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Hypertension Awareness and Understanding Among High School Students

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ABSTRACT

The purpose of this study was to examine hypertension awareness and understanding among high school students and to understand what factors contribute to high awareness of hypertension, and its related causes and symptoms. Hypertension is a leading cause of death in the United States, not just for the elderly, but also for teenagers. Even more concerning is that 74.9% of high school students with hypertension are unaware of their condition. To accomplish this goal, the author adopted a pre-test post-test quasi-experimental method, as it best suited the objective of the research. This methodology was largely assumed from Anggraini Kurnia, who utilized a pre-test post-test quasi-experimental method in her study, which proved to be highly effective at both assessing a baseline level of understanding, while also testing the validity of a multitude of interventions. Through random sampling, and sample group of 36 students was obtained, and each student was given a survey. After completing the survey, data was collected and analyzed. Through the data analysis, the author drew 2 major conclusions. First, students were greatly unaware of hypertension as students on average scored a mere 6.6/10 on the pre-test. Second, the author found that there existed a strong correlation between initial understanding and a family history of hypertension. In conclusion, although students had a low baseline awareness of hypertension, the informed intervention was ineffective, and other methods must be adopted in the future to discover an effective method for informing high school students about the dangers of hypertension.

Introduction

Hypertension, or high blood pressure, affects an estimated 1.28 billion adults across the globe, and a staggering 119.9 million in the United States (Centers For Disease Control and Prevention, 2023). Hypertension is life-threatening and can lead to heart attacks, strokes, and lung disease. Although hypertension is both deadly and widespread, most Americans are unaware that they have it, as two-thirds of those with hypertension were unaware of the condition (New York City Government, 2023). Even more astonishing than that, however, is the staggeringly low rates of awareness among adolescents. Out of all the high school students identified to have hypertension in a study, of them did not even know they were suffering from this life-threatening condition, which is even higher than among adults (Gooding et al., 2014). Although Gooding et al. argue for a low level of awareness, other studies, such as the study done by Yiyi Zhang and Andrew E. Moran, argue that 47.9% of young adults are unaware of hypertension, which is substantially different than the number reported by other studies (Zhang and Moran, 2017). Many studies provide varying perspectives about hypertension knowledge and awareness among young adults/high school students, however, no studies specifically assess hypertension awareness among high school students, as well as a solution to improve levels of understanding. By assessing hypertension awareness of high school students, as well as a plausible solution, the researcher can fill the lack of clarity surrounding this subject matter. This begs the question: How knowledgeable are high school students about hypertension, and what can be done to educate them about this life-threatening condition?

Literature Review

Hypertension, most commonly referred to as high blood pressure, is a leading cause of death in the United States, contributing to almost 500,000 deaths per year alone (Centers for Disease Control and Prevention, 2023). Hypertension can cause heart attack, stroke, and lung disease. The main culprit for rising blood pressure levels is an unhealthy lifestyle. Some factors include smoking, drinking, and a lack of exercise (Cleveland Clinic, 2023). Hypertension is not just present in adults, as children and adolescents also struggle with similar issues. Meghanad Meher from the General Medicine, Institute of Medical Sciences puts it best; "[h]ypertension is an overlooked problem in young adults", and something must be done to combat it (Meher et al., 2023).

A review of the literature illustrates a deep concern for the effects of hypertension on young adults, and their future health. Janusz Feber and Maheen Ahmed from the Children's Hospital of Eastern Ontario uncovered the true role childhood hypertension has on future health. By utilizing auscultation and oscillometric blood pressure measuring methods, the researchers measured the blood pressure levels of children in schools and communities across the globe. Based on this data, they concluded that high blood pressure in children was directly correlated to high blood pressure and hypertension in adults (Feber and Ahmed, 2010). They also argued that a lack of awareness of hypertension among those tested contributed to higher blood pressure levels, which in turn increased one's chances of a stroke or heart attack. This research establishes the idea that there is a direct link between a lack of hypertension awareness and high blood pressure levels in children, and hypertension complications in adulthood.

