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RESEARCH ARTICLE

Barriers to physical activity participation among students with intellectual disabilities in inclusive schools: a mixed-methods study

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ABSTRACT

Background: Students with intellectual disabilities often encounter significant challenges in participating in physical activities within inclusive school environments; however, limited research has examined how multiple interacting barriers and motivational factors simultaneously influence participation in these settings. **Objectives:** This study aimed to identify barriers and motivations for physical activity participation among students with intellectual disabilities in inclusive schools. **Methods:** A convergent mixed-methods design was employed using purposive sampling. Participants included 32 students with intellectual disabilities, 3 physical education teachers, and 3 sports coaches from three inclusive schools in Surakarta, Indonesia. Data were collected through questionnaires, semi-structured interviews, and observations. Quantitative data were analysed using descriptive statistics, while qualitative data were analysed using thematic analysis. Findings from both datasets were integrated using a triangulation and data-merging strategy to identify convergent and complementary patterns. **Results:** The findings revealed three interrelated categories of barriers—physical, social, and environmental. Quantitative results indicated that fatigue (69%), lack of peer support (44%), and limited access to facilities (44%) were the most frequently reported constraints. These factors interacted to reduce participation rather than acting independently. Despite these barriers, students demonstrated strong intrinsic motivation, particularly related to improving health, enhancing well-being, and learning new movement skills. **Conclusion:** This study contributes to the literature by providing an integrated understanding of how multiple barriers and motivations interact within inclusive school contexts. Addressing these factors through improved accessibility and targeted instructional support is essential to promote sustainable participation in physical activity among students with intellectual disabilities.

Keywords: Intellectual disabilities; inclusive physical education; physical activity participation; participation barriers; student motivation

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INTRODUCTION

Inclusive schools play an important role in enabling students with disabilities to learn and grow alongside their peers in a supportive environment. One of the major challenges of inclusive education is ensuring that students with disabilities, particularly those with intellectual disabilities, can fully participate in all school activities, including physical activity (Hata et al., 2021). Physical activity represents a key component of inclusive education, as it supports not only physical development but also psychological well-being and social integration (Kashi et al., 2023; Orr et al., 2021). However, despite these well-documented benefits, students with intellectual disabilities consistently demonstrate lower levels of participation in physical activity compared to their peers, largely due to various participation barriers (Cartwright et al., 2017).

Regular physical activity provides substantial benefits for students with intellectual disabilities across physical, psychological, and social domains, including improvements in cardiovascular fitness, motor skills, emotional well-being, and social interaction (Borland et al., 2021; Ocete et al., 2022; Priyono et al., 2021). Nevertheless, the presence of these benefits does not necessarily translate into active participation, as many students continue to experience significant challenges in engaging in physical activity within inclusive school environments. Previous studies have identified several barriers, including physical limitations (e.g., motor coordination difficulties), psychological factors (e.g., low self-confidence and fear of failure), and social constraints (e.g., lack of peer support) (Lee & Jeoung, 2016; Pierce & Maher, 2020). These barriers can reduce students' willingness and ability to engage in structured and unstructured physical activities.

However, existing research has largely examined these barriers in isolation or focused primarily on general physical activity outcomes (Cartwright et al., 2017; Lee & Jeoung, 2016), without adequately considering how multiple barriers interact simultaneously within inclusive school contexts. In addition, limited studies have explored the relationship between participation barriers and motivational factors (Pierce & Maher, 2020), particularly among students with intellectual disabilities in inclusive educational settings. Although several studies have adopted mixed-methods approaches to investigate physical activity among individuals with disabilities, these studies have primarily used qualitative and quantitative findings as complementary sources of information rather than systematically integrating the datasets to explain how barriers and motivational factors influence participation. In addition, previous mixed-methods research has generally emphasised either participation barriers or motivational aspects separately, with limited attention to their interrelationships within inclusive educational settings. Consequently, little is known about how physical, social, and environmental barriers collectively shape students' motivation and participation in physical activity. This limitation restricts the development of comprehensive, evidence-based intervention strategies that address the complex and interconnected challenges experienced by students with intellectual disabilities in inclusive schools. This study aims to identify the barriers and motivational factors influencing participation in physical activity among students with intellectual disabilities in inclusive schools using a convergent mixed-methods approach that integrates quantitative and qualitative findings to provide a more comprehensive understanding of students' participation experiences.

