

Cost effects of assistive devices on the household welfare of persons with disabilities in Kakamega County, Kenya

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ABSTRACT

This study analysed the relationship between the cost of assistive devices and the household welfare of persons with disabilities (PWDs) in Kakamega County, Kenya. The main objective of the study was to investigate the cost effects of assistive devices on household welfare for PWDs in Kakamega County, Kenya. The study had two specific objectives: to find out the effects of the economic costs of assistive devices and labour costs of assistive devices on the household welfare for persons with disabilities in Kakamega, Kenya. This study was limited to the social model theory of disability. The period from 2020 to 2022 encompasses the onset and aftermath of the COVID-19 pandemic, which had significant economic, social, and health impacts globally and in Kenya. The pandemic intensified challenges for persons with disabilities, such as increased costs of healthcare, limited mobility due to lockdowns, and disruptions in the supply chain for assistive devices. A descriptive survey design was adopted. The study target was the 1110 registered PWDs in Kakamega County. The proportionate sampling technique was used to get the 113-sample size. A closed-ended questionnaire was used to collect the data. A pilot study was undertaken in Vihiga County to pre-test the validity and reliability of the study. The SPSS software version 20 was used to analyse the data. Anonymity, consent and confidentiality were adhered to. The study applied both descriptive and inferential statistics. Frequency tables, percentages, as well as correlations and regressions were used to present and analyse the data. The findings generally indicated that most persons with disabilities found assistive devices unaffordable, whether for purchase, maintenance, repair, or replacement of parts. Consequently, households often faced the difficult choice between supporting their PWD siblings and participating in their own economic activities. As a result, many households experienced economic downturns, as they expended significant time or financial resources assisting their PWD siblings with assistive devices, often at the expense of engaging in other productive activities. Ultimately, households bore this cost by struggling to participate in other gainful socio-economic pursuits. These outcomes were affirmed by regression analysis, which showed that labour costs of assistive devices were significantly associated with improved household welfare ($\beta = 0.169$, $p = 0.004$), while economic cost was not ($p = 0.695$). Among demographic factors, primary disability type ($\beta = -0.245$, $p < 0.001$) and highest education level attained ($\beta = 0.873$, $p < 0.001$) significantly influenced household welfare, whereas age, gender, and marital status did not have a significant effect. The findings underscore the importance of education and the affordability of assistive devices for PWD households. The study recommends increasing the availability of cost-effective and efficient assistive devices in households. There is also a need for collective responsibility to initiate reasonable and expanded interventions that would empower vulnerable PWD households in Kakamega County.

Keywords: Assistive Devices, Cost Effects, Household Welfare, Labour Costs, Persons with Disabilities

I. INTRODUCTION

International Classification of Functioning Disability and Health define disability as an umbrella word that encompasses impairments, activity limitations, and participation restrictions adding that disability is a contextual variable, dynamic over time and in relation to circumstances. People with disabilities may be excluded from the workforce and wealth creation platforms, have limited educational opportunities and or face institutional barriers that restrict their earnings (Smith, *et al.*, 2024). Consequently, this leads to lower standards of living among people with disabilities. The World Bank estimates that 20% of the world's poorest people have some kind of disability, and tend to be regarded in their own communities as the most disadvantaged.

The prevalence of disability in Africa is often higher due to factors such as conflict, poor healthcare access, and disease. This translates to over 80 million people in Africa live with a disability. Estimates show that only 5-15% of PWDs in low-income countries, including many in Africa, have access to the assistive devices they need (World Health Organization, 2024). The World Health Organization (WHO, 2024), approximates that 1.3 billion (16%)

people experience significant disability globally. The United Nations (UN) on the other hand approximates that close to 80 million Africans live with various forms of disability (UN, 2019).

The Kenya Population and Housing Census (KPHC, 2019) reports that 2.2% or 0.9 million of Kenyans above five years live with some form of disability, and a majority are living in rural areas. In a different survey, the Kenya National Survey of People with Disability (KNS-PWD) found that around 4.6% of the population (not aggregated by age), or 1.7 million Kenyans, live with a form of disability. Generally, 1.9% of men have a disability as compared to 2.5% of women (KPHC, 2019). People with disabilities (PWDs) in Kenya live in a vicious cycle of poverty due to stigmatization, limited education opportunities, inadequate access to economic opportunities, and access to the labour market (Zikhali, 2024).

Data from Kenya National Bureau of Statistics (KNBS) shows that Kakamega County is the second after Meru County with population of PWDs (Kenya National Bureau of Statistics [KNBS], 2019). To address the challenges that PWDs face, the government enacted several policy documents that gradually contributed to the sustenance of the poor and vulnerable populations. Article 20 of the Constitution of Kenya for instance grants the administration's obligation to the advanced recognition of the rights of all Kenyans.

This is further buttressed in Article 43 which guarantees the right to the maximum standard of health care and services, education, accessible and adequate housing, food security, access to clean water, and social security with an emphasis on providing for those unable to support themselves or their dependents (Constitution of Kenya, 2010). The government put in measures such as establishment of a State Agency i.e. the National Council for People with Disabilities (NCPWD) to deal with disability issues, the provision of wheel chairs, white cane, sunscreen lotions and other assistive technologies in addition to establishing a Disability Fund.