Although many attempts have been made to promote a healthy lifestyle in order to resist rising blood pressure levels in young adults, there has been little to no improvement. This stems from a lack of understanding and awareness of hypertension among young adults, specifically high school students, showing a gap in this area of research. The Johns Hopkins University School of Medicine estimates that 1 in 25 youths ages 12-19 have hypertension, and when compared to the fact that 75% of young adults with hypertension are unaware of their condition, there are a staggering number of young adults with their lives unknowingly at risk (Johns Hopkins Medicine, 2023; Gooding et al., 2014). Hypertension is a leading issue in young adults, and when left unattended, may have fatal symptoms. And, as previous research has shown, the best way to combat it is through education and engagement.

To address hypertension awareness among a general group, Myo Nyein Aung from the Department of Global Health in Japan, along with other authors, conducted a study analyzing awareness and knowledge of hypertension among hypertensive patients in Thasongyang, Thailand. By utilizing a cross-sectional survey of 298 participants and a questionnaire developed by researchers at the Boromarajonani College of Nursing Nakhon Lampang and at the Thasongyang Hospital, the authors were able to draw multiple conclusions. These conclusions demonstrated that less than half of the participants were adequately knowledgeable about hypertension, even though all participants were hypertensive, highlighting the lack of knowledge surrounding hypertension, even among groups who are at risk (Aung et al., 2012).

Only recently have researchers begun to systematically examine hypertension awareness among younger groups. MD Holly C. Gooding and other authors conducted a cross-sectional study of 13,512 young adults with hypertension, to assess their understanding of the condition and its associated risks. These adolescents were selected through convenience sampling, and in the end, the authors found that 76% of the study had uncontrolled hypertension, and out of that 76%, three-fourths were unaware of this life-threatening condition, emphasizing the lack of awareness among young adults, specifically those who are hypertensive. However, this research was greatly limited as reports of hypertension in the study were "based on self-report and thus is subject to either underreporting or over-reporting" (Gooding et al., 2014). According to most of the literature produced on the subject, there is a glaring lack of hypertension awareness among young adults, however, no research has effectively assessed this baseline knowledge, while simultaneously testing the efficacy of a possible solution.

Although these studies used cross-sectional analysis to analyze awareness levels, this methodology was not able to also test a plausible solution to combating low awareness, which is an essential aspect of this research's goal. This is where a pre-test post-test quasi-experimental method comes into play, as it serves as a methodology in which

the researcher is able to test the validity of a possible solution. Author Billy A. Danday from the International Journal of Learning, Teaching, and Educational Research demonstrated the efficacy of a pre-test post-test quasi-experimental method on assessing baseline knowledge while also testing a possible solution, which was not possible with the cross-sectional survey method utilized by Holly C. Gooding. In this study, he sought to understand the differing impacts on Pre-service Teachers' Technological Pedagogical Content Knowledge in passive and active micro-teaching lesson plans. By using a pre-test post-test quasi-experimental mixed method approach and random sampling, Danday was able to effectively conclude that active microteaching lessons were much more effective than passive microteaching lessons, as the pre and post-tests served as comparison points between different populations, and that the ability to test the validity of different microteaching lessons was essential to the success of his research, which is not possible without a pre-test post-test quasi-experimental method (Danday, 2019).

However, to put this methodology into practice in this field of study, the researcher will turn to Anggraini Dwi Kurnia's study of the effects of an educational program on hypertension awareness. In this study, Kurnia, along with a group of other professionals, utilized a pre-test post-test quasi-experimental method to assess the validity of a new educational system on hypertension awareness and treatment among a group of hypertensive patients in a Thailand hospital. By using this quasi-experimental, the authors found that baseline levels of awareness were far too low among elderly patients struggling with hypertensive-related conditions, (below 75% comprehension), potentially putting them at an increased risk due to this ignorance. Also, results showed that elderly patients with a stronger educational background or a job in a health-related field also performed better in the pre-test compared to those with a weaker educational background or non-health-related jobs. Finally, the intervention included between pre and post-tests proved to be an effective measure of increasing patients' understanding of hypertension, and that health education could vastly "improve hypertension management knowledge and attitude among uncontrolled hypertension", something that a cross-sectional study would not be able to accomplish (Kurnia et al., 2022).

