



Exploring barriers to physical activity participation among female nursing students adhering to specific social-cultural norms in Indonesia: A qualitative study

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Abstract

Background: The prevalence of insufficient physical activity is common among nursing students and impacts their academic performance. Research on obstacles to physical activity (PA) among religious women, notably Muslims, is limited.

Objectives: This study aimed to explore barriers to PA among Indonesian Muslim female nursing students and gather suggestions for overcoming those barriers.

Methods: This study used a qualitative descriptive design. Two focus groups were conducted with 12 Muslim female nursing students in Makassar, Indonesia. Interviews were audio-recorded and transcribed verbatim. The data were collected from May and July 2019. Inductive thematic analysis was used to identify core themes and sub-themes.

Results: Thematic analysis identified barriers to PA across four main themes: intrapersonal, interpersonal, institutional, and social-cultural related to religious context. Each theme included two to three sub-themes, totaling nine categories of PA participation barriers. Intrapersonal barriers consisted of low motivation, emotional states, and a sedentary lifestyle. Interpersonal challenges included a lack of family or friend support and family obligations. Institutional barriers involved academic workload prioritization, school environment inaccessibility, and absence of athletic curriculum policy. Socio-cultural barriers posed by religious expectations included gender-related concerns and modest dressing. Drawing from their perspectives as Muslim female nursing students, study participants proposed six strategies to address these barriers. Proposed solutions include promoting PA through Apps, forming female team-up clubs, providing designated exercise spaces, and implementing mandatory athletic courses for nursing students at the institutional level. Additionally, offering female instructors and private exercise rooms could reduce the barriers from a socio-cultural perspective caused by religious expectations.

Conclusions: The study found that Muslim female nursing students with dual roles face increased barriers to PA participation, driven by intrapersonal and interpersonal levels, nursing learning load, and religious norms. Schools could build environments to meet the religious expectations within Indonesian society to promote PA for Muslim female nursing students. For example, the practical strategies include offering private rooms or female instructors when they physically exercise in school.

Keywords

Indonesia; exercise; schools; nursing students; female; Islam; physical activity; workload; curriculum; policy

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Background

Physical inactivity is a significant global health concern, impacting overall well-being ([World Health Organization, 2020](#)), including young adults ([Bashatah et al., 2023](#)). The shift from senior high school to university often leads to decreased physical activity (PA), increased sedentary behavior, and lower participation rates ([Winpenny et al., 2020](#)). Recent

global research shows that only 25–40% of university students consistently meet the recommended PA level ([Bin Abdulrahman et al., 2021](#); [González et al., 2017](#); [Murphy et al., 2018](#)). Nursing students face physical inactivity, with only 33% meeting recommended levels ([Baj-Korpak et al., 2020](#); [FitzGerald, 2015](#)). Female nursing students show lower levels than male peers ([Baj-Korpak et al., 2020](#); [Blake et al., 2017](#)), a trend mirrored by Muslim female college students ([Sharara](#)

et al., 2018). Reduced physical activity negatively affects physical health (Warburton & Bredin, 2017) and mental well-being (Singh et al., 2023), as well as academic performance (Deliens et al., 2015). It is crucial to identify barriers for nursing students, particularly focusing on Muslim females, to enhance their participation in recommended physical activity levels and provide tailored interventions.

Physical activity participation includes physically demanding movements, sports, and energy expenditure and is characterized by PA levels, participation frequency, and physical exertion intensity (Ross et al., 2016). Regarding the barriers to participating in recommended PA among university students, a systematic review categorized barriers into three dimensions: psychology, emotion, and cognition; environment; and socio-culture (Ferreira Silva et al., 2022).

In the dimensions of psychology, emotion, and cognition, university students commonly reported barriers such as a lack of time related to academic learning (Chim et al., 2020), willpower, and motivation (Ranasinghe et al., 2016). Environmental barriers included the lack of accessible and suitable sports facilities (Frederick et al., 2022). In the socio-cultural dimension, barriers included lower socioeconomic levels, often attributed to work schedules lacking flexibility (Pedersen et al., 2021), or a lack of support for space due to gender segregation was identified as being related to religious norms for Muslim females (Burton et al., 2021).

The socio-cultural and religious dimensions related to physical activity among Muslim female groups are significant concerns that need attention. Young Muslim women face barriers to participating in sports and other activities during physical education at school, whereas Muslim men can freely participate. Laar et al. (2019) found barriers among 20 Muslim female undergraduates in Pakistan, including reduced autonomy due to unsupportive attitudes towards female sports, the influence of family values shaped by religion and social culture, and economic constraints hindering sports participation.

