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ORIGINAL RESEARCH

Physical activity behaviour and use of assistive mobility devices as predictors of health-related quality of life among Kenyan learners with physical disabilities

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Abstract

Aim: Physical activity (PA) is essential for the health and well-being of children and youth with physical disabilities. However, many Kenyan learners with disabilities may not be meeting recommended PA guidelines, potentially compromising their health-related quality of life (HRQoL). This study assessed PA behavior, HRQoL, and use of assistive mobility devices (AMDs). Further, it analysed the relationship and the influence of PA and use of AMDs on the HRQoL of Kenyan secondary school learners with physical disabilities. **Method:** Using a quantitative cross-sectional descriptive design, data were collected from 650 learners across seven special secondary schools. PA behavior, HRQoL, and AMD satisfaction were measured using validated instruments: the Youth Activity Profile (YAP), Paediatric Quality of Life Inventory (PedsQL™), and the Assistive Device User Satisfaction tool. **Results:** Results showed that 43.9% of learners used an AMD, with wheelchairs being the most common. PA frequency was higher during out-of-school sessions (mean 2.96, SD 0.046) compared to school-time (mean 2.60, SD 0.043), and learners participated more in PA than sedentary behaviors. A moderately high HRQoL score was reported and positively correlated with school-based PA frequency ($rs = 0.211$, $p < 0.001$). **Conclusion:** The findings indicate that increased participation in school-based PA and appropriate use of AMDs are associated with improved HRQoL among learners with physical disabilities, underscoring the potential of schools as key venues for promoting health and wellness in this population. The results have implications on the design of school-based PA and the need for policy infrastrucure which can ensure that learners access appropriate AMDs in order to promote HRQoL.

Introduction

Physical activity (PA) is widely recognized for its vital role in enhancing the physical functioning, independence, and overall well-being of children and youth with physical disabilities (Maher et al., 2016) Participation in PA positively impacts physical health, social engagement, and psychological wellness (Kapsal et al., 2019). Research indicates that PA can help alleviate the effects of impairments and improve independence in activities of daily living (ADLs) for children with disabilities both globally and in Kenya (Bloemen et al., 2017). These individuals are, however, disproportionately affected by increased sedentary behaviours amd lower participation in PA (Faccioli et al., 2025).

In Kenya, an estimated 11.4% of children and youth live with disabilities (Kenya Institute of Special Education, 2019). The country's constitution guarantees at least basic education for every child, providing an opportunity for schools to serve as effective platforms for health promotion, including PA interventions. Kenyan learners with disabilities attend special schools, integrated special units within mainstream schools, or inclusive regular schools. The choice of school often depends on factors such as the severity of impairment, accessibility, affordability, and parental preferences.

Health-related quality of life (HRQoL) is a key concept reflecting an individual's perceived physical, mental, and social well-being (Karimi & Brazier, 2016). For children with disabilities, HRQoL

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captures the impact of impairments on their functioning and independence. Compared to their non-disabled peers, children with disabilities tend to report lower HRQoL due to physical limitations, emotional challenges, and social barriers (Puspitasari et al., 2014; UNICEF, 2021).

Loss of mobility may necessitate the use of assistive mobility devices (AMDs), which aim to reduce disadvantages related to impairments and enhance access to activities including PA. Despite the United Nations' recognition of the right to appropriate AMDs (U.N., 2006) only about 15% of those in need globally have access to appropriate devices (Rohwerder, 2018). The definition of 'appropriate devices' has to satisfy user needs and environmental suitability, fit and support, availability, safety, sustained services and affordability (WHO, 2015). The overarching goal of this appropriateness is ensuring user satisfaction and independence in activities of daily living, and promoting QoL. Barriers related to design, fitting, environment, and access can hinder AMD effectiveness, sometimes reducing participation in daily activities and negatively affecting HRQoL (Jirikowic & Kerfeld, 2016; Layton, 2012). Local studies have documented such challenges among Kenyan adults and school-age children with disabilities (Moyi, 2017; Williams et al., 2017). This appears to be a global challenge in which use of AMDs such as wheelchairs is associated with lower participation in PA (Seemüller et al., 2023).