Another study done to assess the effectiveness of a possible solution in informing patients of hypertension is by Wendy Zernike and Amanda Henderson. In this study, by using a quasi-experimental method, the authors were able to test the efficacy of an educational program in informing patients of hypertension. In the end, they found that "patients' knowledge improved with the structured patient-centred education" programs (Zernike and Henderson, 1998). However, they also argued that patients did not utilize this newly obtained knowledge to change their behaviors toward the condition, further adding to the gap in the research as an educational program was deemed ineffective in combating the dangers of hypertension among patients.

Overall, hypertension, especially among young adults, is a growing issue that needs to be combatted. However, there is little to no research assessing and attempting to improve hypertension awareness levels among young adults. Spreading awareness is the key to success, as proven by Anggraini Dwi Kurnia, and something new must be implemented in high schools to stop students from jeopardizing their health in the future. This research paper will analyze the baseline understanding of hypertension among high school students, while also exploring the efficacy of a possible solution and other factors that may influence an understanding of hypertension, or rather the lack thereof, to combat and prevent young adults from the detrimental effects of high blood pressure.

Methods

The goal of this research is to understand the awareness of hypertension among high school students. This study aligns with a variety of studies on the topic of study, however, this study most closely resembles the work of Anggraini Kurnia, as mentioned above. The researcher chose to employ a pre-test post-test quasi-experimental method to understand the baseline hypertension awareness of high school students while also assessing the efficacy of the intervention. This allows the researcher to analyze and evaluate data that supports their hypothesis that students would have a low initial awareness of hypertension, while simultaneously testing for a plausible solution, such as an informed intervention.

Population

The population of this research consisted of High School students in a large, high-performing public high school in a high-income suburban setting. Demographically, this population is 73.4% White, 11.3% Hispanic, 5.6% Asian, 3.1% African American, and 5% Two or more races. This school is also co-ed and grades 9-12. This contrasts deeply with the previous studies as they focus on elderly and hypertensive patients in hospitals and clinics, whereas this study focuses on young adults without immediate hypertension-related issues.

Sample Selection

To obtain a sample, the researcher chose to adopt a random sampling strategy from Billy A. Danday's work which was previously mentioned. The researcher advertised and incentivized one day to take the survey, and students, at random, came to the location of the survey and completed it while the researcher was analyzing the behavior and actions of the participants. This selection method resulted in all members of the targeted population being equally likely to be chosen. Through this process, 36 students were identified to participate in the study.

Implementation

Once the respondent was identified, they would note down the date, time, and location of the study that was present on the flyer. On the day of the survey, students came to the location, and a QR code was projected onto the screen for students, along with a link, to complete the survey within the bounds of the researcher so that they could create hypotheses and observations during the survey. Also, before students filled out the survey, the researcher read aloud a short statement that guaranteed the anonymity of the respondents and informed consent. This informed consent (Appendix A; Appendix B) was then accepted by both the participant and a parent/legal guardian, ensuring ethical practices within this research. Finally, once surveys were completed, the researcher pulled the data into Google Sheets, where it was tested by both independent and paired t-tests, as well as the Pearson Correlation Test.

Instruments

The questions utilized in the researcher's survey, as seen below, were either self-defined, or derived from the Hypertension Knowledge Test (HKT), or "Hypertension Knowledge Among Patients from an Urban Clinic" (Sanne et al., 2008).