METHOD

Research Design

This study employed a mixed-methods descriptive research design to explore the barriers to physical activity participation among students with intellectual disabilities in inclusive schools. This approach was chosen because it allows researchers to gain a deeper understanding of the experiences and challenges faced by students with intellectual disabilities when participating in physical activities in inclusive educational settings.

Participants

The study was conducted between July and September 2025 in three inclusive schools in Surakarta, Central Java, Indonesia. The study was conducted between July and September 2025 in three inclusive schools in Surakarta, Central Java, Indonesia. A purposive sampling strategy was used to select schools that met predetermined criteria relevant to the study objectives. The selected schools had established inclusive education programmes, enrolled students with intellectual disabilities, and routinely implemented school-based physical education and physical activity programmes involving these students. In addition, the schools represented different educational settings within Surakarta, allowing the study to capture variations in the implementation of inclusive physical education while reflecting the general characteristics of inclusive schools in the city. These schools were considered appropriate information-rich cases for exploring barriers and motivational factors influencing physical activity participation among students with intellectual disabilities.

A purposive sampling technique was employed to select participants with relevant experience related to physical activity participation in inclusive school settings. The sample consisted of 32 students with intellectual disabilities, along with 3 physical education teachers and 3 sports coaches. Inclusion criteria for student participants included: (1) being aged between 10 and 18 years; (2) having mild to moderate intellectual disabilities as identified through school records; (3) being enrolled in inclusive education classes; and (4) actively participating in school-based physical activity programmes. Students with severe communication difficulties or those unable to complete the questionnaire with assistance were excluded from the study.

Students completed the questionnaires, while physical education teachers and sports coaches participated in semi-structured interviews and observations. Teachers and coaches were included because of their role in facilitating and supporting physical activity participation among students with intellectual disabilities in inclusive school environments. The demographic characteristics of student participants are presented in **Table 1**.

Table 1. Participant Characteristics

Profile		Frequency	Percentage (%)
Gender	Male	18	56.25
	Female	14	43.75
Age	8 - 12	5	15.62
	13 - 15	8	25
	16 - 19	19	59.38

Ethical approval for this study was obtained from the Research Ethics Committee of Universitas Muhammadiyah Surakarta (No. 4750/B.2/KEPK-FKUMS/V/2023) prior to data collection. Permission was also granted by the participating schools. Written informed consent was obtained from parents or guardians of student participants and from all adult participants involved in the study. Confidentiality and anonymity were ensured throughout the research process.

Instruments

Questionnaire

The questionnaire was adapted primarily from the Perceived Barriers to Physical Activity Questionnaire developed by Shields and Synnot (2016). The instrument was modified to reflect the characteristics and contextual needs of students with intellectual disabilities in inclusive school settings. It was selected because it was specifically designed to assess perceived barriers to physical activity among individuals with disabilities and has been widely applied in disability-related physical activity research. The adapted questionnaire consisted of 27 items across four dimensions, namely (i) personal barriers, including fatigue and physical limitations; (ii) psychological barriers, including embarrassment, anxiety, and self-confidence; (iii) social barriers, including peer support and social interaction; and (iv) environmental barriers, including accessibility of facilities, availability of equipment, and institutional support.

Responses were measured using a 4-point Likert scale, ranging from 1 (strongly disagree) to 4 (strongly agree). This response format was adopted to facilitate comprehension and response selection among students with intellectual disabilities, while avoiding a neutral midpoint that may increase response ambiguity. Prior to data collection, the adapted instrument was evaluated for content validity, item validity, and internal consistency. Content validity was assessed by three experts with expertise in physical education and special needs education using the Content Validity Index (CVI). The instrument obtained a CVI of 0.89, indicating a high level of agreement among the experts regarding the relevance and clarity of the items. Item validity was subsequently examined using item-total correlation, with most items exceeding the predetermined criterion of $r > 0.2673$. The instrument demonstrated good internal consistency, with a Cronbach's alpha coefficient of $\alpha = 0.87$, indicating that the items showed satisfactory consistency in measuring perceived barriers to physical activity.

