)
Smoking	313 (51.7)
Obesity	367 (60.7)
Kidney problems	122 (20.2)
Thyroid diseases	100 (16.5)
Pregnancy	101 (16.7)
Low physical activity	261 (43.1)
Gene and family history of hypertension	314 (51.9)
Excessive eating of salt	353 (58.3)
Drinking caffeine§	204 (33.7)
	21.7)
Drinking excessive amounts of water§	19 (3.1)
Fever§	30 (5.0)
Panic attacks and anger§	267 (44.1)
Urine retention§	84 (13.9)
Nothing from the above	6 (1.0)

§ indicates that the choice is wrong

Table III: Complications section	N (%)
Cerebral stroke	280 (46.3)
Retinal hemorrhage	140 (23.1)
Arrhythmia	379 (62.6)
Sudden death	252 (41.7)
Peripheral vascular diseases (such as occlusion)	182 (30.1)
Heart failure	252 (41.7)
Aneurisms	205 (33.9)
Coronary vascular diseases	207 (34.2)
Alzheimer	18 (3.0)
Kidney diseases	149 (24.6)
Anemia§	125 (20.7)
Parkinson's disease§	47 (7.8)
Diabetes mellitus§	96 (15.9)
Nothing from the above	30 (5.0)

§ indicates that the choice is wrong

Table IV: General knowledge section. N (%)

	Agree	Neutral	Don't agree
A hypertensive must present with symptoms, else he does not have the disease§	223 (36.9)	240 (39.7)	142 (23.5)
Hypertension is a prevalent disease in Saudi Arabia	376 (62.1)	182 (30.1)	47 (7.8)
You can prevent hypertension by exercising and losing weight	516 (85.3)	77 (12.7)	12 (2.0)
People under 30 years old do not have hypertension or heart diseases§	41 (6.8)	138 (22.8)	426 (70.4)
Most hypertension cases do not feel any symptoms until a complication happens	256 (42.3)	246 (40.7)	103 (17.0)
Hypertension is one type, and it cannot be treated§	80 (13.2)	182 (30.1)	343 (56.7)
Cessation of smoking could help in preventing hypertension	469 (77.5)	114 (18.8)	22 (3.6)
No one could have hypertension unless they have a family history§	62 (10.2)	115 (19.0)	428 (70.7)

§ indicates that the choice is wrong

Table V: Total level of knowledge with comparisons.

	Level of Knowledge		P-value
	Poor Knowledge	Good Knowledge	
	N (%)	N (%)	
	417 (68.9)	188 (31.1)	
Gender			
Male	249 (68.2)	116 (31.8)	
Female	168 (70)	72 (30)	0.643
Track			
Humanitarian	92 (84.4)	17 (15.6)	
Health	143 (56.1)	112 (43.9)	<0.01
Science	182 (75.5)	59 (24.5)	

Discussion

To summarize, our study found that although many students have heard about the term “hypertension” by themselves or from a family member; their knowledge about it is insufficient and unsatisfactory. This indicates the need to transmit knowledge especially in an area with so many hypertensives. The research did not reveal any significant relationship between sex and level of knowledge about hypertension and its risk factors. Other related observations in this field varied (17)(18)(19); however, students in the health track had the highest level of knowledge followed by students in the science track.
Knowledge about individual aspects in the risk factors section was low relative to a study conducted in the United Arab Emirates (UAE) that had a similar population to ours. For example, the level of knowledge that diabetes mellitus is a risk factor was 37.2% compared to 50% in the UAE study(12). Knowledge about complications was pretty similar relative to prior work although the population was different. The level of knowledge about stroke was 46.3%, but in prior work was 46.2%(21). The results are similar in respect to knowledge about visual impairment and retinal hemorrhage.

By showing these low rates of knowledge about hypertension among young adults, our study underscores the need to focus on this population. There is a lack of adoption of raising awareness on such topics. This issue has also been repeatedly identified in knowledge, attitudes, and practice studies in the west(20)(22)(23). When individuals have background knowledge about hypertension’s risk factors, they guide the prevention of hypertension among them(8). This eventually leads to fewer cases of hypertension and hence a cessation of its complications.

This study does have some limitations. First, our study method was convenience sampling, which, while easy to conduct, may lead to selection bias. This obstacle could be overcome by performing a random sampling method instead. Even though the study assessed multiple risk factors and complications, we could not assess all of them. Enhancing those sections by choosing other specific risk factors and complications could offer a more precise understanding of the population’s knowledge of hypertension and may help to create better strategies to fight it. Data acquisition was via a questionnaire, which may lead to misinterpretation of questions that conflicts with the researcher’s main goal of the question, thus leading to inaccurate results during data analysis. Finally, our main intent was to reach a 3% confidence interval, but that goal was not met due to the SARS-CoV-2 pandemic and the shift towards online learning.

The knowledge about hypertension and its risk factors among the adolescent population has health implications for both hypertensives and non-hypertensives. This research showed that most of the participants’ knowledge about hypertension came from their families, followed by social media. This may be basic good knowledge but it is not always detailed nor precise. This highlights the need for the stakeholders to develop educational health programs. In addition, the implementation of educational hypertension sessions through social networks may be very helpful.