School environments hold substantial promise to promote lifelong health behaviors such as PA (WHO, 2010). However, Kenyan learners with disabilities may face impediments linked to safety, accessibility, and equipment availability, potentially limiting their PA levels and HRQoL (Ireri et al., 2020; Wekesa et al., 2017). The contribution of different school-day segments to Kenyan special secondary school learners' PA has not been assessed. Thus, the potential of school day as a contributor to learners' PA is not ascertained. There is also dearth of evidence associating participation in PA with HRQoL for Kenyan learners. Such evidence could facilitate the development of appropriate need-responsive interventions. This study seeks to assess the PA behavior and HRQoL of Kenyan secondary learners with physical disabilities and determine the influence of PA and AMD use on their well-being. We hypothesize that PA, AMD use, and gender significantly influence HRQoL in this population.

Methods

This study employed a quantitative cross-sectional descriptive design to assess physical activity (PA) behavior, health-related quality of life (HRQoL), and perceptions of assistive mobility devices (AMDs) among learners with physical disabilities.

Research Tools

PA behavior data were collected using the Youth Activity Profile (YAP) questionnaire(Saint-Maurice & Welk, 2014, 2015), a validated self-report tool specifically designed to assess physical activity and sedentary behavior (SB) in youth. The YAP captures frequency of participation on a 0–5 scale, ranging from low or no participation to always active. The questionnaire addresses PA and SB during school and out-of-school sessions. Scoring followed the guidelines prescribed by (Saint-Maurice et al., 2017). The YAP questionnaire has been extensively validated against objective accelerometer-based measures such as the SenseWear Armband and GT3X+ ActiGraph, demonstrating good group-level agreement for estimating moderate-to-vigorous physical activity and sedentary behavior (Saint-Maurice et al., 2017).

HRQoL was measured using the Paediatric Quality of Life Inventory (PedsQL™), a 23-item generic instrument that assesses physical, emotional, social, and school functioning on a Likert scale. The tool has been previously validated for use with children and youth with physical disabilities (Maher et al., 2016; Varni, 2017) and was adapted for this study by including the term "wheel" in mobility-related items to accommodate non-ambulatory learners. Although some participants were aged 18 and above, the boarding school setting ensured homogeneity of school activities with younger peers. The PedsQL™ 4.0 instrument has shown high internal consistency (0.75–0.88) and validity across diverse populations, both with and without disabilities (Adar et al., 2017; Ferreira et al., 2014; Waters et al., 2009).

Perception of the suitability of AMDs was evaluated using the Assistive Device User Satisfaction (Demers & Weiss-Lambrou, 1996). This instrument assesses user satisfaction across multiple dimensions, including device weight, dimensions, ease of adjustment, safety, durability, usability, comfort, and effectiveness, as well as related services. Responses are scored on a 5-point Likert scale from

"least satisfied" to "very satisfied" with composite scores computed for analysis. The tool's validity has been established in previous research (Demers et al., 2002).

Whereas these tools have been developed in non-African contexts, several measures were undertaken to enhance appropriateness for use in Kenyan contexts. Firstly, all the instruments were pretested for relevance, suitability and clarity with leaners from similar schools, who were later not involved in the main study. As a result of the pretesting, minor wording adjustments and explanations were done during administration.

Participants

The study focused on learners with verified mobility impairments attending all seven special secondary schools for physical disabilities in Kenya. These institutions were selected due to their superior resourcing for disability-specific needs and their provision of a controlled, boarding school environment. Unlike mainstream day schools, where learners with disabilities are dispersed and heterogeneous in composition, the special schools enabled unified access to the study population and allowed for consistent monitoring of learners' school-day activities.

The broader target population encompassed learners aged 14 to 43 years, acknowledging the reality those individuals with disabilities may commence or continue schooling at older ages than their non-disabled counterparts. For analytic consistency, however, only those within the 14–18 year age bracket were included in the final sample. The protocols and research procedures were sanctioned by the Kenyatta University Ethics Review Committee (PKU/920/1980). Further approvals were granted by the ministry of education and respective school heads. Prior to data collection, written informed consent were acquired from learners' guardians, and voluntary assents from the learners themselves.