Survey Questions	Answer Options	Source
Hypertension is when one's blood pressure is above the normal limit	**True** False	Self-defined
Hypertension is not present in young adults	True **False**	Adapted Hypertension Knowledge Test (HKT)
Family history is not associated with hypertension	True **False**	Adapted Hypertension Knowledge Test (HKT)
Maintaining a healthy diet is	**True**	Adapted Hypertension

essential in combatting hypertension	False	Knowledge Test (HKT), Sanne et al. 2008
There are no ways to detect future cases of hypertension	True **False**	Self-defined
Hypertension usually gets recognized before it becomes harmful	True **False**	Adapted Hypertension Knowledge Test (HKT)
Hypertension can be life-threatening	**True** False	Adapted Hypertension Knowledge Test (HKT), Sanne et al. 2008
A heart attack could be a result of hypertension	**True** False	Sanne et al. 2008
Hypertension can increase one's risk for cancer	True **False**	Sanne et al. 2008
When diagnosed with hypertension, which of the following is a way to lower blood pressure?	Switch from artificial salt to natural sea salt Drink less Caffeine **Lose weight** No artificial flavors or colors	Adapted Hypertension Knowledge Test (HKT), Sanne et al. 2008

The researcher chose to utilize survey questions from the Adapted Hypertension Knowledge Test (HKT), which was first created by Hae-Ra Han and other authors from the Johns Hopkins School of Nursing and has since been adapted, as this test is a 21-item questionnaire utilized globally to assess hypertension awareness in patients, and is accepted to be one of the best at testing patients for their knowledge (Han et al., 2011). The researcher also utilized questions from "Hypertension Knowledge Among Patients From An Urban Clinic" as the authors combined many tests, including the HKT, to create what they thought to be the best questions to assess the understanding of hypertension among patients. Demographic (Appendix C) and Likert Scale questions (Appendix D) were also present in the survey, and were entirely based on the questionnaire used in "The Effect of Educational Program on Hypertension Management Toward Knowledge and Attitude Among Uncontrolled Hypertension Patients in Rural Area of Indonesia" (Kurnia et al., 2022). Likert Scale questions were based on a 1 to 5 scale, 1 being "Strongly Disagree", and 5 being "Strongly Agree". One example of a Likert Scale Question asked to surveyees is "I Have Knowledge on Hypertension". These questions allowed the researcher to collect data on the surveyees, including their background and family history of hypertension, as well as their attitudes and opinions toward the condition. In between the pre-test and post-test was the informed intervention (Appendix E; Appendix F), which served to educate the participants about hypertension. The information in the informed intervention was collected from a plethora of peer-reviewed journals. The researcher combined findings and analysis from seven academic articles, which were utilized to inform the surveyees, and educate and inform them on hypertension, which would translate to their post-test scores

Findings

Different methods were utilized to analyze the data collected, however, the majority of these data analysis methods were based on the research of Anggraini Dwi Kurnia, as both t-tests for independent and dependent means were used,

as well as the Pearson correlation coefficient, which was adopted from Kurnia's research. In total, the data was analyzed from a total of 36 respondents.