Provision of assistive devices and services to persons with disabilities in Kenya enable them to actively engage in society. These include wheelchairs, crutches, hearing aids, calipers, surgical boots and prosthetic arms or legs. A sign language interpreter is also included as provision of an assistive service. Priority is given to those in need of assistance in work, training and learning environments. Limited studies have shown how PWDs suffer in regards to the effect of the cost of this device in improving the living standards of the persons with disabilities. For instance, Ganle et al. (2020), Calvert (2021) and Gupta and Priyadarshi (2020) among other studies agree that PWDs still face multiple challenges among them those of mobility, health issues, educational challenges and participation in income generational activities.

Because of the looming challenges that face disadvantaged people with disabilities, the Government of Kenya identified disability inclusion as a criterion to the attainment of the Sustainable Development Goals (SDGs) and its fundamental initiative 'leaving no one behind' (Mitra et al., 2017; Abualghaib *et al*, 2019). To do this, the government incessantly strived to ensure that PWDs were accounted for and could participate equally in every aspect of life. This helped in enhancing equal opportunity, inclusion, justice and economic growth for the nation. The government for instance established several interventions of improving the living standards of persons with disabilities. One of the approaches include the provision of PWDs with devices that assist them in leading a normal life. Priority is given to those in need of assistance at work, training and learning environments

While it is important to consider the financial and long-term impacts of assistive devices, prioritizing cost-effectiveness may lead to overlooking expensive but potentially more effective solutions for people with disabilities. A study conducted by Garland-Thomson (2020), and confirmed by Waitoller and Gorham (2021) found that focusing solely on maximizing impact through resource allocation may neglect the importance of preferences and needs in selecting assistive devices. It is essential therefore to consider a holistic approach when addressing the needs of people with disabilities (Abualghaib *et al*, 2019). This includes considering unique abilities, challenges, and personal preferences to ensure that assistive devices are more suitable or effective for the individual. This consideration would lower chances of probable frustration, decreased independence, and a lack of success in performing daily tasks.

In most cases, assistive devices must be customized to every individual in terms of size, fitting and some other considerations (Pinilla-Roncancio & Alkire, 2021). While personalized care is important, it is also crucial to consider that not all individuals have access to or can afford customized assistive devices. In some cases, individuals may have to accept generic options that may not fully meet their needs. Madans et al. (2017) however, indicate that the generic options could still provide some level of support and functionality for those who need them. It is important in the long run to explore all available options and resources to find the best solution for the specific needs of persons with disabilities. In some cases, customization or additional support may be necessary to ensure the best possible outcome. This may involve working closely with a healthcare provider or specialist to identify the most effective approach.

1.1 Statement of the Problem

Kakamega County has a total population of 1,867,579 with a prevalence rate of disability at 2.9% which is slightly higher than the National disability prevalence rate of 2.2% (KPHC 2019). There is a strong link between poverty and disability where Johnner (2016) reveals that poor people have a higher risk of acquiring a disability

because they are more exposed to disabling diseases and conditions. At the same time, disability increases the possibility of falling into poverty by being excluded from participation of development initiatives (Pinilla-Roncancio & Alkire, 2021). People with disabilities may be excluded from the workforce and wealth creation platforms, have limited educational opportunities and or face institutional barriers that restrict their earnings (Smith *et al.*, 2024). Consequently, this leads to lower standards of living among people with disabilities. Data from World Health Organization (2024) indicates that 80% of disabilities are acquired majorly through chronic illnesses, accidents, and aging. PWDS often face higher poverty rates compared to the general population due to factors such as limited access to education, employment and social services.

The overall poverty level in Kakamega County stands at 49.2% making it one of the counties with the highest poverty rates in Kenya (KNBS, 2019). Given the 49.2% overall poverty rate in Kakamega, it is reasonable to infer that the poverty rate among PWDS in the County is higher due to additional barriers they face. Statistics have indicated that 2.5 billion PWDs need one or more assistive devices, yet nearly one billion of them are denied access where accessibility can be as low as 3%. Affordability is the major barrier to access (WHO, 2024). The number of people in need of assistive devices is likely to rise to 3.5 billion because of increase in the prevalence of non-communicable diseases (WHO, 2024). The WHO's Global Report on Assistive devices presents evidence on the need and access to assistive products. Assistive devices that were covered by National Health Insurance are only 7 out of 50 types recommended by WHO (KNBS, 2019). This means PWDS have to purchase out of pocket to get the device or rely on family and friends for financial support. There are limited studies that highlight how the cost of assistive devices affects the household welfare of PWDs.

A study by Restrepo (2015) that used comparable data from 14 developing countries found not only that people with disabilities tended to be less well off in terms of education, employment, living conditions, consumption and health, but also that, on average, households with disabilities also report spending a higher fraction of their expenditure on health care. The study did not shade light on how the cost of assistive devices affected the household welfare of persons with disabilities. This study has helped the researcher to a more understanding there has been an increased and progressive interest in the study of living conditions of people with disabilities.

Further, understanding that people with disabilities fully depend on others for their independence, there is scarce data on living standards of these people even when they possess assistive devices. Therefore, this study aims to fill this gap by shedding more light on the costs and welfare effects of assistive devices to bring about long-term solutions.

