Journal of Public Health and Pharmacy
2775-4952 (Online - Elektronik)
Research Articles Open Access

Psychological Well-Being Mediates Cyberbullying Victimization and Risky Health Behavior: Public Health Implications for Universities

Purwo Setiyo Nugroho[1,2*], Bhubate Samutachak[3], Tawanchai Jirapramukpitak[4], Fatimah Ahmad Fauzi[5] Ghozali Ghozali[6], Aphichat Chamratrithirong[7]
[1]Institute for Population and Social Research, Mahidol University, Nakhon Pathom, Thailand
[2]Faculty of Public Health, Universitas Muhammadiyah Kalimantan Timur, Kalimantan Timur, Indonesia
[3]Institute for Population and Social Research, Mahidol University, Nakhon Pathom, Thailand
[4]Institute for Population and Social Research, Mahidol University, Nakhon Pathom, Thailand
[5]Faculty of Medicine and Health Sciences, University Putra Malaysia, Malaysia
[6]Faculty of Public Health, Universitas Muhammadiyah Kalimantan Timur, Samarinda, Kalimantan Timur, Indonesia
[7]Institute for Population and Social Research, Mahidol University, Nakhon Pathom, Thailand

*Corresponding Author: E-mail: purwo.skm@umkt.ac.id

ARTICLE INFO

Manuscript Received: 07 Sept, 2024
Revised: 01 Feb, 2025
Accepted: 05 Feb, 2025
Date of publication: 01 Jul, 2025
Volume: 5
Issue: 2
DOI: 10.56338/jphp.v5i2.6044

KEYWORDS

Cyberbullying;
Risky Health Behavior;
Coping Capacity;
Psychological Wellbeing;
Undergraduate Student

ABSTRACT

Introduction: Cyberbullying has become a burden in the current digital world and has an impact on health status, including physical and mental health. People try to mitigate these mental health issues through various coping strategies, including engaging in risky health behavior. Such risky health behaviors may have implications for future health status. Thus, this study aims to examine the prevalence of cyberbullying victimization and elucidate the consequences of cyberbullying victimization on psychological well-being and risky health behavior.
Methods: A cross-sectional design was employed in this study, with 700 undergraduate students as research participants. The students were randomly selected using proportional stratified and random sampling in a selected university in Samarinda, Indonesia, between January and March 2024. Participants were first-year, second-year, third-year, and fourth-year students. Self-administered data collection using a standard questionnaire for each variable. This study used the Structural Equation Model to analysed the associations between variables.
Results: Cyberbullying victimization affects psychological well-being, which, in turn, influences risky health behaviors. While no direct link was found between cyberbullying and risky health behaviors, psychological well-being fully mediates this relationship. This suggests that the negative impact of cyberbullying on health behaviors occurs through its detrimental effects on psychological well-being, leading to risky health behaviors as coping strategies.
Conclusion: The study reveals significant links between cyberbullying victimization, coping capacity, psychological well-being, and risky health behavior. These findings highlight the importance of effective coping strategies. Future research should focus on enhancing problem-focused coping techniques, which could serve as positive strategies to reduce the negative impact of cyberbullying on psychological health and risky health behaviors.

Publisher: Pusat Pengembangan Teknologi Informasi dan Jurnal Universitas Muhammadiyah Palu

INTRODUCTION

The global impact of information and communication technology (ICT) has been considerably influenced by its advanced growth over the past decade, especially in Indonesia. Individuals are more familiar with technology devices such as smartphones, computers, and others. The increasing use of modern information and communication technology has resulted in a notable rise in the number of individuals utilizing the internet, mainly social media. Indonesia has the highest number of internet users among Southeast Asian nations (1). The increased internet utilization has the potential for individuals to engage in either positive or negative interactions throughout cyberspace, including experiences of cyberbullying (2).

As Indonesia lacks a comprehensive nationwide survey on cyberbullying despite a notable rise in its prevalence, accurately gauging the extent of this phenomenon poses a significant challenge (1). One major factor contributing to this challenge is the tendency of individuals experiencing cyberbullying to remain silent, often due to feelings of embarrassment, thereby refraining from reporting themselves as victims (3). Previous research has extensively examined the phenomenon of cyberbullying in middle and high school contexts. However, more studies are needed to investigate this phenomenon among university students (4,5).

The phenomenon of cyberbullying among college students is connected to the transmission of cyberbullying behavior from childhood and adolescence to adulthood. If cyberbullying occurs among university students, it is likely that cyberbullying will also happen in adulthood, namely that on the job (6). University students are more vulnerable to engaging in cyberbullying compared to other age groups due to their extensive use of the internet without parental supervision. Primarily, university students reside in boarding houses, where they are often separated from their parents. University students predominantly reside in boarding houses, usually living away from their parents. This separation can render them more vulnerable to cyberbullying victimization than high school students (7). Previous studies revealed the prevalence of cyberbullying among undergraduate students, exhibiting a range of 10% to 60% across various nations.

Previous studies also highlighted that experiencing victimization was associated with many adverse health and behavioral consequences. Victims may experience mental health issues, including feelings of loneliness, anxiety, stress, and even thoughts of suicide (8). Some people who experience cyberbullying may engage in risky health behaviors, such as consuming high-fat foods, consuming carbonated beverages, smoking, excessively gaming, or engaging in other activities that might effectively alleviate stress (8–14). Nevertheless, the adverse consequences of being a victim of cyberbullying depend on an individual's coping capacity, including factors such as self-esteem, self-control, and self-efficacy, which enable them to manage the stressors associated with cyberbullying effectively (15).

However, previous studies have analyzed the effects of being a victim of cyberbullying separately, without considering their combined consequences. For instance, the impact of being a victim of cyberbullying on one's emotional well-being (8), mental health, and risky health behavior (8–14). The previous study did not consider the coping capacity on the pathway association between cyberbullying consequences (8–14). This study uniquely examines the mediating role of psychological well-being in the relationship between cyberbullying victimization and engagement in risky health behaviors. Thus, the objective of this study is to investigate the prevalence of cyberbullying among university student and the pathway association of the impact of being a victim of cyberbullying on psychological well-being and engagement in risky health behaviors among undergraduate students.

