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Original Research Article

Factors influencing availability of tracer essential medicines in selected health facilities in Nyeri County, Kenya

Minai Samuel Munga[1]*, Tabither Muthoni Gitau[1], Lawrence Mirie Kimani[2], Peterson Kariuki[1], Enoch Ng'etich[1]

[1]School of Public Health, Mount Kenya University, Thika, Kenya
[2]Department of Clinical Pharmacy, United States International University, Nairobi, Kenya

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***Correspondence:**
Dr. Minai Samuel Munga,
E-mail: minaisamuelmunga@gmail.com

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ABSTRACT

Background: Tracer essential medicines are drugs which fully fulfil a population's health requirements and ought to be always available allowing for a properly functioning health system all the time. They should be available in the appropriate dosage, adequate amounts and at assured quality at a price that many people and the community can easily afford.
Methods: Analytical cross-sectional study design was used. This study utilized a mixed method approach (qualitative, observation and quantitative).
Results: The study found out that artemether lumefantrine was the least available drug at 50% in all the sampled facilities with KEMSA cited as the main supplier of tracer essential medicines in these facilities. Policy formulation was done without any involvement of pharmacy in-charges and policies passed at the county management team merely passed onto the staff at the health facilities without their engagement.
Conclusions: With the roll out of UHC program, majority of the participants indicated an increase in the availability of essential drugs in Nyeri County hence the government should roll out the program countrywide. Health management and leadership teams in the county needs to engage the pharmacy in-charges during policy making and changes, provide efficient communication in the supply chain system, including proper inventory management systems and to enhance research of drugs and emerging diseases in the county.

Keywords: Analytical cross-sectional, Nyeri County, Policy formulation, Tracer medicines

INTRODUCTION

Tracer medicines are drugs which fully fulfil a population's health requirements and ought to be always available allowing for a properly functioning health system all the time. They are chosen with a regard to evidence of efficacy, safety, cost effectiveness and public health relevance. These tracer essential medicines have to be regularly procured to avoid regular stock-outs.[1]

The availableness of tracer essential medicines in both private and the public sectors in some central African countries with findings from analysis of 10 tracer essential medicines indicated poor availability in the different health system levels both in private and public health sectors.[2] As a result, a project named supply chains for community case management was designed to pinpoint factors in the supply chain which influence availability of medicine in sub-Saharan Africa.

According to a report done in Uganda which portrayed the public health system as unreliable, it was established that private pharmacies took this advantage in selling tracer essential medicines to the general public. Some of the existing gaps highlighted in the study were

procurement issues, weak regulatory enforcements and frequent stock-outs.[3]

Due to the large number of public health facilities in Kenya, sufficient and adequate supply of tracer essential medicines to these facilities has not been met.[4] Nyeri is one of the four pilot counties under Universal Health Coverage scheme which is part of the Big Four Agenda of the Kenya government. It is one of the counties with the high prevalence of non-communicable diseases in Kenya at 26%.[5] According to NCDs account for 27% of deaths in Kenya equivalent to 100,000 people per year. Over 55% result in hospital deaths.[6]

The frequent shortage of many tracer vital medicines experienced in many public care centers leave patients with little option than seek the essential medicines and services in private health facilities and pharmacies where the cost is very high.[7]

Problem statement

Lack of crucial tracer medicines in many health facilities in Kenya greatly increases the mortality rates. The overall child mortality rate in Kenya is 121/1000 and majority of this is attributed to the lack of essential medicines in many health facilities.[8]

The state agency mandated by the Kenya government to procure and supply medicines to public health facilities is KEMSA. It has nine regional warehouses across the country with one being located in Nyeri County. The pharmacy in-charge in each health facility places an order through KEMSA online portal on a quarterly basis. This new ordering system from the older manual ordering process has fastened the delivery of tracer essential medicines to many health facilities. However, adequate supply of required medicines in these facilities has not been met with KEMSA facing problems of political interference, lack of autonomy and inadequate funding. KEMSA has a requisite transport system which ensures dispatch and delivery of the ordered medicines to the public health facilities. Another agency which supplies essential medicine to public health facilities as well as faith-based organizations is MEDS which is a Christian non-profit organization based in Nairobi (KHSSP 2013-2017).

Despite the renewed government's effort to improve the Universal Health Coverage (UHC) in Kenya which would in turn improve tracer essential medicines' availability in many public facilities, little assessment has been evaluated by the government or scholars to establish the challenges hindering availability of tracer essential medicines for quality health care service delivery in Nyeri County. Therefore, this study intended to bridge the knowledge gap by assessing the availability of tracer essential medicines and assessing the commodity management of these drugs in community care centers located within Nyeri County.

Significance of the study

The study will be relevant because it will increase to the body of knowledge about factors that influence access to tracer vital medicines in selected public facilities in Nyeri County. Information obtained from the results of the study will be shared with the Nyeri County health system managers and it will form a basis for them to understand the factors affecting the tracer crucial medicines' availability in the county for future planning on the needs and expectations of various public health facilities. This information could be shared with UHC implementation team at the national level for adoption of the applicable policies during the roll out of the UHC program nationally.

METHODS

Study design

An analytical cross-sectional study design was used. This study involved a mixed method approach (qualitative, observation and quantitative). Qualitative data collection entailed conducting key informant interviews with the pharmacy in-charges who have particularly informed perspectives and first-hand knowledge about the available tracer essential medicines in their facilities and the factors that could influence availability of these tracer essential medicines. Quantitative data collection involved administration of survey questionnaire to the pharmacy personnel. An observational checklist was used during the study to confirm the available tracer essential medicines in selected facilities.

Target population

All pharmacy in-charges and pharmacy staffs in all the selected facilities of each of the eight sub-counties in Nyeri County were targeted. The study targeted 93 pharmacy staffs in the selected health facilities in Nyeri County.

Sample size

The largest facilities in each level (level one to level five) of every sub-county in Nyeri County were sampled as these were the main points of call for the sick in each sub-county and had an operational pharmacy. Pharmacy in-charges and pharmacy staffs in selected facilities in each of the eight sub counties in Nyeri County were targeted. Pharmacy staffs across all selected facilities were sampled as the sample size since they number was limited, hence a sample size of 93 respondents.

Sampling technique

Purposive sampling was used since these were the people with first-hand knowledge about the available tracer essential medicines in their facilities and factors that influenced the availability of these tracer essential

medicines. Nyeri County is divided into eight sub-counties and data was collected in all the sub-counties. The selected facilities in the county were divided into level one to level five facilities using purposive sampling to make data collection more manageable and make the sampling process more practical. Purposive sampling was then used to select the largest facility in each level (level one to level five) facilities of every sub county in Nyeri County as these were the main points of call for the sick in each sub-county and had an operational pharmacy. All staffs handling the pharmacy in each selected facility were sampled.

Reliability test

The Cronbach's alpha coefficient was used to assess the reliability of instruments for internal consistency. Once the individual responses were entered into statistical software (SPSS version 20), the Cronbach's alpha coefficient was calculated for all the items. A coefficient greater than 0.7 was acceptable but a coefficient below 0.7 was not tolerable for the data collection instruments, and this study adopted a Cronbach alpha of 0.75.

RESULTS

Objective one

Table 1 shows bivariate analysis carried out to check whether there exists any statistically significant association between respondent's socio-demographic characteristics and the availability of tracer essential medicines. Designation (p=0.001) and academic qualification (p=0.002) were shown to be statistically significant with the availability of tracer essential medicines.

Table 1: Bivariate analysis.

	Availability index			
	N (%)	N (%)		P value
Age of respondents (yrs)	**Adequate**	**Inadequate**		
<30	20 (64.5)	11 (35.5)	1.813 (3)	0.612
31-40	16 (61.5)	10 (38.5)		
41-50	8 (50)	8 (50)		
>51	1 (33.3)	2 (66.7)		
Designation	**Availability index**			
	Adequate	**Inadequate**		
Pharmacist	16 (100)	0 (0)	24.15 (4)	0.001
Pharm. tech	15 (68.2)	7 (31.8)		
Nurse	6 (25)	18 (75)		
Clinical officer	5 (50)	5 (50)		
Other	3 (75)	1 (25)		
Academic qualification	**Availability index**			
	Adequate	**Inadequate**		
Postgraduate	5 (100)	0 (0)	17.02 (4)	0.002
Degree	12 (100)	0 (0)		
Higher diploma	0 (0)	2 (100)		
Diploma	26 (49.1)	27 (50.9)		
Other	2 (66.7)	1 (33.3)		

Table 2: Availability of tracer essential medicines in the selected health facilities sampled.

No.	List of essential medicines	N	Percent of cases
1	Amoxicillin 250 mg capsule/tablet	93	100.00
2	Amoxicillin 125 mg/5 ml for oral liquid	88	94.60
3	Paracetamol 500mg tablet	93	100.00
4	Cotrimoxazole 480 mg tablet	91	97.80
5	Artemether lumefantrine 20/120 mg tablet	47	50.50
6	Benzyl penicillin 600 mg (1 MU) OR 3 gm (5 MU) vial	91	97.80
7	Epinephrine (Adrenaline^ 1 mg/ml (as HC1 or hydrogen tartrate) Injection	81	87.10
8	Oral Rehydration Solution (ORS) (low osmolality); WHO formula (in sachet for 500 ml)	93	100.00
9	Oxytocin injection 10 ILI/ml in 1 ml ampoule	60	64.50
10	Retinol (Vitamin A) (as palmitate) capsules	90	96.80

Continued.