1.2 Research Objective

- i. To find out effects of Economic Costs of assistive devices on household welfare for persons with disabilities in Kakamega County.
- ii. To determine the labour costs effects of Assistive Devices on the household welfare for persons with disabilities in Kakamega County, Kenya.

1.3 Research Hypothesis

Ho₁: Economic Costs of assistive devices significantly affect household welfare for persons with disabilities in Kakamega County.

Ho₂: Labour cost effects of Assistive Devices significantly affect the household welfare for persons with disabilities in Kakamega County.

II. LITERATURE REVIEW

2.1 Theoretical Review

The Social Model of Disability, developed by Mike Oliver in 1980, shifts the focus from individual impairments to the societal barriers that restrict people with disabilities. It challenges the traditional view of disability as an individual problem, arguing that by removing social, environmental, and economic barriers, individuals with impairments can fully participate in society. The Social Model also emphasizes that when people with disabilities are denied access to assistive devices, they are excluded from education, employment, and social life, reinforcing negative stereotypes and deepening social exclusion (Johner, 2016). This perpetuates cycles of poverty and dependency, placing additional strain on households and limiting the potential contributions of people with disabilities to their communities. In areas with limited resources like Kakamega County, the high cost of assistive devices exacerbates these challenges and underscores the need for collective action. The cost of assistive devices places a heavy financial burden on low-income households, which are often already struggling with reduced income and additional care responsibilities. These financial challenges diminish household welfare and restrict the independence and

opportunities of individuals with disabilities. Without affordable access to assistive devices, families face further marginalization and economic stress.

2.2 Empirical Review

2.2.1 Economic Costs of Assistive Devices on Household Welfare for persons with Disabilities

A study by Mitra *et al.* (2017) showed that in low-income countries, the upfront cost of devices like wheelchairs or hearing aids often exceeds the average household's monthly income, resulting in financial strain and reduced access. A study by Yeager *et al.* (2018) highlighted that caregivers in households with PWDs who use assistive devices experienced reduced caregiving responsibilities and stress levels, allowing them to engage in more paid work or entrepreneurial activities. Caregivers who previously spent up to 40% of their time providing direct care were able to redirect their time towards income-generating activities after their dependents received assistive devices.

A Kenyan study by Owuor *et al.* (2021) indicated that households in rural areas, such as Kakamega, spend between 20-40% of their income on acquiring assistive devices, limiting their capacity to meet other essential needs like food, education, and housings in a study focusing on Kenya, Owuor *et al.* (2021) demonstrated that access to assistive devices facilitated greater participation of PWDs in both formal and informal sectors. Households with PWDs who had access to assistive devices reported a 25% increase in monthly income due to improved work opportunities and productivity. The use of assistive devices is associated with reduced healthcare costs and lower levels of dependency, leading to long-term economic benefits for households.

The costs associated with maintaining and repairing assistive devices also contribute significantly to household financial burdens. According to Borg and Ostergren (2014), regular maintenance is necessary to ensure device functionality, yet the expenses for parts, repairs, and professional services are often prohibitive for many families. The found that maintenance costs can account for up to 15% of the initial purchase price annually, further straining household budgets and potentially leading to the abandonment of devices. Indirect costs also include increased healthcare expenditures. Some studies suggest that assistive devices, intend to improve quality of life, but they can necessitate additional medical consultations, rehabilitation services, and special accommodations. Owuor *et al.* (2021) reported that households with PWDs often incur 50% higher healthcare costs than those without, due to the need for specialized care and device-related health issues.

2.2.2 Labour Costs Effects of Assistive Devices on the Household Welfare for Persons with Disabilities

A study by Owuor *et al.* (2021) in Kenya demonstrated that assistive devices like prosthetic limbs and wheelchairs increased the mobility of PWDs, allowing them to access workplaces that were previously inaccessible. The study further revealed that individuals with disabilities who used assistive devices were employed at higher rates in the education, healthcare, and information technology sectors compared to those without such devices

According to a study by Cook and Polgar (2019), assistive technologies help reduce workplace fatigue and injury, enabling employees with disabilities to maintain their job performance and retain employment. The study found that employees who used appropriate assistive devices were more likely to advance in their careers due to increased productivity, independence, and confidence in their work.

A study by Phillips and Zhao (2020) found that assistive devices such as ergonomic workstations, speech recognition software, and mobility aids significantly increased the productivity of employees with physical disabilities by enabling them to work more comfortably and efficiently. It was found that access to affordable assistive devices led to a 20% increase in employment rates for PWDs in both formal and informal sectors. In the context of Kenya, a study by WHO (2024) observed that farmers with disabilities who used assistive tools such as adaptive ploughing and modified farming equipment increased their agricultural productivity by 30% compared to those who did not use such devices.

A research study by De Jonge *et al.* (2016) indicated that assistive devices minimize pain and discomfort associated with specific disabilities, leading to reduced absenteeism and higher job satisfaction. It was found that employees using assistive technologies reported higher levels of job satisfaction due to reduced barriers to task completion and greater workplace inclusion. Research by Palmer and Saval (2021) in Turkey demonstrated that PWDs who used assistive technologies had significantly lower dependency levels on co-workers and supervisors, which positively impacted their overall productivity and workplace integration through community sensitization and capacity-building workshops. These efforts resulted in enhanced social inclusion, greater acceptance in workplaces, and increased access to services.