Almaqhawi (2022) and Burton et al. (2021) also recruited Muslim female college students from Saudi Arabia to explore these issues. Almaqhawi (2022) indicated that due to gender segregation by sociocultural-religious norms, there is a lack of separation of gyms for women and a lack of fitness trainers. Burton et al. (2021) highlighted how socio-cultural and religious norms impact PA participation by requiring Muslim women to wear an abaya and Shayla, resulting in discomfort and reduced activity motivation. Additionally, these norms limit women's access to support in public spaces and constrain outdoor activities after 6 pm due to socio-cultural expectations related to domestic duties.

According to systematic reviews, the barriers identified pertaining to socio-cultural and religious norms on PA participation among Muslim female youth include the merging of societal and gender norms, with parents prioritizing educational and spiritual activities; traditional attire unsuitable for PA; requirement for female accompaniment in public spaces; absence of facilities segregated by gender; cultural value of comfort and avoiding physical exertion; the perception that public spaces are unsuitable for physical activity (Peng et al., 2023; Sharara et al., 2018).

Nurses advocate for health promotion and emphasize maintaining a healthy lifestyle (Morris et al., 2022). While

students are typically educated about the health benefits of PA, with the hope that this knowledge will influence their personal lifestyle choices, it is noteworthy that nursing students have a higher prevalence of not meeting the recommended levels of PA (Baj-Korpak et al., 2020; FitzGerald, 2015).

Compared to the overall number of university students, two studies indicated that nursing students faced similar barriers, such as lack of time or facilities not being available with their schedules. Additionally, they encountered extra challenges related to insufficient energy due to demanding learning schedules in clinical settings and difficulties coordinating exercise routines with their study timetables (Blake et al., 2017; Bryer et al., 2013; Tavalacci et al., 2018). Nursing students usually spend more time in class, laboratory, and clinical settings than students in other areas of study, and they face more demands (Bryer et al., 2013; Tavalacci et al., 2018). A recent study found that fatigue due to clinical shifts was a barrier faced by nursing students (Wirth et al., 2023).

According to a scoping review, only 12.2–52.3% of Indonesian youth report sufficient physical activity, and between 24.5–33.8% have sedentary behavior levels of ≥ 3 hours per day (Andriyani et al., 2020). Over 87% of Indonesia's population identifies as Muslim (Briliana & Mursito, 2017), and Muslim females face challenges from socio-cultural or religious norms, which limit their PA participation (Laar et al., 2019). The evidence-based literature indicates that barriers related to social norms or religious factors have diverse impacts (Almaqhawi, 2022; Burton et al., 2021; Sharara et al., 2018), shaped by each country's unique socio-cultural characteristics.

Current perspectives often focus solely on Muslim college students or nursing students when exploring barriers to PA participation, neglecting their dual roles and the collective impact on these groups. There is limited evidence to guide the development of interventions addressing barriers among female nursing students, especially within populations with religious considerations like Muslim groups, to enhance their participation in recommended PA. Hence, college students managing dual roles as "Muslim females and nursing students" face greater challenges in PA participation. These barriers require increased attention and further investigation.

This study aimed to explore the barriers to physical activity (PA) participation among Muslim female nursing students in Indonesia and gather their practical suggestions for overcoming barriers. We expect the findings to highlight these barriers and provide guidance for developing practical interventions within this group to encourage PA engagement during clinical learning programs.

Methods

Study Design

A qualitative descriptive approach was used to explore barriers to physical activity among Muslim female nursing students and to gather suggestions from this group on overcoming these barriers. This study pioneers new ground in nursing research by exploring dual roles and capturing participants' experiences, perceptions, and attitudes, which is particularly pertinent in this context (Doyle et al., 2020). The research

followed the guidelines outlined in the Consolidated Criteria for Reporting Qualitative Research (COREQ) (Tong et al., 2007).

Participants

Purposive sampling was used to recruit study participants from a nursing college in Makassar, South Sulawesi, Indonesia. The inclusion criteria were nursing students who are Muslim females, while the exclusion criteria included first-year students who had not yet participated in nursing skills laboratories or clinical practicums. Recruitment strategies involved posting flyers on campus and making announcements during class meetings. Initially, 20 nursing students expressed interest in the study, but eight first-year students were excluded. Finally, 12 eligible participants were invited to participate in this study after providing informed consent.