No.	List of essential medicines	N	Percent of cases
11	Water for injection 10 ml ampoule	93	100.00
12	Glucose injectable solution; hypertonic (10% OR 50%)	82	88.20
13	Syringe disposable 5 cc with needle 21 G sterile	93	100.00
14	Cotton wool, absorbent, 400 mg BP, white	93	100.00
15	Surgical gloves, size 7.5", Latex Sterile medium	85	91.40
16	Cotton, gauze plain 36" × 100 yds, 1500 gms BP weight white color, loosely woven and absorbent	93	100.00
17	Sodium hypochlorite 4-6% external solution	91	97.80
18	Chlorhexidine gluconate 5% solution or 7.1% gel	60	64.50
19	Tetanus toxoid vaccine; >40 IU/0.5 ml in 10-dose vial	93	100.00
20	Measles vaccine; live-attenuated, freeze-dried 10 × 0.5 ml dose vial	93	100.00

In agreement with the quantitative findings, qualitative findings also showed that artemether lumefantrine (AL) was the least available drug at 50%. Key informant interview respondents also acknowledged that AL was the least available essential medicine as the study area has a low prevalence of malaria hence the least stocked drug. Drawing rights was mentioned by a key informant as a factor to the availability of essential medicines. Many staff in the different health facilities complained of having a small drawing right hence so little to order and this could not sustain the needed orders due to the large numbers of patients visiting health facilities. *"There are several essential medicines that we don't have. Availability becomes a challenge because of the drawing rights we are given to run us for 3 months and the amount we are supposed to budget for is less"* KII with a clinician at Ngorano Health Centre (Table 2).

Objective two: human resource factors that influence availability of tracer essential medicines

Inadequate human resource was highlighted as a challenge among health-care workers given the workload. This was evident in almost all the facilities visited and especially with the influx of patients after UHC program was rolled out in the county. This had resulted in staff working fewer hours than recommended in their facilities to avoid burn outs and staff not going for their annual leaves. *"Human resource is inadequate, we can't be able to run for 24 hours, we need staff to work at night, go for offs and leave but this is not possible so the number should be increased to about 10 we have few pharmacists and two pharmaceutical technologists"*- respondent Othaya Sub County (Table 3).

Table 3: Staff trained on commodity management.

Trained on commodity management	Frequency	Percent
Yes	58	62.4
No	35	37.6
Total	93	100.0

As illustrated from Table 3, every 6 out of 10 respondents (62.4%) in the survey had received training in pharmaceutical commodity management while 37.6% had not.

Table 4: Respondents who had attended a short course on commodity management.

Attended short course on commodity management	Frequency	Percent
1-3 times	68	73.1
4-6 times	25	26.9
Total	93	100.0

From the data in Table 4, majority of the respondents (73.1%) had attended a short course on commodity management for not more than 3 times throughout their practice. Some respondents alluded that they had attended training on other areas but not commodity management while others had received training though not facilitated by the county or national government but by other private agencies. "*We have gone for different trainings, like last week we had a training on non-communicable diseases and one of the staffs went. Last month, we had a malaria training. The whole of last week was another training but none on commodity management*" KII with a pharmaceutical technologist in Wamagana Health center, Tetu sub-county.

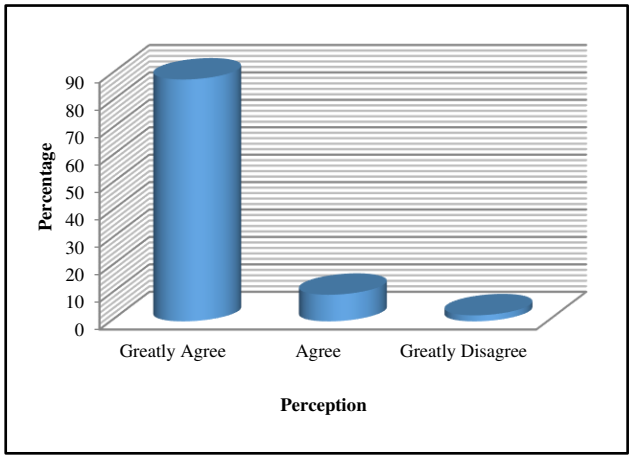


Figure 1: Need for health commodities management training in a health facility.

Most of the respondents agreed that there was a need for commodity management training in a health facility. Only a few respondents greatly disagreed. Various key informants in the study had varied opinions on commodity training. For instance, a key informant at sub-county health facility attested that the majority of trainings done were disease- specific such as either malaria or HIV but not on essential medicines in particular. *"There is one that was done for pharmacy malaria treatment. The new guidelines for malaria treatment I can't remember when exactly when, but it was this year"*- Pharmacist- Othaya Sub-county hospital (Figure 1).

Table 5: Commodity management ensures efficient storage and distribution of essential medicines.

	Frequency	Percent
Greatly agree	67	72.0
Agree	24	25.8
Greatly disagree	2	2.2
Total	93	100.0

About three quarter of the participants in the survey agreed that commodity management ensures efficient storage and distribution of essential medicines while only 2.2% did not agree with this (Table 5).

Table 6: Perceptions on commodity management training and availability of tracer essential medicines.

Crosstab				
		Availability index		OR (95% CI), P value
		Adequate	Inadequate	
		N (%)	N (%)	
There is need for health commodity management training in a health facility	Greatly agree	41 (57.7)	30 (42.3)	1.165 (2) 0.559
	Agree	3 (75)	1 (25)	
	Greatly disagree	1 (100)	0 (0)	
		100.0%	0 (0)	
Commodity management training improves quality of healthcare services	Greatly agree	39 (58.2)	28 (41.8)	0.753 (2) 0.686
	Agree	5 (62.5)	3 (37.5)	
	Greatly disagree	1 (100)	0 (0)	
		100.0%	0.0%	
Commodity management training ensures availability of essential medicines	Greatly agree	33 (61.1)	21 (38.9)	2.42 (4) 0.659
	Agree	9 (56.3)	7 (43.8)	
	Neutral	2 (50)	2 (50)	
	Disagree	0 (0)	1 (100)	
	Greatly disagree	1 (100)	0 (0)	
		100.0%	0.0%	
Commodity management training ensures efficient storage and distribution of essential medicines	Greatly agree	33 (63.5)	19 (36.5)	2.32 (2) 0.315
	Agree	11 (47.8)	12 (52.2)	
	Greatly disagree	1 (100)	0 (0)	
		100.0%	0.0%	
Commodity management training ensures rational use of essential drugs	Greatly agree	30 (52.6)	27 (47.4)	4.74 (3) 0.192
	Agree	12 (75)	4 (25)	
	Neutral	2 (100)	0 (0)	
	Greatly disagree	1 (100)	0 (0)	
		100.0%	0.0%	

Based on the Likert scale responses, more than half of the respondents (57.7%) acknowledged the need for commodity management training in a health facility. A higher proportion of the respondents (58.2%) were in agreement that commodity management training improves the quality of healthcare services. Furthermore, the majority (5 out of 10) admitted that commodity management training ensures availability of essential medicines with 63.5% of respondents attributing commodity management training to ensuring efficient storage and distribution of essential medicines. About half of the respondents in the study concurred that commodity management training ensures rational drug use of tracer essential medicines (Table 6).

Objective three: health financing factors influencing availability of essential medicines

60% of the respondents in the survey had information about the amount of budget allocation while 39.8% of the respondents had no information about the amount of budget allocated to their facilities. *"We were allocated*

K.sh 700,000 in the last quarter which is about 25-30% of the budget which I can say it is insufficient" KII with a nurse Karima dispensary (Figure 2).

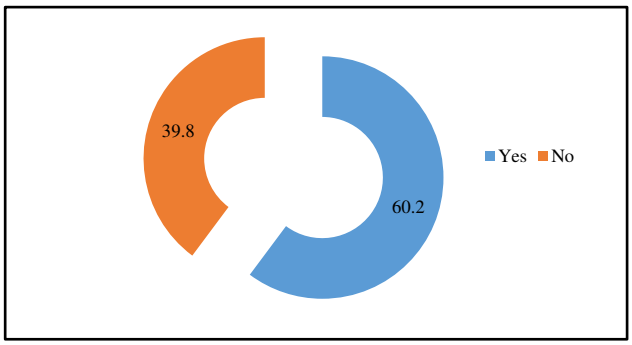


Figure 2: Information on budgetary allocation for essential medicines in your facility.

Bivariate analysis was done to check if there exists any statistically significance between budgetary allocation and availability of tracer essential medicines. Budgetary allocation (p value=0.285) was not statistically significant with availability of tracer essential medicines (Table 7).

Table 7: Association between health care financing and availability of tracer essential medicines.

Budgetary allocation	Availability index			P value
	Adequate	Inadequate		
Yes	25 (54.3)	21 (45.7)	1.145 (1)	0.285
No	20 (66.7)	10 (33.3)		

Objective 4: perceptions on leadership and management factors that influence availability of tracer essential medicines

Devolution

A key informant in this survey alluded that through devolution, there has been improvement in the supply of essential drugs at health facilities

"Since devolution, there is timely drug delivery and also patients are more satisfied because more drugs are supplied so they get drugs prescribed in the hospital. Supplies are received at 70% of the prescriptions we see. We have sufficient stock commodities unlike before devolution. After devolution, health care has become closer to citizens and more drugs are delivered to hospital as before devolution" KII with a nurse in Witima health center, Othaya sub-county.

Policies governing drug supply

With regards to policies on commodity supply, some of respondents were unaware of policy documents guiding the essential drug commodities at the county and national level and even if present, there were no written documents to guide on the existing policies.

A respondent indicated that in-charges were not involved during policy making regarding drugs and commodity management at the county level. The policies were formulated at the county level and passed onto the staff at the facilities to be followed.

Transport

Transport was a significant factor in determining whether a health facility had a certain drug in stock or not. This was evidenced by the varying responses from the respondents. A key informant in one of the health facilities mentioned that management of transport logistics for drugs from the county store to the facilities was a big problem.

Communication and planning

Communication breakdown in the supply system was cited as a barrier towards having adequate stocks in the pharmacy. This communication breakdown led to staff placing orders to KEMSA with no idea of certain out of stock drugs with the supplier and only realized this upon drug delivery. This resulted in order fill rate reduction and consequently lowering availability of certain tracer essential medicines in health facilities.

Supervision visits

Health management team from the county and sub-county normally involved in supervision visits sometimes took long before visiting health facilities to check on the health delivery services. With few supervision visits, challenges including improper inventory management, inaccurate drug data collection due to technological problems (lack of an electronic inventory system) were not acted upon. This led to many human errors involved during drug ordering which in turn resulted in frequent stock outs and expiries.