Research by De Jonge *et al.* (2016) showed that assistive devices reduced the need for frequent medical visits, hospitalizations, and long-term care, which are typically expensive and a significant economic burden for families. It was found that older adults using assistive devices for mobility and self-care experienced a reduction in healthcare expenditures by up to 35%. This reduction in direct healthcare costs indirectly benefits the economic welfare of households, allowing for the allocation of resources to other essential needs such as education, nutrition, and housing.

According to a study by Layton and Boulr (2020), households that invest in assistive devices often experience significant cost savings over time due to reduced need for paid care giving services and lower healthcare expenses. This allows for better financial planning, savings, and the potential to invest in assets such as property, education, or small businesses. Households with PWDs who used assistive devices reported a 15% increase in savings over five years, leading to improved financial stability (Layton & Boulr, 2020).

III. METHODOLOGY

3.1 Research Design

The study adopted a descriptive survey research design. This design is particularly appropriate as it allows for a comprehensive understanding of both the quantitative and qualitative aspects of the issue. By integrating both approaches, the study can effectively measure the economic impact of assistive devices on household welfare while also capturing the lived experiences and perceptions of individuals with disabilities.

3.3 Target Population

The target population for the study was the 1110 PWDS in Kakamega County registered with the National Councils of Persons with disability (NCPD, January 2020-December 2022). Using stratified sampling, method, the study sample size was 113 participants.

3.4 Sample Size and Sampling Technique

The target population for the study was all PWDS in Kakamega County registered with the National Councils of Persons with disability (NCPD, January 2020-December 2022). This study was carried out in all the 12-sub county. The proportionate stratified sampling was the sampling method of this study.

Table 1

Showing Target Population

SR.NO	Sub County's	Total Population	Sample size
	Lugari Sub-County	90	9
	Likuyani Sub-County	100	10
	Navakholo Sub-County	35	4
	Lurambi Sub-County	120	12
	Malava Sub-County	55	6
	Ikolomani Sub-County	45	5
	Shinyalu Sub-County	220	22
	Kakamega Central Sub-County	110	11
	Mumias East Sub-County	140	14
	Mumias West Sub-County	95	10
	Matungu Sub-County	30	3
	Butere Sub-County	70	7
Total		1110	113

3.5 Data Collection Instrument

Primary data was collected. The selected PWDs were informed prior to the days of study. The introductory letter from university was read to the selected respondents. Any concerns and questions from the respondents were attended to at this time. This study utilized closed ended questionnaires with a five-point Likert scale items. If the disabled person was not available, too young or unable to comprehend the questionnaire, a suitable proxy was asked to respond on his/her behalf. The questionnaires collected personal information of the respondents and that concerning the cost of assistive devices on household welfare. They were distributed to the respondents by the researcher and interpretation was made on a need basis through use of research assistants mostly specialized in sign language interpretation. This method was appropriate since it was easy to analyze and classify the collected information especially on closed ended questions. It also catered for this large population in relation to available time. To ensure reliability and validity, a pilot study was conducted in Sabatia Sub County, Vihiga County. The scores obtained were correlated using SPSS version 20.

3.6 Data Analysis

The researcher employed descriptive (frequencies, percentages, Means, standard deviations and variances) and inferential statistics (regression analysis) were used to analyse quantitative data. Faraway (2002) argued multiple

regression is used when analyzing statistical significance of more than two independent variables on one dependent variable. For the purposes of this study, the following linear regression model was used:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \dots \text{Model 1}$$

Where;

Y= Aggregate mean score of Household welfare

α = y-intercept/constant

β_1 =Regression coefficient for Economic cost of assistive devices

X_1 = Aggregate mean score of Economic cost of assistive devices

β_2 =Regression coefficient for Labour cost of assistive devices

X_2 =Aggregate mean score of Labour cost of assistive devices

ε = error term-random variation due to other unmeasured factors

3.8 Ethical Considerations

In carrying this out, strict ethical standards were very necessary to make sure that all the participants were adequately taken care of and respected. The ethical principles of respect to persons, beneficence, justice, and informed consent were of interest in this study since they are essential in preserving the integrity of the research and the wellbeing of the participants. The Masinde Muliro University of Science and Technology, Ministry of Social Services, Sports, Youth, Gender and Culture and NCPDs Kakamega chapter granted the ethical approval to undertake this research.

Such a principle as Respect for Persons is based on the acknowledgment of autonomy and dignity of each party participant and specifically persons with disabilities, which can be termed a vulnerable group. In this study, the participants were adequately informed concerning the nature of the study, its purpose, the possible risks, and benefits of the study. They had the liberty to make a free choice on whether to take part or withdraw at any stage with no form of coercion or consequences. Also, the researcher employed communication means that can be agreed on by the participants to achieve ease in communication like sign language, Braille or whichever other forms interpretable by the participants to ascertain that they are aware of what the study is all about and what the researcher is expected to do to his/her participants.

