

Contributory Effect of Assistive Technology on Physical Activity Level and Quality of Life among Students in Federal College of Education Oyo (FCEO), Nigeria

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Abstract: This study investigated the role of Assistive Technology (AT) in influencing Physical Activity Levels (PAL) and Quality of Life (QoL) among Visually Impaired (VI) and Hearing Impaired (HI) students at Federal College of Education (Special) Oyo, Nigeria, where access to inclusive education remains challenging despite legal mandates. Using an ex post facto design, a purposive sample of 129 students (67 VI, 62 HI) completed adapted versions of the Physical Activity Scale for Individuals with Physical Disabilities (PASIPD) and WHO Quality of Life-BREF questionnaire. Data were analyzed via descriptive statistics, multiple regression, and independent t-tests at $\alpha = .05$. Findings revealed high overall AT adoption (72.9% regular use), but with disparities: 92.5% among VI versus 51.6% among HI students. Mean PAL was 2679.57 MET-minutes/week, with HI students significantly more active (3007.03 METs) than VI students (2376.55 METs; $t(127) = 5.660, p < .001$). AT exerted no significant influence on VI students' PAL but a negative effect on HI students' PAL ($\beta = -.371, p = .003, R^2 = .138$). Similarly, PAL showed no impact on VI students' QoL but a negative association for HI students ($\beta = -.342, p = .007, R^2 = .117$). QoL ratings were comparable across groups (no significant difference; $t(127) = .908, p = .366$). Based on these premises, recommendations raised include tailored AT for mobility enhancement and adaptive physical programs to bridge activity gaps, fostering equitable health outcomes in special education settings.

Keywords: assistive technology, quality of life, physical activity level, visually impaired, hearing impaired, health, fitness, Federal College of Education, Oyo, Nigeria

Introduction

Effective communication is essential for optimal interaction, connection, and participation in society. It involves sending information through a channel to the receiver, who is expected to act accordingly. Distortions of the conveyed information can arise from abnormalities in the visual or auditory systems due to impairment. Impairment is actual attributes or the absence of attributes related to limbs, organs, or psychological

well-being {World Health Organisation (WHO), 2020}. A person is considered impaired when they have difficulties in body functions or structures that limit how affected body part can be used to perform daily tasks.

Nigeria, with a population exceeding 200 million, faces significant challenges in providing equitable education for individuals with disabilities (WHO, 2020). Estimates suggest that approximately 15% of Nigerians live with some form of disability, with visual and hearing impairments being among the most prevalent. Despite legal frameworks like the Discrimination Against Persons with Disabilities (Prohibition) Act 2018, access to education and support services remains limited, particularly in rural and semi-urban areas (Yusuf & Lawal, 2023). The Federal College of Education (Special) Oyo stands as a beacon of specialized education, catering specifically to students with disabilities, including those with Visual Impairment (VI) and Hearing Impairment (HI). Established to train educators and provide tertiary education for students with special needs, FCEO is uniquely positioned to leverage Assistive Technology (AT) to enhance both academic and non-academic outcomes.

Students with visual and hearing impairment face distinct barriers in educational settings. Visual impairment, encompassing low vision and blindness, limits access to visual information, affecting reading, navigation, and participation in physical activities (Ogunleye, Adeyemi & Okoro, 2024). Hearing impairment, including hard of hearing and deafness, hinders communication, social interaction, and engagement in auditory-based learning environments. These challenges can lead to reduced physical activity and compromised Quality of Life (QoL), as students may experience exclusion, mobility limitations, or social stigma. Assistive Technology, ranging from braille devices and screen readers for visually impaired students to hearing aids and sign language software for Hearing Impaired students, aims to mitigate these barriers, fostering greater independence and inclusion (Mutiso, 2020).

Assistive technology is defined by the World Health Organization (2020) as any device or system that enables individuals to perform tasks they would otherwise be unable to do or increases the ease and safety with which tasks are performed. In educational contexts, Assistive Technology includes tools like text-to-speech software, braille displays, hearing aids, frequency-modulated (FM) systems, and mobility aids (Yusuf & Lawal, 2023). These technologies are tailored to address specific impairments, enabling students to access curricula, communicate effectively, and engage in extracurricular activities. At FCEO, Assistive Technology is integral to the academic framework, supporting students in overcoming sensory limitations and participating in a holistic educational experience.