Technology

Most health facilities visited during the survey were using manual methods of quantification, drug ordering, and data collection. Respondents urged the management to try and embrace technology and consider a proper data collection mechanism per facility to help establish the actual needs.

Research

Some respondent urged the health management team to enhance research within the county to cover even rare diseases which may arise from time to time. There was a case at a facility in Mukurweini sub-county and the respondent had this to say

"Here we have a new disease, it's called 'myiasis' whereby people come with live maggots buried in their skins. It starts like a painful boil and when you press to try and evacuate it, what emerges is a live maggot. It's affecting even babies and one can even have like ten. The cases are common during rainy seasons and we have reported. More research should be done on this and we are also advising residents on proper hygiene" KII with a clinician at Karaba health center.

Standard operating procedures

Regarding having standard operating procedures (SOPs) at the facilities, some respondents acknowledged that they knew about them but there were no written SOPs in some health facilities.

"There are supposed to be there but we don't have written ones though am aware of the SOPs" KII with a health care worker in Kangocho dispensary.

Managing expiries

Regarding wastages and expiries, many health facilities noted this as a challenge due to accumulation of uncollected expired drugs in their stores. The county management team tasked with destruction of the expired drugs took a long time before collecting these expired drugs posing a severe danger to the staff and also occupying the inadequate space in the facilities.

Lead time

The average lead time for an order to reach the health facility once placed was dependent on the level of health facility. At referral facilities, the average lead time was 15 days as attested in the key informant interviews. Over-dependence of the health management team to source and procure drugs from one major supplier, KEMSA was seen as a factor in increasing the lead time.

DISCUSSION

Availability of tracer essential medicines

According to the data, artemether lumefantrine (AL) was the least available drug at 50%. This was attributed to the fact that the study area was not a malaria endemic zone hence the AL was least stocked. This is consistent with a study done in Kaliro district, Uganda where AL also had the highest percentage out of stock out at 51.6%.[9]

After health services were devolved in Kenya, there was an influx of patients visiting health facilities and this increased especially after introduction of UHC. Hence, many respondents felt the need to increase allocation of resources to provide the necessary drugs needed by the many patients visiting the facilities. This is in line with a pre- and post-devolution study done in Makueni County which cited an overall influx of patients visiting the hospital and the need for increased funding.[10]

Human resource factors

Human resource was highlighted by respondents as a major challenge towards availability of essential medicines in majority of the health facilities visited. These findings are consistent with other studies done in Mozambique where it was noted that stock-outs of essential medicines affected those living far from health facilities and especially those with few staff .[11]

Health financing factors

60% of the respondents agreed to have knowledge regarding the budgetary allocation in their health facilities and termed it insufficient. Various respondents did not know their facility allocation but still thought it was not sufficient. This was consistent to a study conducted in Tanzania where authors attributed lack of adequate funding in the health sector contributing to shortages of adequately trained and skilled personnel whose skills are needed to effectively forecast, order and manage medicines stocks.[12]

Drawing rights which is the amount of money allocated to each facility per every quarter was seen as a challenge since it was too little to meet the facilities demands and in some facilities, the allocation used was previously what was used in the national government even before devolution. A study done in Tanzania reported similar results where delays in funds disbursement and rigid budget rules and inequitable patterns of resource distribution created localized shortages.[12]

Perceptions on leadership and management factors

Health workers reported that citizens considered health care to have been brought closer home. However, some respondents were unaware of any policies guiding essential drugs with regard to ordering, storage and distribution. Policies were passed at the county management level then the information regarding any new or changed policy was passed down to the staff at the facilities to implement. This is in line with a study conducted in Tanzania where lack of transparency and performance oversight at central levels interact with behaviour at the local government level further undermining the functioning, planning and procurement systems.[13]

Transport logistics for drugs was a big problem since there were no enough transport vehicles and staff had to even rely on social media groups like WhatsApp to borrow and exchange out of stock drugs. This is in line with a study conducted in South Africa which found out that logistical bottlenecks in the medicines supply chain hampered availability of tracer essential medicines. In that study, authors found out that poor transport network

was cited by respondents as a hindrance factor towards accessibility of essential medicines.[14]

CONCLUSION

The study established that with the introduction of UHC program there was an increase in availability of essential medicines in the facilities. However, as indicated by 50% of the respondents, AL was the least available drug. This was attributed to the low prevalence rate of malaria in the region.

Lack of enough pharmacy personnel in the facilities with some not even trained on commodity management was a contributing factor to lack of available tracer essential medicines. Most health workers (91%) were cognizant of the fact that there was need for commodity management training in the health facilities and 74.4% acknowledged that the training ensures availability of tracer essential medicines. Therefore, recruitment of skilled personnel is mandatory.

Inadequate and untimely budgetary allocations was a major factor influencing availability of tracer essential medicines with a small drawing right set for some facilities being seen as a hindrance to adequate stocking and ordering of essential medicines. There was need to allocate each facility a budget based on actual needs per facility rather than set drawing rights. The study exhibits a significant relationship between budgetary allocation and availability of tracer essential medicines in Nyeri County. The results reveal that budgetary allocation is statistically significant in determining the availability of tracer essential medicines in Nyeri County.

Health management and leadership factors had a part to play in ensuring availability of tracer essential medicines in the health facilities. Drug orders were supposed to be made based on the level of facility (level 1-level 5) but some respondents had no idea of any guiding policies in the county that govern the ordering and stocking. Policy formulation was done without any involvement of pharmacy in-charges and policies passed at the county management team merely passed onto the staff at the health facilities without their engagement. There was need for the health management team to ensure regular supervision visits to facilities, provide an efficient electronic data management and capture method regarding drugs, set up a drug therapeutics committee in every facility and lastly to enhance research within the county to even cover rare emerging diseases which may arise from time to time.

Recommendations

The study shows that with the roll out of UHC program, majority of the participants indicated an increase in the availability of essential drugs in Nyeri County hence the government should roll out the program countrywide.

Commodity management training is crucial in ensuring rational drug use, minimized expiries, adequate stocking and proper storage and distribution which in turn translates to availability of tracer essential medicines. The county government should facilitate continuous commodity management trainings for health workers.

Majority of the participants cited budgetary allocation as a limiting factor towards availability of tracer essential medicines. Hence the county government should increase the health budgetary allocation to be able to procure these medicines in adequate quantities to make sure they are available to the many patients visiting the health facilities.

Human resource in almost all the sampled facilities was inadequate to meet the patients' demands. The county government should hire more staff to ensure service delivery is prompt and uninterrupted.

Lastly, health management and leadership teams in the county needs to engage the pharmacy in-charges during policy making and changes, provide efficient communication in the supply chain system, including proper inventory management systems and to enhance research of drugs and emerging diseases in the county.

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Original Research Article

Socio-demographic factors influencing practice and awareness of exclusive breastfeeding benefits among women of reproductive age attending maternal and child health clinic in tudor sub county hospital

Consolata Mandi Machila[1]*, Jane Karonjo[1], Dominic Mogere[2], Peterson Kariuki[1]

[1]School of Public Health, [2]School of Nursing, Mount Kenya University, Kenya

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***Correspondence:**
Dr. Consolata Mandi Machila,
E-mail: consolatamandimachila@gmail.com

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ABSTRACT

Background: Knowledge of exclusive breastfeeding (EBF) among women is essential when promoting optimal breastfeeding practices. Breastfeeding is recommended for the first six months of life and continuation of breastfeeding and adequate complementary foods for up to two years of age or beyond.
Methods: A descriptive cross-sectional study design was used. This study utilized a mixed method approach (qualitative and quantitative).
Results: Four socio-demographic factors were found to be influencing the practice of exclusive breastfeeding. Those include child gender, level of education, marital status and parity. Two socio-demographic factors were found to influence awareness of the benefits of EBF. Those are Level of education and Occupation.
Conclusions: The government should improve on the level of education of women in the area. Increase in number of educated women.

Keywords: Descriptive cross-sectional, Exclusive breastfeeding, Level of awareness

INTRODUCTION

Breastfeeding is a practice of feeding infants with breast milk from the mother.[1] Exclusive breastfeeding is a practice of feeding only breast milk (including expressed breast milk) and no other liquids or solids except vitamins, mineral supplements or medicine to infants for six months.[1] Exclusive breastfeeding should be practiced for six months and complementary feeding should follow for 2 years or longer for optimal growth and development.[2] Globally, 11.6% mortality in under-fives is due to suboptimal breastfeeding practices, being equivalent to 804,000 infant deaths in 2011.[3] In 2012, WHA 65.6 resolution emphasized on countries to ensure that maternal and child nutrition especially the six global targets are met by 2025, and mostly more efforts were to be put on increasing the rate of exclusive breastfeeding by 50%.[4] In East Africa countries prevalence of are as follows Uganda 63.2%, Kenya 61% and Tanzania 50%, while in Mombasa County, the uptake is 67 - 68% and in Mvita constituency its 49%.[5] In Kenya most mothers prefer mixed feeding than exclusive breastfeeding because they receive conflicting advice on breastfeeding from various sources including health workers, relatives and community members.[6]

Statement of the problem

Despite the recent increase in EBF to 61%, from 32%, our country is the second lowest rate among East African countries.[7] According to KDHS, 99% of infants under 6 months were breastfed, while 61% were exclusively breastfed, 0-1 months who were exclusively breastfed were 84.1% and 4-6 months were 42%.[8,9] Despite the

Government's efforts on fostering exclusive breastfeeding, its uptake still remains a challenge since three in five (61%) children under six months are exclusively breastfed and also they are breastfed for 21 months and exclusively breastfed for 4.3 month. However, this reflects an overall low uptake of exclusive breastfeeding in the country.[7] Since, there is low uptake on exclusive breastfeeding worldwide and in Kenya as whole, factors contributing to low uptake of exclusive breastfeeding for six months need to be identified and addressed so that child morbidity and mortality is reduced.

METHODS

Research design

A descriptive cross-sectional study was adopted. It's preferred because it helps to describe the factors affecting exclusive breastfeeding among mothers at that point in time.