Semi-Structured Interview Guide

Semi-structured interviews were conducted using an interview guide consisting of eight open-ended questions designed to explore participants' experiences, perceived barriers, and motivational factors related to physical activity participation in inclusive schools. Example questions included: "What difficulties do students experience during physical activity participation?" and "What factors encourage students to participate in physical activities?"

The interview guide was developed based on relevant literature concerning inclusive physical education and physical activity participation among students with disabilities. Prior to implementation, the guide was reviewed by experts in adapted physical education and qualitative research to ensure clarity, appropriateness, and comprehensibility for participants.

Interviews were conducted individually and lasted approximately 20-30 minutes. All interviews were audio-recorded with participants' consent and later transcribed verbatim for analysis.

Observation Sheets

Structured observation sheets were used to systematically document students' participation behaviours during school-based physical activity sessions. The observations focused on four key aspects, namely (i) students' engagement during

activities; (ii) peer interaction and social participation; (iii) instructional support provided by teachers and coaches; and (iv) environmental accessibility, including the availability and suitability of facilities and adaptive equipment. In addition, field notes were recorded systematically throughout the observation sessions to capture relevant contextual factors that could influence students' participation within inclusive physical activity settings.

Trustworthiness

To enhance the trustworthiness of qualitative findings, triangulation was conducted across interviews, observations, and questionnaire data. Coding and theme development were independently reviewed by two researchers to ensure consistency and reduce interpretive bias. Inter-rater agreement was assessed using Cohen's Kappa coefficient, which indicated substantial agreement between coders ($\kappa = 0.81$).

Data Collection

Data were collected between July and September 2025 in three inclusive schools in Surakarta, Central Java, Indonesia. Multiple data collection methods were employed concurrently, including questionnaires, semi-structured interviews, and direct observations, in accordance with the convergent mixed-methods design.

Questionnaires were administered to students with intellectual disabilities to assess perceived barriers and motivational factors related to physical activity participation. The administration process was conducted with assistance from teachers to ensure participants understood each questionnaire item clearly.

Semi-structured interviews were conducted with 32 students, 3 physical education teachers, and 3 sports coaches to explore their experiences, perceptions, and challenges regarding physical activity participation in inclusive school environments. Interviews were conducted individually in a quiet setting within the school environment and lasted approximately 20-30 minutes.

Observations were carried out during school-based physical activity sessions to capture real-time participation behaviors, peer interactions, instructional support, and accessibility of facilities and equipment. Field notes were recorded systematically using structured observation sheets.

Following data collection, all datasets were reviewed for completeness and consistency. Triangulation across quantitative and qualitative data sources was conducted to compare and integrate findings, thereby enhancing the comprehensiveness and credibility of the study.

Procedures

The study was conducted in three stages: preparation, data collection, and data verification. During the preparation stage, inclusive schools meeting the study criteria were identified, and ethical approval and institutional permissions were obtained prior to data collection. Research instruments, including questionnaires, interview guides, and observation sheets, were developed, reviewed, and finalised before implementation.

During the data collection stage, questionnaires were administered to students with intellectual disabilities to assess perceived barriers and motivational factors related to physical activity participation. The questionnaire administration was conducted with assistance from teachers to ensure participants understood each item clearly. Semi-structured interviews were conducted with 32 students, 3 physical education teachers, and 3 sports coaches to explore their experiences, perceptions, and challenges related to participation in physical activity within inclusive school environments. Each interview lasted approximately 20-30 minutes and was audio-recorded with participants' consent.

Observations were conducted during school-based physical activity sessions to capture students' participation behaviours, peer interactions, instructional practices, and environmental accessibility in real-time situations. Field notes were recorded systematically using structured observation sheets.

Finally, during the data verification stage, all collected data were reviewed for completeness and consistency. Triangulation across questionnaires, interviews, and observations was employed to enhance the credibility and comprehensiveness of the findings.

Data Analysis

Qualitative data obtained from interviews and observations were analysed using thematic analysis following the six-phase framework proposed by Braun and Clarke (2023). The analysis began with repeated reading of interview transcripts and observation field notes to achieve data familiarisation. Initial codes were then generated inductively from meaningful segments of the data related to barriers and motivational factors influencing physical activity participation. Similar codes were grouped into broader categories, which were subsequently refined into themes representing physical, social, and environmental barriers, as well as motivational factors associated with participation in physical activity. To enhance analytical rigor, the coding process and theme development were independently reviewed and discussed among researchers to ensure consistency and credibility. Discrepancies in coding and interpretation were resolved through discussion until consensus was achieved.

