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Assessing the Accessibility, Affordability, and Acceptability as Barriers to Spectacle Use in Kakamega Municipality, Kenya

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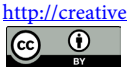

Abstract

Background information: Refractive errors and presbyopia remain a burden to the entire population. An estimated 76% of the 191 million blind people have preventable or treatable causes. Uncorrected Refractive Error (URE), the number one cause (51%) of moderate and severe vision impairment, is easily preventable. **Aim:** The study aims to evaluate the accessibility, affordability, and acceptability of spectacles in Kakamega Municipality through a questionnaire. **Methodology:** A population-based descriptive cross-sectional study was undertaken in Kakamega municipality using a cluster sampling method and descriptive data analysis. **Results:** Out of 358 participants, 199 (55.6%) were male and 159 (44.4%) were female. The analysis shows affordability (18.3%) as the main reason for not using spectacles, followed by lack of quality care (3.4%), access to eye care (3.4%), awareness (2.5%), unpleasant past experiences (2.2%), importance not given to eye care issues (1.6%), lack of communication (0.9%), and disapproval from family members (0.9%). The study found that the affordable price range for spectacles varies between Kshs.5000. More participants (38.0%) reported above Kshs.5000, while 29% indicated less Kshs.2000. The study found that affordability ($p = 0.000$), availability ($p = 0.004$), and accessibility ($p = 0.005$) of refractive services significantly influenced the uptake of these services. **Conclusion:** The study reveals that refractive services in Kakamega municipality are not easily accessible due to the lack of adequate services in government hospitals. Additionally, patients in the municipality struggle to afford spectacles due to the direct cost of spectacles and the lack of services in easily accessible public facilities.

Keywords

Barriers, Accessibility, Affordability, Availability, Spectacles

1. Introduction

Background and Rationale

Uncorrected refractive errors are a significant cause of vision impairment and blindness, with the global average being 43% [1]. In 2010, refractive errors were the second leading cause of blindness after cataracts [2]. The challenge lies in correcting these errors globally, particularly in Africa, where vision impairment is higher in developing countries like Kenya [1]. India and China account for approximately 50% of global vision impairment and blindness due to uncorrected refractive errors [3] [4]. The annual global economic burden attributed to distance vision impairment due to uncorrected refractive errors is estimated at $220 billion, while the cost of training manpower and establishing service delivery facilities is only $28 billion [5] [6].

Accessibility and affordability are key factors affecting the uptake of refractive services. A study done in Kenya, Nairobi County cited accessibility and affordability of eye health services as the major reasons for high school students not correcting their poor vision [7]. In a neighboring country, Uganda, accessibility to services and affordability of spectacles were major barriers to correction of presbyopia and refractive errors [8]. Some health facilities are located far from where people reside and this poses as a challenge for people to access services that are basic to their lives. People will need to travel to these health facilities thus incurring an indirect transportation cost which increases the overall expense of accessing the services. For some low income patients it would be difficult to afford the services. The conditions of the roads may also hinder people from accessing facilities. In some areas, the road infrastructure is poor and still under development. This forces residents to use a circuitous route even though in terms of direct distance measures from health facilities to places of residence are not as great. Community based interventions should be put in place to solve the issue of accessibility to services. For example refractive services can be integrated into already existing community health facilities. This can make the services accessible to the people and therefore solve the issue of poor accessibility to refractive services [9].

Universal eye health is needed to provide 100% universal access to healthcare, which can be achieved by increasing coverage of services [10]. Addressing uncorrected refractive errors requires human resource development, service delivery, social enterprise, infrastructure, and supplies [11]. In Africa, there is an unequal provision of refractive training, which poses a challenge to maintaining uniformity in service quality. Integrating refraction services into existing healthcare systems is also necessary [6] [12]. In Kenya, there is a limited number of eye care workers and inadequate human resource capacity in government institutions, however, patients seek care at these government institutions because they cannot afford private services [13].