The integration of assistive technology in educational settings has transformed the landscape of inclusive education, particularly for students with disabilities. Assistive technology encompasses a broad range of devices, tools, and systems designed to enhance

the functional capabilities of individuals with impairments, enabling them to participate more fully in academic, social, and physical activities. Assistive Technology plays a pivotal role in addressing the unique needs of students with visual impairments and hearing impairments (Sangodeyi, Ayodele, Dominic & Bakinde, 2024). The adoption of Assistive Technology in special education has been associated with improved academic performance, social integration, and self-efficacy. However, its impact extends beyond the classroom to influence physical and psychosocial domains.

Physical activity, measured in metabolic equivalents (METs), is a critical indicator of health, particularly for students with disabilities who may face environmental or physiological barriers to movement (Brown & Lee, 2023; Johnson & Patel, 2024). Quality of life, encompassing physical, emotional, and social well-being, is equally vital, as it reflects the overall health and satisfaction of individuals. For students at FCEO, Assistive Technology has the potential to enhance physical activity level by facilitating mobility and access to sports or recreational activities, while also improving quality of life by fostering independence and reducing dependency-related stress.

Physical activity is a cornerstone of health, contributing to cardiovascular fitness, mental well-being, and social engagement. The WHO recommends at least 1500 MET-minutes per week for adults to achieve health benefits, with higher levels (≥ 3000 METs for highly active individuals) linked to enhanced outcomes (WHO, 2020). For students with visual impairment, physical activity can be restricted by environmental barriers, such as inaccessible facilities or lack of adaptive equipment, leading to lower physical activity level compared to their non-disabled peers. Hearing impaired students, while less restricted by mobility issues, may face challenges in group activities requiring auditory cues, potentially limiting participation in team sports or fitness programmes (Atare, Abdullah, Olarinoye & Ibraheem, 2024). At special schools, promoting physical activity level is critical, as students with disabilities are at higher risk of sedentary lifestyles, which can lead to obesity, cardiovascular issues, and reduced mental health. Assistive Technology can play a transformative role here. For visually impaired students, devices like tactile maps or audio-guided exercise apps can enhance navigation and participation in physical activities while visual or vibratory signalling devices can facilitate communication during sports, enabling greater involvement for the hearing impaired students,

Quality of life is a multidimensional construct, encompassing physical health, psychological well-being, social relationships, and environmental factors. For students with disabilities, Quality of Life is often influenced by access to education, social inclusion, and personal autonomy (Brown & Lee, 2024). At FCEO, Visually Impaired and Hearing Impaired students face unique Quality of Life challenges. Visually Impaired students may experience social isolation due to difficulties in visual communication, while Hearing Impaired students may struggle with verbal interactions, impacting their

social and emotional health. Both groups may face stigma, which can lower self-esteem and Quality of Life. Assistive Technology has the potential to enhance Quality of Life by empowering students to overcome these barriers. For instance, screen readers and braille devices enable visually impaired students to access educational materials independently, fostering a sense of achievement. Similarly, hearing aids or real-time captioning systems allow hearing impaired students to engage in classroom discussions, improving social connectedness. Beyond academics, Assistive Technology can influence Quality of Life indirectly through Physical Activity Level. Higher physical activity levels are associated with improved mental health, reduced stress, and better overall well-being (Sangodeyiet *al.*, 2024). By facilitating physical activity level, Assistive Technology could create a positive feedback loop, enhancing both physical health and Quality of Life.

The burden of impairment is exacerbated by systemic issues prevalent in many parts of the continent (Africa). For persons with impairment, the challenges faced are compounded by pervasive social and economic barriers, cultural beliefs, stigma surrounding the impairment, and limited educational or employment opportunities which can lead to marginalization and exclusion from family and community life (Yusuf & Lawal, 2023). For Nigerian students with impairments, the institution's environment presents a unique set of obstacles that directly impact their bio-psychosocial health. Institution campuses in Nigeria are often not designed with universal accessibility in mind (Sangodeyi, Dominic, Adeoye, Alabi, & Chukwudo, 2025). This lack of a safe and accessible environment is a primary deterrent to physical activity participation that may force many students with visual impairment into a state of enforced sedentary for fear of injury. This study examined contributory effect of assistive-technology on physical activity and quality of life among students in Federal College of Education Oyo (FCEO).