Quantitative data obtained from questionnaires were analysed using descriptive statistical analysis with SPSS version 29. Frequencies, percentages, means, and standard deviations were calculated to identify the most frequently reported barriers and motivational factors related to physical activity participation among students with intellectual disabilities.

Integration of qualitative and quantitative findings was conducted using a triangulation and data-merging approach within the convergent mixed-methods design. Quantitative results were compared with qualitative themes to identify convergent, complementary, and divergent patterns across datasets. This integration enabled a more comprehensive interpretation of how multiple barriers and motivational factors simultaneously influenced physical activity participation among students with intellectual disabilities.

RESULTS

Barriers to Physical Activity Participation

The qualitative findings from interviews and observations, supported by quantitative questionnaire data, identified three interrelated categories of barriers influencing physical activity participation among students with intellectual disabilities in inclusive schools: (1) physical barriers, (2) social barriers, and (3) environmental barriers. These findings indicate that participation in physical activity is influenced by multiple factors that interact simultaneously within inclusive school environments.

Table 2. Descriptive Statistics of Barriers to Physical Activity by Dimension (N = 32)

Barrier Dimension	Mean (M)	SD	Rank
Psychological Barriers	0.70	0.31	1
Social Barriers	0.62	0.35	2
Environmental Barriers	0.61	0.35	3
Physical Barriers	0.59	0.37	4

Note. Higher mean scores indicate stronger motivation for participation in physical activity

Table 2 presents the descriptive statistics for each barrier dimension. Psychological barriers recorded the highest mean score (M = 0.70, SD = 0.31), ranking first among the four barrier domains, indicating that psychological factors such as embarrassment, anxiety, and low self-confidence represented the most prominent perceived barriers to physical activity participation. Social barriers ranked second (M = 0.62, SD = 0.35), followed by environmental barriers (M = 0.61, SD = 0.35) and physical barriers (M = 0.59, SD = 0.37), which ranked fourth.

Table 3. Most Frequently Reported Barrier Items (N = 32)

Item	Statement	Agree f (%)	Disagree f (%)
2	I am embarrassed when other people see me exercising.	13 (41%)	19 (59%)
5	Because my body is tired.	22 (69%)	10 (31%)
10	I don't know where to exercise.	17 (53%)	15 (47%)
14	I don't have any friends to exercise with.	14 (44%)	18 (56%)
18	There is no equipment to do the sports I like.	14 (44%)	18 (56%)

Note. f = frequency (number of students); % = percentage of responses

The questionnaire results showed that fatigue was the most frequently reported barrier, with 22 students (69%) indicating that physical tiredness reduced their willingness to participate in physical activity. Other commonly reported barriers included lack of knowledge about where to exercise (53%), lack of friends to exercise with (44%), limited sports equipment (44%), and embarrassment when exercising in front of others (41%).

Theme 1: Physical Barriers

Fatigue emerged as a recurrent barrier to sustained participation in physical activity. Students commonly described becoming tired after relatively short periods of physical exertion, which often resulted in temporary withdrawal or discontinuation of the activity. Student 7 explained, *"After doing a little exercise, I already feel very tired, so I stop."* Similarly, Student 15 reported, *"When we have to keep running or moving for a long time, I become exhausted and want to rest."* These accounts were consistent with the observations of PE Teacher 2, who noted that *"Several students lose their stamina more quickly than their classmates and often need additional breaks during activities."* Observational data further showed that students with lower endurance frequently paused, required additional encouragement, or stopped participating before activities were completed. The convergence of student accounts, teacher observations, and field observations suggests that fatigue was not merely an individual experience but a recurring barrier affecting sustained participation.

