The Relationship between Health Information Scanning through Social Media and Health Behavior with Moderating Effects of Perceived Susceptibility towards Cardiovascular Disease

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Abstract

Cardiovascular disease is one of the most urgent health concerns in Indonesia. Since this disease is heavily influenced by a person's lifestyle, it is of the utmost importance to promote health behavior in those who are at risk. One area of interest in health promotion is the usage of social media to disseminate health information and increase health behavior. The purpose of this research is to study the relationship between health information scanning through social media and health behavior, as well as the moderation effects of perceived susceptibility towards cardiovascular disease. This research is aimed towards students enrolled in a university in Depok who are in the emerging adulthood phase (18-25 years old) and have a family history of cardiovascular disease. This study utilizes three instruments which measure health behavior, perceived susceptibility towards cardiovascular disease, and health information scanning through social media respectively. The total number of participants for this study was 205 university students who met the required criteria. All of the data in this study were collected online. The results of this study indicate that health information scanning has a positive and insignificant impact on healthy behavior ($r = 0.082$, $p > 0.05$). Aside from that, this study also found that the moderating effect of perceived susceptibility towards cardiovascular disease on the relationship between health information scanning through social media and healthy behavior was positive and not significant ($b = 0.1003$, $t = 1.0927$, $p > 0.05$). Even so, these findings imply that social media has the potential to become a powerful tool to disseminate health information. The way in which this information needs to be conveyed in order to produce significant outcomes requires further research.

Keywords: *Cardiovascular Disease; Health Information Scanning; Social Media; Health Behavior; Perceived Susceptibility*

Introduction

Cardiovascular disease is a type of noncommunicable disease that affects the heart and blood vessels (National Health Service, 2018). This disease was responsible for 35% of all deaths in Indonesia (World Health Organization, 2018). Cardiovascular disease also causes a significant economic burden for both the country and its people. According to Bloom et al. (2015), these diseases are responsible for 39,6% of Indonesia's Gross Domestic Product (GDP) loss. Furthermore, the cost of treatment and healthcare also contributes to poverty (WHO, 2017). Therefore, it is crucial to take preventive actions to avoid the development of these diseases.

Diagnosis for cardiovascular disease is typically found in older adults and the elderly. Even so, it is critical for prevention efforts to start at a younger age. This is because cardiovascular disease is heavily linked to lifestyle choices (WHO, 2017). Another factor that may contribute to the development of this illness is having a family history of cardiovascular disease (Kolber & Scrimshaw, 2014). Although genetic risk factors cannot be modified, they may be lessened through preventive measures such as health behavior (Centers for Disease Control and Prevention, 2020). Sarafino and Smith (2011) define health behavior as "any

activity people perform to maintain or improve their health, regardless of their perceived health status or whether the behavior actually achieves that goal".

This prevention method is crucial for university students in the emerging adulthood phase who are prone to developing cardiovascular disease in the future. Emerging adulthood is defined as a period of preparation for maturity that takes place between the ages of 18-25 years (Arnett, 2020). The urgency for preventive efforts is strengthened when looking at the declining trend of health behavior in emerging adults (Taylor, 2017). With that being said, emerging adults who are university students showcase a few differences regarding their characteristics and health behavior when compared to emerging adults who aren't students. University students tend to have a higher sense of experimentation/possibilities which may cause an increase in health risk behaviors (Reifman, Arnett, & Colwell, 2007). Research also shows that university students consume more alcohol and consume fewer fruits and vegetables than their non-student counterparts (Arnett, 2015; Simons-Morton et al., 2017). Nevertheless, it is important to find ways to increase health behaviors in emerging adults, especially those who are at risk of getting cardiovascular disease in the future.

Promotion of health behavior and disease prevention can be done by increasing health knowledge (CDC, 2017). These days, there is an abundance of health information that can be accessed freely on the internet. Those types of information could even be obtained without having to search for them. The process in which a person gains information accidentally from routine exposure to a certain source is known as information scanning (Niederdeppe et al., 2007). Even though exposure to these types of information is accidental, this process requires the individual to consciously pay attention to the information at hand (Shim, Kelley, & Hornik, 2006). Health information received through health information scanning has an impact on a person's health behavior (Shim et al., 2006). This process may increase health behavior by providing access to knowledge about the benefits and risks of certain behavior and how to be able to carry out these behaviors successfully (Hornik et al., 2013). The association between health literacy and health behaviors has also been found in a research conducted by Vozikis, Drivas, and Konstantinos (2014).