Research questions

- To what extent is Assistive Technology used among Visually Impaired and Hearing Impaired students of FCEO?
- What are the Physical Activity Level of Visually Impaired and Hearing Impaired students of FCEO?
- What is the influence of Assistive Technology use on the Physical Activity Level of Visually Impaired and Hearing Impaired students of FCEO?

Hypotheses

- There is no significant influence of Assistive Technology use on Physical Activity Level of Visually Impaired and Hearing Impaired students of FCEO.
- There is no significant influence of Physical Activity Level on Quality of Life of Visually Impaired and Hearing Impaired students of FCEO.

- There is no significant difference in Physical Activity Level of Visually Impaired and Hearing Impaired students of Federal College of Education (Special) Oyo.
- There is no significant difference in Quality of Life of Visually Impaired and Hearing Impaired students of FCEO.

Methodology

Ex post facto research design was adopted for the study. A sample of 129 participants was selected purposively based on the availability and readiness of the students. An adapted and validated questionnaires/data form from Physical Activity Scale for Individual with Physical Disabilities (PASIPD) with reliability score of .83r was used alongside other standardised and calibrated instruments such as body fat/ hydration monitor scale, height scale and inelastic tape rule. Ethical clearance with the number UERC/ASN/2020/2034 was obtained from University of Ilorin Ethical Review Committee.

An adapted Physical Activity Scale for Individual with Physical Disabilities (PASIPD) and World Health Organization Quality Of Life (BREF) were used for data collection. Descriptive statistics of frequency, percentage, mean and standard deviation was used to describe the demographic characteristics of the participants and to answer the research questions. Inferential statistics of Multiple Regression and t-test were used to test the formulated hypotheses at .05 alpha level.

Results

Table 1: Descriptive analysis of impairment characteristics of visually impaired and hearing impaired students of FCEO

Variables of Assistive Technology		Frequency	Percent
Nature of Impairment			
	Visual	67	51.9
	Hearing	62	48.1
	Total	129	100.0
Degree of Impairment			
	Low Vision	22	17.1
	Blind	45	34.9
	Hard of Hearing	10	7.8
	Deaf	52	40.3
	Total	129	100.0

The sample was balanced between Visually Impaired (51.9%) and Hearing Impaired (48.1%) students. Among Visually Impaired students, blindness (34.9% of total)

was more prevalent than low vision (17.1%), while among Hearing Impaired students, deafness (40.3%) dominated over hard of hearing (7.8%). This distribution suggests the study captured a diverse range of impairment severities, which is important for generalizability within special education contexts. However, the higher proportion of severe impairments (blind and deaf) indicated that FCEO caters more to profound disabilities, potentially influencing access to resources like Assistive Technology.

Answer to research questions

Research question one: To what extent is Assistive Technology used among Visually Impaired and Hearing Impaired students of FCEO?

Table 2: Descriptive analysis of assistive technology usage among visually impaired and hearing impaired students of FCEO

Response	All Students		Visually Impaired		Hearing Impaired	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Regularly	94	72.9	62	92.5	32	51.6
Occasionally	9	7.0	4	6.0	5	8.1
Not at all	26	20.2	1	1.5	25	40.3
Total	129	100.0	67	100.0	62	100.0

Overall, 72.9% of students reported regular Assistive Technology use, with occasional use at 7.0% and non-use at 20.2%. Visually Impaired students showed higher adoption (92.5% regular use) compared to Hearing Impaired students (51.6% regular, 40.3% non-use). This disparity could stem from the nature of impairments: Visually Impaired students may rely more on tangible devices (braille readers or magnifiers) for daily academic tasks, while Hearing Impaired students might face barriers like limited access to hearing aids or sign language interpreters, or perhaps cultural stigma around device use. The high overall adoption reflects positive integration of Assistive Technology in special education.

Research question two: What is the Physical Activity Level of Visually Impaired and Hearing Impaired students of FCEO?