METHOD

Research design and settings

This research employed a cross-sectional design, whereas undergraduate students from Universitas Muhammadiyah Kalimantan Timur in Samarinda, Indonesia, were recruited. The university is one of the biggest universities in Samarinda, with more than 8,000 students, which reported some cyberbullying victimization there. The process of gathering data was conducted between January and March 2024, utilizing a self-administered questionnaire. To minimize the risk of bias caused by potential misunderstandings during the completion of the self-administered questionnaire, the researchers provided clear guidance and explained each section of the research instrument. Additionally, the questions were structured in a logical sequence aligned with the progression of events to reduce errors.

Population and sample

The study's inclusion criteria include undergraduate students registered at the selected university who are willing to complete the questionnaire. These students include first-year, second-year, third-year, and fourth-year students. The study excludes students who were absent during the study. According to the data registration of academic affairs, the entire student population on November 4th, 2023, amounted to 7,951 individuals, distributed among 18 undergraduate programs. The A-Priori sample size for structural equation models, as proposed by Soper, 2020 (16) was utilized to determine the total of 700 samples. This study used proportionately stratified according to the number of each study program student sizes and simple random sampling techniques according to student size at each level of study to select participants.

Measurement

Cyberbullying victimization

The study assessed cyberbullying victimization among undergraduate students using the Cyberbullying Victimization Measures (CVM) developed by Virginia L. Byrne (17). The questionnaire has eight questions related to individuals' experiences with cyberbullying, with a 5-point Likert-type scale ranging from "Never" to "Always.". The outcome of being a victim of cyberbullying was a calculated mean score. CVM is specifically designed to measure experiences of cyberbullying, such as online harassment, threats, or exclusion. It is flexible, works for different age groups, and provides clear insights into victimization behaviors (17).

Coping capacity

The examination of coping capacity included a comprehensive set of 12 questions that addressed various dimensions: emotional coping, behavioral coping, categorical thinking, superstitious thinking, and negative thinking. The assessment of coping capacity was conducted using a five-point scale, which included the following categories: very inconsistent, quite inconsistent, consistent, relatively consistent, and strongly consistent (18). The coping capacity measured outcome was a mean score.

Psychological wellbeing

The measurement of psychological well-being was conducted using the Patient Health Questionnaire (PHQ-9)-General Anxiety Disorder (GAD-7) (19,20), employing a four-point scale ranging from "not at all" to "every day." The psychological well-being assessment contains a set of 16 questions that relate to the frequency of participants' experiences with their daily psychological situations, including emotions such as sadness, depression, hopelessness, and so on. A mean score is computed to reflect the level of psychological well-being. PHQ-9 is a widely recognized tool for assessing depression. It is simple, quick to complete, and aligns with clinical standards for diagnosing depression (19).

Risky health behavior

The risky health behaviors refer to smoking, alcohol use, appetite, sleep problems, sedentary behavior, and skipping breakfast. These factors related to their activity are measured using a Likert scale, including response options such as never, sometimes, often, and always. Binge eating, as a risky health behavior, can be categorized into four separate groups: mild disorder (1–3 binge-eating events per week), moderate disorder (4–7 binge-eating activities per week), severe disorder (8–13 binge-eating activities per week), and extreme disorder (14 or more binge-eating activities per week) (21). The result of participating in risky health behaviors was a calculated mean score.

Data analysis

Descriptive analysis was employed to provide a comprehensive depiction of the variable, covering the characteristics of the participants as well as the specific variables related to the research question. This research employed the Structural Equation Model (SEM) to examine and evaluate the linear causal (22,23) and relationship pathway (24) between cyberbullying victimization, psychological well-being, coping capacity, and risky health behavior. The SEM examines the association between the observable and latent variables (25). Cyberbullying experiences, as a latent variable, have eight observed variables denoted C1, C2, C3, C4, C5, C6, C7, C8, C9). As a latent variable, Coping capacity has 12 observed variables denoted E1, E2, E3, E4, E5, E6, E7, E8, E9, E10, E11,

E12. As a latent variable, psychological well-being has 16 observed variables denoted F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12, F13, F14, F15, F1. The definition of indicated observable variables may be found in the appendix of this article. Risky health behavior, as a latent variable, consists of binge eating (G1), smoking (G2), alcohol use (G3), appetite (G4), skipped breakfast (G5), sedentary behavior (G6), and sleep problems (G7).

The Structural Equation Modeling (SEM) analysis revealed a 95% significance level in understanding the associations between each latent variable. The p-value can be employed to reveal the association between variables. A significant association between variables is indicated when the p-value is less than 0.05 (26). The analysis also considered factor loadings, which are essential in SEM as they reflect the importance of each variable in defining the underlying constructs being investigated (27). Higher factor loadings indicate a stronger relationship between the observed variables and the latent constructs, while lower loadings suggest a weaker connection (28).

The rho_a values were used to assess the internal consistency and reliability (rho_A > 0.7). Construct reliability is also assessed using the value of composite reliability. If the composite reliability exceeds 0.70, the indicator is considered consistent in measuring the latent variable (29). The research framework confirmed the model's adequacy by analyzing fit indices, including the x^2 value, NFI, SRMR, and degrees of freedom (df) (30). The data was analyzed using SMART-PLS.

Ethical Clearance

The researchers obtained ethical permission from the Institutional Research Board of the Institute for Population and Social Research, Mahidol University, with reference number 2023/12-242. The researcher asked the students about their willingness to engage in the study. Subsequently, the researcher ensured that the participants read the participant information sheet and completed the information concern sheet.