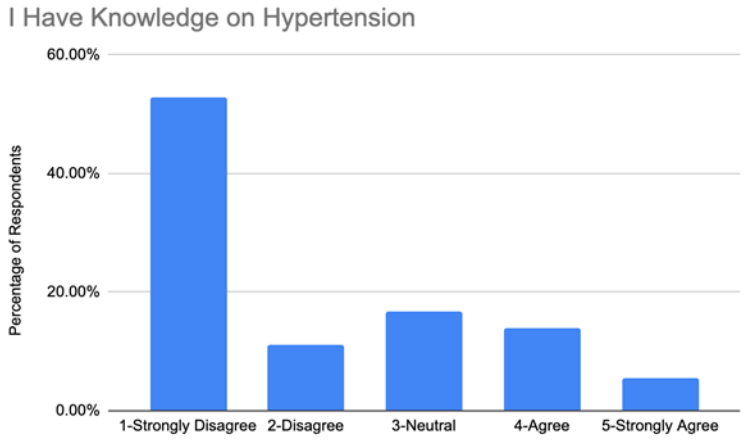

Figure 1. I Have Knowledge on Hypertension Likert Scale

To understand and evaluate the initial confidence levels of students entering the pre-test, a Likert scale question was utilized. The question "I Have Knowledge on Hypertension" was based on a 1 to 5 scale, with each number representing "Strongly Disagree", "Disagree", "Neutral", "Agree", and "Strongly Agree" respectively in ascending order. Figure 1 is heavily skewed to the right, signifying most CHS students did not feel that they had an adequate understanding or knowledge of hypertension prior to the pre-test assessment and intervention (63.9%), indicating a low initial confidence level among students

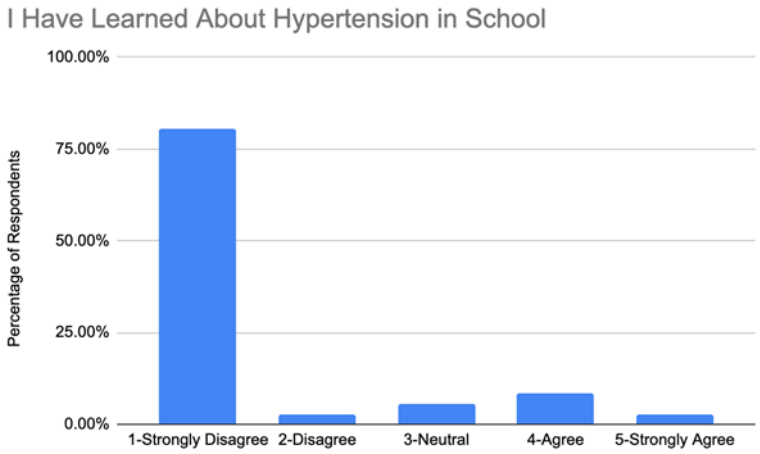

Figure 2. I Have Knowledge about Hypertension in School Likert Scale

The next Likert scale question, titled "I Have Learned About Hypertension in School" was utilized to assess the origin of hypertension awareness, and confirm the researcher's hypothesis that students do not obtain knowledge of the condition through school. This histogram was also heavily skewed to the right, as an overwhelming majority of CHS students did not feel as if they had learned about hypertension in school (83.3%), which may have contributed to their overall lack of understanding as seen later.

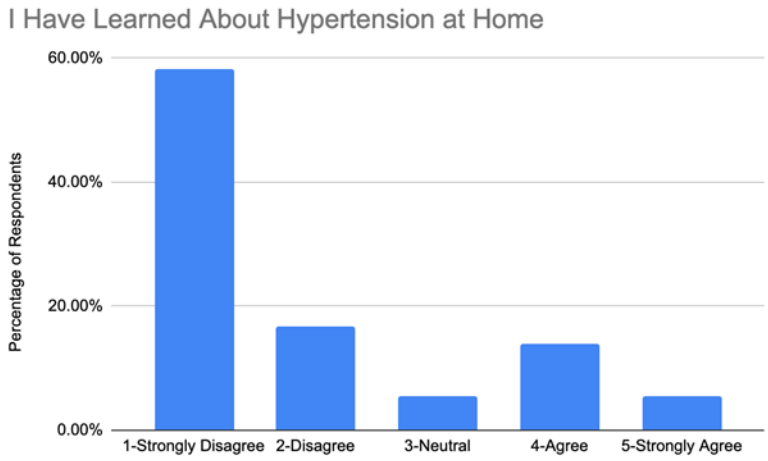

Figure 3. I Have Knowledge about Hypertension at Home Likert Scale

The final Likert scale question, "I Have Learned About Hypertension at Home", was based on an identical 1-5 scale, as seen with questions 1 and 2. This question was utilized similarly to Likert scale question 2 to confirm the researcher's hypothesis that students who had an understanding of hypertension had obtained their hypertension knowledge at home. This histogram, although still skewed to the right, is not as disproportional as the previous question. A larger majority of students agree that they have learned about hypertension at home compared to in school (75%), suggesting that those who did display an understanding of hypertension may have received this knowledge through a parent or other family member