Table 3: Descriptive analysis of physical activity level of impaired students of FCEO

All Students (n = 129)		Visually Impaired (n = 67)		Hearing Impaired (n = 62)	
Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
2679.57 METs	694.634 METs	2376.55 METs	461.161 METs	3007.03 METs	756.672 METs
Rating of Physical Activity Level	METs	Frequency	Percent	Frequency	Percent
Minimally Active	600 – 1500 METs	3	4.5	2	3.2
Moderately Active	1501 – 2999 METs	63	94.0	27	43.5
HEPA Active	≥ 3000 METs	1	1.5	33	53.2
	Total	67	100.0	62	100.0

The mean PAL was 2679.57 METs (metabolic equivalents) per week overall, indicating moderate activity levels. Hearing impaired students had a higher mean (3007.03 METs) than visually impaired students (2376.55 METs). In terms of ratings, visually impaired students were predominantly moderately active (94.0%, 1501–2999 METs), with minimal minimally active (4.5%) or highly active (HEPA, ≥3000 METs; 1.5%). Hearing impaired students showed more variability, with 43.5% moderately active, 53.2% HEPA active, and 3.2% minimally active. This suggests hearing impaired students engage in more vigorous activities, possibly due to fewer mobility constraints compared to Visually Impaired students, who may face environmental barriers (navigation challenges).

Research question three: What is the influence of Assistive Technology use on the Physical Activity Level of Visually Impaired and Hearing Impaired students of FCEO?

Table 4: Descriptive analysis of the influence of assistive technology use on the physical activity level of visually impaired and hearing impaired students in FCEO

Extent of Assistive Technology Use	Physical Activity Level (PAL) in METs							
	Visually Impaired (n = 67)				Hearing Impaired (n = 62)			
	N	Minimum	Maximum	M ± SD	N	Minimum	Maximum	M ± SD
Not at all	1	2480	2480	2480 ± 0.00	25	2591	3911	3300.80 ± 473.15
Occasionally	4	2078	2816	2323.00 ± 374.90	5	3112	3564	3361.00 ± 220.86
Regularly	62	1085	3216	2378.34 ± 473.06	32	1234	3987	2722.22 ± 879.48

Descriptive data showed varied patterns for both visually and hearing impaired students. For the visually impaired students, regular assistive technology users had a mean PAL of 2378.34 METs, occasional users 2323.00 METs, and non-users 2480 METs (based on only one non-user). For hearing impaired students, regular users had the lowest mean (2722.22 METs), while occasional (3361.00 METs) and non-users (3300.80 METs) were higher.

Research question four: What is the quality of life of Visually Impaired and Hearing Impaired students of FCEO?

Table 5: Descriptive analysis on quality of life of visually impaired and hearing impaired students of FCEO

Variable	Rating	Visually Impaired (n = 67)		Hearing Impaired (n = 62)	
		Frequency	Percent	Frequency	Percent
Quality of Life					
	Fair	13	19.4	9	14.5
	Average	5	7.5	18	29.0
	Above Average	11	16.4	9	14.5
	Good	17	25.4	11	17.7
	Very Good	5	7.5	10	16.1
	Excellent	16	23.9	5	8.1
	Total	67	100.0	62	100.0

Quality of Life ratings were generally positive but varied. Visually impaired students had ratings within the range of; 23.9% excellent, 25.4% good, but 19.4% fair. Hearing impaired students had ratings within the range of; 29.0% average, 17.7% good, 16.1% very good, but only 8.1% excellent. No group dominated in high or low categories, suggesting comparable overall Quality of Life despite impairments. This could reflect effective support systems at FCEO.

Research question five: What is the influence of Physical Activity Level on Quality of Life of Visually Impaired and Hearing Impaired students of FCEO?

Table 6: Descriptive analysis on influence of physical activity level on quality of life of visually impaired and hearing impaired students of FCEO

Physical Activity Level	Quality of Life	Visually Impaired Students (n = 67)				Hearing Impaired Students (n = 62)			
		n	Minimum	Maximum	M ± SD	n	Minimum	Maximum	M ± SD
Minimally Active	Quality of Life	3	51.00	68.00	62.33 ± 9.82	2	81.00	81.00	81.00 ± 0.00
Moderately Active	Quality of Life	63	32.00	88.00	61.55 ± 15.05	27	44.00	81.00	59.63 ± 12.35
HEPA Active	Quality of Life	1	-	-	-	33	46.00	85.00	58.85 ± 9.78

Table 6 shows descriptive analysis on influence of Physical Activity Level on Quality of Life of Visually Impaired and Hearing Impaired students of FCEO. Visually impaired students (3) were minimally active, in relation to their quality of life and 2 respondents from with the hearing impaired population were minimally active. Visually impaired students displayed a high rate of moderately active physical activity level, when compared to the hearing impaired group. 33 respondents among the hearing impaired group had high physical activity levels.