The critical ethical requirement was to ensure the consulting of informed consent. Detailed information was given to the participants or their legal guardians where that is involved about the study in a language and format acceptable and readily understood by the participants. Consent form was provided, purpose of the study, involved methods of data collection, risks and benefits as well as measures to maintain confidentiality. Consent was given freely and was devoid of any pressure or undue influence. Participants who had a cognitive impairment such as those who may not be in a position to grasp the information surrounding the study were fully assisted to help them move in the direction of realizing their rights to participate.

Participant secrecy and confidentiality was secured during the research process. To protect identity and personal details of participants, the researcher took steps to anonymize the data and save all the sensitive details securely. The principle of beneficence was adhered to. The study was intended to act in the best interest of the participants as well as society at large and reduce any possible harm.

IV. FINDINGS & DISCUSSION

4.1 Response Rate

This study issued 113 questionnaires and upon the end of the data collection period, a total of 97 of the questionnaires that were returned were approved for analysis considering factors such as completeness of the survey and eligibility of respondents. This led to a response rate of $\frac{97}{113}$ which is equivalent to 85.8%. From 324 questionnaires distributed all were filled and returned indicating a response rate of 100%. The study also found that 14(77.8%) Church leaders responded as all clergy responded in interviews.

4.1.1 Demographic Characteristics of the Respondents

The demographic data collected from respondents include their gender, age, marital status and education. The findings show that half of the respondents were aged 18-39 years i.e. 25.8% aged 18-29 and another 25.8% aged 30-39 years. Apparently issues of disability mostly affect young people and young adults whether directly (the ones having a disability) or indirectly as caregivers etc. about a fifth of the respondents were aged 40-49 years while 17.5% were aged 50-59 years. The data on the gender of the respondents showed that more than two thirds of the respondents were female i.e. 68% while the male respondents were only 32% of the sample which aligns with secondary research that less men (1.9%) have a disability as compared to 2.5% of women (KPHC, 2019). Data on marital status of respondents showed that a majority of the respondents were either single or married. Two fifths were married (41.2%)

while 37.1% of the respondents were single with only one in five respondents reporting to be widowed. This means that quite a substantial number of the persons with disability still suffer a stigma for towards marriage. Data about highest level of education of respondents indicated that a majority of the respondents did not school to the level of college or university education. From the data, half of the respondents had acquired secondary education, while a third had attained up to primary level of education. One in ten respondents had attained tertiary education whereas very few (3.1%) had vocational training and another 3.1% had no formal education. This is summarized in Figure 1