RESULTS

Table 1 provides an overview of the student's characteristics, including age, sex, student year, study program, original home, ostracized experience, living at the boarding house, and household structure. According to the findings of the univariate analysis, the age range of the participants ranged from 18 to 23 years. Students aged 18-19 had the highest number of respondents, including 372, accounting for 53.15%. Most participants, specifically 407 (58.14%), were female. The participants of this study included students in their first, second, third, and fourth years of study. Most participants were first-year students, with 211 individuals (30.14%) in total. The selected university has 18 study programs, with most students, approximately 20.86% (146 students), studying management studies.

During the research, students were asked about their place of origin, with the majority originating from rural regions (60%) and the majority residing in boarding houses during the academic period (54.43%). The students were also questioned about their experiences and perceptions of being ostracized. Most students (76%) reported having no feeling of ostracization. Most students (85.57%) reported belonging to the nuclear family when asked about household structure.

Table 1. Demographic characteristics of respondents

Variable	n (700)	%
Age		
18-19	372	53.15
20-21	296	42.29
22-23	34	4.57
Sex		
Female	407	58.14
Male	293	41.86
Student year		
First-year	211	30.14
Second year	192	27.43
Third year	153	21.86
Fourth-year	144	20.57
Study program		
Nursing	55	7.86

Variable	n (700)	%
Public health	72	19.29
Environmental health	19	2.71
Pharmacy	53	7.57
Psychology	78	10.00
Law	57	8.14
Management	146	20.86
Accountancy	10	1.43
International relation	28	4.00
Informatics	71	10.14
Civil engineering	29	4.14
Mechanical engineering	25	3.57
Geology engineering	9	1.29
Sport education	15	2.14
English education	17	2.43
Digital business	3	0.43
Agrotechnology	8	1.14
Agribusiness	13	1.86
Original home		
Rural	420	60.00
Urban	280	40.00
Ostracized experienced		
Yes	32	4.57
No	532	76.00
I am not sure	136	19.43
Living at boarding house		
Yes	381	54.43
No, living with relatives	52	7.43
No, living with parent	267	38.14
Household structure		
One-person	6	0.86
Single parent	79	11.29
Composite	2	0.29
Extended	14	2.00
Nuclear	599	85.57

Table 1 provides a comprehensive breakdown of the different types of cyberbullying reported by participants. The analysis categorizes cyberbullying into eight distinct forms: receiving hurtful comments, hurtful images, hurtful videos, hurtful web pages, spreading rumours, online threats via messages, online threats via platforms, and impersonation of the victim online. The most frequently reported experience was occasionally receiving hurtful comments, affecting around 30.57% of participants, while the least common experience was encountering hurtful web pages, with around 89.14% of participants indicating they had never experienced this form of cyberbullying. Figure 1 presents the frequency of cyberbullying experiences reported by participants. The data show that 52.4% of participants experienced hurtful comments, representing a significant proportion. On the other hand, most participants (89.1%) reported never encountering harmful web pages.

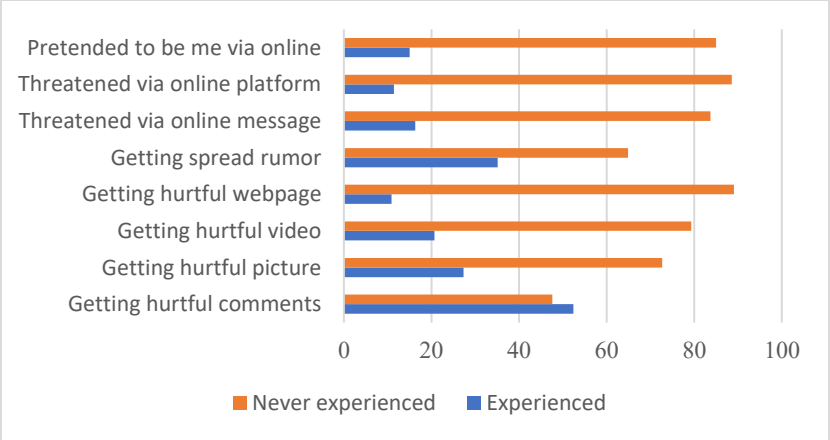


Figure 1. The percentage of students who experienced cyberbullying

Table 2 displays the internal consistency and reliability of each latent variable. All latent variables have a Rho_A value over 0.7, indicating that the internal consistency and reliability of the latent variables are significant. All latent variables have a construct validity value above 0.70, indicating that the indicators consistently measure the latent variables.

Table 2. Internal consistency validity and reliability

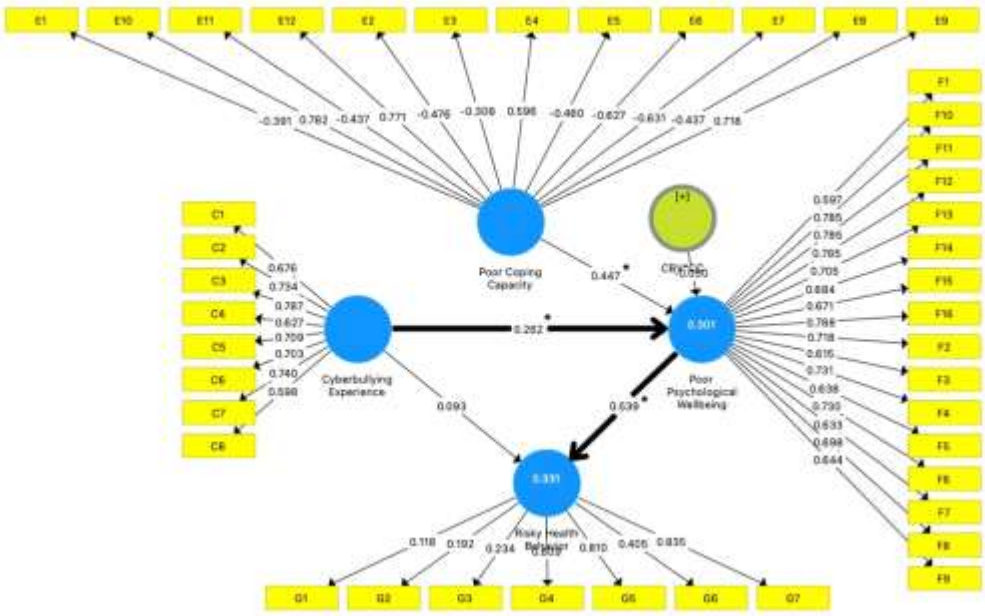
	Rho_A	**Composite reliability**
Coping Capacity	0.860	0.910
Cyberbullying victimization	0.867	0.884
Risky Health Behavior	0.782	0.710
Psychological Wellbeing	0.933	0.939