Hypotheses testing

Hypothesis one: There is no significant influence of Assistive Technology use on Physical Activity Level of Visually Impaired and Hearing Impaired students of FCEO.

Table 7 a: Model summary of multiple regression analysis of the influence of assistive technology use on physical activity level of visually impaired and hearing impaired students in FCEO

Model	N	Nature of Impairment	R	R ²	Adjusted R ²	SEE	ANOVA			
							F	df ₁	df ₂	Sig.
1	67	Visual	.108	.012	-.004	461.973	.768	1	65	.384
2	62	Hearing	.371	.138	.124	7.363	9.604	1	60	.003*

$p \leq 0.05$; *significant

Table 7a shows the model summary of multiple regression analysis for the influence of Assistive Technology use on the Physical Activity Level of Visually Impaired and Hearing Impaired students of FCEO ($n = 129$). The result indicates a low multiple correlation ($R = 0.108$) between the use of Assistive Technology and the Physical Activity Level for the visually impaired (VI) students ($n = 67$) however, the model was not a suitable predictor of the influence of Assistive Technology use on their Physical Activity Level $F(1, 65) = 0.768$, $p = .384$. There was a moderate multiple correlation between Assistive Technology use and the Physical Activity Level of the hearing impaired students ($n = 62$, $R = .371$). The model significantly predicted their Physical Activity Level, indicating that the use of Assistive Technology could influence 13.8% variations in the Physical Activity Level of Hearing Impaired students; $R^2 = .138$, standard error of the estimate (SEE) 7.363, $F(1, 60) = 9.604$, $p = .003$. Hence, the stated null hypothesis is not rejected for Visually Impaired students but rejected for Hearing Impaired students.

Table 7 b: Coefficient of model predictor of assistive technology use on physical activity level of FCEO students

Nature of Impairment		Beta (β)	t	Sig.
Visually Impaired	(Constant)		30.562	.000
		.108	.876	.384
Hearing Impaired	(Constant)		19.661	.000
		-.371	-3.099	.003*

$p \leq 0.05$; *significant

Table 7b shows analysis of the coefficient of the model predictor which explains the extent to which Assistive Technology use might influence the PAL of the participants. As shown in model summary the use of Assistive Technology had influence on the PAL of only Hearing Impaired students. The result however revealed a negative influence of Assistive Technology use on their Physical Activity Level $\beta = -.371$, $t = -3.099$, $p = .003$.

Hypothesis two: There is no significant influence of Physical Activity Level on Quality of Life of Visually Impaired and Hearing Impaired students of FCEO.

Table 8 a Model summary of multiple regression analysis of the influence of Physical Activity Level on Quality of Life of Visually Impaired and Hearing Impaired Students in FCEO

Variable	Mode 1	Nature of Impairment	R	R ²	Adjusted R ²	SEE	ANOVA			
							F	df 1	df 2	Sig.
Quality of Life	1	Visual	.187 ^b	.035	.020	14.829	2.631	1	65	.129
	2	Hearing	.342 ^b	.117	.102	10.824	7.922	1	60	.007*

$p \leq 0.05$; *significant

Table 8a shows the model summary of multiple regression analysis for the influence of Physical Activity Level on Quality of Life of Visually Impaired and Hearing Impaired students of FCEO ($n = 129$). Physical Activity Level had significant influence on only Quality of Life of the Hearing Impaired students. There was also a moderate multiple correlation between Physical Activity Level and Quality of Life of the Hearing Impaired students $R .342$, accounting for about 11.7% variation in their health status using Quality of Life as an indicator $F(1, 60) = 7.922$, $p = .007$.