Data Collection

One person moderated the interviews, while another assisted. AJAFK, serving as moderator and first author, is a male doctoral student, and the assistant, a female first-year master's student, aided the moderator by taking notes during discussions, ensuring every participant had a chance to contribute. Both received training before starting the study and completed a 3-day, 7-hour training workshop led by three PhD-level researchers of the research team who were experienced in focus group research.

Participants agreed upon a date, time, and location for the focus group discussions (FGDs). Data were collected between May and July 2019. The participants were assigned two focus group sessions based on availability. All participants received an Indonesian version of the short form of the International Physical Activity Questionnaire (IPAQ-SF) to evaluate the participant's PA levels and realize their PA behaviors (Suyoto et al., 2016). The separate discussions for two focus groups (FGD1 and FGD2) took place in a private room within the nursing department, each during a different time frame. Discussions continued until participants had thoroughly covered their accounts of barriers to PA without introducing any new experiences. Each session included six nursing students.

At the start of each focus group session, the moderator read a short introduction to explain the study and process. Participants were instructed to speak loudly and clearly, one person at a time, to facilitate audio recording. The moderator posed open-ended questions and encouraged participants to elaborate through probing or clarifying questions. Each group lasted about 120 minutes. At the end of each focus group session, the moderator provided a verbal summary of the discussion and allowed participants to add comments. Participants then completed a brief demographic questionnaire.

Interview guide questions were developed using pertinent literature related to barriers to exercise/ PA at moderate levels. The discussion guide consisted of broad questions with more specific follow-up probes (Krueger, 1997). The guide was pilot-tested on five university students for clarity (Table 1). The five students proposed assessing PA levels before the focus group interviews for eligible participants.

Table 1 The focus group discussion guide

Interview Guide Questions	
Step 1 Introduction	After the moderator and observer introduced themselves, the moderator stated the study objective and clarified anonymity, and some consented to conduct the discussion. Permission to record the interview was also obtained. Finally, the recommended levels of PA were defined in detail, including physical exercise.
Step 2 Open questions	What are the barriers to exercise/ PA at moderate levels, at least during the school day?
Step 3 Open questions	What are the suggestions for overcoming barriers to engaging in exercise/ higher density levels of PA?
Step 4 Ending	Is there anything else that you would like to discuss further?

Data Analysis

Data from the audiotapes were transcribed verbatim, and during this stage, the transcripts were translated into English. A bilingual expert translated the Bahasa into English, and another reviewed the translation. Our analytical process followed an inductive approach (Liu, 2016; Thomas, 2006) involving five steps: reading the text data, identifying specific text segments related to the objectives, labeling the text segments to generate categories, reducing overlap and redundancy among the categories, and creating a model incorporating most essential categories. Experts were anonymized and identified to process data before and during analysis. Upon reaching data saturation, 19 free themes emerged from the interview transcripts. Following this, we minimized any overlap and redundancy among these free themes. We continuously wrote critical and diagrammatic memos to facilitate ongoing data reduction. Two researchers who were doctoral levels and bilingual experts in Bahasa and English independently conducted steps one to five.

Trustworthiness

To ensure the trustworthiness of our qualitative data analysis, we employed member checking and peer debriefing techniques from two experienced qualitative researchers. Differences were resolved through discussion, and as new themes emerged, earlier transcripts were reread. After thoroughly reviewing all the free themes, we derived the core themes and sub-themes to include the research findings. Finally, we contacted four participants in person to review and confirm the data analysis results, minimizing the bias and increasing trustworthiness.

Ethical Considerations

Ethical approval was obtained from the Institutional Research Board of the Universitas Islam Sultan Agung (UNISSULA), Indonesia, with approval number 102/A.1/FIK-SA/III/2019 on 25 March 2019. This study followed ethical principles by respecting participants' autonomy to participate or withdraw from this study until data analysis was concluded. Before data collection, the researchers provided detailed information about the study. Participants voluntarily signed the informed consent form, indicating their willingness to participate. During data transcription, all interview data were anonymized, with participants identified by assigned numbers, such as P1 to

P12, to protect their privacy, and access to participant identities was restricted through password protection.

Results

Participant Characteristics

Twelve Muslim female nursing students (grades 2-3) aged 19 to 21 participated in the study. The demographics of participants are summarized in **Table 2**. All participants took 17-22 credits per semester according to their study options. Two out of the 12 participants had not yet begun their

internship at the hospital as they were currently occupied with the nursing skill laboratory and were devoting a significant amount of time to learning nursing skills in laboratory classes. On average, most participants ($n = 10$) were required to complete at least 80 hours of clinical practicum credits. Most participants ($n = 8$) lived with their families, and others lived in boarding houses. Based on the short version of the IPAQ used to estimate their PA level, most participants were classified as having low levels of PA. Only one participant was identified as moderately physically active.