2. Research Methods

This study used a population-based descriptive cross-sectional design to investi-

gate refractive errors and presbyopia in a population aged 18 - 60 years in Kakamega town. The study used cluster sampling to select households in four administrative sub-locations, with subjects aged 18 - 60 years. Subjects between the ages of 18 to 60 years with vision below 6/12 which improved with pinhole were included in this research. Subjects below the age of 18 years and those above 60 years were excluded. Also, those with visual acuity below 6/12 who had no improvement with pinhole were excluded from this research. The sample size was 384 people, selected based on Krejcie and Morgan's table [14]. A questionnaire (See **Appendix**) was used to interview participants with refractive errors and presbyopia identified through visual acuity testing. A questionnaire was used as part of the material used in a situational analysis of refractive services in Pakistan [15]. The owners did not restrict the use of this questionnaire. This questionnaire underwent a pilot study in a smaller location for the purpose of validation. Visual acuity charts, log MAR for distant and the N notation for near were used. Subjects were probed about their gender, age, tribe, occupation, and residence. Visual acuity monoculars for distance (using Log MAR) and binocular for near (using the N notation) were taken. The visual acuity testing was used as a guide to select participants as indicated in the inclusion criteria. The questionnaires were used to interview participants with refractive error (those with visual acuity below 6/12 in either eye but improved with the pin-hole test) and presbyopia (those above 40 years of age) that were identified through the visual acuity testing.

Data was analyzed using SPSS version 26, with frequencies and chi-square computed. The research was approved by the Kenyan ethical clearance committee and presented to the local government administration. The study followed procedures to ensure ethical clearance and data collection.

3. Results

3.1. Spectacle Coverage among Participants in Kakamega Municipality

The study found that 55.4%) of participants used spectacles for near reading, while 34.5% used them for far distance vision correction. Other reasons included general near vision (2.4%), light sensitivity (2.4%), and cosmetic reasons (0.4%). 109 participants did not provide reasons (Shown in **Table 1**).

3.2. Perspectives of Affordability, Accessibility and Availability of Refractive Services in Kakamega Municipality

3.2.1. Reasons for Not Using Spectacles

The analysis shows affordability (18.3%) as the main reason for not using spectacles, followed by lack of quality care (3.4%), access to eye care (3.4%), awareness (2.5%), unpleasant past experiences (2.2%), importance not given to eye care issues (1.6%), lack of communication (0.9%), and disapproval from family members (0.9%) shown in **Table 2**.

Table 1. Participants stating reasons for spectacle use.

Responses	f	Rel. f	Cf	Percentile
Cosmetic	1	0.003	358	100.00
For near vision	6	0.017	357	99.72
For near reading	138	0.385	351	98.04
For far distance	86	0.240	213	59.50
Others	8	0.022	127	35.47
Don't know	4	0.011	119	33.24
Light sensitivity	6	0.017	115	32.12
Did not respond to this question	109	0.304	109	30.45

Table 2. Participants stating reasons for not using spectacles.

Responses	f	Rel. f	cf	Percentile
No reason	203	0.567	358	100.00
Affordability	59	0.165	155	43.30
Lack of quality care	11	0.031	96	26.82
Lack of access to eye care services	11	0.031	85	23.74
Lack of communication with others regarding health issues	3	0.008	74	20.67
Family disapproval or pressure	3	0.008	71	19.83
Importance not given to eye care issues	5	0.014	68	18.99
Unpleasant experience	7	0.020	63	17.60
Shyness	2	0.006	56	15.64
Don't know	7	0.020	54	15.08
Others	1	0.003	47	13.13
Lack of awareness	8	0.022	46	12.85
Problem was corrected	1	0.003	38	10.61
Refusal to use	1	0.003	37	10.34
Did not respond to this question	36	0.101	36	10.06

3.2.2. Affordable Price Range for Spectacles in Kakamega Municipality

The study found that the affordable price range for spectacles varies between Kshs.5000 and less than Kshs.2000. More participants (38.0%) reported above Kshs.5000, while 29% indicated less Kshs.2000. This difference may be due to the main types of spectacles worn: near vision and distance vision. Reading spectacles are cheaper than distance vision correction spectacles. The types of spectacles were not investigated (See Figure 1).