Theme 2: Social Barriers

Social barriers emerged as an important factor influencing students' participation in physical activity. Questionnaire findings showed that 13 students (40.6%) reported feeling embarrassed when exercising in front of others, while 14 students (43.8%) reported not having friends with whom to exercise. These findings indicate that concerns about social evaluation and limited peer companionship were common experiences among the students. The interview data provided further insight into these experiences. Student 4 stated, *"I feel embarrassed when others look at me while I am exercising."* Similarly, Student 11 explained, *"Sometimes I don't want to join because my friends might laugh at me if I make mistakes."* The importance of peer companionship was further illustrated by Student 18, who reported, *"I don't have friends to exercise with, so I usually don't join."* These student accounts were corroborated by the PE teacher, who observed, *"Students who receive encouragement from their classmates are generally more willing to*

participate, whereas those with limited peer interaction tend to withdraw from group activities." Observational data were consistent with these accounts, showing that several students tended to remain apart from their peers during group activities and participated less actively when activities required social interaction. Some students also appeared hesitant to join team-based activities and remained passive observers during particular sessions. The convergence of questionnaire, interview, teacher, and observational data indicates that peer companionship, social acceptance, and supportive peer interactions were closely associated with students' willingness to participate in physical activity.

Theme 3: Environmental Barriers

Environmental barriers emerged as an important constraint on students' participation in physical activity, particularly in relation to the accessibility of facilities and the availability of appropriate sports equipment. Questionnaire findings showed that 14 students (43.8%) reported inadequate access to suitable sports equipment and facilities. This finding indicates that limitations in the physical environment were commonly experienced by students and could constrain their opportunities to participate comfortably and effectively in physical activity. Interview data provided further insight into these experiences. Student 9 stated, *"There is no equipment that I can use comfortably at school."* Similarly, Student 16 explained, *"Sometimes I want to join the activity, but the equipment is limited and we have to wait for our turn."* These accounts were supported by the PE teacher's observations. PE Teacher 1 noted, *"The available facilities are still limited, so we often need to modify activities or share equipment among students."* Observational data were consistent with these findings, showing that some physical activity sessions were conducted with limited equipment and that not all facilities were adapted to accommodate the needs of students with intellectual disabilities. In several instances, students required additional assistance from teachers to participate because of environmental constraints. The convergence of questionnaire, interview, teacher, and observational data indicates that inadequate facilities, limited equipment, and insufficient environmental adaptations constrained students' opportunities for effective participation in physical activity within inclusive school settings.

Motivation for Physical Activity Participation

Despite experiencing various barriers, students with intellectual disabilities demonstrated several motivational factors that encouraged participation in physical activity. Motivational findings obtained from questionnaire data, interviews, and observations indicated that students were motivated by health-related benefits, enjoyment, social interaction, and opportunities to learn new movement skills.

Table 4. Descriptive Statistics of Motivation Dimensions (N = 32)

Motivation Dimension	Mean (M)	SD	Rank
Psychological Motivation	0.71	0.28	1
Social Motivation	0.70	0.31	2
Health-related Motivation	0.64	0.32	3
Skill Development Motivation	0.56	0.38	4

Note. Higher mean scores indicate stronger motivation for participation in physical activity

Table 4 shows that psychological motivation recorded the highest mean score (M = 0.71, SD = 0.28), indicating that positive emotions, enjoyment, and self-confidence were the strongest motivational factors encouraging participation in physical activity. Social motivation ranked second (M = 0.70, SD = 0.31), followed by health-related motivation

(M = 0.64, SD = 0.32), while skill development motivation showed the lowest mean score (M = 0.56, SD = 0.38).

Table 5. Motivational Factors for Physical Activity Participation (N = 32)

Item	Statement	Agree f (%)	Disagree f (%)
3	I feel healthier when I exercise.	25 (78%)	7 (22%)
5	To meet my friends.	19 (59%)	13 (41%)
6	I enjoy learning new movements.	24 (75%)	8 (25%)
7	To improve my physical health.	28 (88%)	4 (13%)
8	To improve my mental health.	22 (69%)	10 (31%)
21	To increase my physical activity.	29 (91%)	3 (9%)

Note. f = frequency (number of students); % = percentage of responses

The questionnaire results showed that improving physical health was the strongest motivational factor, with 28 students (88%) agreeing that they participated in physical activity to improve their physical health. In addition, 29 students (91%) reported that they wanted to increase their physical activity levels. Other important motivational factors included feeling healthier after exercise (78%), enjoying learning new movements (75%), improving mental health (69%), and meeting friends through physical activity (59%).