Conclusion

This study shows that there is a gap in the knowledge of hypertension across multiple different aspects. Although our sample may not be representative, a larger study is advised to reach a conclusive result for education that reduces the impact of hypertension.

References

1. What is High Blood Pressure? [Internet]. American Heart Association. Available from: https://www.heart.org/en/health-topics/high-blood-pressure/the-facts-about-high-blood-pressure/what-is-high-blood-pressure
2. High Blood Pressure. Medlin Plus [Internet]. Available from: https://medlineplus.gov/highbloodpressure.html
3. Gupta-Malhotra M, Banker A, Shete S, Hashmi SS, Tyson JE, Barratt MS, et al. Essential hypertension vs. secondary hypertension among children. Am J Hypertens. 2015;
4. Kotliar C, Obregón S, Koretzky M, Botto F, Di Leva A, Boscaro M, et al. Improved identification of secondary hypertension: use of a systematic protocol. Ann Transl Med. 2018;
5. Rimoldi SF, Scherrer U, Messerli FH. Secondary arterial hypertension: When, who, and how to screen? European Heart Journal. 2014.
6. Shen W, Zhang T, Li S, Zhang H, Xi B, Shen H, et al. Race and Sex Differences of Long-Term Blood Pressure Profiles from Childhood and Adult Hypertension: The Bogalusa Heart Study. Hypertension. 2017;
7. Know Your Risk Factors for High Blood Pressure [Internet]. American Heart Association. Available from: https://www.heart.org/en/health-topics/high-blood-pressure/why-high-blood-pressure-is-a-silent-killer/know-your-risk-factors-for-high-blood-pressure
8. Metelska J, Nowakowska E, Kus K, Kajtowski P, Czubak A, Burda K. Evaluation of the knowledge of primary healthcare patients in Poland on the prevention of hypertension: A community study. Public Health. 2011;
9. Sanagawa A, Ogasawara M, Kusahara Y, Yasumoto M, Iwaki S, Fujii S. Investigation into differences in level of knowledge about hypertension between high school students and elderly people. Yakugaku Zasshi. 2017;
10. Demaio AR, Otgontuya D, De Courten M, Bygbjerg IC, Enkhtuya P, Meyrowitsch DW, et al. Hypertension and hypertension-related disease in Mongolia; Findings of a national knowledge, attitudes and practices study. BMC Public Health. 2013;
11. Grad I, Mastalerz-Migas A, Kilis-Pstrusińska K. Factors associated with knowledge of hypertension among adolescents: Implications for preventive education programs in primary care. BMC Public Health. 2015;

12. Shaikh R, Mathew E, Sreedharan J, Muttappallymyalil J, Al Sharbatti S, Basha S. Knowledge regarding risk factors of hypertension among entry year students of a medical university. J Fam Community Med. 2011;
13. Aubert L, Bovet P, Gervasoni JP, Rwebogora A, Waeber B, Paccaud F. Knowledge, attitudes, and practices on hypertension in a country in epidemiological transition. Hypertension. 1998;
14. Al-Nozha MM, Abdullah M, Arafah MR, Khalil MZ, Khan NB, Al-Mazrou YY, et al. Hypertension in Saudi Arabia. Saudi Med J. 2007;
15. Yusufali AM, Khatib R, Islam S, Alhabib KF, Bahonar A, Swidan HM, et al. Prevalence, awareness, treatment and control of hypertension in four Middle East countries. In: Journal of Hypertension. 2017.
16. Walker BR. Davidson's principles and practice of medicine 22nd edition. 22nd ed. Churchill Livingstone/ Elsevier; 2014. xix, 1372.
17. Vanhecke TE, Miller WM, Franklin BA, Weber JE, Mccullough PA. Awareness, knowledge, and perception of heart disease among adolescents. Eur J Prev Cardiol. 2006;
18. Niknian M, McKinlay SM, Rakowski W, Carleton RA. A comparison of perceived and objective CVD risk in a general population. Am J Public Health. 1989;
19. Winham DM, Jones KM. Knowledge of young African American adults about heart disease: A cross-sectional survey. BMC Public Health. 2011;
20. Weiland SK, Keil U, Spelsberg A. Knowledge and attitudes towards hypertension and hypercholesterolemia in a population of Southern Germany: Results from a population survey in the Augsburg area. Sozial- und Präventivmedizin SPM. 1991;
21. Kisokanth G, Ilankoon I, Arulanandem K, Goonewardena C, Sundaresan K, Joseph J. Assessment of Knowledge on Hypertension, its consequences and management practices among hypertensive patients - A descriptive study. J Postgrad Inst Med. 2016;
22. Cumming RG, Barton GE, Fahey PP, Wilson A, Leeder SR. Cardiovascular disease-related knowledge and attitudes in a high-risk Australian population. Med J Aust. 1989;
23. Hunt SM, Hopton J, Padfield PL, Holton DW. Health related behaviour in hypertension. J Hum Hypertens. 1990;