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Factors influencing the practice of breast self-examination among teenage girls in Salatiga City, Indonesia

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ABSTRACT

Breast cancer is the second leading cause of cancer-related mortality among women in Indonesia. Early detection improves survival, yet many adolescent girls do not practice breast self-examination (BSE). Evidence on personal barriers among young women remains limited. To analyze knowledge, perceived susceptibility, and barriers to BSE practice among late adolescents in Salatiga, Central Java. A cross-sectional study was conducted in February 2023 among 67 female students aged 18–21 years living in a university dormitory. Data were collected using a self-administered questionnaire based on the Health Belief Model and analyzed with descriptive statistics and logistic regression. Most respondents (70.1%) had received BSE information, mainly from social media (35.8%) and school (32.8%). Barriers included perceiving BSE as unimportant (37.3%), lack of knowledge (35.8%), belief that it was unnecessary without illness (38.8%), and feeling too young (20.9%). Logistic regression identified four predictors of non-practice: lack of knowledge (OR = 0.003, 95% CI: 0.000–0.243, p = 0.010), belief BSE is only needed with symptoms (OR = 0.022, 95% CI: 0.002–0.312, p = 0.005), lack of privacy (OR = 0.026, 95% CI: 0.001–0.946, p = 0.046), and time constraints (OR = 0.064, 95% CI: 0.006–0.701, p = 0.024). Misconceptions, limited knowledge, and social constraints were the main barriers to BSE practice among adolescent girls. Addressing these requires school-based programs, integration of BSE into reproductive health curricula, and community campaigns, while nursing practice should focus on enhancing self-efficacy and normalizing BSE.

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1. INTRODUCTION

Cancer is characterized by the uncontrolled growth and division of abnormal cells in the body, which can invade surrounding body tissues. These cancer cells can grow further and spread to other body parts, resulting in death. Body cells will begin to experience changes in growth and divide more quickly and uncontrollably. One type of cancer that often occurs in women is breast cancer. Currently, breast cancer is the most frightening health problem for women [1], [2].

Globally, breast cancer is the most common cancer among women, with more than 2.3 million new cases reported in 2022 [3]. In Indonesia, the national age-standardized incidence of breast cancer reached 37.4 per 100,000 women in 2019 [4]. More recent national statistics, however, show a continuous increase, with over 200,000 cases documented between 2016 and 2021 and 65,858 new cases reported in 2020 alone [5].

At the provincial level, the Health Office of Central Java reported that 1.2% of women of reproductive age (2,800 women) were diagnosed with breast tumors and referred due to suspected breast cancer. Within the province's 35 districts/cities, Salatiga had one of the lowest rates of clinical breast examinations by health workers, at only 12.9% [6]. This local evidence underlines the relevance of studying barriers to breast self-examination (BSE) among adolescent girls in Salatiga.

Early detection practices, particularly BSE, play a crucial role in identifying breast abnormalities at an early stage. BSE is recommended for women starting from adolescence (15–25 years) as part of preventive health education. However, engagement in BSE among adolescent girls remains low, especially in Southeast Asia. Studies in Malaysia, Thailand, and the Philippines have shown mixed results, with adolescents often reporting limited knowledge, misconceptions, and socio-cultural barriers to BSE [7]-[9]. Despite these contributions, most existing research focuses on adult women or evaluates short-term interventions, leaving a critical gap in understanding adolescent-specific barriers. Addressing this gap is essential, since adolescence is a formative stage for establishing lifelong health behaviors.

Cultural and social contexts further complicate adolescent engagement in preventive health. In many Southeast Asian communities, taboos surrounding the female body and fatalistic beliefs about illness—such as perceiving cancer as destiny—discourage open discussion and preventive action. These beliefs may lower perceived susceptibility, reduce motivation, and reinforce embarrassment or avoidance of BSE, even when awareness exists [10].

Health behavior theories provide a valuable framework to understand why awareness does not always translate into preventive action. The health belief model (HBM), one of the most widely applied frameworks in cancer prevention research, emphasizes perceived susceptibility, severity, perceived benefits, perceived barriers, cues to action, and self-efficacy in shaping health behavior [11]. Previous studies have shown that low perceived susceptibility ("feeling too young"), low perceived benefits ("BSE is unnecessary without symptoms"), and various socio-cultural barriers are significant predictors of poor BSE practice among young women [12]. Grounding this study in the HBM framework allows for a deeper analysis of how personal and/or social barriers shape adolescent girls' decisions to engage, or not engage, in BSE.