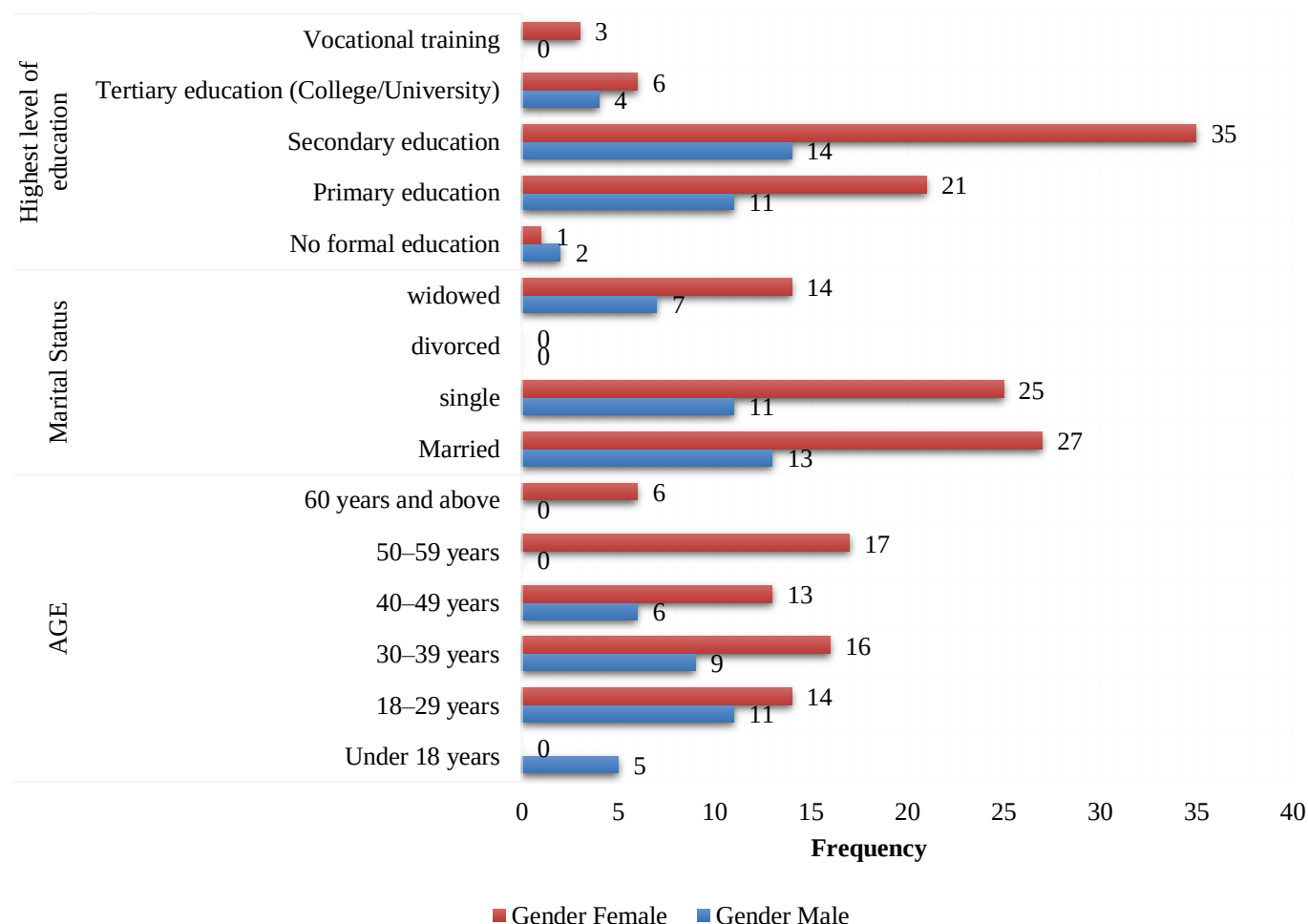


Figure 1
Demographic Characteristics

The findings imply that PWDs in Kakamega County face various obstacles in attaining higher education that could be attributed socio-economic factors such poverty. The study findings are consistent with research findings of Restrepo (2015) that found that people with disabilities tended to be less well off in terms of education, employment, living conditions, consumption and health. The findings on demographic characteristics of the respondents were also presented in clustered cross tabulated bar charts shown below. Cross-tabulations indicate that the burden of disability lies more on women. There was no significant difference in terms of marital status for both genders. More PWD women attained vocational skills training compared to male PWDs.

4.1.3 The Primary Type of Disability Affecting the Household

This study investigated the types of disability and assistive devices that prevail among respondents as shown in the Figure 2.

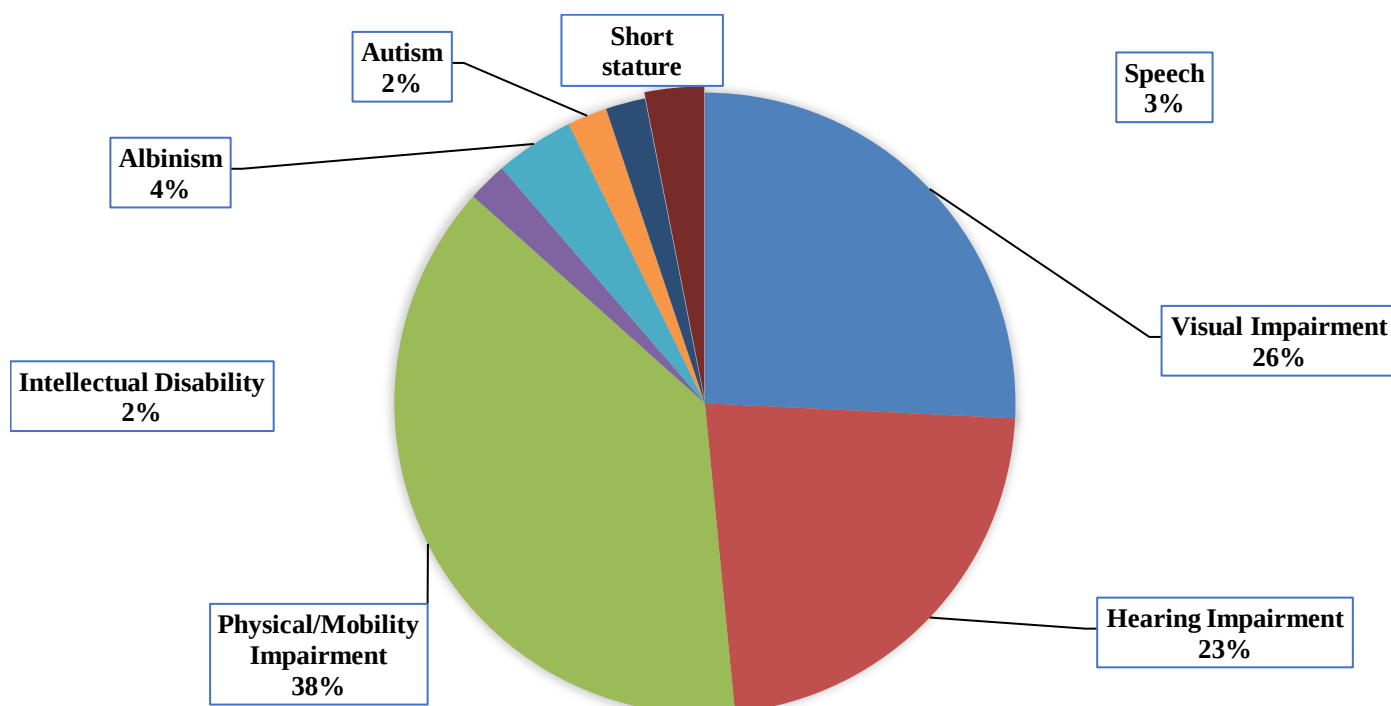


Figure 2
Demographic Characteristics

The data indicates the most prevalent type of disability was physical impairment which was prevalent among 38.1% of the respondents. This was followed by visual impairment with a prevalence of 25.8% and further hearing impairment with a 22.7% prevalence among the respondents. Intellectual disability was the least prevalent only among 2.1% of the respondents. Additionally, 11.3% of the respondents had other types of disabilities of which, 36.4% was albinism; autism and short stature each 18.2% prevalent while speech disability was 27.3%. This information is summarized in the below pie-chart.