Figure 2 shows the association between the latent variable and the observed variable. The latent variable encompassing the cyberbullying experience has eight observable factors, namely C1, C2, C3, C4, C5, C6, C7, and C8. The latent variable of coping capacity consists of 12 observable variables, namely E1, E2, E3, E4, E5, E6, E7, E8, E9, E10, E11, and E12. The latent variable of psychological well-being consists of 16 observable variables, namely F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12, F13, F14, F15, and F16. Seven observable variables (G1, G2, G3, G4, G5, G6, G7) are associated with the latent variable of risky health behavior.

Figure 2 illustrates the factor loadings and the interrelationships among latent variables, including cyberbullying victimization, coping capacity, psychological well-being, and risky health behaviors. The model further clarifies the moderating effect of coping capacity on the relationship between cyberbullying victimization and psychological well-being, as depicted by the interaction term (CBV*CC) highlighted in green. This interaction effect demonstrates how coping capacity influences the impact of cyberbullying victimization on psychological well-being. The analysis revealed a significant association (p-value < 0.000) between cyberbullying victimization, psychological well-being, and risky health behaviors. However, no significant direct association was found between cyberbullying victimization and risky health behaviors (p-value > 0.05). A one-unit increase in the frequency of cyberbullying victimization led to a 0.262-unit increase in experiencing poor psychological well-being. Additionally, a one-unit increase in poor psychological well-being corresponded to a 0.539-unit increase in the frequency of risky health behaviors.

Regarding the potential moderation effect, coping capacity was significantly associated with psychological well-being ($p < 0.000$). However, the interaction between coping capacity and cyberbullying victimization (CBV*CC) did not show a significant association with psychological well-being, indicating that coping capacity does not moderate the impact of cyberbullying victimization on psychological well-being.

The SEM analysis confirmed a full mediation effect in the study. Specifically, there was a significant relationship between cyberbullying victimization and psychological well-being, as well as between psychological well-being and risky health behaviors. However, there was no direct association between cyberbullying victimization and risky health behaviors. The analysis further identified psychological well-being as a significant mediating variable (p-value < 0.000) in the relationship between cyberbullying victimization and risky health behaviors, as evidenced by the specific indirect effect in SEM analysis.



*p-value < 0.000; X2= 3704.049; NFI = 0.721; SRMR = 0.072; df= 851
CBV*CC (Moderation/ interaction effect between cyberbullying victimization and coping capacity)
Figure 2. Measurement model of the study among students (N: 700)

DISCUSSION

Interpretation of Key Findings

Cyberbullying victimization has a significant impact on psychological well-being, which plays a key role in shaping individuals' engagement in risky health behaviors. Although no direct association was identified between cyberbullying and risky health behaviors, psychological well-being serves as a full mediator in this relationship. This means that the harmful effects of cyberbullying on health-related behaviors are not immediate but rather manifest through the deterioration of psychological well-being. As victims experience declines in psychological well-being, they may turn to risky health behaviors as a way to cope with emotional distress and manage the negative effects of cyberbullying. Therefore, it is the indirect influence of cyberbullying, through its adverse impact on psychological well-being, that leads individuals to adopt potentially harmful coping mechanisms.

Comparison with Previous Studies

Cyberbullying victimization in adolescence is a predictor of psychological issues, emphasizing the need for greater awareness in both research and clinical settings regarding its unique contributions to psychopathology (31). This aligns with findings from those who report that cyberbullying victimization is linked to emotional well-being, suggesting that those who experience cyberbullying may suffer from diminished life satisfaction and emotional health (32). Furthermore, it provides a systematic review indicating that the emotional repercussions of cyberbullying include depressive symptoms and psychological distress, reinforcing the notion that such victimization can lead to significant mental health challenges (33). Cyberbullying victimization is associated with a significant decrease in subjective well-being, alongside psychological and somatic symptoms (34).

The influence of stressors on psychological is significant as individuals engage in various coping strategies. Coping strategies include a range of behavioral and cognitive techniques designed to deal with and manage distressing situations effectively (35). There are two types of coping strategies: problem-focused and emotion-focused techniques (35). A negative impact of stressors can occur when people use an emotional-focused technique (36).

People with emotional-focused coping techniques often decide to engage in more hazardous health practices, including smoking, alcohol drinking, skipping breakfast, binge eating, sleep problems, appetite, and sedentary activity, as an attempt to relieve their psychological issues. Engaging in risky health behaviors can potentially be identified as the emotional distress experienced as a result of being subjected to cyberbullying (36) in an attempt to reduce the psychological distress of affected people and enhance mental health and happiness (37).

Individuals often engage in risky health behaviors with the feeling that their actions help effectively manage distressing emotions caused by stress, anxiety, or other psychological issues (35). Some risky health behaviors are related to the use of substances that contain ingredients that can cause feelings of calmer and more relaxed, such as nicotine in cigarettes (38) and stress-response dampening (SRD) phenomena in alcohol use (39). Apart from that, consuming excess food can also increase the hormone cortisol. Cortisol influences several physiological processes and primarily functions by controlling the body's stress response (40).

Individuals experiencing psychological issues might seek comfort in being alone and engaging in enjoyable activities, such as sedentary behavior like gaming or watching television (41). Individuals with psychological issues might experience problems with the quality of their sleep, including insufficient or excessive sleep. Anxiety-induced sleeplessness affects someone's capacity to sleep. An individual with psychological issues may have excessive sleep duration due to an enhanced feeling of comfort resulting from increased sleep (42).