Table 8 b: Coefficient of physical activity level model in predicting quality of life of visually impaired and hearing impaired students in FCEO

Variable	Nature of Impairment		Beta (β)	t	Sig.
Quality of Life	Visually Impaired	(Constant)		7.986	.000
			-.187	-1.536	.129
	Hearing Impaired	(Constant)		13.284	.000
			-.342	-2.815	.007*

$p \leq 0.05$; *significant

Table 8b shows analysis of the coefficient of the model predictor which explains the extent to which Physical Activity Level might influence Quality of Life of the Hearing Impaired students in FCEO. There was a negative influence of Physical Activity Level on the Quality of Life of the Hearing Impaired students $\beta -.342$, $t -2.815$, $p .007$.

Hypothesis three: There is no significant difference in Physical Activity Level of Visually Impaired and Hearing Impaired students of Federal College of Education (Special) Oyo.

Table9: t-test analysis of difference in physical activity level of visually impaired and hearing impaired students of FCEO

Variable	Nature of Impairment	N	M ± SD	MD	SED	t	df	Sig.	η^2
Physical Activity Level (in METs)	Visual	67	2376.55 ± 461.16	630.48	109.42	5.660	127	.000*	0.20
	Hearing	62	3007.03 ± 756.67						

p ≤ 0.05; * significant

Table 9 shows independent sample *t*-test analysis of difference in Physical Activity Level of the Visually Impaired and Hearing Impaired students. The result revealed that the Hearing Impaired students were significantly more physically active than the Visually Impaired students with a mean difference (MD) 630.48, standard error difference (SED) 109.42 METs per week, $t(127) = 5.660$, $p .000$. There was a large effect size, $\eta^2 = 0.20$ indicating that the Physical Activity Level of Hearing Impaired students was about 20% higher than the Physical Activity Level of Visually Impaired students. Based on this the stated null hypothesis was rejected.

Hypothesis four: There is no significant difference in Quality of Life of Visually Impaired and Hearing Impaired students of FCEO.

Table 10: t-test analysis of difference in quality of life of visually impaired and hearing impaired students in FCEO

Variable	Nature of Impairment	N	M ± SD	MD	SED	t	df	Sig.	η^2
Quality of Life	Visual	67	62.04 ± 14.98	2.14	2.36	.908	127	.366	-
	Hearing	62	59.90 ± 11.42						

Table 10 shows independent sample *t*-test analysis of difference between the Quality of Life of the Visually Impaired and the Hearing Impaired students. The result revealed that there was no significant different in Quality of Life of Visually Impaired and

Hearing Impaired students (MD 2.14, SED 2.36 mm Hg, $t(127) = .908$, $p .366$). Based on this the stated null hypothesis was rejected.

Discussion of findings

The study conducted provided significant insights into the interplay among assistive technology (AT), physical activity levels (PAL), and quality of life (QoL) among visually impaired (VI) and hearing impaired (HI) students in Federal College of Education (Special) Oyo (FCEO) with a sample of 129 students (67-Visually Impaired and 62-Hearing Impaired). The descriptive analysis showed that 72.9% of students regularly used assistive technology, with visually impaired students demonstrating significantly higher adoption (92.5% regular use) compared to hearing impaired students (51.6% regular, 40.3% non-use).

This disparity aligns with Yusuf and Lawal (2023), who noted that visually impaired students often rely on tangible devices like braille readers, screen readers, or magnifiers for academic and daily tasks, which are more readily integrated into educational settings. In contrast, hearing impaired students may face barriers such as limited access to hearing aids, frequency-modulated systems, or sign language software, compounded by cultural stigma around visible devices (Mutiso, 2020). The high assistive technology adoption among visually impaired students reflects FCEO's efforts to integrate technology into its academic framework, consistent with global trends in inclusive education (Brown, 2023). However, the substantial non-use among hearing impaired students (40.3%) suggests gaps in resource availability, awareness, or training, which could hinder their academic and social participation. This finding underscores the need for targeted interventions to enhance assistive technology accessibility for hearing impaired students, such as subsidized devices or workshops to reduce stigma, as recommended by Sangodeyiet *al.* (2024).