4.2 Analysis of PWD Household Welfare

This study analyzed household welfare through four indicator variables on income levels, asset ownership, savings status and debt status of the respondents. The 10-scale rating findings are summarized in the table 1:

Table 1
PWD Household Welfare

	Mean	Std. Dev.	Variance
There is adequate income that helps to meet all the basic needs of the household such as food, shelter, education etc.	2.2165	.98136	.963
The household owns adequate arable land, domestic animals and a decent house	2.3711	1.18427	1.402
The household has enough savings to handle emergencies and other threatening eventualities	2.3505	.82967	.688
The household does not currently survive on loans from institutions, friends or relatives	2.4330	.97796	.956

N=97

Findings showed that the general welfare of PWD households was poor. The respondents did not generally have adequate incomes and neither did they own adequate productive assets. They also were not able to maintain savings for the future or emergencies but had accumulated reasonable amounts of debts from friends, relatives and

other financing instructions. The households were underprivileged in most aspects because of insufficient mechanisms for support nor their own empowerment.

4.2.1 Effect of Economic Costs of Assistive Devices on Household Welfare

PWDs found it costly to acquire or purchase assistive devices as well as maintain, replace or upgrade parts as highlighted in the tables 2 and 3.

Table 2

Direct Economic Costs of Assistive Devices on Household Welfare

Variable	Mean	Std. Dev.	Variance
The initial purchase cost of the assistive device was affordable for my household	1.9588	1.145	1.311
The ongoing maintenance and repair costs of the assistive device are manageable for my household.	1.7216	1.077	1.161
The cost of replacing parts or upgrading the assistive device is affordable.	1.6495	.89024	.793

N=97

The findings generally indicated that majority of the respondents found assistive devices not affordable either during purchase or maintenance, repair and replacement of parts. Specifically, with a very low mean coefficient rating of 1.9588 and a standard deviation of 1.145, respondents strongly disagreed that the initial purchase cost of the assistive device was affordable for the household. Similarly, many respondents further strongly disagreed, with a mean coefficient rating of 1.7216 and a standard deviation of 1.077 that the ongoing maintenance and repair costs of the assistive device were manageable for their households. There was also a strong affirmation that the cost of replacing parts or upgrading the assistive device was not affordable based on the lowest mean rating of 1.6495 with a standard deviation of 1.077. The study findings are consistent with research results of Borg and Ostergren (2014) which linked the purchasing, maintaining and repairing assistive devices to be contributing significantly to household financial burdens.

In summary, PWDs found it costly to acquire or purchase assistive devices as well as maintain, replace or upgrade parts. This finding was consistent with past research on utilization of assistive technologies. For instance, Pinilla-Roncancio and Alkire (2021) found that poverty was a key indicator on the ability to acquire, maintain or upgrade assistive technologies and further reiterated by Palmer and Saval (2021) that inability to access appropriate assistive devices was a major challenge associated with disability population in Kakamega.

Table 3

In-Direct Economic Costs of Assistive Devices on Household Welfare

Variable	Mean	Std. Dev.	Variance
My household has incurred additional costs for transportation to acquire or maintain the assistive device.	3.7526	.85429	.730
The time spent on maintaining or servicing the assistive device is burdensome for the household.	4.4639	.70802	.501

N=97

The study found out that respondents faced challenges due to indirect costs of assistive devices which limited their proper participation in socio-economic activities. For instance, majority of the respondents agreed that their households had incurred additional costs for transportation to acquire or maintain the assistive devices as evident from the mean coefficient rating of 3.7526 with a standard deviation of 0.85429. Additionally, the respondents strongly agreed that the time spent on maintaining or servicing the assistive device was burdensome for the households based on a very high mean coefficient rating of 4.4639 with a standard deviation of 0.70802

4.2.2 Labour Costs of PWD Assistive Devices

Whereas it was costlier to purchase, maintain or upgrade assistive devices based on its type, in the event that the devices were acquired, they greatly improve the quality of life for persons with disability making this to be considered a worth opportunity cost for household members. This finding was also consistent with Phillips and Zhao (2020) who found that assistive devices significantly increased the productivity of employees with physical disabilities by enabling them to work more comfortably and efficiently. The tabulated data in table 4 refers to the long term labour costs associated with assistive devices.

Table 4*Long Term Labour Costs Associated with Assistive Devices*

	Mean	Std. Dev.	Variance
Over time, the labour costs associated with assistive devices have become a long-term burden on my household.	3.1546	1.53664	2.361
The increased time and effort required for assistive device maintenance have reduced the opportunity for household members to engage in full-time or part-time employment.	3.2784	1.34430	1.807
The labour input required for the use and maintenance of the assistive device is justified by the improvements it has made to the person with a disability's quality of life.	3.1959	1.32790	1.763

N=97

The findings denote that households have to choose between being there for their PWD siblings or participation in own economic activities. Consequently, majority of these households suffer economic downturns as they have to spend a lot of time or financial resources assisting their PWD siblings to use or maintain their assistive devices at the cost of participation in other productive activities. The household thus pays for this cost by finding it hard to participate in other gainful socio-economic activities consistent with earlier research conducted by Cook and Polgar (2019) on PWD assistive devices and productivity.