Table 2 Summary of participants' characteristics ($n = 12$)

Focus Group	Participant	Age/ years	Clinical practicum	Residence	IPAQ Scoring
1	P1	20	Yes	Parent	Low
1	P2	20	Yes	Boarding House	Low
1	P3	21	Yes	Boarding House	Low
1	P4	21	Yes	Parent	Low
1	P5	22	Yes	Parent	Low
1	P6	19	Not yet*	Parent	Low
2	P7	19	Not yet*	Boarding House	Moderate
2	P8	20	Yes	Parent	Low
2	P9	20	Yes	Parent	Low
2	P10	21	Yes	Boarding House	Low
2	P11	21	Yes	Parent	Low
2	P12	21	yes	Parent	Low

Note: *Participants were currently occupied with the nursing skill laboratory

Barriers to Physical Activity Participation

After conducting the inductive analysis, we identified four core themes and nine sub-themes (as presented in **Figure 1**) that summarized the research findings, focusing on the barriers to

PA participation among Indonesian Muslim female nursing students. The four core themes were intrapersonal level, interpersonal level, school level, and socio-cultural level. Each core theme and the sub-themes were presented as follows.

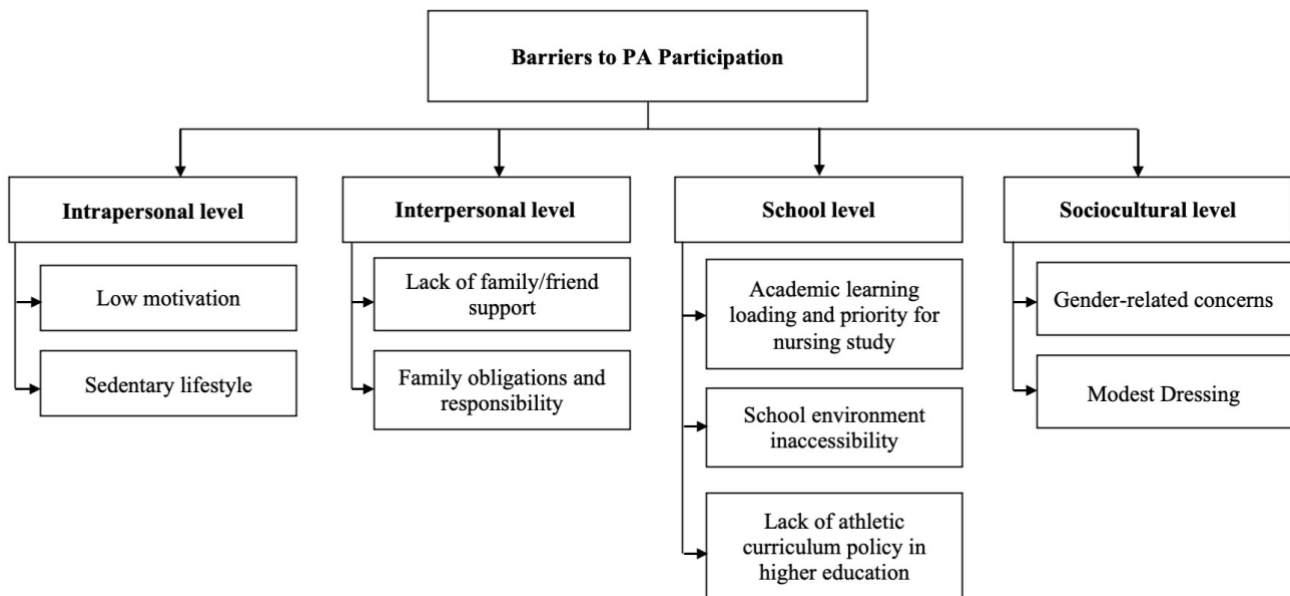


Figure 1 Core themes and subthemes barriers to physical activity for Muslim female nursing students

Core theme 1: Intrapersonal level

Participants engaged in discussions and shared their personal experiences with barriers to participation in PA. These barriers were often related to their low motivation and a sedentary lifestyle. The influence of participants' personalities and lifestyles was described and reflected upon.