Previous studies on BSE have predominantly examined general factors such as knowledge, awareness, and attitudes [13]-[15]. However, these studies have not explored the specific personal obstacles that prevent young women from practicing BSE. This gap is critical, given that adolescence is a formative stage for developing lifelong health behaviors. Moreover, local data from Central Java indicate that Salatiga has one of the lowest rates of breast examinations by health workers (12.9%) [6]. Yet, no prior research has explored why young women in this setting underutilize self-examination. Focusing on adolescent girls in Salatiga, this study uniquely contributes to the literature by highlighting context-specific personal and social barriers, providing evidence to inform teenage health education and policy in Indonesia. To address the lack of adolescent-focused research in Southeast Asia, this study investigates factors influencing BSE practice among teenage girls in Salatiga City, Indonesia. By identifying personal, cognitive, and socio-cultural barriers, the findings aim to inform adolescent health education strategies and contribute to breast cancer prevention efforts in Indonesia.

2. METHOD

This research used an institution-based cross-sectional study approach. The study was conducted at Satya Wacana Christian University in Salatiga City, Central Java, Indonesia. The population comprised female students aged 18–21 years at Satya Wacana Christian University (SWCU), Salatiga, who resided in university dormitories. A total of 67 respondents were recruited using purposive sampling. This technique was chosen because access to participants required permission from university and dormitory administrators, and the study aimed to target a specific subgroup of late adolescents. Moreover, dormitory residents represented a unique population from diverse regions across Indonesia, contributing varied cultural backgrounds, knowledge levels, and motivations that might affect BSE practice. Nevertheless, the dormitory-based sample limits generalizability, since adolescents living with families or independently may have different experiences.

A purposive sampling technique was applied to include respondents who met the following criteria: female students aged 18–21 years, not diagnosed with breast tumors, and willing to participate in the study. Female students diagnosed with breast tumors, aged below 15 or above 25 years, or unwilling to participate were excluded from this study. Given the limited population size in the dormitory and the voluntary participation of respondents, a purposive sampling technique was used to recruit all eligible and willing participants. This approach ensured an adequate sample size while maintaining relevance to the target population, although findings may not be generalizable to all adolescents outside this setting.

Data were collected using a self-administered questionnaire. The structured questionnaire was developed using the HBM framework. It consisted of three main components: i) knowledge of BSE, ii) perceived susceptibility to breast cancer, and iii) ten identified barriers to BSE practice, namely fear, being busy,

embarrassment, not feeling sick, absence of symptoms, lack of privacy, perceived incompetence, feeling too young, perceiving BSE as unimportant, and not knowing how to perform BSE. Barriers were measured using dichotomous responses (yes/no), while knowledge and perceived susceptibility were categorized into low and high levels.

The instrument consisted of Likert-scale items, with positive statements scored 4, 3, 2, and 1, and negative statements scored 1, 2, 3, and 4. Response options included strongly agree, agree, disagree, and strongly disagree. Content validity was established through expert review and pilot testing among a small group of students. Reliability testing was not conducted, and this is acknowledged as a study limitation. As all respondents provided complete responses to the questionnaire, no missing data management procedures were required. This research was ethically approved by the Ethics Committee of Universitas Kristen Satya Wacana with the number 298/PE/KEPK.UKSW/2020.

Data were analyzed using the statistical package for the social sciences (SPSS) version 25. Descriptive statistics (frequency and percentage) were used to summarize participant characteristics and study variables. Furthermore, a binary logistic regression analysis was performed to identify factors associated with BSE. Ten independent variables (fear, time constraints, embarrassment, perception of no illness, perception of no symptoms, lack of knowledge, lack of privacy, incompetence, feeling too young, and perception of unimportance) were simultaneously entered into the model using the backward stepwise (likelihood ratio) method. This approach represents a multivariable analysis, as multiple independent variables were examined concerning a single binary outcome (BSE practice: yes/no).