4.3 Inferential Analysis**4.3.1 R Square Model Analysis**

The model shows an R square value of 0.696 which means that the model, in predicting the dependent variable, was 69.6% perfect. The table below presents data on the analysis of variance.

Table 5*Regression Model Summary*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.834 ^a	.696	.686	.31072

a. Predictors: (Constant), , Economic Cost of Assistive Devices, Labour Costs of Assistive Devices

The variance presented a statistically significant model at 99% confidence interval where p-value was 0.000 and F coefficient of 71.009. This was an indicator that the regression model significantly predicted the dependent variable (household welfare).

Table 6*Analysis of Variance (ANOVA)*

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20.567	3	6.856	71.009	.000 ^b
	Residual	8.979	93	.097		
	Total	29.546	96			

a. Dependent Variable: Household Welfare

b. Predictors: (Constant), Economic Cost of Assistive Devices, Labour Costs of Assistive Devices

The regression coefficients as shown in Table 7 indicates that the relationship between Labour Costs of Assistive Devices and household welfare was statistically significant at the 99% confidence interval ($p = 0.004$, $t = 2.929$). In contrast, there was no statistically significant relationship between Economic Cost of Assistive Devices and household welfare ($p = 0.695$, $t = -0.393$).

Table 7*Regression Coefficients*

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.490	.419		-1.169	.245
	Economic Cost of Assistive Devices	-.034	.086	-.022	-.393	.695
	Labour Costs of Assistive Devices	.188	.064	.169	2.929	.004

a. Dependent Variable: Household Welfare

In view of the findings above, increased labour costs of assistive devices are significantly associated with improved household welfare. Conversely, economic cost of assistive devices did not show a significant relationship with household welfare in this model. These results suggest that enabling households to afford the labour costs associated with assistive devices may enhance their overall welfare, which is consistent with findings from De Jonge et al. (2016) and Layton and Boulr (2020).

4.3.2 Dependent Variable and Demographic Characteristics Effect

The study analyzed the relationship between the dependent variables and the demographic characteristics of PWDs. Regression coefficients are shown in the table below.

Table 8

Regression Coefficients for Demographic Characteristics

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.092	.155		13.535	.000
	Gender	-.081	.068	-.068	-1.195	.235
	Age	.040	.024	.097	1.686	.095
	Primary Disability Type	-.111	.024	-.245	-4.646	.000
	Marital Status	.035	.025	.073	1.411	.162
	Highest level of education	.608	.037	.873	16.387	.000

a. Dependent Variable: Household Welfare

From the regression statistics, the study showed that there was no statistically significant relationship between gender and household welfare (p value = 0.235). Likewise, the relationship between household welfare and age as well as marital status was not statistically significant where p -values respectively were 0.095 and 0.162. This means that household welfare status is not significantly dependent on age, gender and marital status. However, disability type and education level achieved significantly determine the household welfare status for people with disabilities where respectively the t -value was -4.646 and 16.387 both significant at a 99% confidence interval. The findings imply that the severability of disability has an inversely proportional impact on household welfare. Additional, when more PWD members access education and skills, the overall wellbeing of the household is improved.

V. CONCLUSIONS & RECOMMENDATIONS

5.1 Conclusions

Although it may be costlier to purchase, maintain or upgrade, assistive devices greatly improve the overall quality of life for persons with disability and acquisition of such devices is therefore a worth opportunity cost for household members. However, because the financial burden of the assistive devices, many households still find it difficult to participate in gainful socio-economic activities because of the need to cater for the needs of their PWD members. The ability to participate in gainful economic activities by PWDs is vital. However, this is possible when households can access affordable and maintenance-free assistive devices which allow saving of funds for investment to successfully contribute to household incomes. Therefore, highly organized and result driven interventions can help emancipate PWD communities in Kakamega County. Whereas there is an attempt to assist, the available support programmes are inaccessible to majority of the needy PWD households. As a result, the PWDs cannot relate with how such programmes contribute to their wellbeing. This then calls for an expansion of the support scope within Kakamega County to target as many vulnerable PWDs as possible in order to develop independence and empowerment of PWD. In conclusion, in order to improve the household welfare, the economic costs of assistive devices should be lowered. Household welfare for PWDs can also be improved when PWD members acquire education and training skills because this promotes their empowerment and independence.

5.2 Recommendations

The biggest challenge of PWDs in Kakamega County Kenya was high costs of assistive devices occasioned by limited inclusion in education and training. Therefore, this study recommends that the national and county governments, in collaboration with development partners, subsidize the cost of assistive devices or provide them at no cost to low-income households

Additionally, establishing community-based assistive technology programs could enhance access and reduce transportation or logistical costs, further easing the economic burden on affected households. Finally, it is recommended that more assistance or support to PWDs should also target their caregivers, aides and further cover

aspects such as maintenance to ease the burden encountered by persons with disabilities especially in accessing assistive devices.

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