Subtheme 1.1: Low motivation

Participants expressed a lack of desire for PA, resulting in their failure to establish a regular exercise schedule. They

lacked the motivation to commit to a specific exercise routine. One of the participants admitted:

"...I just don't have the willingness to do the exercises, so I never set an exercise schedule" (P2-FGD1)

Another participant acknowledged the conflict between laziness and recognizing the cognitive benefits of exercise for health improvement:

"I am lazy; I fail to maintain a regular exercise routine" (P11-FGD2)

One participant highlighted how emotional states influenced her PA engagement:

"I felt upset when my boyfriend was late for a date; it put me in no mood to go exercise (All participants laugh)" (P12-FGD2)

Subtheme 1.2: Sedentary lifestyle

One female nursing student shared that exercise was not her preferred choice during free time. Instead, she spent time playing smartphone games or chatting with friends:

"In my free time, I prefer smartphone games, chatting with friends, and watching YouTube over exercising" (P12-FGD2)

Core theme 2: Interpersonal level

At the interpersonal level, participants described a lack of support from family and friends, family obligations, and responsibilities.

Subtheme 2.1: Lack of family/friend support

Participants highlighted how lack of support from parents or friends influenced their PA participation. One participant expressed frustration about the lack of support and companionship from family or friends, which often led her to cancel exercise plans aimed at managing her body weight:

"When I notice weight gain, I intend to exercise, but if I'm alone, I often cancel my plan (Laughs)" (P5-FGD1)

Two participants also shared similar sentiments, stating that without company, they tended to prefer going to bed instead of exercising:

"If my mom or close friend doesn't join me for exercise, I often give up and go to bed (Laughs)" (P8,11-FGD2)

Subtheme 2.2: Family obligations and responsibility

One participant mentioned the time constraints due to her responsibility to assist with household chores after school, making it challenging to find time for exercise:

"I need to assist my mother with house cleaning. Due to time constraints after classes, I find it challenging to make time for exercise" (P12-FGD2)

Core theme 3: School level

Participants discussed academic priority, environmental inaccessibility, and the absence of a physical education curriculum policy, impacting their PA engagement.

Subtheme 3.1: Academic learning loading and priority for nursing study

Some participants emphasized how their demanding nursing study schedules significantly limited their time for physical exercise:

"We have a significant number of assignments that require us to study nursing knowledge and practice related skills... Our available time for physical exercise is limited" (P1, P3, P5-FGD1)

Most participants revealed that the demands of their nursing studies often left them too fatigued to exercise and preferred resting to recover:

"The hospital internship from Monday to Saturday limits my energy for exercise on Sunday if we don't have an assignment from school, we usually go to sleep for energy recovery (Laugh)" (FGD1 & FGD2)

Additionally, the participants expressed a loading for their hospital internship learning:

"After the hospital internship, feel extremely tired... difficult to exercise due to busy nursing study schedule..." (FGD1 & FGD2)

All participants also voiced their experiences, indicating that they prioritized academic assignments over physical exercise:

"We spend long hours studying nursing skills so that we couldn't find time for exercise due to the many demands on our schedule" (FGD1 & FGD2)

Subtheme 3.2: School environment inaccessibility

Participants emphasized the insufficient availability of equipment in school to support their engagement in PA, such as basketball and badminton. As participants expressed:

"... on this campus, hmm....it does not have enough equipment to support us to do the exercise, such as basketball, badminton" (FGD1 & FGD2)

In addition, weather conditions such as extreme heat or rain are one of the biggest obstacles to outdoor exercise, and the absence of indoor exercise spaces on campus presented an additional challenge, as participants mentioned:

"The weather issues- too hot or raining- unfortunately, there is lack of convenient access to a suitable location and no indoors available to support physical activity on this campus" (FGD1 & FGD2)

Subtheme 3.3: Lack of athletic curriculum policy in higher education

In our study site, the nursing school lacks a policy about the physical education curriculum. All participants complained and completely agreed that the school does not offer athletic courses to every student, demonstrating a collective viewpoint:

"The school does not provide mandatory credits or courses related to athletic programs for students" (FGD1 & FGD2)

Core theme 4: Socio-cultural level

Most participants noted that influences on physical activity, including gender-related issues and clothing, stem from Muslim beliefs and expectations for women.