The study found that hearing impaired students had significantly higher physical activity level (mean 3007.03 METs, 53.2% HEPA active) than Visually Impaired students (mean 2376.55 METs, 94.0% moderately active), as confirmed by the tested hypothesis three. This difference, with a large effect size, indicates that hearing impaired students engage in more vigorous activities, likely due to fewer mobility constraints compared to visually impaired students, who face environmental barriers like inaccessible facilities or navigation challenges (Atareet *al.*, 2024). The overall mean physical activity level of 2679.57 METs aligns with WHO recommendations (≥ 1500 MET-minutes/week) for health benefits, suggesting that FCEO students maintain moderate-to-high activity levels. However, the predominance of moderate activity among visually impaired students (94.0%) and minimal HEPA activity (1.5%) highlights the impact of visual impairment on physical engagement. The study of Ogunleyeet *al.* (2024) noted that visually impaired students often experience enforced sedentarism due to safety concerns or lack of adaptive

equipment, limiting their participation in sports or recreational activities. Conversely, hearing impaired students' higher HEPA activity (53.2%) may be facilitated by visual or vibratory signalling devices, enabling communication during group activities (Sangodeyiet *al.*, 2025).

It is worthy of note that differential impact of assistive technology on physical activity level was found. For visually impaired students, assistive technology use had no significant influence, suggesting that the available assistive technology devices primarily support academic rather than physical tasks. This aligns with Brown (2023), who argues that assistive technology for visually impaired students is often designed for static, classroom-based activities. In contrast, assistive technology use had a significant negative influence on physical activity level for hearing impaired students, explaining 13.8% of variance. This counterintuitive result may indicate that hearing impaired students using assistive technology, such as hearing aids, engage more in sedentary academic tasks, reducing time for physical activities. Alternatively, students with severe hearing impairments, who rely heavily on assistive technology, may have lower baseline physical activity level due to physiological or social factors, as suggested by Johnson and Patel (2024). The negative association raises questions about the design and application of assistive technology for hearing impaired students, suggesting a need to integrate devices that actively promote physical engagement, such as wearable fitness trackers with visual feedback.

Quality of Life ratings were generally positive, with no significant difference between visually impaired and hearing impaired students, despite varied distributions. This lack of difference suggests that FCEO's support systems, including assistive technology and inclusive education, effectively mitigate impairment-specific challenges, fostering comparable well-being across groups. The positive Quality of Life aligns with Brown and Lee (2024), who highlighted the role of institutional support in enhancing psychosocial health among students with disabilities. However, the presence of fair ratings indicates room for improvement, particularly in addressing social isolation or stigma, as noted by Mutiso (2020).

The study revealed no significant influence of Physical Activity Level on Quality of Life for visually impaired students, but a significant negative influence for Hearing Impaired students, explaining 11.7% of variance. This unexpected negative relationship for hearing impaired students contradicts prior research linking higher physical activity level to improved Quality of Life (Brown & Lee, 2023). This suggests that intense physical activity (HEPA levels) leads to fatigue, overexertion, or social exclusion during group activities, negatively affecting hearing impaired students' emotional or social well-being. Alternatively, confounding factors like impairment severity or socioeconomic barriers may contribute, as severe deafness could limit social integration during sports (Kishanrao, 2024). For visually impaired students, the lack of influence may reflect their

lower physical activity level, which limits the potential for activity-related Quality of Life benefits. These findings highlight the complexity of physical activity level's impact on Quality of Life, necessitating tailored interventions to balance activity intensity with psychosocial outcomes.

Conclusion

- Physical activity level has a key impact on quality of life of hearing impaired students of FCEO(Special).
- Hearing impaired students were more physically active than the visually impaired students.
- There is little or no usage of assistive technology in the enhancement of physical activity level for the visually impaired (VI) students.
- Physical activity level does not affect the quality of life of hearing impaired students.
- There is no disparity in the Quality of Life rating of both visually and hearing impaired students.

Recommendations

- Implementation of targeted programmes to increase the adoption of assistive technology should be encouraged.
- Assistive technology should be redesigned to incorporate mobility and exercise infusion for Hearing Impaired students.
- Establishment of specialised physical education curriculum with accessible facilities to bridge activity gaps and foster equitable health outcomes in special education settings.
- Regular QoL assessments using WHOQOL-BREF should be adopted to track improvements and inform policy driven actions.

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