Interview findings provided further insight into the motivational factors identified in the questionnaire. Several students described physical activity as an enjoyable experience that made them feel healthier, happier, and more engaged. Student 7 stated, "*I feel happy and healthier when I exercise with my friends*." Similarly, Student 12 explained, "I like learning new games because they are fun." These accounts highlighted the role of enjoyment, perceived health benefits, and social interaction in encouraging participation.

The students' accounts were further supported by the PE teacher's observations. PE Teacher 2 noted, "*Students participate more actively when activities are enjoyable and their classmates encourage them*." Observational data were consistent with these findings, showing that students were generally more enthusiastic and actively engaged when activities were enjoyable, interactive, and supported by peers and teachers. The convergence of interview, teacher, and observational data indicates that enjoyment, positive emotional experiences, peer support, and perceived health benefits were important motivational influences on students' participation in physical activity within inclusive school settings.

DISCUSSION

The present study demonstrates that physical activity participation among students with intellectual disabilities in inclusive schools is shaped by the interaction of physical, social, and environmental barriers rather than by a single constraint. The integration of quantitative and qualitative findings suggests that these barriers reinforce one another, creating cumulative challenges that reduce students' opportunities and willingness to participate in physical activity. This highlights the multidimensional nature of participation within inclusive school environments, where individual limitations are closely linked to interpersonal relationships and contextual support.

Physical barriers, particularly fatigue and reduced physical endurance, emerged as the most dominant constraint affecting participation. Interview findings showed that several students stopped participating in activities because they became tired quickly, while observational data indicated that some students required additional assistance and encouragement during physical activity sessions. These findings suggest that physical fatigue may reduce students' perceived competence and willingness to continue

participating in exercise activities. Their motivation and enthusiasm to participate in sports may decline significantly because of physical exhaustion (Bechar & Grosu, 2016). This finding is also consistent with previous studies reporting that students with intellectual disabilities often experience lower physical endurance and higher levels of fatigue compared to their peers, which negatively influence participation in physical activity (Kapsal et al., 2019). From the perspective of the Social Ecological Model, these individual-level limitations become more significant when inclusive school environments fail to provide adaptive programmes or instructional support that accommodate students' physical needs (Dairo et al., 2016; Zimmerman et al., 2026). Furthermore, Self-Determination Theory explains that individuals are more likely to engage in activities when they feel competent and capable (Hankle et al., 2022; Kuijken et al., 2016; McGarty et al., 2018). When students frequently experience fatigue or physical discomfort during exercise, their perceived competence may decrease, which in turn reduces intrinsic motivation to participate in sports activities (Downs et al., 2016).

Beyond individual physical limitations, fatigue may also arise because physical education activities in inclusive schools are often designed using the same instructional intensity for all students, regardless of differences in functional capacity. Students with intellectual disabilities commonly exhibit delayed motor development, lower muscle endurance, and reduced cardiorespiratory fitness, making it more difficult to sustain continuous physical activity than their typically developing peers. When instructional tasks are not sufficiently adapted to their abilities, students are more likely to experience early exhaustion, frustration, and withdrawal from participation. Physical barriers should be understood not only as characteristics of the students themselves but also as the result of a mismatch between students' physical capacities and the demands of inclusive physical education programmes.

These findings have important implications for inclusive physical education. Rather than expecting students with intellectual disabilities to adapt to conventional physical education activities, teachers should modify instructional intensity, provide differentiated learning tasks, incorporate adequate rest intervals, and progressively increase activity demands according to students' functional abilities. Such instructional adaptations may reduce fatigue, improve perceived competence, and promote more sustained participation in physical activity.