A comprehensive understanding of the risk factors associated with non-communicable diseases (NCDs) reveals that behaviors such as smoking, physical inactivity, unhealthy dietary patterns, and excessive alcohol consumption are critical contributors to the development of these diseases. For instance, smoking is identified as having the most substantial impact on mortality from NCDs, with evidence suggesting that cessation significantly reduces risk over time (43). Similarly, physical inactivity has been shown to correlate with increased risk for metabolic syndrome and other NCDs, emphasizing the need for regular physical activity as a preventive measure (44).

Dietary habits also play a crucial role in NCD risk profiles. Studies indicate that a diet low in fruits and vegetables, combined with high consumption of processed foods, contributes to obesity and other metabolic disorders, which are precursors to NCDs (45,46) Furthermore, the clustering of unhealthy behaviors—such as poor diet, lack of exercise, and smoking—has been documented, suggesting that interventions targeting multiple behaviors simultaneously may be more effective in reducing NCD risk (47).

Enhancing digital literacy among Generation Z, currently university students, is essential, particularly in addressing cyberbullying, as platforms like TikTok and Instagram Reels can serve as effective educational tools. Given Gen Z's high digital engagement, integrating interactive multimedia learning strategies can improve their ability to navigate online interactions responsibly (48,49). Short video content can effectively educate students about the consequences of cyberbullying and the importance of respectful communication, as these platforms align with their digital consumption habits (50,51).

Moreover, digital interventions play a vital role in promoting mental health and well-being among Gen Z, as they can provide self-care strategies such as mindfulness and goal setting, which are proven to reduce stress and anxiety (52). Research indicates that wellness-focused digital content can improve perceived health outcomes, making it a valuable approach for supporting students' mental well-being (52). Additionally, incorporating mental health education into the university curriculum can enhance awareness and encourage students to seek support when needed. Studies suggest that continuous engagement with mental health resources throughout the academic year increases students' likelihood of utilizing these services, ultimately fostering a more supportive university environment (53).

This study employed a cross-sectional design, which limited the capacity to determine a causal relationship. Nevertheless, applying SEM analysis in this study facilitates evaluating the causal linear relationship (23). The limitation also arises from the lack of researcher control input information for participants caused by the self-administered questionnaire used in this study. Respondents might show misunderstandings in their answers to specific

questions or failure to follow the given instructions in the questionnaire. The researcher could not clarify, ask about, verify the responses, or interpret the participants' non-verbal communication (54).

Implications for Public Health

The findings of this study have significant implications for public health. Enhancing digital literacy among university students is essential to prevent cyberbullying and its potential adverse effects on their future. Providing psychological services within universities is crucial for improving students' psychological well-being. Additionally, university management should periodically assess students' psychological status through self-reporting measures. This practice helps students become aware of their susceptibility to cyberbullying and the potential negative impacts on their future due to poor psychological well-being. If students recognize that they have poor psychological well-being, they can seek appropriate help.

To enhance digital literacy, prevent cyberbullying, and promote positive coping strategies, universities can collaborate with student associations to educate their peers through social media platforms such as Instagram Reels and TikTok, which are widely used by students in Indonesia. Additionally, integrating cyberbullying prevention into the university curriculum ensures that all students receive structured education on this issue as part of their courses. Furthermore, universities can provide free psychological services through specialized units managed by experts in public health and psychology, offering support to students with poor psychological well-being. To strengthen preventive measures, universities can also establish an online cyberbullying reporting system via WhatsApp, enabling students to report incidents efficiently so that the disciplinary team can take appropriate action against perpetrators.

Limitations and Cautions

Although our study offers valuable insights, it is important to recognize several limitations. This study utilized a cross-sectional design, limiting the ability to establish causality. However, using SEM analysis in this research allows for evaluating causal linear relationships. Another limitation stems from the self-administered questionnaire, which resulted in a lack of researcher control over the input information from participants. Respondents might have misunderstood certain questions or failed to follow the provided instructions. Consequently, the researcher could not clarify, verify, or interpret the participants' responses or non-verbal cues. This study investigated the consequences of cyberbullying at a specific university in East Kalimantan Province. Therefore, the findings cannot be generalized to the entire nation, as different contexts, particularly social, demographic, and cultural factors, may influence the results.

Recommendations for Future Research

Building on the insights from this study, future research should prioritize examining problem-focused coping strategies that yield positive outcomes, refining study designs, and expanding the scope of population studies. Firstly, researchers should consider employing cohort studies to assess the impact of cyberbullying victimization among university students and identify prevalent coping strategies. Secondly, this study suggests conducting longitudinal research to establish causal relationships. Thirdly, future researchers should investigate the influence of cultural factors in shaping the effects of cyberbullying would provide deeper insights. Fourthly, future researchers are encouraged to evaluate the positive coping strategies and whether these coping strategies correlate with reduced stress levels among university students. Lastly, conducting nationwide surveys can provide insights into the varying consequences of cyberbullying victimization across different demographic, social, and cultural contexts in Indonesia, given the diverse population structure.

CONCLUSION

There is a significant association between cyberbullying victimization and psychological well-being, as well as between psychological well-being and risky health behaviors. However, no significant direct association was found between cyberbullying victimization and risky health behaviors. This finding supports the research hypothesis that psychological well-being serves as a full mediating variable in the relationship between cyberbullying victimization and risky health behaviors. In other words, the impact of cyberbullying victimization on risky health behaviors is fully mediated by psychological well-being, indicating that the effects of cyberbullying are channelled through poor psychological well-being, which in turn leads to an increase in risky health behaviors as negative coping strategies.