Inclusion and exclusion criteria

Mothers with infants below two years, from Tudor location and also those who signed consent forms were interviewed. The researcher interviewed mothers with infants below two years because some mothers brought infants for growth monitoring. The basis is that if the researcher dwelt only on mothers with babies who are 6 months old, she may have not been able to achieve the desired sample size.

Mothers with children above two years, not from Tudor location and refused to sign consent form were not interviewed.

Target population

The study targeted a population of 12,150 breastfeeding mothers attending maternal and child health (MCH) clinic at Tudor sub-county hospital.

Sampling procedures and technique

The study area was chosen among the 6 constituencies conveniently and purposively because it hosts four large slums within the county with people from different background and class.

As for the respondents, the MCH attendance register at the hospital was used to identify the first mother to arrive at the facility and systematic sampling method was used to get the rest of the required sample size. The facility per day receives 40 mothers and monthly 1760 and the sample size was 422, then the sampling interval was 4. Sampling interval was achieved by the following method:

40 mothers per day

44 days-duration of data collection

422 sample size

Therefore:

$$K = \frac{N}{n}$$

$$K = \frac{40 \times 44}{422} = \frac{1760}{422} = 4.1 \text{ which is approximate to } 4$$

Therefore the sampling interval was 4 which is the K. The first respondent was assigned an even number and all mothers with even numbers were interviewed. The sampling frame per day was: 2,6,10,14,18,22,26,30,34,38,.....422

Sample size determination

Since the population of the under-five is greater than ten thousand it was calculated using the formula below according to.[10]

$$n = \frac{Z^2 pq}{d^2}$$

Where,

n=desired sample (population >10,000) i.e. population greater than 10,000.

Z^2= 1.96 (confidence interval). The standard normal deviate usually set at 1.96 or simply 2.00 which correspond to 95% confidence level.

P=The proportion of target population (0.5=50%) if prevalence is not known.

q = 1-p (1-0.5)

d =0.05 or 0.02

D = Design effect (1 if its 95%, 2 if its 99%)

Therefore: $n = \frac{1.962 \times 0.5 \times 0.5 \times 1}{0.05^2} = 384$

n =384

10% for none respondents

384x10/100=38.4

Therefore the sample size was 384+38=422.

Construction of research instrument

Both quantitative and qualitative data was collected in this study. Quantitative data was collected using questions which had multiple choices for the respondents to choose. Qualitative data was collected using open ended questions in the interviewer schedule, which was constructed using simple English language which was easy to interpret to breastfeeding mothers. Leading questions were also avoided to minimize biasness. All the variables were covered in the research instrument.

Testing for validity and reliability

Validity means the quality or correctness of a measure. The tool measures what is supposed to measure. This was ensured by pre-testing the research instrument after the training research assistants before administering it on breastfeeding mothers. A pre-test of the questionnaire through a pilot study was carried out to ascertain the clarity of the research instrument. The pre-test included 15 respondents who were deemed knowledgeable on issues regarding exclusive breastfeeding. A pilot study was conducted at Shimo annex dispensary to assess the validity and reliability of the data collected. Thereafter the interviewer schedule was adjusted based on the pre-test recommendations.

Pre-testing ascertained the respondents understood the questions in the study tool. Reliability refers to stability of measurement over time even after several repetitions. It was measured using split half technique.

RESULTS

Socio-demographic factors influencing practice of exclusive breastfeeding in tudor sub county

Four socio-demographic factors were found to be influencing the practice of Exclusive Breastfeeding. Those include child gender, level of education, marital status and parity. As indicated in the data, the girl child was 11.556 times more likely to exclusively breast fed than the boy child (OR=11.556: 95% CI 6.746-19.796, P<0.05), Women with secondary level of education and above were 1.27 times more likely to breastfeed their children exclusively compared to women with primary level of education and below (OR=1.273: 95% CI 1.025-1.580, P<0.05). Married women were 1.67 times more likely to breastfeed their children exclusively compared to un married women (OR=1.697: 95% CI 1.056-2.729, P<0.05), and lastly women with two children and above were found to be 1.4 times more likely to practice exclusive breastfeeding compared to women with 1 child (OR=1.444: 95% CI 1.145-1.822, P<0.05). The following Table, (Table 1) represents a summary of these findings.

Table 1: Socio-demographic factors influencing practice of EBF.

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for Exp(B)	
								Lower	Upper
Step 1[a]	Maternal Age	0.151	0.180	0.704	1	0.402	1.163	0.818	1.653
	Infant Age	-0.065	0.136	0.225	1	0.636	0.937	0.718	1.224
	Child Gender	2.447	0.275	79.403	1	0.000*	11.556	6.746	19.796
	Level of Education	0.241	0.110	4.784	1	0.029*	1.273	1.025	1.580
	Marital Status	0.529	0.242	4.771	1	0.029*	1.697	1.056	2.729
	Parity	0.368	0.118	9.637	1	0.002*	1.444	1.145	1.822
	Occupation	-0.018	0.122	0.022	1	0.883	0.982	0.773	1.247
	Constant	-6.411	0.889	52.046	1	0.000	0.002		

Variable(s) entered on step 1: Maternal age, Infant age, Infant gender, Level of education, Marital Status, Number of children, Occupation.

Table 2: Socio-demographic factors influencing level of awareness of the benefits of EBF.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for Exp(B)	
							Lower	Upper
Maternal Age	-0.085	0.160	0.279	1	0.598	0.919	0.671	1.258
Infant Age	-.191	0.121	2.507	1	0.113	0.826	0.652	1.046
Child Gender	0.215	0.122	3.083	1	0.079	1.239	0.975	1.575
Level of Education	0.436	0.106	16.839	1	0.000*	1.546	1.255	1.903
Marital Status	0.228	0.215	1.129	1	0.288	1.257	0.825	1.915
Number of Children	-0.016	0.106	0.023	1	0.879	0.984	0.799	1.212
Occupation	1.368	0.233	34.536	1	0.000*	3.926	2.488	6.195
Constant	-3.135	0.734	18.268	1	0.000	0.043		

a. Variable(s) entered on step 1: Maternal age, Infant age, Infant gender, Level of education, Marital status, Number of children, Occupation.

Socio-demographic factors influencing level of awareness of benefits of exclusive breast-feeding in tudor sub-county hospital

Two socio-demographic factors were found to influence awareness of the benefits of ebf. Those are level of education and occupation. women with secondary level of education and above were found to be 1.5 times more likely to be aware of the benefits of ebf compared to women with primary level of education and below (or=1.546; 95% ci of or=1.255-1.903, p<0.05). Women who reported that they were employed were found to be 3.9 times more likely to practice ebf than women who were not employed and those who reported to be self-employed, (or=3.926, 95% CI of or= 2.488-6.195, p<0.05). Table 2 represents the summary of these findings.

Discussion

Socio-demographic factors influencing the practice of exclusive breastfeeding

Four socio-demographic factors were found to be influencing the practice of Exclusive Breastfeeding. They were child gender, level of education, marital status and parity. The girl child was more likely to be exclusively breastfed compared to the male child. This is perhaps due to fact that boys are more aggressive in feeding than girls. This could have contributed to the believe that that breast milk is not adequate for boys compared to the girls. A study conducted in Nigeria indicates that the perception that a child does not get satisfied by breast milk is a key barrier to practice of EBF in the country.[11] This is perhaps the reason why male children are more likely to not to be breastfed exclusively in Tudor Sub-county. In regard to level of education, children from educated mothers were found to be more likely to be breast fed exclusively compared to children from less educated mothers. This can be explained by the fact that educated women are more likely to understand the benefits of exclusive breastfeeding compared to uneducated women and hence they are more likely to practice EBF compared to the uneducated. These findings are supported by the following studies.[12-14]

In regard to parity multiparous women were found to be more likely to practice EBF compared to women with on child. This is perhaps due to the fact that the multi parous women have been exposed to health education on the benefits of EBF many times compared to women with only one child. Another possibility is that women with many children are more likely to have experienced the benefits of EBF from previous children and hence they are more likely to practice EBF compare to women with only one child. These findings have been confirmed by studies conducted in other regions. A study conducted in Wajir established that multiparous women were more likely to practice EBF compared to primiparaous women.[15] It is however important to note that a study conducted by, reported that new mothers were more likely to practice EBF compared to multiparous mothers. Other studies have also shown that parity is a significant determinant of EBF.[16,17]

In regard to occupation, women in employed professions were more likely to exclusively breastfeed their children. This is perhaps due to the fact that women in employed professions are more likely to be educated and therefore more likely to know the benefits of EBF. Several studies have also supported these findings. A study conducted in Nigeria identified occupation as one of the determinants of Exclusive breastfeeding.[13] Another study conducted in Ghana also identified occupation as a key determinant of practice of EBF.[18]

Socio- demographic factors influencing awareness of the benefits of exclusive breastfeeding

Two socio - demographic factors were found to influence awareness of the benefits of Exclusive breastfeeding. Those include; level of education and occupation. This can be perhaps explained by the fact that educated people are expected to be more knowledgeable than uneducated ones and hence they were found to be more knowledgeable of the benefits of EBF compared to respondents with lower level of education or no education at all. On the same note, educated people are more likely to get employment opportunities and this is perhaps the reason why respondents in employment were more likely to be aware of the benefits of EBF compared to the self employed and those without jobs. Those are supported by the following studies.[19,20]

CONCLUSION

The socio-demographic factors influencing practice of EBF among women of reproductive age in Tudor sub county are child gender (OR=11.556: 95% CI 6.746-19.796, P<0.05), Level of education (OR=1.273: 95% CI 1.025-1.580, P<0.05). Marital status (OR=1.697: 95% CI 1.056-2.729, P<0.05), and parity (OR=1.444: 95% CI 1.145-1.822, P<0.05). The socio-demographic factors influencing awareness of benefits of EBF among women of reproductive age are level of education (OR=1.546; 95% CI of OR=1.255-1.903, P<0.05) and Occupation (OR=3.926, 95% CI of OR= 2.488-6.195, P<0.05).