3. RESULTS AND DISCUSSION

In this section, the research results are explained, and at the same time, a comprehensive discussion of the area is given.

3.1. The characteristics of the respondents

The respondents in this study as cited in Table 1 were aged 18-21 years, with the most respondents aged 21 years (43.3%) and the fewest respondents aged 19 years (13.4%). It can also be seen in Table 1 that most respondents are Protestant Christians (64.5%), and the least are Muslims (1.3%). Respondents were students who lived in student dormitories and came from various regions in Indonesia. Respondents were dominated by young women from Kalimantan (10.7%), followed by young women from East Nusa Tenggara (10.1%). Meanwhile, the fewest female respondents in this study came from Sulawesi (2.0%).

Table 1. Characteristics of respondents

Characteristics	Frequency (n = 67)	Percentage (%)
Age (y.o)		
18	17	25.4
19	9	13.4
20	12	17.9
21	29	43.3
Religion		
Islam	2	1.3
Christian	51	64.5
Catholic	14	34.2
Origin		
Papua	3	4.5
East Nusa Tenggara	15	10.1
Maluku	13	8.7
Kalimantan	16	10.7
Sumatra	10	6.7
Sulawesi	3	2.0
Java	7	4.7

This research presents age as one of the demographic characteristics of respondents because BSE is recommended to be carried out from adolescence. BSE is more effective when a woman is 15 years old because, at that age, women are already at risk of developing breast cancer. Young age is often characterized by a person's tendency to have a higher desire and enthusiasm to seek information, receive information, and increase knowledge actively, so new skills such as BSE practices should be learned and practiced from early adolescence. This high desire and enthusiasm can make young women behave well in BSE.

In addition, younger women are pursuing formal education. They are involved in more social activities and are more exposed to social media, such as watching television, Facebook, WhatsApp, and YouTube.

Hence, they are more exposed to information related to women's health problems compared to older women [16]. Another thing that can cause younger women to have better BSE behavior is that younger women pay more attention to their physical appearance and health than older women [17].

Religion and the respondents' area of origin in their demographic status are factors related to their beliefs regarding the practice of BSE. A previous study showed that women believe that the breasts are a sensitive organ and an important symbol of a woman, so they should not be checked frequently. Carrying out breast examinations is also considered taboo. If a woman experiences breast cancer, then she must accept her fate because she is destined to do so [13]. Of course, this will be a significant obstacle in implementing BSE practices in the community.

Cultural and religious backgrounds shape knowledge and attitudes toward BSE. In many communities, cultural norms that regard the breast as a private or sensitive area and religiously framed fatalistic beliefs (e.g., illness as destiny) can discourage open discussion about breast health and reduce perceived necessity of self-screening, even when factual information is available [18], [19]. These socio-cultural factors operate through multiple pathways: they limit exposure to normative health conversations, increase shame or embarrassment about touching or examining one's body, and lower perceived self-efficacy to perform BSE correctly. Empirical studies among young women and community samples have repeatedly shown that shame, taboo, and low self-efficacy are significant correlates of lower BSE uptake, independent of formal knowledge levels [20], [21]. Importantly, intervention studies indicate that culturally sensitive education — especially programs that explicitly address religious/fatalistic beliefs and build practical skills and confidence (self-efficacy) — can improve both intent and actual BSE practice among women [22]. Therefore, when interpreting the present findings, the role of cultural and religious background should be acknowledged as a potential mediator between information exposure and preventive behavior.

3.2. The information source regarding BSE received by respondents

Based on Table 2, the information on BSE obtained by young women in this study mainly came from social media (35.8%), followed by school (32.8%), and 29.9% did not get any information. Formal and informal education information contributes to BSE practice behavior [23]. This research shows that as many as 70.1% of young women have received information about the practice of BSE, and mostly get this information through social media.

Table 2. Reception of information regarding BSE practices

Reception of information	Frequency (n = 67)	Percentage (%)
Yes	47	70.1
From social media	24	35.8
From school	22	32.8
No	20	29.9
Total	67	100.0

BSE information can come from other people, such as seeing health information on television, reading books or news about women's breast health, and social media [24]. Social media is a platform for teenagers to access information about BSE. The use of social media in increasing knowledge is very effective because it can be read wherever and whenever they are. Apart from that, the presentation of health information via Instagram is dominated by images, photos, or videos, making it easier for people to receive health information [25]. Social media influenced health promotion efforts to increase understanding and support the public in healthy behavior. Social media has positively contributed to health promotion efforts [26].