	Mean	Median	Standard Deviation
Female Pre-Test Scores	6.4	6.5	1.69829636
Female Post-Test Scores	6.4	6.5	2.062190966
Male Pre-Test Scores	7.0625	7	1.388944443
Male Post-Test Scores	6.9375	7	2.080664958
Upperclassmen Pre-Test Scores	5.916666667	6	1.729862492
Upperclassmen Post-Test Scores	5.583333333	5	2.065224326
Lowerclassmen Pre-Test Scores	7.083333333	7	1.380506103
Lowerclassmen Post-Test Scores	7.166666667	7.5	1.88048714
Family History of Hypertension Pre-Test Scores	7.833333333	8	1.329160136
Family History of	7.333333333	7.5	2.503331114

Hypertension Post-Test Scores			
No Family History of Hypertension Pre-Test Scores	6.392857143	6	1.571488695
No Family History of Hypertension Post-Test Scores	6.5	6.5	2.009237924

Figure 4. Pre and Post-Test Subpopulation Data

To test for statistical significance between the scores of subpopulations, the researcher conducted a T-test for dependent means. This statistical test was conducted using the *Social Science Calculators* and served as a way to test for statistically significant differences in both pre and post-test scores between subpopulations. Data from the researcher's pre-test and demographic questions, in conjunction with a T-test for dependent means, proved that a family history of hypertension improves one's baseline understanding of the issue, as pre-test score averages increased by almost 1.5 points among those with a family history of hypertension compared to those without a family history of hypertension. Also, lowerclassmen, grades 9 and 10, scored significantly better on the pre-test than the upperclassmen, grades 11 and 12, which contradicts the findings of much research in this field of study, such as the work of Anggraini Kurnia.

	I Have Knowledge on Hypertension	**I Have Learned About Hypertension in School**	**I Have Learned About Hypertension at Home**
I Have Knowledge on Hypertension	1		
I Have Learned About Hypertension in School	0.5294093424	1	
I Have Learned About Hypertension at Home	0.8624612785	0.5576189073	1

Figure 5. Likert Scale Question Correlation

To test for statistical significance between Likert scale questions, the researcher utilized a paired samples T-test from *XLMiner Analysis*, which yielded a wide range of R-values. Comparing results from the researcher's Likert scale questions, it was discovered that question 1 (I Have Knowledge on Hypertension) and question 3 (I Have Learned About Hypertension at Home) have a strong positive correlation with one another, as they yielded an R-value of over 0.8. This may signify that hypertension knowledge was obtained at home rather than in school, possibly from family members as discussed before.

Discussion

In order to analyze data, the researcher utilized both independent and paired t-tests to test the significance between scores of two different groups or populations. Also, the researcher utilized Pearson Correlation tests to understand the correlation between different questions, such as Likert scale questions. The results of this study prove the researcher's

hypothesis that many students lack a baseline understanding of hypertension and its related issues. This is because participants in the study averaged a score of roughly 67%, with the pre-test having an average score of 6.6/10. This is marginally below the required knowledge standard as described by Anggraini Dwi Kurnia's study of 75% comprehension, which is the standard for an acceptable understanding of the issue. This indicates that high school students have an inadequate understanding of hypertension, its causes, and the detrimental effects it may have on one's health. This emphasizes the need to improve hypertension education in high schools as many students are unaware of the life-threatening condition while also answering the researcher's initial research question.

Also, previous literature failed to accurately assess hypertension knowledge among high school students in a well-educated, suburban area, underlining this research's contribution to the field of study.