Recommendations

The government should improve on the level of education of women in the area. Increase in number of educated women in Tudor is likely to increase prevalence of EBF in the sub county. The Government must guarantee that workplace is free of harassment and discrimination against women who prefer to breastfeed their babies through appropriate mechanisms.

Stake holders working in slum areas together with department of social services within Tudor location

should sensitize young mothers to start income generating activities which will sustain them with their families instead of practising prostitution.

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Risk Factors Associated with Diabetic Retinopathy among Patients Aged 50-75 Years Attending Diabetic Clinic at Mbagathi Hospital Nairobi County, Kenya

Tom Michira Nyakaba [a*], Dominic Mogere [a], Lucina Koyio [b] and Peterson Kariuki [a]

[a] School of Public Health, Mount Kenya University, Kenya.
[b] Department of Health Services, Nairobi City County Government, Kenya.

Authors' contributions

This work was carried out in collaboration among all authors. Authors TMN, DM and LK participated in the entire research process. Author TMN participated in the data analysis process. Authors DM, PK and TMN played a key role in drafting the manuscript. All authors read, accepted and approved the final manuscript.

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ABSTRACT

Background: According to research, nearly 60% of persons with type 1 diabetes are likely to experience diabetes retinopathy after 20 years after the initial diagnosis of diabetes type 1. Nearly 40 % of all persons with unrestrained type 2 diabetes are likely to experience diabetes retinopathy during their lifetime.
Objective: The study aimed to determine the risk factors associated with Diabetes Retinopathy among patients aged between 50 - 75 years seeking care at Mbagathi Hospital Nairobi County, Kenya.

**Corresponding author: Email: nyakabatom532@gmail.com;*

Method: This study used an analytical cross-sectional study design. A systematic random sampling design was used to recruit study partakers. The sample size for this study was 151 study respondents. Both Bivariate and binary logistic regression techniques were also utilized to evaluate the degree of association between the independent and the dependent variable. Statistical significance was set at p=<0.05.

Results: The prevalence of diabetes retinopathy (non-proliferati ve diabetes retinopathy) in this study was 31.5% indicating this is a real public health concern that needs an urgent multisectoral approach. From this study, The presence of laboratory services (OR=10,95%CI=3.56-30.99), support group (OR=5.2,95%CI=1.81-14.85), provision of health care message (OR=11.6,95%CI=3.46-38.59), normal BMI (OR=3.6.95%CI=19.88-65.36) reduced the odds of diabetes retinopathy. Drinking alcohol (OR=22,95%CI=0.003-0.771), smoking (OR=33.95%, CI=0.004-0.262), uncontrolled blood sugars (OR=4,95%CI=19.89-65.36) increased the odds of diabetes retinopathy. Low education level (OR=5.9,95%CI=0.03-0.79), earning less than 6000 Ksh per month (OR=9,95%CI=0.04-0.29) smoking (OR=33.3,95%CI=0.004-0.262), uncontrolled blood sugars (OR=4,95%CI=19.89-65.36) increased the odds of diabetes retinopathy.

Conclusion: The prevalence of diabetic retinopathy was high, earning less than 6000 Ksh per month, drinking alcohol, smoking, Low education level, and having uncontrolled blood sugars increased the odds of diabetes retinopathy. The presence of laboratory services, support group, provision of health care messages, and normal BMI reduced the odds of diabetes retinopathy

Keywords: Diabetic macular edema; diabetes mellitus; diabetic retinopathy; eye complications.

ABBREVIATIONS

DM : Diabetes Mellitus, DME;
DR : Diabetic Retinopathy;
NACOSTI : National Commission for Science Technology and Innovation;
SPSS : Statistical Package for Social Sciences;
WHO : World Health Organization.

1. INTRODUCTION

The term Diabetes Mellitus (DM) stands for a group of metabolic disorders that are categorized by elevated levels of glucose often known as hyperglycemia in the absence of treatment [1]. Diabetic Mellitus is characterized by inadequate insulin production, poor insulin action, or both this often leads to disruption of fat, protein, and carbohydrate metabolism [2]. The most common long-term effect of diabetes includes diabetes neuropathy, retinopathy, and diabetic nephropathy among other complications [2]. The likelihood of vision loss in an individual with diabetes is up to 25 times more in non-diabetic people. People with poorly controlled diabetes are more likely to develop systemic complications, including diabetes retinopathy. Long-term diabetes management is crucial to prevent or delay the advancement of eye complications [3].

There are worrying trends of increased cases of diabetes, recent statistics from WHO there are 435 million cases of diabetes globally with a higher number of the cases being recorded in developing nations [4]. The international diabetes federation approximates that if no measures or interventions are put in place to curb the problem, it is estimated that by the year 2045, the number of diabetes cases will have increased by 48% in 2045. In recent statistics, the Age-adjusted magnitude in adults with diabetes surged from 4.7% in 1980 to 10.5% by 2019 [5]. Worldwide, the number of diabetes cases has got to an epidemic level which is worrying. Low and middle-income nations are highly affected by these emerging trends. In a report by the international diabetes federation of 2017, it's estimated there are more than 425 million in the world who have diabetes Mellitus [6]. In Africa, its approximated that 15.9 million adults are currently surviving diabetes which is a regional magnitude of 3.1% [7]. Despite diabetes being a public health concern, Africa has the most undiagnosed diabetes Mellitus cases and according to projected statistics, Africa will encounter the highest future rise in the load of DM of about 156% by 2045 [8].

The International Diabetes Federation approximates the magnitude of diabetes Mellitus in Kenya in 2015 to be 2-5%, and over 50% of cases are undiagnosed. Kenya is experiencing a rise in diabetes as a result of demographic, nutritional, and social changes such as urbanization [9]. According to the international diabetes federation, in the year 2015, the

prevalence of diabetes in Kenya was at 5% where 50% of these cases were still undiagnosed [10]. Kenya is steadily experiencing a spike in diabetes cases which has been linked to social changes such as urbanization, change in nutrition habits, and change in social demographic factors [11]. As the prevalence rises, patients face an even higher threat from long-term eye complications.

The likelihood of vision loss in a person with diabetes is 25 times higher than in non-diabetic persons. People with poorly controlled diabetes are more likely to develop systemic complications, including retinopathy [12]. Long-term diabetes management is important in delaying the progression of eye complications. Improved lipid profile and hypertension control can also slow the progression of retinopathy, especially when initiated soon after the diagnosis of diabetes [13]. Prevention measures for diabetes include dietary modification, the use of medical interventions, regular screening for Diabetes Retinopathy, and adopting a healthy lifestyle [14]. Vision loss from DR can be averted or reduced through adequate control of blood sugar, prompt diagnosis, and treatment of retinopathy. Periodic retinal examinations even when there are no signs and symptoms are key to preventing diabetes-related vision loss.

2. METHODOLOGY

2.1 Research Design

This study used an analytical cross-sectional study design. It involved figuring out how the independent variable (risk factors) and dependent variable (Diabetes retinopathy) were related to one another.

2.2 Study Area

Primary data was collected from the Mbagathi county hospital DM clinic. Mbagathi county hospital is a level five hospital located in Nairobi County, Lang'ata Constituency it serves an urban population mostly from the slum area. The health facility has over 400 patients seeking diabetes care every month [15].

2.3 Study Population

All diabetic patients who were either type 1 or type 2 aged between 50-75 years on follow-up at Mbagathi diabetic clinic presented during the study period. They were considered since they were at high risk of developing diabetes retinopathy as compared to other age groups.

2.4 Sample Size Determination

The sample size was determined using the formula designed by Fisher as recommended by Mugenda and Mugenda (1999). As a result, 137 clients made up the final sample size for this study. Additionally, 10% of the non-respondent rate resulted in 151 study participants overall. The health facility has about 400 a point of diabetic patients every month. To determine the sampling interval the following formula was used.

Sampling interval= 400/151= 3

To determine the initial starting point, the first participant was randomly selected.

2.5 Sampling Technique

Mbagathi county hospital was purposively selected, A systematic random sampling design was used to recruit study partakers in this study where all diabetic clients aged 50 to 75 years were carefully selected to participate in the study.

2.6 Data Collection Method and Instruments

A semi-structured questionnaire form was used to capture the data information required in this study. Section A of the questionnaire captured data on patients' factors associated with Diabetes Retinopathy, section B captured data on Diabetes Retinopathy screening, section C captured data on lifestyle factors and lastly, section D captured data on health facility factors associated with Diabetes Retinopathy.

2.7 Validity and Reliability

Validity refers to the correctness of the research instruments which promotes the collection of accurate data and information. An expert was requested to appraise the data-gathering tools, and supervisors and a diabetologist was requested to review the data-gathering tools before embarking on the data-collection process. The degree to which data collection is reliable provides the same finding after being subjected to the study participants than ones. Carefully selected study participants were used to carry out the reliability of the study tools. Cronbach alpha reliability test was carried out using SPSS version 26, literature accepts an internal consistency of above 0.7. According to the

findings of the reliability test, a score of 0.94 was obtained, which confirmed that the tools were reliable for data collection.

2.8 Data Processing and Analysis

Using Microsoft Excel, the collected data was cross-checked and verified for accuracy and completeness to prevent double entry before being entered into the Statistical Package for Social Sciences (SPSS) version 26 for analysis. Data was analyzed using descriptive statistics and presented as tables and percentages. The X^2 test for independence was utilized in the bivariate analysis. A p-value of <0.05 was used as a cutting threshold for significant variables. Significant variables in the bivariate analysis were imported into the binary logistic regression. The variables that were significantly associated with DR were identified using binary logistic regression.

3. RESULTS

3.1 Prevalence of Diabetes Retinopathy

As indicated in Fig. 1, both eye clinical examination and fluorescein angiography were used to diagnose diabetes retinopathy (non-proliferative diabetes retinopathy). These procedures were conducted by competent and licensed clinical officers and medical doctors, from this study (31.5%) of the study partakers were diagnosed with diabetes retinopathy, while (68.5%) of the study participants didn't have diabetes retinopathy.