3.3. The factors that influence the practice of BSE

The findings indicate that barriers to BSE among adolescent girls are multifaceted, spanning psychological, social, cognitive, and perceptual domains as shown in Figure 1. From the psychological perspective, embarrassment (19.4%) and fear of the results (22.4%) were cited as barriers. Although not the most dominant, these factors highlight the role of emotional responses and stigma in hindering BSE practice. Previous research has highlighted that fear of cancer diagnosis and shame associated with discussing or touching the breast are common psychological obstacles [27], [28]. These findings suggest that nursing interventions should provide technical knowledge and address emotional readiness. Culturally sensitive counseling and peer-support initiatives could be effective in normalizing BSE and reducing the stigma that adolescents may associate with it.

Regarding social factors, lack of privacy (28.4%) and being too busy (26.9%) emerged as notable barriers. These findings suggest that environmental conditions and daily routines are essential in shaping

adolescents' ability to engage in BSE. Studies conducted among university students in low- and middle-income countries have shown that a supportive environment, whether at home, school, or dormitory settings, plays a vital role in enabling adolescents to adopt self-care practices [29]. Nurses working in school health programs or community-based initiatives can advocate for safe and private spaces for health practices while integrating BSE education into routine school activities. Time-management education and embedding BSE into adolescents' daily health routines could further reduce the perception of "busyness" as a barrier.

Regarding cognitive barriers, 35.8% of respondents reported feeling that BSE was unimportant, 23.9% felt incompetent, and 35.8% cited a lack of knowledge about the procedure. These results indicate a significant gap in awareness and self-efficacy related to BSE practices. Numerous studies confirm that knowledge gaps and poor skills are substantial predictors of low adherence to BSE [9], [30]. Nursing practice should therefore emphasize structured educational interventions that explain the benefits of BSE and provide hands-on demonstrations. School-based workshops led by nurses, supported with visual aids and practice models, could enhance competence and confidence among adolescents, reducing the knowledge deficit contributing to non-compliance.

Finally, perceptual factors appeared as the most frequently cited barriers. Specifically, 20.9% believed they were still too young, 37.3% reported they would only perform BSE when symptoms were present, and 38.8% believed BSE was unnecessary in the absence of illness. These misconceptions suggest that many adolescents link BSE only with existing health problems, rather than recognizing its role in early detection. Recent empirical studies in comparable populations report low levels of accurate knowledge and practice of BSE and frequent delays in care-seeking until symptoms are noticed, indicating a predominantly symptom-driven (reactive) approach to breast health rather than a preventive one [13], [31], [32]. From a nursing standpoint, this highlights the importance of reframing health education messages to focus on early detection and empowerment. Nurses can integrate messages about preventive health into adolescent health promotion programs, emphasizing that breast cancer can occur in young women and that early detection significantly improves outcomes. Overall, the results demonstrate that while psychological and social influences exist, the predominant barriers are rooted in cognitive limitations and misperceptions about the importance and purpose of BSE. Addressing these misconceptions and providing practical knowledge are critical in promoting regular BSE practice among adolescent girls.