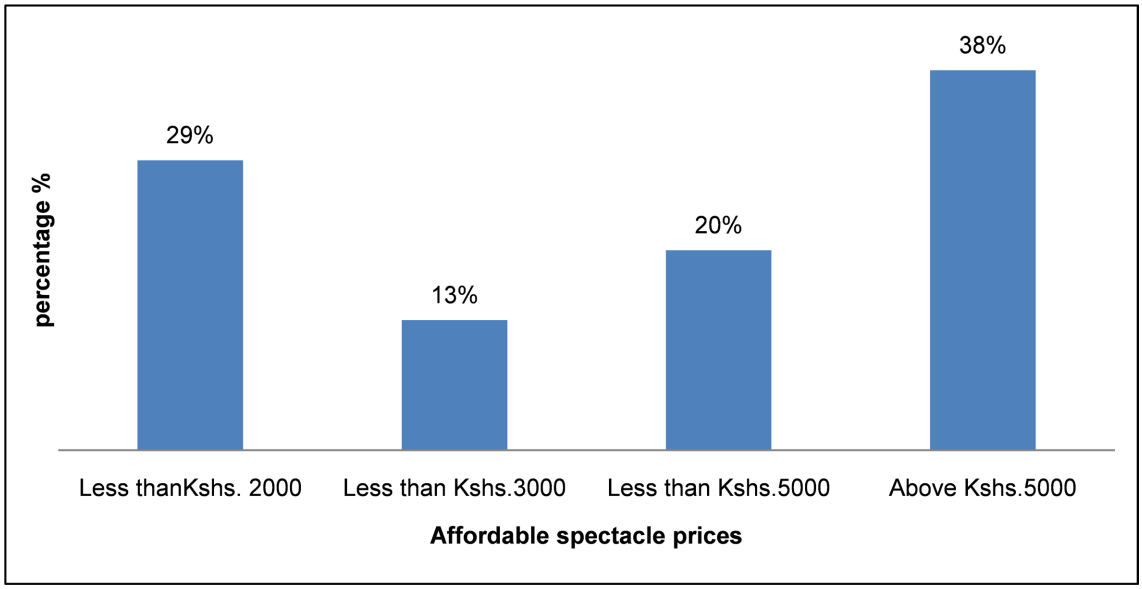

Figure 1. Participant perception regarding an affordable price for spectacles.

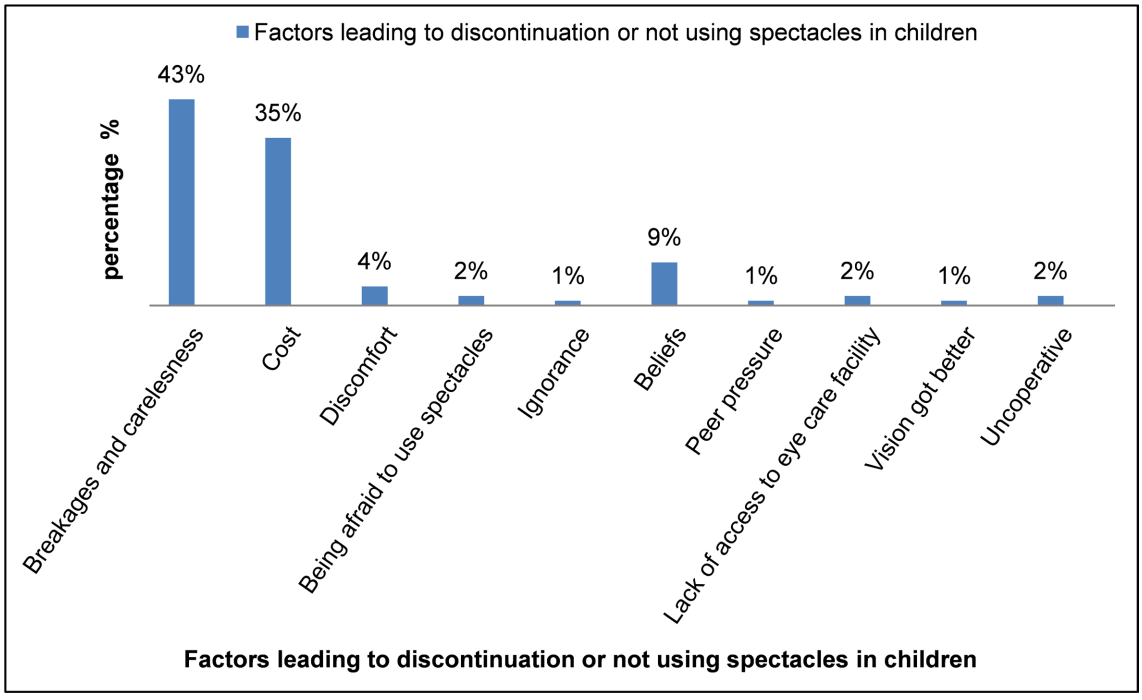

Figure 2. Reasons for not using/discontinuation of wearing spectacles in children.

3.2.3. Factors for Not Using/Discontinuation of Wearing Spectacles in Children

The study reveals that 42.9% of children discontinue spectacle use due to breakage and carelessness, followed by the cost (35.4%). Other reasons include discomfort (4.2%), beliefs (9.1%), lack of access to eye facilities (2.3%), fear of use (1.6%), ignorance (1.3%), peer pressure (1.0%), and a 0.3% report that their vision improved, indicating that spectacles may no longer be necessary (See Figure 2).