A part of the internet that has great potential for health information scanning is social media. This is because social media has unique aspects such as push notifications and news subscriptions that may support accidental exposure to certain information (Tang & Zou, 2021). Other features such as the explore page, advertisement, and automatically recommended content could also encourage health information scanning. Health information scanning on social media may be an interesting topic to study during the pandemic because of the increase of social media usage and health information available online due to the COVID-19 pandemic. In the early days of the pandemic, a 47% increase in the duration of social media usage was observed (Currey, Nazir, & Abukhadra, 2020). Moreover, social media platforms such as Tiktok are experiencing an increased number of users in Indonesia (Annur, 2020). There are also a new array of products emerging from publishers such as videos, infographics, and live blogs (Radcliffe, 2020). Another headway is the growing number of educational content (Annur, 2020). Social media has also become a source of information about COVID-19 (Sampurno, Kusumandyoko, & Islam, 2020). This is especially important for young people who receive information on COVID-19 through social media (Tang & Zou, 2021).

Furthermore, the relationship between health information on social media and health behavior can also be influenced by perceived susceptibility which refers to a person's perception of their probability of getting a disease. (Sarafino & Smith, 2011). The effectiveness of a message on social media to modify behavior is moderated by a person's perceived susceptibility (Gallagher et al., 2011; Updegraff et al., 2015). Additionally, the level of perceived susceptibility to cardiovascular disease tends to be higher in individuals who have a family history of the said disease (Saeidi & Komasi, 2018).

Based on these pieces of information, two research questions emerge, the first being "Is there a relationship between health information scanning on social media and health behavior amongst university students in the emerging adulthood phase with a family history of cardiovascular disease?". The second research question is as follows "Does perceived susceptibility towards cardiovascular disease moderates the relationship between health information scanning on social media and health behavior amongst university students in the emerging adulthood phase with a family history of cardiovascular disease?".

The answer to this question might be affected by the surge of social media usage and increase of online health information due to the COVID-19 pandemic. This research aims to investigate the relationship between health information scanning on social media with the moderating effect of perceived susceptibility towards cardiovascular disease. The dynamics of this relationship are researched on university students in the emerging adulthood phase with a family history of the said disease. Two hypotheses are formulated based on the information discussed. The first hypothesis is that health information scanning on social media has a positive relationship with healthy behavior among university students in the emerging adulthood phase who have a family history of cardiovascular disease. The second hypothesis is that perceived susceptibility towards cardiovascular disease moderates the positive role of the relationship between health information scanning on social media and healthy behavior among university students in the emerging adulthood phase who have a family history of cardiovascular disease.

Methods

Research Design and Participants

This research is a quantitative cross-sectional study.The participants of this study are university students in the emerging adulthood period (18-25 years) who have a family history of cardiovascular disease and at least one social media account. The samples are taken using convenience sampling from university students enrolled at Universitas Indonesia who met the required criteria. The total amount of samples that were used for this research was 205.

Measures

Health Behavior

The current study utilizes three measures, the first one being a health behavior instrument developed by a student research team from the Faculty of Psychology at Universitas Indonesia. The health behaviors mentioned within this instrument revolve around behavior regarding six habits which are eating breakfast, snacking, physical activity, alcohol consumption, smoking, and measuring body weight. Therefore, this instrument has 6 dimensions related to the habits mentioned with a total of 18 items (Fatimah, 2016). Even so, the scoring for health behavior is seen from the total score. Each item from this questionnaire is answered using a 4-point Likert scale, namely 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, and 4 = Strongly Agree (Fatimah, 2016). This instrument contains 5 unfavorable items (item 3, 4, 5, 9, and 12) wherein the value of these items will be reversed. The language used in this instrument is Indonesian. According to the limitations set by Ursachi, Horodnic, and Zait (2015), this instrument has been considered reliable with an Alpha Coefficient of 0.758 for the total score. The validity of this instrument as a whole ranges from 0,178-0,607. Although there are items that are below the validity limit set by Nunnally & Bernstein (1994) on the overall test of the measuring instrument, the item is still maintained because the value of r in the dimensions is valid (eating breakfast = 0,459 snacking = 0,349-0,554 physical activity = 0,823-0,849, alcohol consumption = 0,643-0,816 smoking = 0,439-0,932, measuring body weight =0,749)