Owing to the centralization and manageable size of the population in these schools, a census sampling approach was employed. All learners identified as having mobility impairments in the participating schools were contacted and invited to participate. Ultimately, a total of 650 eligible learners were included, enabling the study to provide a comprehensive prevalence and status report on physical activity behavior among Kenyan adolescents with mobility impairments.

Procedure

All research instruments were undertaken through pretesting to ascertain their usability among the research participants. The pre-test was used to facilitate refining of the instruments and data collection procedures as well as train research assistants. During the pre-testing, the researcher also sought to establish the reliability of the tools as adapted. Nine research assistants were recruited from a pool of graduates of Physical and Health Education, Sports Management and Exercise Sciences graduates. The assistants were trained on the specific requirements of the study. This assured professionalism in the running of the research. Instruments were piloted and pretested to also validate them for local use and adapt them to local school and participant situations. The reliability of the adopted and adapted tools was tested during pretesting in which there were 20 randomly selected learners from one school. Participants in the selected school were excluded from the main study. Using a test-retest approach, it was established that the questionnaire-based tool had a relatively high correlation of r_s 0.79 whereas individual tools returned scores of between 0.71 and 0.83 within 2 weeks' time.

Data Analysis

For analysis, the data was treated as indicated in the manuals of the various tools as well as in previous studies. The YAP data was scored into means (Saint-Maurice et al., 2017). The Likert scale items of the PedsQL™ were scored to means (Varni, 2017) for purposes of presentation and analysis. This was similarly done with the data assessing satisfaction with the use of AMDs. Results from YAP, Assistive Device User Satisfaction tool and PedsQLTM were reported as means. Further, to assess the influence of the learners' PA behaviour and on their HRQoL as well as the influence of gender and use of AMD on this relationship a UNIANOVA regression procedure was run using the Statistical Package for Social Sciences (version 25).

Results

Participants' Characteristics

As indicated in Table 1, the study had a return rate of 80%. There was near parity between males and

females respondents with most of the learners (30.1%) in class level 2 (form 2) of their schooling. The study also established that 43.9% of the learners used an AMD, the most prevalently used being wheelchairs. It was also observed that none of the participants used motorised AMDs. Further, 73% of the learners using AMDs reported to be satisfied with their devices on various aspects such as dimensions, weight, adjustment ease, safety, durability, ease of use, comfort and effectiveness.

Physical Activity Behaviour

From the results, the study established that there was higher frequency of engagement in PA during out of school-time sessions compared to school-time sessions ($t(580) = 6.924$, $p<0.001$). In out of school sessions, the learners reported to engage more in unsupervised and unstructured PA within which most of them (72.6%) participated in at least one sport whereas 27.4% did not.

It was also established, based on the YAP, that the learners participated more in PA than they did in sedentary behaviours. The study found, however, that users of AMDs had statistically higher frequency of engagement in sedentary behaviour compared to those who did not use AMDs $t(580) = 2.439$, $p =0.015$.

For school-time PA, as shown in Figure 1, the learners reported that the frequency was highest in days when there was a PE lesson. Cumulatively, a majority of the learners (57.8%) engaged in MVPA at least with moderate to high frequency compared to 42.2% who spent a little bit of time or never engaged in PA during PE. In addition, it was established that whereas school recess and lunch breaks provided a considerable opportunity for PA, the frequency of engagement in PA during these breaks was comparably less than during PE.

Table 1
Respondents demographic data.

Demographic descriptive		n	%
Do you use an assistive mobility device	Yes	255	43.9
	No	326	56.1
Which Assistive mobility devices do you use?	Wheelchair	119	47
	Walking sticks	14	5
	Orthotics	7	3
	Corrective shoes	17	7
	Callipers and braces	3	1
	Prostheses	14	5
	Crutches	64	25
	Other AMDs	17	7

Table 2
Frequency of participation in school-based physical activity.