3.3. A Chi-Square Analysis Was Conducted to Assess the Affordability, Availability, and Accessibility of Refractive Services in Kakamega Municipality

The study found that affordability, availability, and accessibility of refractive services significantly influenced the uptake of these services, rejecting the null hypothesis (shown in Table 3 below)

Table 3. Chi-square analysis was done on affordability, availability and accessibility of refractive services in Kakamega municipality.

Variables	Coefficient value	P-value
Affordability of refractive services	0.233	0.000
Availability of refractive services	0.173	0.004
Accessibility of refractive services	0.189	0.005

4. Discussions

The low uptake of refractive services in Kenya is attributed to affordability and perception towards spectacle-wearing. Near reading glasses are cheap and readily available, leading many participants to use them. Presbyopia is the most highly corrected refractive error, and addressing barriers to refractive errors will result in good coverage of spectacles. Affordable prices for spectacles and integrated knowledge about eye care within the health system and through community engagement could be solutions to these barriers [16].

The majority of the sample population seeks health services from government hospitals, with private hospitals/clinics being second. Government hospitals or health centers in Kenya do not include eye units as part of their services, and those with eye units are not well equipped to provide optical services. This hinders the uptake of refractive services in the Kakamega Municipality. Many members of the community resort to seeking eye care at private optical shops, which are often more expensive and sometimes unaffordable [17].

A developed economy approach to deliver refractive and eye services, such as those in Europe, South Africa, Australia, New Zealand, and North America, can greatly improve the uptake of refractive services within the country. The affordability of refractive services is significantly associated ($p = 0.000$) with the use of spectacles, with the cheapest spectacles being Kshs.5000 [16]. To tackle this chal-

lenge, the government should equip public hospitals to provide optical services at a lower rate, and bulk purchase of frames and lenses at reduced prices will help decrease prices and reduce the burden of avoidable blindness and poor vision [16]. Additionally, availability and accessibility of refractive services are significantly associated ($p = 0.004$ and $p = 0.005$ respectively) with low uptake, as most participants receive eye services from government hospitals, making accessibility and availability a barrier to the same services.

5. Conclusion

The study reveals that refractive services in Kakamega municipality are not easily accessible due to the lack of adequate services in government hospitals. Additionally, patients in the municipality struggle to afford spectacles due to the direct cost of spectacles and the lack of services in easily accessible public facilities.

6. Study Limitations

The study aimed to interview 371 participants, but only 358 were interviewed. This can be attributed to locked houses during the interview period, also some of the family members were not available, possibly due to the study being conducted during working days and most people were at their workplaces.

7. Recommendations

The ministry of public health can use the findings of this research to advocate for the integration of refractive services into community health facilities, ensuring they are adequately staffed and equipped to meet the needs of patients. This will help solve accessibility as barrier to spectacle use in the country.

They should also consider including refractive services in the national health insurance fund for all citizens, regardless of employment status, this will make the spectacles affordable to patients.

Bulk purchases of consumables like spectacle frames and lenses can help reduce costs and address affordability barriers.

Health care providers should provide accurate information about refractive services to patients, addressing misconceptions and misconceptions.

Definition of Terms

A Refractive error: occurs when the image is not focused on the retina [18].

A Barrier: is something or reason that makes someone not use or access something [16].

Visual impairment: is when someone has unaided visual acuity less than 6/12 in a better eye [16].

Uncorrected refractive error: is when a person has visual acuity of less than 6/12 but improves to 6/12 or more on the use of a pinhole [3] [16].

Presbyopia: it is when a person has a near vision of less than N8 with both eyes

open at a normal working distance in an individual that is above 35 years [3].

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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List of Abbreviations

URE: Uncorrected refractive errors.

VI: Visual impairment.

WHO: World health organization.

RE: Refractive error.

Appendix

BARRIERS TO REFRACTIVE SERVICES QUESTIONNAIRE
ASSESSMENT QUESTIONNAIRE
SERIAL NO. DATE OF INTERVIEW:
CITY/TOWN/VILLAGE:
RESPONDENT'S PROFILE

1) Sex: ☐ ☐ Male ☐ Female

2) Age

☐ 18 20 years
☐ 21 30 years
☐ 31 40 years
☐ 41 50 years
☐ 51 60 years

3) Profession:

_____

4) Marital Status:

☐ Married
☐ SUnmarried
☐ Engaged
☐ Others (specify)

5) How many children:

☐ None
☐ 1
☐ 2
☐ 3 or more

6) Educational Level:

_____

7) What is the occupation of the head of the household?

_____

8) What is the total number of people residing in your home?

_____

9) Who makes the major decisions in your household?

_____

10) Who do you mostly discuss your personal health related matters with in your family?