AUTHOR'S CONTRIBUTION STATEMENT

Purwo Setiyo Nugroho was pivotal in conceptualizing the study, collecting data, analyzing the results, and drafting the manuscript. Bhubate Samutachak offered essential guidance and supervision throughout the research process, significantly contributing to the study design and interpretation of the findings. Tawanchai Jirapramukpitak, Fatimah Ahmad Fauzi, Aphichat Chamratrithirong, and Ghozali supported refining the research methodology and critically reviewing the manuscript for significant intellectual content. All authors have reviewed and approved the final manuscript.

CONFLICTS OF INTEREST

The authors affirm that they have no conflicts of interest to disclose.

SOURCE OF FUNDING

The Muhammadiyah University of East Kalimantan financially supported the research, which was crucial in completing the first author's doctoral research.

ACKNOWLEDGMENTS

The researcher thanks the Muhammadiyah University of East Kalimantan for their financial support in this research. Appreciation is also conveyed to the Ph.D. committee at the Institute for Population and Social Research (IPSR), Mahidol University, Thailand, for their invaluable suggestions and comments that significantly enhanced the quality of this study. This research was also partially supported by the Scholarship for Thesis Promoting SDGs Policies for the Fiscal Year 2024, Faculty of Graduate Studies, Mahidol University (MUGR SDGs-3.4).

BIBLIOGRAPHY

1. Hidayatullah MS, Dimyathi MS, Abdullah, Zubair, Handayani R. Cyber Bullying Against Indonesian Muslim Leaders Through Social Media. Psychol Educ J [Internet]. 2021;58(1):5348–55. Available from: http://psychologyandeducation.net/pae/index.php/pae/article/view/1792
2. Nasywa N, Tentama F, Mujidin. What makes the cyberbullying model among vocational high school students. Cakrawala Pendidik [Internet]. 2021;40(2):329–44. Available from: https://journal.uny.ac.id/index.php/cp/article/view/34549
3. Connolly JP. 'The silence phenomenon' an exploration of the factors influencing Irish gifted adolescents' resistance to report their experiences of cyberbullying behaviour [Internet]. Dublin City University School of. 2017. Available from: http://doras.dcu.ie/21772/%0Ahttps://lens.org/160-146-133-317-639
4. Englander E, Donnerstein E, Kowalski R, Lin CA, Parti K. Defining cyberbullying. Pediatrics [Internet]. 2017;140(November):S148–51. Available from: https://publications.aap.org/pediatrics/article/140/Supplement_2/S148/34183/Defining-Cyberbullying?autologincheck=redirected
5. Kowalski RM, Giumetti GW, Schroeder AN, Lattanner MR. Bullying in the digital age: A critical review and meta-analysis of cyberbullying research among youth. Psychol Bull. 2014;140(4):1073–137.
6. Faucher C, Jackson M, Cassidy W. Cyberbullying among University Students: Gendered Experiences, Impacts, and Perspectives. Educ Res Int [Internet]. 2014;2014:1–10. Available from: https://onlinelibrary.wiley.com/doi/10.1155/2014/698545
7. Luo Q, Wu N, Huang L. Cybervictimization and cyberbullying among college students: The chain mediating effects of stress and rumination. Front Psychol [Internet]. 2023;14(February):1–9. Available from: https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2023.1067165/full
8. Almogbel E, Aladhadh AM, Almotyri BH, Alhumaid AF, Rasheed N. Stress associated alterations in dietary behaviours of undergraduate students of qassim university, Saudi Arabia. Open Access Maced J Med Sci [Internet]. 2019;7(13):2182–8. Available from: https://oamjms.eu/index.php/mjms/article/view/oamjms.2019.571