Subtheme 4.1: Gender-related concerns

As per religious gender norms, Muslim females are requested to wear a hijab, which covers both the chest and head. Participants emphasized the importance of maintaining modesty in public. They also raised concerns regarding their engagement in physical exercise. They expressed discomfort and a sense of being unable to fully engage due to factors such as the unavailability of appropriate spaces and the presence of male instructors in exercise classes:

"It is difficult to maintain modesty due to Muslim clothing during exercise, leading to discomfort and shyness when participating in mixed-sex events. We would rather avoid this. We don't enjoy participating in physical exercise classes if the instructors are male. It makes us feel uncomfortable" (FGD1 & FGD2)

Subtheme 4.2: Modest dressing

Most Muslim female participants expressed their concerns about wearing a hijab, as it necessitates covering their bare

arms, thereby restricting their participation in PA. They described experiencing physical discomfort, facing criticism from others, and encountering difficulties in locating suitable exercise spaces and appropriate categories due to religious dress codes:

"...Because of religious norms, women must wear modest clothing, including a hijab, which restricts the exercise options at school and elsewhere, avoiding outdoor sports wearing a headscarf due to criticism of clothing in the past" (FGD1 & FGD2)

Suggestions for Overcoming the Barriers to Physical Activity

To summarize the opinions from two focus groups, various strategies were proposed across three core themes to address and overcome barriers to PA participation.

Personal level

Applying the apps in promoting physical activity

Participants suggested using smartphone applications for wearable sensors that can serve as personal coaching tools to motivate them to engage in physical exercise independently:

"Using smartphones can help and mention people doing physical exercise by myself" (FGD2)

School level

Participants recommended implementing several strategies for PA at the school level to overcome related barriers.

Creating team-up clubs for female

Participants suggested a strategy involving the establishment of team-up exercise clubs to provide support and motivation for participants:

"The school restricts exercise club membership to team-ups to foster support and motivation for female student exercise" (FGD2)

"The school can offer more options related to exercise clubs for females, such as integrating cultural dance or music into gymnastics" (FGD1 & FGD2)

Establishing mandatory athletic courses for nursing students

Participants strongly suggested establishing mandatory courses for the students:

"The school needs to offer mandatory athletic courses for students, but the schedule matched with the hospital internship for the nursing students" (FGD1)

Providing inner space for exercise

Participants addressed weather issues as a barrier and suggested that the school provide proper space.

"...because the weather is either too hot or raining for outdoor exercise, it needs an inner space to do the exercise" (FGD1 & FGD 2)

Socio-cultural level

To address barriers to gender-related issues among Muslim female nursing students, participants suggested incorporating female instructors into exercise classes and providing rooms only for females to exercise.

Female instructors in exercise classes

The participants consistently expressed the importance of having female instructors for Muslim female students:

"A female instructor is better for Muslim female students, so we do not face any gender-related concerns in physical exercise" (FGD1)

Providing rooms only for females to exercise

Participants suggested the room only for females to exercise to prevent situations where Muslim female individuals fail to adhere to norms regarding inappropriate exposure.

"If the school could provide a private space for female students, we could remove our hijabs during exercise; it can prevent the Muslim female from exposing the extreme arm or alleviate physical discomforts" (FGD1 & FGD2)

Discussion

Based on participant feedback on PA experience, the study identified four main barrier themes among Indonesian Muslim female nursing students and subdivided them into ten sub-themes within their thematic hierarchies. The four themes and the sub-themes included 1) Intrapersonal level: low motivation and sedentary lifestyle; 2) Interpersonal level: lack of family or friends support, family obligations, and responsibility; 3) School level: academic learning loading and priority for nursing study, school environment inaccessibility, and lack of athletic curriculum policy in higher education; 4) Socio-cultural level: gender-related concerns and modest dressing.

Also, the participants provided concrete suggestions to the school, including 1) Intrapersonal level: applying smartphone apps in promoting physical activity; 2) School level: creating team-up clubs for females, establishing mandatory athletic courses for nursing students, and providing inner space for exercise; 3) Socio-cultural level: employing female instructors in exercise classes and providing dedicated exercise rooms for females.

The findings in this study align with the social-ecological model (SEM), which explores how individual factors, interpersonal relationships, community influences, and societal contexts interact to shape behaviors and outcomes (Stokols, 1996). Similarities were observed with previous qualitative studies on barriers to PA participation (Almaqawi, 2022; Burton et al., 2021; Essiet et al., 2017; Laar et al., 2019; Sabharwal, 2018; Vasquez et al., 2021), indicating credibility in the core themes and sub-themes identified through the inductive data analysis approach in this study. The unique characteristics of "Muslim female nursing students" that impact PA participation highlight the significance of this research within this specific population.