Perceived Susceptibility towards Cardiovascular disease

Perceived susceptibility towards cardiovascular disease was measured using the perceived susceptibility instrument by Rimal (2003) that has been adapted and translated by Fatimah (2016). The changes made by Fatimah (2016) were to specify the types of perceived susceptibility according to three diseases, including cardiovascular disease, diabetes, and cancer. This research will only utilize the items that refer to perceived susceptibility towards cardiovascular disease which consists of 2 questions. The items are as follows : a) Compared to most people my age, I understand that my risk of getting cardiovascular disease is . . . and (b) The likelihood of my getting skin cardiovascular disease is...The answers in this questionnaire are scored in the form of a 5-point Likert scale ranging from 1 = very low to 5 = very high (Rimal, 2003 in Fatimah, 2016). The scoring for this variable is seen from the total score. The Alpha coefficient for this instrument is 0.906 and an r value of 0.827 (Fatimah, 2016). This has been classified as reliable if based on the limit by Ursachi et al (2015). In addition, the instrument is also considered valid if it follows the limits of Nunnally & Bernstein (1994) r value > 0.2.

Health Information Scanning through Social Media

The instrument used to measure health information scanning through social media was adapted from one item designed by Shim et al (2006). The item reads “How much attention do you pay to information about health or medical topics on/in [MEDIA SOURCE]?”. The media source referred to here includes television, radio, newspapers, and magazines (Shim et al., 2006). For this research, “[MEDIA SOURCE]” is replaced by “social media” since it is the only intended media source. The phrase “health or medical topics” was modified to make it refer to more specific topics of health information (COVID-19, cardiovascular disease, healthy diet, physical activity, dangers of smoking, and alcohol consumption). Specification towards healthy diet, physical activity, dangers of smoking, and alcohol consumption are added to correspond to the health behaviors measured in this study. Topics about COVID-19 are added in response to the influx of health information on social media regarding this disease. Information about cardiovascular disease was also added because of its relevance to the type of perceived susceptibility discussed in this research. Aside from that, the instrument was also translated into Indonesian. The questions on this instrument are answered on a 4-point Likert scale (1 = not at all, 2 = a little, 3 = sometimes, 4 = often) (Shim et al., 2006). The scoring for this instrument is taken from the total score.

Furthermore, the researchers conducted reliability and validity tests on 32 university students who had a family history of cardiovascular disease. The reliability test process was carried out using Cronbach's Alpha. The result of the Alpha coefficient of this measuring instrument is 0.648. According to Ursachi et al (2015), an Alpha coefficient between 0.6 and 0.7 can be considered as acceptable. Therefore, this measuring instrument can be considered reliable. Next, a validity test was carried out using the corrected total item correlation. The result of the r value for this measuring instrument is 0.240-0.553. Based on the limitations set by Nunnally & Bernstein (1994), this measuring tool can already be considered valid.

Other measurements

The researchers also collected demographic data from the participants. This includes their age, gender, faculty, social media platform used, and types of health information seen on social media.

Data Collection and Analysis Procedure

The data collection process took place from 8 December 2020 to 11 December 2020. The minimum sample size needed to obtain significance is 89. This number is calculated using adequate power = 0.95, alpha level = 0.05, and effect size = 0.36. This calculation is done with the G * Power 3.1 application. The researchers utilized social media to spread awareness about the current study and to gain participants. All data in this study were collected online via a google form. Participants were asked to fill in informed consent, personal data, as well as the measuring instruments. During the beginning of the administration process, the researchers did not include items regarding the participant's gender. A revision was made to the google form questionnaire to include a question about the participant's gender.