Other significant findings contributing to the inquiry topic and field of study were present among subpopulations. Specifically, among those with a family history of hypertension. Pre and post-test data highlighted how respondents with a family history of hypertension scored significantly better on the pre-test than those without a family history of hypertension. This yielded a p-value of 0.045186, which is statistically significant. This means that most students who did have a strong baseline awareness of hypertension most likely obtained this understanding outside of the classroom, from family members with hypertension, for example.

Data from the Likert scale questions further supports this idea. Out of the three Likert scale questions (Appendix D), over 50% of respondents strongly disagreed with the claims surrounding their awareness of hypertension, with a staggering 69% of respondents either strongly disagreeing or disagreeing that they have learned about hypertension in school. This emphasizes the large gap in high school curricula for hypertension education, which is extremely concerning as 1 in 25 teenagers are hypertensive (Johns Hopkins University, 2020). Also, Likert scale questions 1 and 3 demonstrated a significant correlation, as they yielded an R-value of 0.862 and a P-value of <0.0001. Question 1 was "I Have Knowledge on Hypertension" and Question 3 was "I Have Learned About Hypertension at Home". This indicates that those who had confidence about their hypertension knowledge most likely acquired this confidence in the subject at home from family or friends with the condition, rather than in school, aligning with the data from Likert scale question 2. This reemphasizes the absence of hypertension education in high schools, further contributing to the topic of inquiry.

This lack of understanding among high school students is further cemented by the researcher's observations during the survey. As the students attempted to answer the first question, many were unaware of what hypertension even was. The room flooded with remarks such as "What's hypertension?" and "I've never heard of [hypertension] before", indicating the lack of awareness of the condition among these students, further emphasizing and supporting the results of the pre-test and Likert scale questions.

Also, gender did not play a significant role in the pre and post-test scores of the respondees. After comparing scores from both tests, a p-value of 0.731324 was assessed, which is statistically insignificant. This aligns with Anggraini Dwi Kurnia's study of "The effects of an educational program on hypertension awareness" that gender did not significantly affect pre-test scores or initial awareness even among a much younger group of respondents.

However, this study's data slightly differed from Anggraini Dwi Kurnia's results in other subpopulations, such as grade. Upperclassmen (juniors and seniors) and lowerclassmen (freshmen and sophomores) had significantly different scores on the pre-test. A comparison of their scores yields a p-value of 0.000636, which is statistically significant. This means that there was a significant difference between initial understanding of hypertension between grade levels, however not in the way one would expect. Lowerclassmen actually exhibited a stronger awareness of hypertension with an average pre-test score of 7.08 compared to 5.92 among upperclassmen. This contrasts the findings of Anggraini Kurnia as in her study, she proved that patients with a stronger educational background scored higher on the pre-test. This is unusual within the topic of inquiry and further adds to the academic discussion.

Finally, the researcher's informed intervention (Appendix E), which served as a plausible solution to inform high school students about hypertension was deemed ineffective. By comparing pre and post-test scores among every respondent, the researcher uncovered a T-value of 0.13 and a P-value of 0.898214, which is statistically insignificant. This mathematically determines that the informed intervention created by the researcher was ineffective, and it cannot

serve as a plausible solution to combat low levels of hypertension awareness in high schools. This partially answers the part of the research question "what can be done to educate [the students]" as the informed intervention is ineffective, however, the data fails to show an effective method that can be used to educate students. This does not align with the research of Anggraini Kurnia as in her research, an educational intervention proved to be an effective method to inform patients of hypertension. This emphasizes the need for more research on the topic of inquiry, specifically on a solution that can be implemented within academia to strengthen hypertension awareness among high school students.

Overall, the researcher's hypothesis was accurate in that many high school students were unaware of hypertension, and its related symptoms, only scoring an average of 6.6/10 points on the pre-test. Also, the researcher's intervention was not effective, only increasing scores by an average of 0.1 points, refuting its efficacy as a plausible solution, and disproving the researcher's hypothesis that an informed intervention would be effective in educating participants. Finally, both the Likert scale questions and subpopulation breakdowns demonstrated that students with a strong initial awareness of hypertension most likely obtained this knowledge at home, from a family member or friend with the condition.