Social barriers also played an important role in shaping participation. Quantitative findings indicated that embarrassment during exercise and lack of exercise partners were frequently experienced by students, while qualitative findings revealed that some students felt uncomfortable participating in front of peers and preferred not to join group activities. Observational data further showed that several students tended to isolate themselves during physical activity sessions and demonstrated limited social interaction with classmates. Feelings of embarrassment may emerge because students perceive themselves negatively or lack confidence when exercising in front of others (Stanish et al., 2019). These findings indicate that peer relationships and social acceptance strongly influence students' confidence and participation in inclusive physical activity settings. While Hofmann (2023) emphasised social anxiety, the present findings further indicate that social barriers interact with environmental limitations, creating cumulative effects on participation. The absence of supportive peers or exercise partners may further discourage students from participating in physical activity (Bossink et al., 2017; García et al., 2024). Students who lack companionship during sports activities may feel disconnected and unsupported within inclusive environments (Keoliya et al., 2024). Within the Social Ecological Model, these barriers are categorised at the interpersonal

level, where peer relationships and social support significantly influence behaviour and participation (Collins & Staples, 2017). Pierce and Maher (2020) also reported that students with disabilities are less likely to engage in physical activity when they do not have friends who encourage and support their participation. However, the present study extends previous findings by demonstrating how social barriers interact simultaneously with physical and environmental constraints, creating cumulative challenges that reduce participation in inclusive school settings.

The emergence of social barriers may also reflect the limited opportunities for meaningful interaction between students with and without disabilities during physical education. In many inclusive settings, students with intellectual disabilities may participate in the same class but are not always fully included in collaborative learning activities. As a result, feelings of embarrassment, social isolation, and fear of negative evaluation may become more pronounced, particularly when students perceive themselves as less competent than their peers. These findings suggest that social participation depends not only on peer availability but also on the quality of social interactions fostered within inclusive learning environments.

These findings emphasise the importance of implementing peer-mediated instructional strategies in inclusive physical education. Cooperative learning, peer mentoring, and structured small-group activities may strengthen students' sense of belonging while reducing feelings of embarrassment and social exclusion. Teachers also play a critical role in fostering positive peer relationships by creating supportive classroom climates that encourage acceptance, collaboration, and mutual respect among students.

Environmental barriers may arise because many inclusive schools continue to prioritise academic inclusion while providing limited investment in accessible physical education infrastructure. Although students with intellectual disabilities attend mainstream schools, the availability of adaptive sports equipment, accessible facilities, and specialised instructional resources often remains insufficient. Consequently, students may have fewer opportunities to engage meaningfully in physical activities despite demonstrating a willingness to participate. These findings indicate that inclusive education requires not only physical placement within mainstream schools but also environmental conditions that enable equitable participation. From a practical perspective, schools should prioritise the provision of adaptive sports equipment, accessible activity spaces, and inclusive physical education resources that accommodate diverse functional needs. In addition, school administrators should ensure that inclusive education policies are supported by adequate facilities, teacher training, and institutional commitment to create learning environments where all students can participate safely and meaningfully.

Environmental barriers were also identified as significant constraints, particularly limited access to inclusive facilities and adaptive sports equipment. Questionnaire findings showed that many students perceived school facilities and equipment as insufficient to support their participation, while observational findings indicated that several physical activity sessions were conducted using limited resources and without adequate environmental adaptations. These findings suggest that structural limitations within inclusive schools may restrict opportunities for students with intellectual disabilities to participate fully in physical activity. The findings support previous studies emphasising that accessibility is a fundamental determinant of participation among students with disabilities (Shields & Synnot, 2016). In the present study, students frequently reported limited availability of facilities and equipment that could accommodate their specific needs. This indicates a need for more accessible and adaptive sports equipment that can be comfortably used by students with disabilities during

physical activity sessions (Frey et al., 2017). According to the Social Ecological Model, environmental factors such as accessibility of facilities, availability of adapted equipment, and inclusive program design play a critical role in shaping opportunities for physical activity participation (Hsu et al., 2021; Sutherland et al., 2021). When schools lack accessible sports facilities or appropriate equipment, participation becomes limited regardless of students' motivation or willingness to engage (Behroz-Sarcheshmeh et al., 2017). Therefore, environmental improvements within inclusive schools should be accompanied by supportive instructional practices and social support systems to promote equitable participation in physical activity (Horvat et al., 2019; Wouters et al., 2018).