School Session		Mean	SD
Frequency of PA in varied school-sessions	School-time PA	2.60	0.043
	Out of School-time PA	2.96	0.046
	Weekend PA	3.27	0.047
	Sedentary Behaviour	1.92	0.022
Frequency of supervised out of school-time PA sessions per week	Days	%	
	0	28.4	
	1	35.8	
	2	13.9	
	3	11.0	
	4	4.8	
	5	6.0	
Do you participate in any sport at school?	Yes	72.6	
	No	27.4	

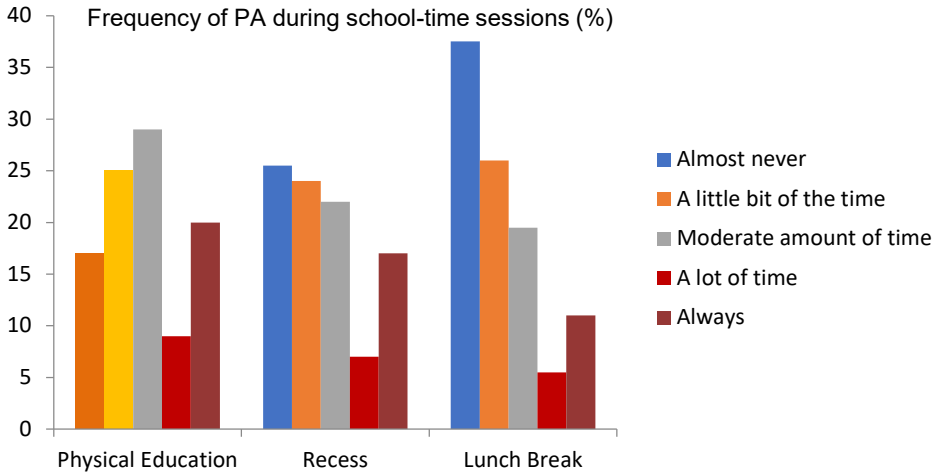

Figure 1. Frequency of physical activity during PE, Recess and lunch break.

Health-Related Quality of Life

The study observed from the scores of the PedsQLTM 4.0 that the learners had a moderately high HRQoL score (mean=74.3734, SD=12.9619). The range of the learners' score on the scale was between 33.91 and 100. A higher score on the scale indicates a better QoL(Varni, 2017). These scores imply that the learners had a relatively high HRQoL with regard to physical, emotional, social and school functioning. The study also established that male learners had higher HRQoL scores than females t (580) = 2.73, p =0.006.

The study had hypothesised that that PA behaviour, use of AMDs and gender would have a significant influence on the learners' HRQoL. A UNIANOVA was run to test this hypothesis. Table 4 presents the results of the model.

Table 3
Learners' self-reported health related quality of life.

	Mean	SD
Physical health and functioning	3.50	0.85
Emotional wellbeing	3.91	0.90
Social wellbeing	3.91	0.86
School functioning	3.67	0.84
Total HRQoL	74.38	12.96

Table 4
Influence of learners' frequency of participation in school-day pa, use of amds and gender on HRQoL

Source	F-value	Significance	Effect Size (η^2)	Interpretation
Corrected Model	7.873	<.001	.099	The overall model is statistically significant and explains ~9.9% of the variance.
Intercept	1515.195	<.001	.727	The intercept is highly significant, accounting for a large portion of variance.
School-Day PA	26.398	<.001	.044	Physical activity during school days has a significant and moderate effect.
Gender	7.984	0.005	.014	Gender has a statistically significant but small effect.
Use of AMDs	5.709	0.018	.010	Use of active mobility devices (AMDs) has a small but significant effect.
Gender * Use of AMDs	13.384	<.001	.023	The interaction between gender and AMD use is significant, with a small-to-moderate effect.