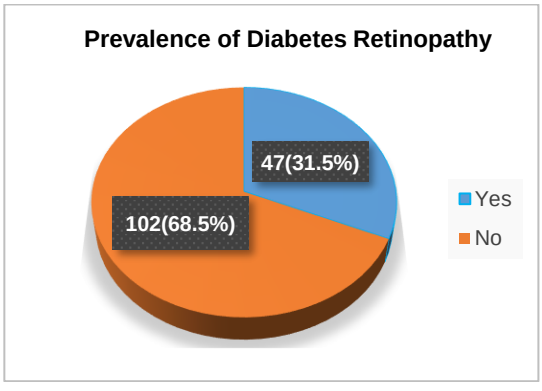


Fig. 1. Prevalence of Diabetes Retinopathy

3.2 Descriptive Statistics on Social Demographic Factors

As indicated in Table 1, more than half (53%) of the study respondents were males. Regarding age, close to half (47%) of the study participants were aged between age 50-55 while only a few(16.1%) of the study respondents were aged 66-75 years. Concerning marital status, the majority (61.7%) of the study respondents were married. Regarding the level of education, close to half (49.7%) of the study participants in this study had attained a secondary level of education. Only a few (12.8%) of the respondents in this study had attained the tertiary level of education. In this study, the majority (82.6%) of the study participants were Christians as compared to Muslims who accounted for (17.4%). Finally, concerning the level of income, the majority (61.1%)of the study respondents reported earning a monthly income of above 6000 Ksh.

3.3 Association between Social Demographic Factors and Diabetes Retinopathy

In the social demographic factors; gender type($X^2=6.256,df=1,p=0.012$), marital status ($X^2=10.36,df=4,p=0.035$), an education level ($X^2=35.707,\ df=3,p=0.000$), and income earned per month ($X^2=32.244,df=1,p=<0.000$), were statistically associated with diabetes retinopathy hence these variables were imported to binary logistic regression for further analysis. Type of religion ($X^2=1.690,df=1,p=0.194$) and age ($X^2=1.091,df=2,p=0.579$) were found not to be statistically associated with diabetes retinopathy. As indicated in Table 2, compared to diabetic patients with tertiary education, those with primary education had a 5.9 higher risk of developing diabetes retinopathy. From this study, study participants who earned less than 6000 Ksh per month had a 9-fold higher risk of developing diabetic retinopathy than their matched peers.

3.4 Association between Health System Factors and Diabetes Retinopathy

In the health system factor associated with diabetic retinopathy, availability of diabetes mellitus medication ($X^2=9.796,df=1,p=0.002$), availability of diabetes mellitus laboratory testing services ($X^2=54.022,df=1,p=<0.000$), presence of diabetes mellitus support groups ($X^2=21.102,\ df=1,p=<0.000$), and the provision of diabetes mellitus healthcare messages ($X^2=46.309,\ df=1,p=<0.000$) were found to be associated with diabetes retinopathy, as a result, these variables were imported in the binary logistic regression for further analysis. Adherence to diabetes mellitus

guidelines ($X^2=0.682, df=1, p=0.409$) was not associated with diabetes retinopathy. As indicated in Table 3, study participants who reported that laboratory test services (blood sugar monitoring and blood pressure monitoring) were available were 10 times less likely to be diagnosed with diabetes retinopathy as compared to their fellow counterparts. In addition, participants in diabetes mellitus support groups had a 5.2-fold lower risk of developing diabetic retinopathy than those who didn't. Study respondents who reported receiving a healthcare message related to diabetes Mellitus were 11.6 less likely to experience diabetic retinopathy than their fellow counterparts.

Table 1. Social demographic characteristics of the study respondents

Independent Variables	Categories	Frequency	Valid Percentage%
Gender	Male	79	53
	Female	70	47
Age	50-55	70	47
	56-65	55	36.9
	66-75	24	16.1
Marital Status	Single	29	19.5
	Married	92	61.7
	Divorced	9	6
	Separated	11	7.4
	Widowed	8	5.4
Educational Level	Never been to school	23	15.4
	Primary level	33	22.1
	Secondary level	74	49.7
	Tertiary level	19	12.8
Religion	Christian	123	82.6
	Religion	26	17.4
Income level	6000ksh and below	58	38.9
	6000 ks and above	91	61.1

Table 2. Multivariate analysis of social demographic factors

Step 1a		B	S.E	Wald	Df	Sig	Exp(B)	95% C.I for EXP(B)	
								Lower	Upper
	Marital status			6.634	4	0.157			
	Single	2.12	1.08	3.888	1	0.049	8.331	1.01	68.53
	Married	2.36	1.00	5.59	1	0.018	10.644	1.45	75.60
	Divorced	2.31	1.33	3.04	1	0.08	10.09	0.75	135.68
	Separated	1.35	1.27	1.19	1	0.28	3.99	0.33	47.90
	Widowed						ref		
	Education level			18.55	3	0.000			
	Never been to school	-0.03	0.829	0.001	1	0.975	0.975	0.192	4.994
	Primary	-1.75	0.769	5.17	1	0.02	0.17	0.03	0.79
	Secondary	0.87	0.74	1.39	1	0.23	2.38	0.56	10.06
	Tertiary						ref		
	Gender	-0.63	0.49	1.69	1	0.19	0.53	0.21	1.37
	Income below 6k	-2.19	0.486	20.32	1	0.000	0.112	0.043	0.290
	Income above 6k						ref		
	Constant	0.19	1.16	0.027	1	0.87	1.21		

3.5 Association between Lifestyle Factors and Diabetes Retinopathy

In the lifestyle factors associated with diabetic retinopathy, smoking(X^2=28.575,df=1,p=<0.000), drinking alcohol (X^2=45.928,df=1,p*=<0.000), body mass index(X^2=98.485, df=3,p*=<0.000), physical activities(both aerobic and anaerobic physical activities)(X^2=32.693,df=1,p=<0.000) were found to be statistically significant with diabetes retinopathy hence they were imported for logistic regression analysis. Controlled blood pressure(X^2=0.358,df=1,p=0.55)and period lived with diabetes mellitus(X^2=2.161,df=1,p=0.142) were found not to be associated with diabetes mellitus. As indicated in Table 4, When compared to their peers, study participants who drank alcohol were 22 times more likely to develop diabetes retinopathy. Study participants who were smokers were 33.3 times more likely to be diagnosed with diabetes retinopathy as compared to their fellow counterparts. When compared to obese study participants, those with a normal body weight had a 3.6 times lower risk of developing diabetes retinopathy. In addition, study participants with uncontrolled blood sugars(persistently high blood sugar levels despite the presence of insulin and oral glycemic control agents) were 17 more likely than those with controlled blood sugars(presence of normal blood sugars after administration of insulin or oral glycemic control agents) to develop diabetes retinopathy.

Table 3. Multivariate analysis of health system factors

Step 1a	Variables	B	S.E	Wald	Df	Sig	Exp(B)	95% C.I for EXP(B)	
								Lower	Upper
	Availability of medicines	0.40	0.57	0.499	1	0.48	1.49	0.49	4.53
							ref		
	Lab test available	2.35	0.55	18.12	1	0.00	10.49	3.56	30.99
							ref		
	Support group	1.65	0.54	9.43	1	0.002	5.19	1.81	14.85
							ref		
	Receiving a message on DR	2.45	0.62	15.82	1	0.00	11.56	3.46	38.59
							ref		
	Constant	-2.23	0.52	18.85	1	0.00	0.10		

Table 4. Multivariate analysis on life style factors

Step 1a		B	S.E	Wald	Df	Sig	Exp(B)	95% C.I for EXP(B)	
								Lower	Upper
	Drinking alcohol	-3.09	1.44	4.58	1	0.03	0.046	0.003	0.771
							ref		
	smoking	-3.45	1.08	10.27	1	0.00	0.03	0.004	0.262
							ref		
	BMI			19.74	3	0.00			
	<18.5	5.66	1.73	10.69	1	0.00	2.86	9.651	85.085
	18.-24.9	5.88	1.48	15.86	1	0.00	3.65	19.887	65.356
	25-29.9	1.73	0.94	3.34	1	0.07	5.61	0.883	35.665
	>30						ref		
	Blood sugar under control(4.5-7.2 mmol/L)	2.85	0.97	8.59	1	0.00	17.33	2.571	116.794
							ref		
	Physical exercise	1.27	0.896	2.02	1	0.16	3.57	0.617	20.680
							ref		
	Constant	-2.43	0.95	6.55	1	0.01	0.09		

4. DISCUSSION

In this study, both eye clinical examination and fluorescein angiography were used to diagnose diabetes retinopathy, from this study (31.5%) of the study partakers were diagnosed with diabetes retinopathy. These findings were close to a study done in Australia which documented a prevalence of 34.6% among study participants [16]. Compared to diabetic patients with tertiary education, those with primary education had a 5.9 higher risk of developing diabetes retinopathy. The need for better health-seeking behavior becomes more and more understood as one's education level rises. These findings were in agreement with another study done in China where being educated reduced the odds of having diabetes retinopathy [17].

Study participants who were earning less than 6000 Ksh per month had a 9-fold higher risk of developing diabetes retinopathy than their matched peers. The probable reason for this is that better income promotes the affordability of various health services related to diabetes management. These findings were in agreement with another study done in Ethiopia [18]. Study participants who reported that laboratory test services were available were 10 times less likely to be diagnosed with diabetes retinopathy as compared to their fellow counterparts. This means the adequate provision of laboratory test services enables earlier detection of parameters that are likely to contribute to diabetes retinopathy, some of the essential services provided include blood sugar monitoring and blood pressure monitoring which are risk factors for diabetes retinopathy. This study's results were in harmony with another study done in Amhara northwest of Ethiopia [19].