9. Moore SE, Norman RE, Suetani S, Thomas HJ, Sly PD, Scott JG. Consequences of bullying victimization in childhood and adolescence: A systematic review and meta-analysis. World J Psychiatry [Internet]. 2017;7(1):60. Available from: https://www.wjgnet.com/2220-3206/full/v7/i1/60.htm
10. Karthikeyan. Workplace Cyberbullying and Its Impact on Productivity. Res Anthol Combat Cyber-Aggression Online Negativity [Internet]. 2022;(November):1498–515. Available from: https://www.igi-global.com/chapter/workplace-cyberbullying-and-its-impact-on-productivity/263428
11. Safaria T. Prevalence and impact of cyberbullying in a sample of indonesian junior high school students. Turkish Online J Educ Technol [Internet]. 2016;15(1):82–91. Available from: https://files.eric.ed.gov/fulltext/EJ1086191.pdf
12. Navarro R, Ruiz-Oliva R, Larrañaga E, Yubero S. The Impact of Cyberbullying and Social Bullying on Optimism, Global and School-Related Happiness and Life Satisfaction Among 10-12-year-old Schoolchildren. Appl Res Qual Life [Internet]. 2015;10(1):15–36. Available from: https://link.springer.com/article/10.1007/s11482-013-9292-0
13. Li, Wu Y, Hesketh T. Internet use and cyberbullying: Impacts on psychosocial and psychosomatic wellbeing among Chinese adolescents. Comput Human Behav [Internet]. 2023;138(August 2022):107461. Available from: https://doi.org/10.1016/j.chb.2022.107461
14. Kowalski RM, Morgan CA, Drake-Lavelle K, Allison B. Cyberbullying among college students with disabilities. Comput Human Behav [Internet]. 2016;57:416–27. Available from: http://dx.doi.org/10.1016/j.chb.2015.12.044
15. Landstedt E, Persson S. Bullying, cyberbullying, and mental health in young people. Scand J Public Health [Internet]. 2014;42(4):393–9. Available from: https://www.jstor.org/stable/45150813
16. Soper DS. A-priori Sample Size Calculator for Structural Equation Models [Software] [Internet]. 2020. Available from: https://www.danielsoper.com/statcalc
17. Byrne VL. Validating a cyberbullying victimization measure among undergraduates. J Coll Stud Dev [Internet]. 2021;62(1):124–9. Available from: https://muse.jhu.edu/article/781700
18. Zhang A, Yang H, Wu X, Luo X, Gao J. Development and validation of the coping capacity measurement scale of public health emergencies in China. Int J Environ Res Public Health [Internet]. 2022;19(1). Available from: https://www.mdpi.com/1660-4601/19/1/94
19. Bueno MR de O, Werneck A de O, Silva DRP da, Oyeyemi AL, Zambrin LF, Fernandes RA, et al. Association between patterns of sedentary time and academic performance in adolescents: the mediating role of self-concept. Rev Paul Pediatr [Internet]. 2022;40:e2021106. Available from: https://www.scielo.br/j/rpp/a/3KkNQ88fQTh83SC9yyt9pdz/?lang=en
20. Savani CD, Jani MP, Patel AH, Modi PR, Odedara VK. Cyberbullying Victimisation and Psychological Well-being: A Cross-sectional Study among Medical Students in Western India. J Clin Diagnostic Res [Internet]. 2023;17(5):10–5. Available from: https://jcdr.net/article_abstract.asp?issn=0973-709x&year=2023&volume=17&issue=5&page=VC10&issn=0973-709x&id=17913
21. National Eating Disorders Collaboration (NEDC). What is binge eating disorder? Eating disorders explained [Internet]. Shire Pharma Canada ULC. 2015. 2–7 p. Available from: http://www.nedc.com.au/binge-eating-disorder
22. Hoang V, Nguyen A, Thi U, Nguyen B, Nguyen T, Tran A, et al. The Relationship between Depression , Doing Exercise , Age and Cigarettes Smoking in ARV - HIV Patients. J Public Heal Pharm [Internet]. 2024;(1):98–112. Available from: https://www.jurnal.unismuhpalu.ac.id/index.php/jphp/article/view/5044
23. Fan Y, Chen J, Shirkey G, John R, Wu SR, Park H, et al. Applications of structural equation modeling (SEM) in ecological studies : an updated review. Ecol Process [Internet]. 2016; Available from: http://dx.doi.org/10.1186/s13717-016-0063-3
24. Garrido M, Hansen SK. A model selection approach to structural equation modelling : A critical evaluation and a road map for ecologists. Br Ecol Soc J [Internet]. 2022;2022(October 2021):42–53. Available from: https://besjournals.onlinelibrary.wiley.com/doi/full/10.1111/2041-210X.13742
25. Hair JF, Hult GTM, Ringle CM, Sarstedt M, Danks NP, Ray S. An Introduction to Structural Equation Modeling BT - Partial Least Squares Structural Equation Modeling (PLS-SEM) Using R: A Workbook. In: Hair Jr. JF, Hult GTM, Ringle CM, Sarstedt M, Danks NP, Ray S, editors. Cham: Springer International Publishing; 2021. p. 1–29. Available from: https://doi.org/10.1007/978-3-030-80519-7_1

26. Joeliantina A, Norontoko DA, Adinata AA, Ragayasa A. Self-care of chronic illness prevents the risk of diabetic foot ulcers in patients with diabetes : a cross-sectional study. J Ners [Internet]. 2024;19(1):39–46. Available from: https://e-journal.unair.ac.id/JNERS/article/view/48387
27. Kineber AF, Hamed MM. Exploring the Sustainable Delivery of Building Projects in Developing Countries: A PLS-SEM Approach. Sustainability [Internet]. 2022;14(22):15460. Available from: https://www.mdpi.com/2071-1050/14/22/15460
28. Debowska A, Boduszek D, Sherretts N. Self-Esteem in Adult Prison Population: The Development and Validation of the Self-Esteem Measure for Prisoners (SEM-P). Deviant Behav [Internet]. 2016;38(11):1240–51. Available from: https://www.tandfonline.com/doi/abs/10.1080/01639625.2016.1246034
29. Dijkstra TK, Henseler J. Consistent Partial Least Squares Path Modeling. MIS Q Manag Inf Syst [Internet]. 2015;39(June). Available from: https://www.jstor.org/stable/26628355
30. Hair JF, Hult GTM, Ringle CM, Sarstedt M. A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM); 3rd Ed. California: SAGE Publications Inc; 2022.
31. Iffland B, Bartsch LM, Kley H, Neuner F. Growing Relevance of Reports of Adolescent Cyberbullying Victimization Among Adult Outpatients. BMC Public Health. 2023;23(1).
32. Halliday S, Taylor A, Turnbull D, Gregory T. The Relationship Between Traditional and Cyber Bullying Victimization in Early Adolescence and Emotional Wellbeing: A Cross-Sectional, Population-Based Study. Int J Bullying Prev [Internet]. 2022;6(2):110–23. Available from: https://link.springer.com/article/10.1007/s42380-022-00144-8
33. Fulantelli G, Taibi D, Scifo L, Schwarze V, Eimler SC. Cyberbullying and Cyberhate as Two Interlinked Instances of Cyber-Aggression in Adolescence: A Systematic Review. Front Psychol [Internet]. 2022;13. Available from: https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2022.909299/full
34. Lin L, Liu J, Cao X, Wen S, Xu J, Xue Z, et al. Internet addiction mediates the association between cyber victimization and psychological and physical symptoms:moderation by physical exercise. BMC Psychiatry [Internet]. 2020;20(1):1–8. Available from: https://bmcpsychiatry.biomedcentral.com/articles/10.1186/s12888-020-02548-6
35. Biggs A, Brough P, Drummond S. Lazarus and Folkman's Psychological Stress and Coping Theory. Handb Stress Heal [Internet]. 2017 Feb 18 [cited 2023 Sep 11];349–64. Available from: https://onlinelibrary.wiley.com/doi/full/10.1002/9781118993811.ch21
36. Baiden P, Mengo C, Boateng GO, Small E. Investigating the association between age at first alcohol use and suicidal ideation among high school students: Evidence from the youth risk behavior surveillance system. J Affect Disord [Internet]. 2019;242:60–7. Available from: https://doi.org/10.1016/j.jad.2018.08.078
37. Baiden P, Tadeo SK. Examining the association between bullying victimization and prescription drug misuse among adolescents in the United States. J Affect Disord [Internet]. 2019;259(August):317–24. Available from: https://doi.org/10.1016/j.jad.2019.08.063
38. Lawless MH, Harrison KA, Grandits GA, Eberly LE, Allen SS. Perceived stress and smoking-related behaviors and symptomatology in male and female smokers. Addict Behav [Internet]. 2015 Dec;51:80–3. Available from: https://www.sciencedirect.com/science/article/abs/pii/S0306460315002671
39. Asselmann E, Wittchen HU, Lieb R, Höfler M, Beesdo-Baum K. Does low coping efficacy mediate the association between negative life events and incident psychopathology? A prospective-longitudinal community study among adolescents and young adults. Epidemiol Psychiatr Sci [Internet]. 2016;25(2):171–80. Available from: https://www.cambridge.org/core/journals/epidemiology-and-psychiatric-sciences/article/abs/does-low-coping-efficacy-mediate-the-association-between-negative-life-events-and-incident-psychopathology-a-prospectivelongitudinal-community-study-among-adolescents-and-young-adults/4C2013C8692CF5134E69DF1096178B19
40. Hewagalamulage SD, Lee TK, Clarke IJ, Henry BA. Stress, cortisol, and obesity: a role for cortisol responsiveness in identifying individuals prone to obesity. Domest Anim Endocrinol [Internet]. 2016;56:S112–20. Available from: http://dx.doi.org/10.1016/j.domaniend.2016.03.004
41. Teychenne M, Stephens LD, Costigan SA, Olstad DL, Stubbs B, Turner AI. The association between sedentary behaviour and indicators of stress: a systematic review. BMC Public Health [Internet]. 2019;19(1):1357. Available from: https://doi.org/10.1186/s12889-019-7717-x