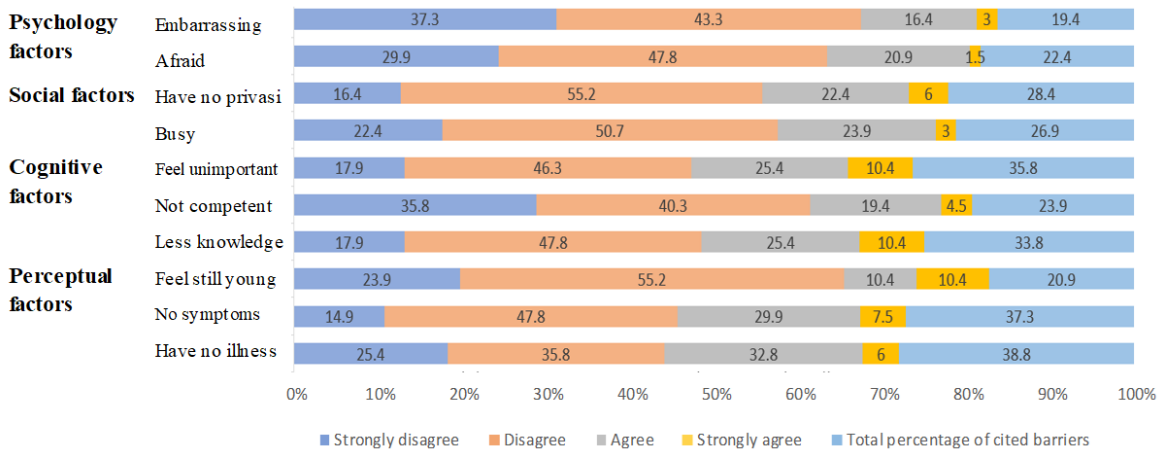

Figure 1. Factors that influence BSE practice among teenage girls

3.4. Multivariable logistic regression analysis of dominant barriers to bse practice

Table 3 presents the multivariable logistic regression analysis results examining factors associated with breast self-examination (BSE) practice among adolescent girls. Four factors were found to be statistically significant predictors. Adolescents who perceived that BSE should only be performed when symptoms are present were significantly less likely to practice BSE (OR = 0.022, 95% CI: 0.002–0.312, p = 0.005). Similarly, lack of knowledge strongly reduced the likelihood of practicing BSE (OR = 0.003, 95% CI: 0.000–0.243, p = 0.010). Social factors also played an important role: being too busy (OR = 0.064, 95% CI: 0.006–0.701, p = 0.024) and lack of privacy (OR = 0.026, 95% CI: 0.001–0.946, p = 0.046) both significantly hindered the practice of BSE. These findings highlight that misperception about symptoms, limited knowledge, and social constraints are adolescent girls' most critical barriers to BSE practice.

Table 3. Multivariable logistic regression analysis of barriers to BSE practice (final model)

Variable	B	SE	OR (Exp(B))	95% CI for OR	p-value
Busyness	-2.743	1.218	0.064	0.006 – 0.701	0.024
No symptoms	-3.810	1.350	0.022	0.002 – 0.312	0.005
Lack of knowledge	-5.817	2.247	0.003	0.000 – 0.243	0.010
Lack of privacy	-3.631	1.824	0.026	0.001 – 0.946	0.046

The findings of this study not only identify statistical associations but also provide insights into the underlying factors shaping adolescents' engagement in breast self-examination. To better understand these results, the following section discusses the barriers within broader psychological, cultural, and theoretical contexts, and highlights practical implications for adolescent health promotion.

- Perceived barriers

This study found that adolescent girls in Salatiga faced multiple barriers to BSE, spanning psychological, cognitive, perceptual, and social domains. Misconceptions, such as believing that BSE is only necessary when symptoms appear (38.8%) or perceiving themselves as too young (20.9%), were among the most frequently cited barriers. These findings echo prior research showing that young women often link preventive behavior only to visible symptoms, reflecting a reactive rather than proactive approach to breast health [31], [32]. Cognitive barriers such as lack of knowledge (35.8%) and feelings of incompetence (23.9%) further limited BSE uptake, underscoring the need for tailored health education.

Interestingly, although a relatively high proportion of respondents reported the perception of "having no illness" in the descriptive findings, this factor did not emerge as a significant predictor of BSE practice in the logistic regression model. One possible explanation is the overlap between this perception and other related barriers, particularly the belief that BSE should only be performed when symptoms are present. When entered simultaneously in the multivariate model, the effect of "having no illness" may have been suppressed by the stronger predictive power of "no symptoms." This result indicates that adolescents' decisions to perform BSE are more directly influenced by symptom-oriented thinking rather than a general perception of being healthy. Another explanation is that the response distribution for this factor may have been too homogeneous to differentiate between those who practiced BSE and those who did not, limiting its predictive utility in the regression model.