_____

11) What basic information do you have about eye care?

_____

12) Would you prefer to have such information in a group or individually?

_____

13) How far is the nearest health facility from your neighborhood?

Kakamega County Hospital ☐
Private clinic or hospital ☐

Ophthalmologist ☐
Optical Shops ☐

14) What kind of health facility do you usually go to?

Government ☐
Private ☐
Others ☐

15) When do you go to see a health care provider?

Regular checkup ☐
In case of sickness ☐
Emergency ☐
Others ☐

16) Does the gender of the care provider make a difference to you?

_____

17) Do you use spectacles?

_____

18) Why do you use spectacles?

_____

19) What are the main reasons for not using or discontinuation of wearing spectacles?

☐ None
☐ Affordability
☐ Lack of quality of care
☐ Lack of access to eye care facilities
☐ Lack of communication with others regarding health issues
☐ Family disapproval or pressure
☐ Importance not given to eye care issues
☐ Unpleasant past experience
☐ Shyness
☐ Lack of awareness
☐ Lack of decision making power at home
☐ Don't know
☐ Others (specify)

Social and Cultural Hindrances

20) How did you come to know about your refractive error?

☐ Eye camp ☐ Doctor ☐ Optician ☐ Others

21) Perception of people about wearing spectacles:

☐ Positive ☐ Negative ☐ Unchanged

22) Gender issues:

☐ Yes ☐ No ☐ Don't know

23) Community perception about female using spectacles:

☐ Positive ☐ Negative ☐ Unchanged

24) What are the myths associated with the use of spectacles?

_____

25) Does use of spectacles affect your appearance?

☐ Positive ☐ Negative ☐ Unchanged

26) Does the use of spectacles affect matrimonial life?

☐ Positive ☐ Negative ☐ Unchanged

27) Does use of spectacles hinder in getting good employment opportunities?

☐ Positive ☐ Negative ☐ Unchanged

28) Does use of spectacles affect your sports and recreation activities?

☐ Yes ☐ No ☐ Don't know

29) Are you satisfied and comfortable in using spectacles?

☐ Yes ☐ No ☐ Don't know

30) If not, what are the reasons?

☐ Cost

☐ Appearance (spectacles frames/design)

☐ Make (local/imported)

31) Do you think that a person using spectacles are clever?

☐ Yes ☐ No ☐ Don't know

32) Does use of spectacles hinder your routine work?

☐ Yes ☐ No ☐ Don't know

33) How often do you change your spectacles?

☐ Once a year

☐ After two years

☐ Others

34) What are the causes of changing the spectacles?

☐ Broken

☐ Change of style

☐ Change of number

☐ Others

35) Does the use of spectacles enhance your personality?

☐ Yes ☐ No ☐ Don't know

36) What is the attitude of your family towards persons using spectacles?

☐ Positive ☐ Negative ☐ Unchanged

37) What is the attitude of friends/colleagues towards persons using spectacles?

☐ Positive ☐ Negative ☐ Unchanged

38) What is the attitude of the community towards persons using spectacles?

☐ Positive ☐ Negative ☐ Unchanged

39) Do you think that use of spectacles protects your eyesight number?

☐ Positive ☐ Negative ☐ Unchanged

40) What type of frames do you prefer?

☐ Metal

☐ Plastic

☐ Others

41) What is the community perception about children wearing spectacles?

_____

42) How are these children identified?

☐ Home ☐ School screening/Teacher ☐ Friends

43) What is the peer reaction towards the children wearing spectacles?

☐ Positive ☐ Negative ☐ Normal

44) What type of frames do children like to use?

☐ Plastic

☐ Metal

☐ Others

45) What shape and design do children prefer?

_____

46) Are these frames easily available in the locality?

_____

47) How does the family react when they come to know about a child's refractive error?

☐ Positive ☐ Negative ☐ Normal

48) What are the main reasons for not using or discontinuation of wearing spectacles in children?

_____

49) What is the attitude of the clinical service provider?

☐ Positive ☐ Negative ☐ Normal

50) What is the attitude of the optical service provider?

☐ Positive ☐ Negative ☐ Normal

51) How long does it take when you go for refraction/spectacle check?

_____

52) Are the services available at an affordable cost?

☐ Yes ☐ No

53) What can be the affordable price range for the spectacles?

☐ Less than Kshs. 2000.00

☐ Less than Kshs. 3000.00

☐ Less than Kshs. 5000.00

☐ Kshs. 5000.00 and above

54) How can we increase the use of spectacles? Do you have any suggestions for the improvement of the eye care facility?

_____