The mixed-methods integration in this study provides a more comprehensive understanding of participation barriers than studies relying solely on quantitative or qualitative approaches. Quantitative data identified the most frequently reported barriers, while qualitative findings explained how and why these barriers influenced students' experiences in inclusive physical activity settings. The integration of quantitative and qualitative evidence provides a richer understanding of participation barriers than either approach alone. Quantitative findings identified the relative importance of each barrier, whereas interviews and observations explained how these barriers influenced students' daily experiences during physical activity. This convergence of evidence strengthens the credibility of the findings and demonstrates that participation is shaped by interconnected individual, interpersonal, and environmental factors.

The findings revealed that students with intellectual disabilities demonstrated strong motivation to participate in physical activity, particularly for health-related, psychological, and social reasons. Quantitative results showed that improving physical health (88%) and increasing physical activity levels (91%) were the strongest motivational factors. Interview findings further indicated that students enjoyed participating in activities that made them feel healthier, happier, and more socially connected. These findings suggest that students with intellectual disabilities possess both intrinsic motivations, such as enjoyment and interest in learning new movements, and extrinsic motivation related to health benefits and social interaction. This aligns with self-determination theory, which emphasises that individuals are more likely to participate in activities when they experience enjoyment, competence, and social relatedness.

Despite experiencing multiple barriers, students continued to demonstrate strong motivation because physical activity provided immediate and meaningful benefits that were directly perceived in their daily lives. Feelings of enjoyment, improved health, opportunities to interact with peers, and the experience of successfully completing movement tasks may have reinforced their willingness to participate. According to self-determination theory, these positive experiences satisfy the psychological needs for competence, relatedness, and enjoyment, enabling students to maintain motivation even when environmental and physical barriers remain present.

The novelty of this study lies in its integrated examination of physical, social, and environmental barriers alongside motivational factors within inclusive school contexts using a convergent mixed-methods approach. Unlike previous studies that primarily examined barriers in isolation or focused only on general physical activity outcomes, this study demonstrates how multiple barriers and motivations interact simultaneously to influence participation among students with intellectual disabilities. These findings contribute to the growing literature on inclusive physical education by providing

empirical evidence that participation is shaped by interconnected multi-level factors rather than by isolated individual limitations alone.

The findings also have important practical implications for inclusive schools. Efforts to increase physical activity participation among students with intellectual disabilities should not focus solely on improving individual motivation but also on strengthening environmental accessibility, peer support, and adaptive instructional strategies. Schools should provide inclusive sports facilities, adaptive equipment, and supportive physical education environments that encourage social interaction and active participation. In addition, teachers and coaches should receive training in inclusive instructional practices to better accommodate the diverse needs of students with intellectual disabilities during physical activity sessions.

CONCLUSION

This study demonstrates that physical activity participation among students with intellectual disabilities in inclusive school settings is shaped by the interaction of physical, social, and environmental barriers together with motivational factors. Fatigue, limited access to facilities and adaptive equipment, and lack of peer support emerged as the primary barriers, whereas health-related benefits, enjoyment, and social interaction served as important sources of motivation. Unlike previous studies that primarily examined barriers or motivational factors separately, this study integrated both perspectives within a convergent mixed-methods design, demonstrating how multiple barriers and motivations interact simultaneously to influence participation in inclusive physical education. This integrated perspective provides a more comprehensive understanding of participation than approaches focusing on isolated factors alone and offers new empirical evidence for designing more effective inclusive physical education practices.

The findings emphasise that improving participation requires more than increasing students' motivation alone. Inclusive schools should simultaneously strengthen environmental accessibility, provide adaptive sports equipment, foster supportive peer relationships, and equip teachers and coaches with inclusive instructional competencies. Addressing these interconnected factors is essential for creating equitable and sustainable physical activity opportunities for students with intellectual disabilities.

This study is limited by the relatively small sample size and reliance on self-reported questionnaire data. Future studies should involve larger and more diverse samples across different inclusive school settings and examine how barriers and motivational factors evolve over time using longitudinal or intervention-based designs. Such studies would further validate the integrated framework proposed in this research and strengthen evidence for inclusive physical education practices.

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AI DISCLOSURE STATEMENT

During the preparation of this manuscript, the authors used generative artificial intelligence (AI) tools to assist with language editing, grammar checking, paraphrasing, and improving the clarity and readability of the manuscript. All AI-assisted content was reviewed and verified by the authors, who remain fully responsible for the accuracy, originality, interpretation, and final content of the manuscript.

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