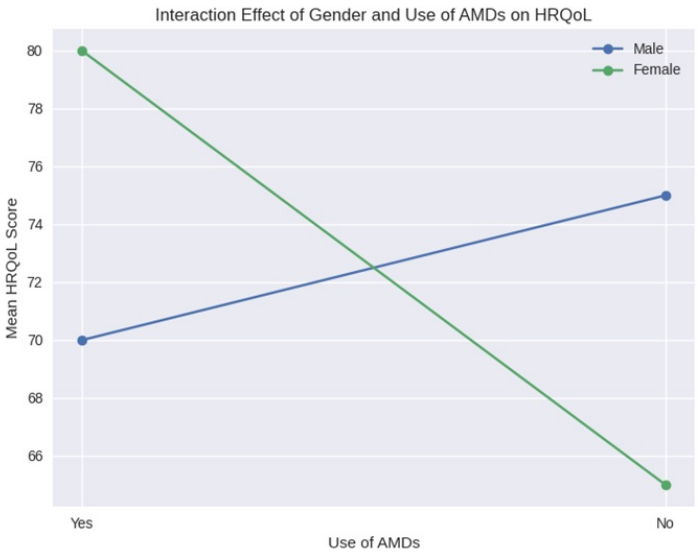

Figure 2. Interaction of gender and use of assistive mobility devices on health-related quality of life.

As indicated in Table 4, participation in school-day PA had a positive influence on HRQoL F (580) = 26.398, p<.001. From these results, the more the learners participated in school-time PA, the higher the HRQoL they got (*r*s=0.211, p<.001). Participation in school-day PA had a higher effect (η2 = 0.044) on the HRQoL scores than gender (η2 = 0.014) and combined effect of both gender and use of AMD (η2 = 0.023) in the model. Further, it was established that participation in PA was more likely to influence emotional HRQoL (rs=0.207, p<.001) compared to physical HRQoL (rs=0.156, p<.001) and social HRQoL (rs=0.177, p<.001). The correlation was however not significant between school day PA and school HRQoL. It may imply that participation in PA could result in more direct improvement on the physical health, emotional health and social relations of the learners as opposed to their performance in school work. The HRQoL of males was, however, found to decrease if they participated in school-day PA using AMDs. It may imply that participation in PA resulted in improved HRQoL for all but males who use assistive device. For the males, having an assistive device was not an enhancement. This is demonstrated in figure 1.

Figure 2 illustrates a significant interaction effect between gender and the use of active mobility devices (AMDs) on health-related quality of life (HRQoL). For males, HRQoL scores increase when AMDs are not used, rising from 70 to 75. In contrast, females experience a decline in HRQoL when AMDs are not used, dropping from 80 to 65. This opposing trend highlights that the impact of AMD use on HRQoL is not uniform across genders—suggesting that AMDs may offer greater benefits for females, while males may experience improved HRQoL without them. The crossover pattern in the lines visually reinforces the presence of a meaningful interaction.

Discussion

This study investigated the physical activity (PA) behavior, use of assistive mobility devices (AMDs), and health-related quality of life (HRQoL) among special secondary school learners with physical disabilities. It also examined the role of AMDs in promoting PA and HRQoL. Contrary to previous findings that children with disabilities tend toward inactivity and sedentary behavior (Sit et al., 2017), learners in this study reported more time engaged in PA than sedentary behaviors. This finding, however, may be influenced by the school context; Kenyan special schools likely reduce opportunities for sedentary indulgences such as screen time, as mobile phones are banned, and television access is limited (Nkoma et al., 2022). The role of contexts as a determinant of PA has been recently reported as an importamt variable in PA behaviour (Seemüller et al., 2023). Future studies using objective measures are recommended to verify these self-reported behaviors given potential biases (Ainsworth et al., 2015).

The analysis differentiated PA across school-day segments, showing greater PA out of school than during school hours, corroborating prior research

(Fairclough et al., 2012; Steele et al., 2010). Firsrly, school remains a key determinant of PA behaviour of school and adolescent (Leahy et al., 2025). Secondly, these results may reflect greater autonomy of engagement in PA in out-of-school sessions where unstructured and unsupervised activities prevail (Li et al., 2017). The findings suggest benefits in targeting out-of-school interventions to enhance PA engagement, while in-school opportunities remain critical, especially for less active learners and those with more severe impairments. In addition, structured physical education (PE) lessons contributed more to PA during school than recess or lunch breaks. Nearly all learners participated in PE and enjoyed these lessons, consistent with existing studies highlighting PE's role in promoting moderate-to-vigorous physical activity (Gao et al., 2015; Schneller et al., 2017). That the learners could be occupied with other actitivies such as lunch and snack-breaks during recess could have resulted in signigicantly lower PA during recess. The study suggests the need for greater autonomy during recess in view of increasing participation in PA.