At the intrapersonal level, barriers such as low motivation and a sedentary lifestyle were identified. Both the current study and numerous previous research studies have highlighted that "low motivation" is a significant obstacle to engaging in PA (Burton et al., 2021; Hilger-Kolb et al., 2020; Sabharwal, 2018; Vasquez et al., 2021; Wirth et al., 2023). A systematic review also emphasized that motivation affects PA across diverse groups regardless of gender, economic background, nationality, or religious identity (Sharara et al., 2018).

A sedentary lifestyle was identified as a barrier in the present study despite its absence in relevant qualitative studies covered by our literature review. Participants preferred smartphone games, chatting, and YouTube over exercise in their daily routines. The study group suggested integrating apps to promote physical activity, aligning with findings from a

systematic review (Goodyear et al., 2021). This approach could be part of a technology-based program to encourage PA among youth. However, addressing and preventing potential adverse effects such as guilt, inadequacy, and failure to achieve goals in future efforts is crucial. Achieving an optimal balance of social media use for promoting positive health behaviors is a research priority (Shimoga et al., 2019). Additionally, experts recommend implementing a school-level exercise club to improve individual motivation (Burton et al., 2021; Duffey et al., 2021).

At the interpersonal level, lack of family or friend support and family obligations and responsibilities were reported as the barriers in our study. These findings align with numerous studies across various demographic groups (Brown et al., 2024; Burton et al., 2021; Duffey et al., 2021; Hilger-Kolb et al., 2020; Khan et al., 2020; Ranasinghe et al., 2016; Sabharwal, 2018). Participants in the current study did not propose solutions to address this barrier. Seo and Ha (2019) found that peer support significantly influenced PA among female college students, contrasting with the absence of this barrier among males. Engaging in PA with friends or peers fosters bonding and friendship, which is crucial for sustaining PA among females (Brown et al., 2024; Peng et al., 2023; Sukys et al., 2019). Future research should explore peer-supported programs tailored to promote PA participation among female nursing students, including considerations for program design.

The barrier of family obligations and responsibilities is crucial to discuss, given that the participants were college students, females, and from diverse Asian nations, as evidenced in previous studies (Burton et al., 2021; Sabharwal, 2018). Due to their academic responsibilities, taking on family obligations such as chores challenges their full participation in the school schedule or activities (Burton et al., 2021; Sabharwal, 2018). Participants in the current study who lived at home indicated that family obligations hindered their engagement in PA. This observation is consistent with findings from previous studies, which noted that living with parents at home contributes to addressing family responsibilities (Burton et al., 2021; Sabharwal, 2018). Several studies on young populations have reported that gender roles, with females primarily taking on caregiving responsibilities, can impact their PA participation due to limited time (Burton et al., 2021; Mao et al., 2020). This challenge arises from cultural demands on females to prioritize family obligations and responsibilities. Therefore, addressing these issues calls for school-level interventions and awareness campaigns to empower females to overcome these obstacles in future research.

At the school level, the barriers reported in the present study include academic learning load and prioritization of nursing studies, school environment inaccessibility, and lack of athletic curriculum policy in the nursing school. These barriers arise from the demanding nature of nursing education, which occupies time meant for exercise, causes fatigue, and places a higher priority on academic study over PA. Similar challenges have been noted in studies involving general students (Duffey et al., 2021; Ferreira Silva et al., 2022; Hilger-Kolb et al., 2020; Peng et al., 2023; Rosselli et al., 2020), Muslim female students (Al-Hazzaa, 2018; Burton et al., 2021; Laar et al., 2019), and nursing students (Tavolacci et al., 2018; Wirth et al., 2023). However, the composition of

resources addressing these barriers differs between the current study and others. Unlike nursing students who engage in hands-on learning approaches, general college students and Muslim female college students typically attend all their academic lectures in classrooms. An earlier observational study found that nursing curriculum demands, particularly those related to clinical teaching, patient care, and workloads, obstructed PA participation (Tavolacci et al., 2018; Wirth et al., 2023). It highlights the different challenges nursing students face compared to their peers in overcoming barriers to PA while pursuing their education. Furthermore, our participants suggested creating team-up clubs for females, which could provide a supportive and empowering environment where female students can exchange experiences and strategies for overcoming obstacles.