- Cultural influences

Cultural and religious contexts significantly shaped adolescent perceptions. In many Southeast Asian communities, the female body is considered a taboo subject, and fatalistic beliefs, such as viewing illness as destiny, discourage preventive practices [10], [18]. Our findings suggest that embarrassment (19.4%) and lack of privacy (28.4%) reflect these broader cultural constraints. Such socio-cultural barriers restrict open discussions about breast health and lower self-efficacy, even among adolescents with some knowledge of BSE. Interventions must therefore be culturally sensitive and designed to challenge stigma and fatalism.

- Theoretical integration with the HBM

The results can be interpreted through the HBM. Low perceived susceptibility was evident in adolescents who felt "too young" to be at risk. Low perceived benefits were reflected in the belief that BSE is unnecessary without symptoms. Perceived barriers, including lack of privacy, embarrassment, and time constraints, directly hindered practice. Finally, reduced self-efficacy was apparent in feelings of incompetence and uncertainty about performing BSE correctly. These findings align with previous meta-analyses showing that perceived severity, benefits, and self-efficacy are stronger predictors of BSE behavior than awareness alone [33]. Grounding the results in HBM highlights the multifactorial nature of adolescent health behavior and underscores the importance of interventions that address both cognitive and cultural dimensions.

- Implications for practice

The findings have several practical implications. Peer-led education and mentoring can help normalize BSE among adolescents, reduce embarrassment, and build motivation. Digital health platforms and social media, already cited as major information sources in this study, should be harnessed for culturally appropriate health campaigns. School-based interventions must integrate structured BSE training into reproductive health curricula. Nurses play a central role in these strategies: they can deliver culturally sensitive education, strengthen adolescents' self-efficacy, and collaborate with teachers and community health workers to sustain awareness and practice.

4. CONCLUSION

This study identified several factors that influence the practice of BSE among teenage girls in Salatiga City, Indonesia. Although 70.1% of respondents had received information about BSE, mainly from social media and school, many still perceived the practice as unnecessary unless symptoms appeared. This result highlights a gap between knowledge and preventive behavior.

The most significant barrier was the perception that BSE is not important (reported by 37.3% of respondents), followed by a sense of being too young (10.4%) and a lack of knowledge about how to perform BSE (10.4%). Other personal barriers, such as feeling not sick (6.0%) and incompetent (4.5%), were less commonly acknowledged. Social barriers such as embarrassment and lack of privacy had relatively low influence, while fear of the results was the least cited reason (1.5%).

This study highlights the need for school-based interventions that integrate structured BSE education into reproductive health curricula, supported by practical demonstrations and training for school health personnel. Collaboration with local health authorities and community campaigns using social media and peer modeling are also recommended to address misconceptions and enhance adolescent engagement. Future research should employ qualitative approaches, expand to more diverse adolescent populations, and evaluate the effectiveness of school- and community-based interventions.

This study has several limitations that should be considered when interpreting the findings. First, the study employed a cross-sectional design, which limits the ability to determine causal relationships between knowledge, attitudes, and BSE behavior. Second, the sample was restricted to young women residing in a student dormitory in a single city, which may not represent the broader adolescent population in Indonesia with more diverse cultural, socioeconomic, and educational backgrounds. Additionally, self-reported questionnaires may be subject to response bias, particularly social desirability bias, as participants might provide answers that they believe are expected rather than their actual behavior or perception. The study did not include qualitative data that could have enriched the understanding of deeper personal or cultural beliefs influencing BSE practices.

In summary, this study highlights that adolescent girl in Salatiga face significant personal, cognitive, and socio-cultural barriers to breast self-examination. Misconceptions, low perceived susceptibility, and cultural taboos remain the strongest obstacles, which are consistent with constructs of the Health Belief Model. These findings emphasize the need for tailored, culturally sensitive interventions that strengthen self-efficacy and normalize BSE as a preventive health behavior. Peer-led education, school-based programs, and the integration of digital health platforms represent promising strategies to reach adolescents more effectively. Nurses, as trusted health professionals, are pivotal in promoting adolescent health literacy and shaping positive preventive practices.

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C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

ETHICAL APPROVAL

This research was ethically approved by the Ethics Committee of Universitas Kristen Satya Wacana with the number 298/PE/KEPK.UKSW/2020.

DATA AVAILABILITY

The data that support the findings of this study are available from the corresponding author, [KDT], upon reasonable request.

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