The IBM SPSS Statistics 23 program was used to analyze the data from this research. A summary of the participant's demographic data was obtained through descriptive analysis. Pearson Correlation was used to analyze the relationship between health information scanning on social media and health behavior. This process is done to confirm the correlation between those two variables because the researchers would like to explore this relationship within the context of the COVID-19 pandemic. A statistical analysis was made using Hayes Process Version 3.5 to examine the strength moderating effect of perceived susceptibility towards cardiovascular disease. This study did not go through an ethical review because the data collected has no psychological consequence for the participants. The researchers also did not test for assumptions and did not undergo a missing data analysis. Test of assumption was not done because of the sample size. This is because parametric tests can be done to a larger sample size (> 40) regardless of the normality distribution (Ghasemi & Zahediasl, 2012). A missing data analysis was not completed because the data missing in this research (gender) were not considered in the hypothesis testing.

Results

The total number of participants involved in the data collection process was 269. However, the total number of participant data that was ultimately used was 205. This is because 64 of the initial participants did not meet the criteria for having a family with a history of cardiovascular disease.

Table 1. Overview of Participant Demographics

Characteristics		n	%
Gender			
	Female	89	43.4
	Male	26	12.7
	Data unavailable	90	43.9
Age	18	16	7.8
	19	56	27.3
	20	76	37.1
	21	50	24.4
	22	6	2.9
	24	1	0.5
Faculty Group			
	Social Sciences	128	62.5
	Technical	48	23.4
	Health Sciences	22	10.7
	Vocational Program	7	3.4

Figure 1. Social Media Platform Used by Participants

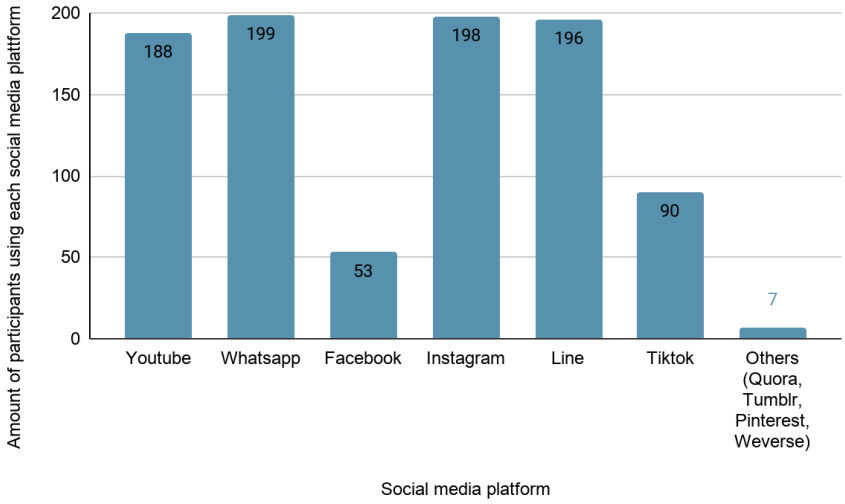
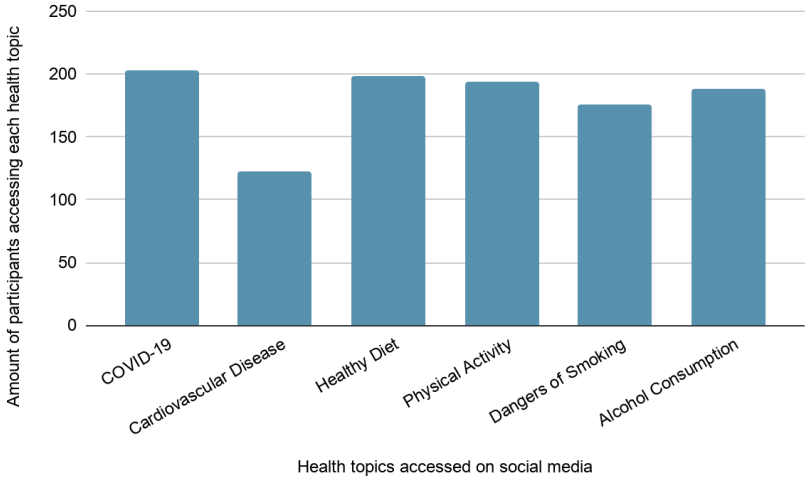


Figure 2. Health Topic Seen on Social Media by Participants



The majority of the participants with their gender recorded were women. Even so, there were 90 other participants with missing data regarding their gender. Most of the participants were 20 years old. Although the age range for this study was 18-25 years old, there were no participants aged 23 years old and 25 years old. Additionally, the participants mainly came from social science majors. The most common health information topic seen on social media is about COVID-19 and the most used social media is Whatsapp.