42. Kowalczuk K, Krajewska-Kułak E, Sobolewski M. Relationships Between Sleep Problems and Stress Coping Strategies Adopted by Nurses Including Socio-Occupational Factors. Front psychiatry [Internet]. 2021;12:660776. Available from: https://doi.org/10.3389/fpsyt.2021.660776
43. Taniguchi C, Narisada A, Ando H, Hashimoto A, Nakayama A, Ito M, et al. Smoking Cessation Behavior in Patients With a Diagnosis of A Non-Communicable Disease: The Impact of Perceived Disease Severity of and Susceptibility to the Disease. Tob Induc Dis [Internet]. 2023;21(October):1–9. Available from: https://doi.org/10.18332/tid/170430
44. Sheikholeslami S, Ghanbarian A, Azizi F. The Physical Activity and Non-Communicable Diseases Risk Factors: 20 Years of the TLGS Findings. Int J Endocrinol Metab [Internet]. 2018;In Press(In Press). Available from: https://brieflands.com/articles/ijem-84740.html
45. Sudarko LNR, Djannah SN, Handayani L, Hidayat MS, Tukiyo IW. Study of Adolescent Health Behavior Towards Non-Communicable Disease Risk Factors in Special Region of Yogyakarta. Epidemiol Soc Heal Rev [Internet]. 2023;5(1):11–20. Available from: https://journal2.uad.ac.id/index.php/eshr/article/view/7237
46. Caprara G. Mediterranean-Type Dietary Pattern and Physical Activity: The Winning Combination to Counteract the Rising Burden of Non-Communicable Diseases (NCDs). Nutrients [Internet]. 2021;13(2):429. Available from: https://doi.org/10.3390/nu13020429
47. Allen Z van, Bacon S, Bernard P, Brown H, Desroches S, Kastner M, et al. Clustering of Health Behaviors in Canadians: A Multiple Behavior Analysis of Data From the Canadian Longitudinal Study on Aging. Ann Behav Med [Internet]. 2023;57(8):662–75. Available from: https://doi.org/10.1093/abm/kaad008
48. Natsir SZM, Rubini B, Ardianto D, Madjid N. Interactive Learning Multimedia: A Shortcut for Boosting Gen-Z's Digital Literacy in Science Classroom. J Penelit Pendidik Ipa [Internet]. 2022;8(5):2168–75. Available from: https://journal.um.ac.id/index.php/jptpp/article/view/22251
49. Sujoko A, Prianti DD, Wahyudi D, Lestari MRS. Literasi Media Digital Bagi Gen-Z Di MAN 1 Kota Malang. Pengabdianmu J Ilm Pengabdi Kpd Masy [Internet]. 2023;8(4):577–85. Available from: https://journal.umpr.ac.id/index.php/pengabdianmu/article/view/4681
50. Bakti S, Marpaung D. Short Video Marketing: Strategies for Increasing Tourism in Indonesia. Reslaj Relig Educ Soc Laa Roiba J [Internet]. 2024;6(3):2506–15. Available from: https://journal.laaroiba.com/index.php/reslaj/article/view/6266
51. Shi R, Wang M, Liu C, Gull N. The Influence of Short Video Platform Characteristics on Users' Willingness to Share Marketing Information: Based on the SOR Model. Sustainability [Internet]. 2023;15(3):2448. Available from: https://doi.org/10.3390/su15032448
52. Park SY, Do B, Yourell J, Hermer J, Huberty J. Digital Methods for the Spiritual and Mental Health of Generation Z: Scoping Review. Interact J Med Res [Internet]. 2024;13:e48929. Available from: https://www.i-jmr.org/2024/1/e48929
53. King N, Pickett W, Pankow K, Dimitropoulos G, Cullen E, McNevin S, et al. Access to University Mental Health Services: Understanding the Student Experience: L'accès Aux Services Universitaires De Santé Mentale : Comprendre L'expérience Des Étudiants. Can J Psychiatry [Internet]. 2024; Available from: https://journals.sagepub.com/doi/full/10.1177/07067437241295640
54. Zimmerman M. The value and limitations of self-administered questionnaires in clinical practice and epidemiological studies. World Psychiatry [Internet]. 2024 Jun;23(2):210–2. Available from: https://onlinelibrary.wiley.com/doi/10.1002/wps.21191