In addition, participants in diabetes mellitus support groups had a 5.2-fold lower risk of developing diabetes retinopathy than those who didn't. The presence of support groups ensures patients who have diabetes receive maximum care and treatment which reduces the odds of developing diabetes-related complications. Some of the essential services provided by this support group include support to purchase diabetes medication, provision of regular health education, and promotion services related to diabetes management. These findings were in harmony with another study done in India [20]. Study respondents who reported receiving a healthcare message related to diabetes Mellitus were 11.6 less likely to experience diabetes retinopathy than their fellow counterparts. The provision of healthcare messages serves protective factor since it reminds diabetes patients to observe preventive measures as well as the need to comply with the prescribed regimen. These findings were in harmony with another study done in Germany [21].

When compared to their peers, study participants who drank alcohol were 22 times more likely to develop diabetes retinopathy. Drinking of alcohol among diabetes patients has been observed to be a risk factor for diabetes mellitus and its associated complication which include DR. These findings were in harmony with a study in Sweden [22]. Study participants who were smokers were 33.3 times more likely to be diagnosed with diabetes retinopathy as compared to their fellow counterparts. Smoking has been linked to an increased risk of developing diabetes and its complications such as DR. These findings agreed with another study carried out in Russia [23]. When compared to obese study participants, those with a normal body weight had a 3.6 times lower risk of developing diabetes retinopathy. Being overweight and obese have been researched and have been recognized to be risk factors for diabetes complications such as diabetes retinopathy, These findings were in agreement with a study done in China [24]. Lastly, Study participants with uncontrolled blood sugars were 17 more likely than those with controlled blood sugars (4.5-7.2mmol/L) to develop diabetes retinopathy. In this study, uncontrolled blood sugar was considered a persistently high blood sugar despite the provision of insulin injections or oral agents for control purposes. Diabetes retinopathy is more likely to occur as a result of damaged nerves and blood vessels in the eye caused by elevated levels of sugar in the blood. These findings were in agreement with another study done in Cameroon [25].

5. CONCLUSION

The present investigation's prevalence of diabetes retinopathy was 31.5%, which was high indicating this is a public health concern requiring urgent interventions. In the social demographic factors, earning less than 6000 Ksh per month, and having a primary level of education increased the odds of having diabetes retinopathy. In the health system factors associated with diabetes retinopathy, the provision of laboratory testing services, the presence of a diabetes mellitus support group,

and the provision of diabetes mellitus health messages reduced the odds of diabetes retinopathy. In the lifestyle factors, drinking alcohol, smoking, and the incidence of uncontrolled blood sugars augmented the odds of diabetes retinopathy while having a normal body mass index reduced the odds of having diabetes retinopathy. There is a need for joint action by concerned stakeholders to reduce the risk of diabetes retinopathy among diabetic patients.

ETHICAL APPROVAL AND CONSENT

Ethical approval was sought from the MKU institutional and ethical review committee (ERC). An introduction letter was sought from MKU graduate school. NACOSTI granted the license to conduct the study. Additional approval was requested from the appropriate county offices (County Department of Health, County health committee, and HR Department). Consent forms were provided to the study participants before embarking on data collection. Participation in this study was purely voluntary. Study respondents' confidentiality and anonymity were highly upheld. Those who were found to be positive for DR were referred to an eye expert for appropriate treatment.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Original Research Article

Level of awareness of the benefits, socio-demographic and cultural factors influencing exclusive breastfeeding among mothers attending MCH clinic in Tudor sub county hospital

Consolata Mandi Machila[1]*, Jane Karonjo[1], Dominic Mogere[2], Peterson Kariuki[1]

[1]School of Public Health, [2]School of Nursing, Mount Kenya University, Kenya, East Africa

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***Correspondence:**
Consolata Mandi Machila,
E-mail: consolatamandimachila@gmail.com

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ABSTRACT

Background: Knowledge of exclusive breastfeeding (EBF) among women is essential when promoting optimal breastfeeding practices. Breastfeeding is recommended for the first six months of life and continuation of breastfeeding and adequate complementary foods for up to two years of age or beyond.
Methods: A descriptive cross-sectional study design was used. This study utilized a mixed method approach (qualitative and quantitative).
Results: The prevalence of exclusive breastfeeding was low at 33.6%. Data revealed that 60.9% of respondents were knowledgeable on the benefits of EBF, while 38.6% were not knowledgeable, the rest of the respondents did not respond or their answers were not valid.
Conclusions: Women's knowledge on benefits EBF and intention to practice it is still low. There was significant difference in the participants place of residence (rural versus urban).

Keywords: Exclusive breastfeeding, Descriptive cross-sectional, Prevalence, Level of awareness

INTRODUCTION

Researchers have identified breastfeeding during the first year as one of the most important strategies for improving child survival.[1] Knowledge of exclusive breastfeeding (EBF) among women is essential when promoting optimal breastfeeding practices. Based on this, WHO recommends EBF for the first six months of life and continuation of breastfeeding and adequate complementary foods for up to two years of age or beyond.[2] Despite the awareness being created by various government and non-governmental organizations on benefits of EBF, its practice remains lower than the globally recommended standard especially in developing countries.[3]

In Nigeria, the federal ministry of health (FMOH) in their document 'saving newborn lives maternal and child health' reported that Nigeria has one of the lowest EBF rates in the african continent.[4] The recent data indicated that the percentage of infants exclusively breastfed to the age of six months is fluctuating, from 17% in 2003 to 13.1% in 2008 and returned to 17% in 2013, while the proportion of children less than six months who received complementary foods increased from 18% to 35% in 2008 and dropped to 23% in 2013.[5]

Exclusive breastfeeding is known for its many benefits to both the mother and child. For an infant, the presence of vital nutrients likes proteins, vitamins and carbohydrates helps to protect the child from numerous diseases like ear infections, lower respiratory illnesses and meningitis, also protects the child from obesity. Moreover it protects the

child from developing allergies and also lowers the baby's risk of sudden infant death syndrome (SIDS). For the mother, EBF reduces stress level and postpartum depression, reduces the risk of getting breast and ovarian cancers and helps to reduce unplanned pregnancies enabling her to take good care of other children. It provides a strong bonding between the mother and her new born.[6] In 2012, WHA 65.6 resolution emphasized on countries to ensure that maternal and child nutrition especially the six global targets are met by 2025 and mostly more efforts were to be put on increasing the rate of exclusive breastfeeding by 50%.[7]

In Kenya, EBF was prioritized as one of the most important strategy in the reduction of maternal and infant mortality. EBF rates nationally was 32% and by 2017 it was expected to increase to 80%, but currently it's at 68%.[8,9] In 1991 baby friendly hospital initiative hospital was launched by WHO and UNICEF to strengthen EBF and to ensure the response is tremendous globally.[10] Hence the current study aimed at identifying any existing gaps which would ensure proper intervention measures can be put in place so that maternal and child health is safeguarded and specifically reducing infant morbidity and mortality within the study area.

Increase in morbidity and mortality in infants is mainly contributed to lack of exclusive breastfeeding practices which contributed to 11.6% mortality equivalent to 804,000 deaths in 2011 worldwide.[11] Globally 38% of infants are exclusively breastfed. In east Africa countries prevalence of are as follows Uganda 63.2%, Kenya 61% and Tanzania 50%, while in Mombasa county, the uptake is 67-68% and in Mvita constituency its 49%.[12]

METHODS

Research design

A descriptive cross-sectional study was adopted. It was preferred because it helps to describe the factors affecting exclusive breastfeeding among mothers at that point in time.

Inclusion and exclusion criteria

Mothers with infants below two years, from Tudor location and also those who signed consent forms were interviewed. The researcher interviewed mothers with infants below two years because some mothers brought infants for growth monitoring. The basis is that if the researcher dwelt only on mothers with babies who are 6 months old, she may have not been able to achieve the desired sample size.

Mothers with children above two years, not from Tudor location and refused to sign consent form were not interviewed.

Target population

The study targeted a population of 12,150 breastfeeding mothers attending MCH clinic at Tudor sub-county hospital.

Sampling procedures and technique

The study area was chosen among the 6 constituencies conveniently and purposively because it hosts four large slums within the county with people from different background and class.

As for the respondents, the MCH attendance register at the hospital was used to identify the first mother to arrive at the facility and systematic sampling method was used to get the rest of the required sample size. The facility per day receives 40 mothers and monthly 1760 and the sample size was 422, then the sampling interval was 4. Sampling interval was achieved by the following method; 40 mothers per day, 44 days duration of data collection, 422 sample size. Therefore,

$K=\frac{N}{n}$

$K=\frac{40\times44}{422}=\frac{1760}{422}=4.1$ (which is approximate to 4).

Therefore the sampling interval was 4 which is the K. The first respondent was assigned an even number and all mothers with even numbers were interviewed. The sampling frame per day was 2,6,10,14,18,22,26,30,34,38,.....,422.

Sample size determination

Since the population of the under-five is greater than ten thousand it was calculated using the formula below,[13]

$n=\frac{Z^2pq}{d^2}$

where,

n=desired sample (population >10,000); population greater than 10,000,

Z^2=1.96 (confidence interval). The standard normal deviate usually set at 1.96 or simply 2.00 which correspond to 95% confidence level,

p=the proportion of target population (0.5=50%) if prevalence is not known,

q=1-p (1-0.5),

d=0.05 or 0.02,

D=design effect (1 if its 95%, 2 if its 99%).

Therefore,

$n = \frac{1.962 \times 0.5 \times 0.5 \times 1}{0.05^2}$

n =384.

10% for none respondents,

$\frac{384 \times 10}{100} = 38.4$

Therefore the sample size was,

384+38=422.

Construction of research instrument

Both quantitative and qualitative data was collected in this study. Quantitative data was collected using questions which had multiple choices for the respondents to choose. Qualitative data was collected using open ended questions in the interviewer schedule, which was constructed using simple english language which was easy to interpret to breastfeeding mothers. Leading questions were also avoided to minimize biasness. All the variables were covered in the research instrument.

Testing for validity and reliability

Validity means the quality or correctness of a measure. The tool measures what is supposed to measure. This was ensured by pre-testing the research instrument after the training research assistants before administering it on breastfeeding mothers. A pre-test of the questionnaire through a pilot study was carried out to ascertain the clarity of the research instrument. The pre-test included 15 respondents who were deemed knowledgeable on issues regarding EBF. A pilot study was conducted at Shimo annex dispensary to assess the validity and reliability of the data collected. Thereafter the interviewer schedule was adjusted based on the pre-test recommendations.