Based on the descriptive analysis, the average overall score for health information scanning on social media was 17.49 (SD = 2.88) with a maximum value of 24 and a minimum value of 9. For the health behavior variable, the average value obtained was 49.28 (SD = 6.11). In this variable, the maximum score acquired is 63 whilst the minimum score is 32. Regarding perceived susceptibility towards cardiovascular disease, the average score was 6.58. The maximum score that the participants obtained was 10 and the minimum score was 2.

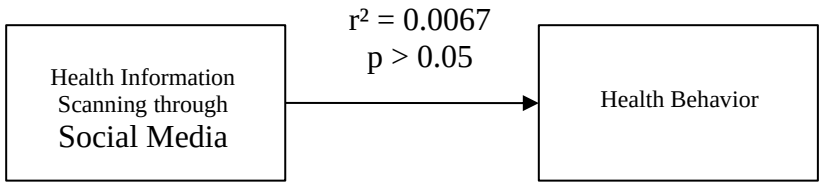
Table 2. Overview of Variables

Variable	Mean (M)	Standard Deviation (SD)	Maximum Score	Minimum Score
Health Information Scanning	17,49	2,88	24	9
Health Behavior	49,28	6,11	63	32
Perceived Susceptibility	6,58	1,72	10	2

Health Information Scanning through Social Media and Health Behavior

Based on the calculations, there was a positive and not significant correlation between health information scanning on social media and health behavior ($r = 0.082$, $p > 0.05$). The effect size for this relationship is $r^2 = 0.0067$ which classifies as a small effect size (Cohen, 1992). Therefore, the first hypothesis H_1 is not supported by the data.

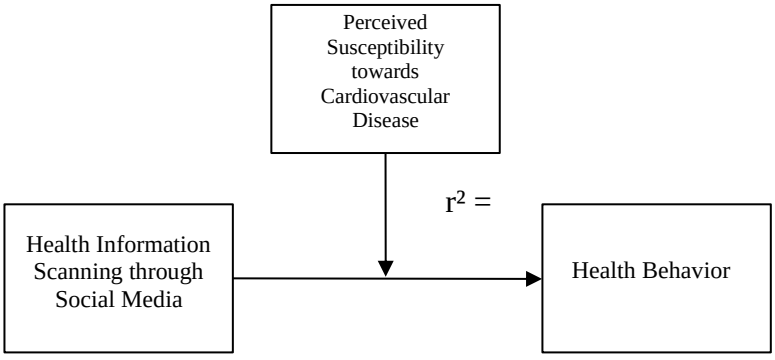
Figure 3. Health Information Scanning through Social Media and Health Behavior



Moderating Effect of Perceived Susceptibility towards Cardiovascular Disease

The results of the analysis showed that perceived susceptibility did not significantly explain the relationship between health information scanning and healthy behavior, $r^2 = 0.0128$, $F (3.201) = 0.8669$, $p > 0.05$. This signifies a small effect size (Cohen, 1992). In conclusion, perceived susceptibility towards cardiovascular disease did not significantly moderate the relationship between health information scanning on social media and health behavior ($b = 0.1003$, $t = 1.0927$, $p > 0.05$). Therefore, H_2 is not supported by data.