Importantly, increased participation in school-day PA correlated positively with improved HRQoL across physical, emotional, social, and school functioning domains. This underscores PA's multifaceted benefits for children with disabilities - enhancing self-care, independence, and academic performance (Willis et al., 2018). Previous studies affirm PA's positive impact on various facets of health and quality of life (Faccioli et al., 2025; Moeijes et al., 2019). The current study also reveals greater frequency participation in unstructured compared to organized PA, raising avenues for future research to compare their relative effects on HRQoL. A suggested dose-response relationship between PA and HRQoL (Wu et al., 2017) merits further exploration considering individual and environmental moderators.

The study observed lower HRQoL scores in learners using AMDs, whether or not they participated in PA. A similar trend was documented in Hong Kong, where users of AMDs exhibited higher sedentary behavior (Sit et al., 2017). Challenges include device misfit, environmental barriers, and discomfort from device use (Chow & Levy, 2011; Jirikowic & Kerfeld, 2016; Layton, 2012). Although the majority expressed satisfaction with their AMDs, device-environment interaction issues persist, potentially limiting functional independence and social participation, adversely affecting psychosocial HRQoL. Increased sedentary behavior in AMD users might also stem from fear of injury and reliance on others for mobility, deterring active participation. This aligns with broader evidence of enhanced barriers faced by users of mobility aids (Jirikowic & Kerfeld, 2016). These results also resonmate with emerging evidence pointing to the influence of the physical environment on satisfaction with AMDs and subsequent participation in acivities (Gudjonsdottir & Gudmundsdottir, 2023).

The study also observed gender moderated the effects of AMD use on HRQoL. Males experienced a decline in HRQoL when using AMDs, whereas females showed improved outcomes, suggesting that AMDs may fulfill different psychosocial and functional needs across genders. Literature indicates females often rely more on assistive devices due to caregiving roles and experience improved safety and independence from AMDs (Baars et al., 2018; England et al., 2023; Graham et al., 2016). Males might associate AMD use with stigma or diminished autonomy, explaining their comparatively higher HRQoL without devices. These findings promote the need for gender-sensitive approaches in mobility device design and policy to ensure equitable benefits.

Given the elevated risks of sedentary behavior among children with disabilities (Reinehr et al., 2010), closer attention to AMD-related barriers is critical. Areas warranting targeted interventions include device availability, user satisfaction, fitting, and integration of AMDs into daily activities to enhance PA participation (Lauruschkus et al., 2017). Building users' capacities to effectively utilize AMDs could foster greater independence and improved HRQoL.

Conclusions

The study concludes that schools hold great potential in promoting PA for school-going children and youth with physical disabilities. There also seems to be more potential for PA during out of school-times compared to school-times. It is also established by the study that the more the learners engaged in school-based PA, the better their HRQoL. Participation in PA could result in gains in view of physical fitness components, academic performance, enhanced social networks and increase independence. The use of AMDs could however result in lower HRQoL due to AMD-related aspects. It was notable that gender moderated the

relationship between PA and HRQoL, underlining the need to have gender-sensitive approaches in the provision of AMDs.

The study, however, has notable limitations which limit generalizations such as a specific sample size, the characteristics of the participants and the scope of the research variables. The limitations notwithstanbding, it makes signigicant contributions to knowledge on school-based PA, HRQoL and use of AMDs.

Authors' Contribution

Conceptualization: DN, LW, ET; Methodology: DN; Formal Analysis: DN; Writing-Original Draft Preparation: DN; Writing-Review & Editing: DN, LW, ET.

Ethical Approval

The study was sanctioned by research ethical clearance from Kenyatta University Ethics Review Committee (PKU/920/1980) and the Kenya National Commission for Science, Technology and Innovation (NACOSTI/P/19/925427838). Additional permissions were obtained from the Kenya Ministry of Education and respective school administration authorities.

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Conflict of Interest

The authors hereby declare that there was no conflict of interest in conducting this research.

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