The school environment's inaccessibility posed barriers to exercise in the current study, mainly due to constraints such as insufficient equipment and limited activity spaces. These findings align with previous studies (Al-Hazzaa, 2018; Ferreira Silva et al., 2022; Laar et al., 2019; Peng et al., 2023; Sabharwal, 2018; Sharara et al., 2018). Both current and previous studies propose solutions such as indoor exercise spaces for rainy days and improving school facilities, equipment, and designated areas (Burton et al., 2021; Duffey et al., 2021; Peng et al., 2023). The absence of a physical education curriculum policy specific to this nursing school, a unique finding in our study, holds broader implications, as similar gaps are observed in many universities in Indonesia. It is acknowledged that nursing students' learning priorities and environments differ from those of non-nursing students. Our participants recommended introducing tailored mandatory athletic courses for nursing students, which would enhance opportunities for PA.

At the socio-cultural level in the current study, participants emphasized that gender-related concerns and modest dressing for Muslim female nursing students serve as significant barriers to engaging in PA. Regarding gender-related concerns, most participants expressed discomfort about maintaining modesty in public settings, mainly due to issues like "mixing with men" during exercise and the presence of "male instructors." Similar to our study results, two studies also indicated that "mixing with men" is a barrier to physical exercise for Muslim females (Laar et al., 2019; Peng et al., 2023). Two other studies showed that women sometimes require chaperones when using public exercise facilities due to gender mixing issues (Aljaysousi et al., 2019; Sharara et al., 2018). Islam generally encourages modesty and advocates gender segregation to uphold social decorum (Hafidzi et al., 2023). Gender segregation is a crucial cultural value and religious expectation for Muslim women, which profoundly affects their willingness to participate in PA.

Furthermore, adhering to modest dressing, such as wearing a hijab and avoiding exposure to bare arms, also acted as additional constraints on female participation in PA in the current study. These findings echo previous studies indicating that conservative attire often hinders PA (Peng et al., 2023; Sharara et al., 2018). Rubio Rico et al. (2021) and Aljaysousi et al. (2019) highlighted that modest clothing and gender segregation in recreation facilities were reported issues preventing women from being active.

In the current study, participants suggested addressing these barriers based on their perspectives as Muslim females and nursing students. At the school level, they recommended measures to accommodate religious gender norms. These included inviting female trainers and establishing private exercise spaces where Muslim female students could participate in PA without the need to wear a hijab. These proposed initiatives aim to foster a supportive environment encouraging active PA engagement among Muslim female students.

Limitations

The study's findings appropriately reflect the experiences of Muslim female nursing students during clinical practicum. However, differences in norms and perceptions across various Muslim communities may present different barriers for college students. Non-nursing students may have different reasons for physical inactivity. This study's results specifically pertain to a unique group facing the dual pressures of nursing practicum in clinical settings and specific socio-cultural norms that challenge their motivation for physical activity. When promoting physical activity among groups with distinct socio-cultural challenges and operating within high-pressure clinical learning environments, focusing solely on individual behavior change may not suffice. Addressing socio-cultural perspectives is crucial to meeting their needs effectively.

Implications for Nursing Practice

According to the participants' suggestions, strategies to enhance PA among Muslim female nursing students include utilizing technology and providing gender-specific facilities with adequate and safe spaces. Schools and policymakers should take action to create opportunities and suitable environments for these specific groups to increase their PA participation. These findings hold implications for further research, particularly on promoting PA participation among populations facing similar challenges to this study. While barriers to PA are universal, Muslim female nursing students have diverse experiences influenced by cultural contexts. Future research should prioritize culturally specific interventions to support sustained behavioral changes within this population. Based on these findings, developing practical programs to promote PA among female nursing students should consider integrating religious factors into future research.

Conclusion

This study has identified barriers to physical activity among Muslim female nursing students in Indonesia. The findings categorize barriers into four themes affecting intrapersonal, interpersonal, school, and socio-cultural levels. At the individual level, barriers include personal motivation, emotional state, and sedentary lifestyle. Interpersonally, challenges include a lack of support from family or friends and the burden of family obligations and responsibilities. School-level challenges encompass the demands of nursing studies, limited access to exercise resources, and the absence of a physical education curriculum. Socio-culturally, gender-related restrictions further hinder female participation in physical activities compared to males. These combined challenges

create a significant barrier for individuals striving to engage in physical activities.

Declaration of Conflicting Interest

The authors declared no conflicts of interest in this study.

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Authors' Contributions

AJAFK, CJW, and CCC: Conceptualization, study design, and conducted research. AJAFK and LL: collected data, analyzed and interpreted data, and provided logistic support. CJW and CCC: Supervised all processes, reviewed the original manuscript, and revised and finalized the version. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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Data Availability

The datasets generated during and analyzed during the current study are available from the corresponding author upon reasonable request.

Declaration of Use of AI in Scientific Writing

The authors have declared that no generative AI was used in writing.

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