Figure 4. Moderating Effect of Perceived Susceptibility towards Cardiovascular Disease



Discussion

This study shows that there is a positive and insignificant correlation between health information scanning on social media and health behavior. This means that hypothesis 1 is not supported by the data. One of the things that might influence this result is the increased duration of social media use during this pandemic. Vaterlaus et al. (2015) claim that social media may act as a distraction that causes unhealthy lifestyles such as low exercise time and poor dietary habits. Because of this, it is possible that the amount of time spent by the participants on social media deters them from implementing health behaviors. Hence, the effect of health information scanning through social media health behavior may not be as prominent. Another factor that has the potential to influence the significance of this relationship is the psychological condition of the participants. University students experienced an increase in depression and anxiety during the pandemic (Islam et al., 2020). Psychological stress experienced by a person is related to smoking behavior, lack of exercise, and less consumption of fruits and vegetables (St-Pierre et al., 2019). Therefore, the influence of health information scanning on health behavior may decrease due to psychological factors.

Concerning the moderating effect of perceived susceptibility, this study found a positive and insignificant coefficient. Therefore, hypothesis 2 of this study is not supported by data. Even so, the direction of the moderating effect is consistent with previous research (Gallagher et al., 2011). One of the things that might influence the significance of the moderating effect is the suitability of the type of information received by each participant. Lee and Aaker (2004 in Updegraff et al., 2015) states that health information that focuses on the negative side of a behavior is more effective for individuals who have high levels of perceived susceptibility, whilst individuals with lower levels of perceived susceptibility are more affected by health information that focuses on the positive side of a behavior. Individuals are exposed to various types of health information on social media. This means there is a possibility that the participants did not receive the type of information that matches their level of perceived susceptibility.

Another reason that may cause insignificance of the moderation effect is that not all of the health information obtained through health information scanning on social media is directly related to cardiovascular disease. In previous studies, the health information provided was related to the type of perceived susceptibility participants had (Gallagher et al., 2011; Updegraff et al., 2015; Hwang et al., 2012). Many of the participants in this research were not exposed to information about cardiovascular disease on social media. Therefore, it is possible that the moderating effect proved to be insignificant because participants were not exposed to information that specifically refers to cardiovascular disease.

Another factor that may influence the significance of the moderation effect is the age range of the participants in this study. In previous research, a significant moderation effect of perceived susceptibility is usually shown in an older age range (Gallagher et al., 2011). According to Kaba, Khamisa, and Tshuma (2017), younger adults tend to have a lower perceived susceptibility to non-communicable diseases than older adults. Since all of the participants in this research were in the emerging adulthood phase, their level of perceived susceptibility might be lower and have less of a moderation effect on their health behavior. The findings in this research regarding the level of perceived susceptibility towards cardiovascular shown in the participants is in accordance with previous studies.

Conclusion

In conclusion, there was a positive and insignificant correlation between health information scanning through social media and health behavior. This means that healthy behavior increases along with health information scanning and the changes that occur are not seen significantly. In addition, researchers also tested the moderating effect of perceived

susceptibility towards cardiovascular disease to the relationship between health information scanning through social media and health behavior. The moderating effect of perceived susceptibility towards cardiovascular disease was found to have a positive and insignificant coefficient. This means that perceived susceptibility towards cardiovascular disease does not moderate the relationship between health information scanning through social media and health behavior.

Based on the findings of this research, the researchers recommend a few improvements that may be implemented in future studies. The first is to consider both social media usage duration and the psychological state of the participants as factors that may influence the dynamics of the variables. Future research can also investigate health information scanning focusing on specific health topics and how it affects health behavior that is directly related to the said information. Apart from that, there are also a few suggestions for practical applications. The data from this study points out that there is a need to increase the prevalence of information relating to cardiovascular disease on social media. By doing so, there may be a bigger chance for emerging adults to find and scan this information.

This study is not without its limitations. The first one being the exclusion of social media usage duration as a control variable. Moreover, the researchers also did not take into account the psychological conditions of the participants. Another limitation of this study is related to the instrument used to calculate health information scanning. In this instrument, not all of the health topics attended to during the scanning process is directly related to the orientation of the perceived susceptibility that is being studied. Despite these limitations, the findings from this study shows social media's potential as a tool to disseminate health information, but how that information is conveyed must be tailored to the target audience. Since emerging adults tend to have a lower perceived susceptibility, it could be beneficial to promote the advantages of a healthy lifestyle instead of highlighting the poor outcomes of an unhealthy one. This may serve as valuable information for future health promotion efforts as well as future research in the field of health psychology.

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