Conclusion

By adopting a pre-test post-test quasi-experimental from Kurnia et al., the researcher was able to assess a baseline understanding of hypertension, while also testing the efficacy of the intervention through the use of the post-test as a comparison to the pre-test. This yielded a variety of data, that when analyzed, allowed the author to draw a variety of conclusions and bring about new perspectives that other researchers in the field did not yet understand. Firstly, pre-test score data was able to highlight and bring attention to the vast lack of hypertension knowledge among high school students. This could greatly jeopardize students' futures as hypertension is even life-threatening in some cases, and ignorance of the condition can increase the severity of its complications. Also, there were many significant findings relating to subpopulations. Among those with a family history of hypertension, for example, students with family members who have dealt with the condition scored vastly better on the pre-test, indicating a deeper understanding of hypertension, its related causes, and symptoms. However, contrary to previous literature, the researcher's data also discovered that younger students, those in grades 9 and 10, scored significantly better than older students, those in grades 11 and 12. This heavily contradicts all previous literature, as studies such as the research done by Anggraini Dwi Kurnia showed that those with a more extensive background with education exhibited a stronger understanding of hypertension. This new perspective provides a deeper insight into the academic discussion of high school hypertension awareness. Also, there existed a strong positive correlation between the perceived hypertension knowledge of students and the origin of this knowledge. Most students who entered the study believing they were informed on the subject also stated that they had learned about the dangers of hypertension at home rather than in school. This once again spotlights the argument that students learn about hypertension through family members who are aware of the condition, rather than learning about the dangers of hypertension in school. This emphasizes the need for more focus on hypertension education in school curricula and demands the attention of this topic in the future, or else many students will stay at risk of this life-threatening condition.

Limitations

However, this study was still limited in many ways, which may have affected the data collected and the overall conclusions drawn. Firstly, the study lacked complete engagement by the participants. Many students did not read and comprehend the intervention, therefore suggesting that some post-test scores may have been skewed. Also, many students were conversing with one another, discussing questions and answers. Although the researcher attempted to prevent this to the best of their ability, cooperation between participants was inevitable due to the number of participants completing the survey at the same time. Furthermore, while the researcher had the minimum acceptable sample

size in accordance with the Fraenkel and Wallen principle, a relatively small sample size may have led to inaccurate data and test scores that poorly represent the overall population of high school students. Finally, the pre-test post-test quasi-experimental method that was adopted by the researcher limited this study's ability to contribute to the subject field. This is due to how the pre-test post-test quasi-experimental method was implemented, as only one version of the survey was sent out to participants. This meant that only one plausible solution to combat low levels of hypertension awareness was tested, and deemed ineffective, leaving the field of discussion without an effective solution to combat low levels of awareness.

Future Research

Similar studies should be conducted in different regions of the United States. Different states and different schools provide new demographic data to this study, and this may provide new insight into this topic. Schools with required health classes, for example, may exhibit a better understanding of hypertension, providing a plausible solution to this problem.

In addition to changing the location of this study, future research should implement a much larger sample size. A larger sample size means a more diverse population, which in turn will provide the researcher with a better representation of the overall population, and allow the researcher to more effectively combat this rising issue.

Likewise, future research should implement multiple informed interventions, such as videos and lectures, into their survey methods. By implementing multiple interventions, future research will be able to test multiple hypotheses when it comes to effective ways of informing students of hypertension. This will better allow future researchers to contribute solutions to the field of study, further advancing high school hypertension awareness research.

Finally, future research would greatly benefit from tying in health providers into their research. By implementing health providers into their research, future researchers could ensure that those who are unaware of their hypertensive conditions would be able to reach out to different health providers and guarantee that their condition is dealt with appropriately. This is a very similar idea to the one posed by Kurnia et al. as they argue that the integration of health providers into future research would protect every participant who had newly discovered hypertension (Kurnia et al., 2022).

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