Pre-testing ascertained the respondents understood the questions in the study tool. Reliability refers to stability of measurement over time even after several repetitions. It was measured using split half technique.

RESULTS

Prevalence of exclusive breastfeeding in tudor sub county

The prevalence of EBF was low at 33.6%. The following Table 1 and Figure 1 represent a summary of the findings.

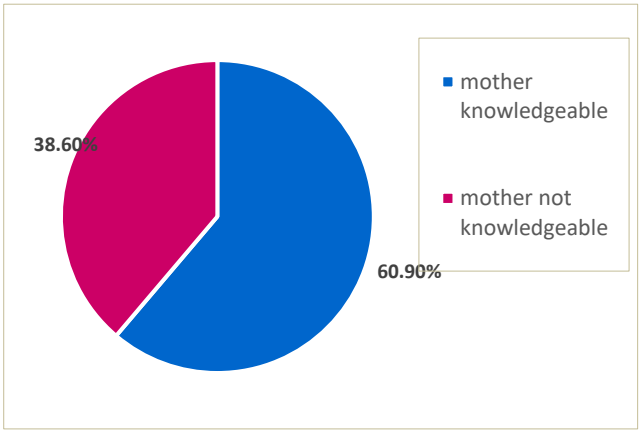


Figure 1: Prevalence of exclusive breast feeding in Tudor sub county.

Level of awareness of the benefits of exclusive breastfeeding in Tudor sub county

Data revealed that 60.9% of respondents were knowledgeable on the benefits of EBF, while 38.6% were not knowledgeable, the rest of the respondents did not respond or their answers were not valid. The following Table 2 and Figure 2 is a summary of these findings.

Table 1: Prevalence of exclusive breastfeeding.

	Frequency	Percent	Valid percent	Cumulative percent
Giving breast milk and other foods within first 6 months	269	66.4	66.4	66.4
Giving breast milk only for 6 months	136	33.6	33.6	100.0
Total	405	100.0	100.0	

Table 2: Mothers knowledge on the benefits of exclusive breastfeeding.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	Mother knowledgeable	248	60.9	61.2	61.2
	Mother not knowledgeable	157	38.6	38.8	100.0
	Total	405	99.5	100.0	
Missing	(No response)	2	0.5		
Total		407	100.0		

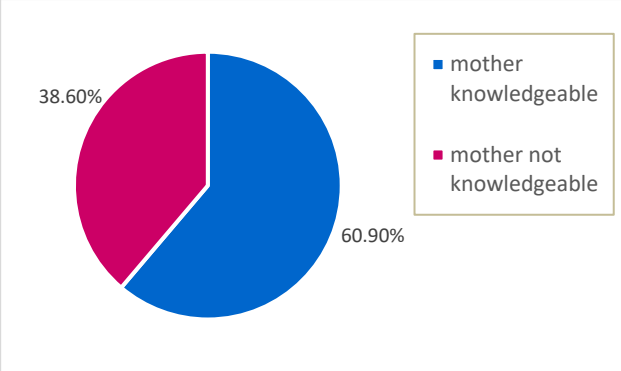


Figure 2: Level of knowledge on the benefits of EBF in Tudor sub county.

DISCUSSION

Prevalence, socio-demographic and cultural factors associated with EBF in Tudor sub county

The prevalence of EBF was observed to be low at 33.6%. This is far much lower than the national prevalence of EBF prevalence reported in the 2014 as 61%.[14] This can be explained by the fact that the national prevalence is not uniform throughout Kenya and some regions in Kenya like Mombasa county have low prevalence of EBF.

In a national study in rural Ghana, education, occupation, economic factors and marital status were the factors affecting EB.[15] In contrast, to this finding, an inverse relationship was observed in developing countries. This was possibly due to a perception that breastfeeding was old fashioned or an indication of lesser social status. There is an association between higher education and socioeconomic status. This increases the mother's ability to purchase infant formula. In addition to educational attainment, maternal age has been identified as among the factors most strongly influencing the initiation, duration and level of infant feeding.[16]

Level of awareness of the benefits of exclusive breastfeeding

As indicated in this study, the level of awareness of the benefits of EBF was 60.9%. Close to 40% women had inadequate knowledge on the benefits of EBF. Studies conducted in other parts of the world have shown that one of the reasons why women do not practice EBF is inadequate knowledge on the benefits of EBF.[12] These findings are in accordance with other studies.[11] More so, the poor knowledge exhibited by the participants might be associated with their parity since this is the first time they are exposed to experiences of motherhood and quite a good number of them claimed they had not witnessed other mothers breastfeeding exclusively.

A similar observation was also noted in Kware town of Sokoto state of Nigeria where only 31% of the mothers had adequate knowledge of exclusive breastfeeding.[17]

CONCLUSION

The prevalence of EBF among women of reproductive age in Tudor sub county is 33.6%. The level of awareness of EBF among women of reproductive age is 60.9%. Findings of this study revealed that women's knowledge on EBF and intention to practice it is still low. There was significant difference in the participants place of residence (rural versus urban), EBF knowledge sources and EBF knowledge, while the maternal age, educational attainment, EBF knowledge and sources of information about EBF were found to be significant predictors of good intention to practise EBF.

Recommendations

Health workers should carry intensify health education to increase the level of awareness of benefits of EBF among women of reproductive age in Tudor sub county. Health workers should empower men on importance of EBF so that they can emphasize to their wives on adherance and also offer social support. Professional employed husbands should be encouraged to apply for paternity leave so that they can offer social and moral support to their wives to help in the implementation of the practice.

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Factors Influencing Uptake of Cervical Cancer Screening among Rural Women in Webuye East Sub - County, Kenya

Peterson K. Kimani[1*], Joseph M. Muchiri[2], Joseph N. Juma[1], Dominic Mogere[1] and Enoch Ngetich[3]

[1]Department of Epidemiology and Biostatistics, Mount Kenya University, Thika, Kenya.
[2]Department of Community Health, Mount Kenya University, Thika, Kenya.
[3]Department of Environmental Health, Mount Kenya University, Thika, Kenya.

Authors' contributions

This work was carried out in collaboration among all authors. Author PKK conceived and designed the study, wrote the protocol, collected data and wrote the first draft and the final of the manuscript, Author EN participated in the statistical analysis, Authors JMM, JNJ and DM supervised and approved the study at any given stage. All authors read and approved the final manuscript.

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ABSTRACT

Aims: The study sort to determine factors influencing the uptake of cervical cancer screening services among rural women aged 18-69 years in Webuye East Sub-County, Kenya.
Study Design: We conducted a cross-sectional descriptive study design.
Place and Duration of Study: Webuye East Sub-County, Bungoma County, Kenya, between December 2018-March 2019.
Methodology: The study adopted a quantitative data collection technique to a target population of 125 rural women aged 18-69 years.
Data on social demographics and social-cultural factors, level of uptake, level of awareness and health care facility factors influencing cervical cancer screening variables were collected using

**Corresponding author: E-mail: Petersonpkk@gmail.com;*

structured questionnaires. Data were verified, coded, and analysed with SPSS version 25. Descriptive statistics were analysed and presented in tables. Chi-square tests were carried out to determine the link between categorical variables.

Results: The use of screening facilities for cervical cancer was found to be low at 26% (33/125). On the overall, the study showed a significant relationship between age [p=0.05], women with insurance cover [p=0.00] and income [p=0.01].

Conclusions: Cervical cancer screening is low women in the study area. The study concludes that there is a significant/potential possibility of improving women's participation in cervical screening if regular best practices are embraced.

Recommendations: The study recommends that Women enrol in health insurance schemes to ensure that they access screening services together with enhancing community awareness on cervical cancer.

Keywords: Cervical cancer; screening uptake; cancer screening; awareness.

1. INTRODUCTION

Globally, about 640,000 cancer cases occur annually due to human papillomavirus (HPV), of that 89% affect women while cervical cancer accounts for a significant 82% of the total [1]. It is estimated that 90% of fatalities from cervical cancer are expected in developing nations [2]. The WHO estimates that around 68,000 cervical cancer incidences occur every year in Africa. While, The figure is conservative and it is thought to be more owing to challenges encountered at cancer registries in the region [3]. The East Africa community bears a high burden of mortality and morbidity rates according to a recent survey, Tanzania ranks 6th followed by Uganda ranked 10th then Kenya ranks 14th [4].

According to the 2014 Kenya Demographic and Health Survey, 68.2% of the women surveyed had heard of cervical disease in the western region this is compared to their counterparts in Nairobi 89.5% and central with 86.8%. Among those, only 8.1% have had cervical cancer screening as compared to 23.6% and 21.8% in Nairobi and central regions, respectively [5].

Reducing cervical cancer incidences will play a huge role too in achieving the sustainable development goals majorly the goals on ending poverty, ensuring healthy lives, promoting the lifelong prospects for all, promoting gender equity and enablement of females and reduce inequalities within and among countries [6].

The study is vital in helping both the National and counties to come up with better policies and frameworks for upscaling uptake of screening services.

2. METHODS

The study was community-based; it adopted a cross-sectional descriptive research design. The sample size was determined using Fisher et al. (1998) formula.

The research focused on 125 women in Webuye East Sub County aged 18 to 69 years. In Bungoma County, due to the low cancer screening uptake in these areas. Women aged 18-69 years were sampled as women at this age are all vulnerable to cervical cancer.

First, Bungoma county was purposively selected as it registered the low rates of utilization of cervical screening services. Second, Webuye East Sub–County was chosen based on the fact that it has a higher rural orientation compared to other Sub–Counties. The use of cervical cancer screening facilities is also comparatively smaller in the Sub– County [5]. Third Ndivisi ward was purposively selected among three wards as it has the highest population compared to the other wards.

3. RESULTS

The response rate was 100%. This was due to the self-administration of the questionnaires, which ensured a 100% response rate. The return rate is statistically representative, therefore enhancing generalization of the research results. Socio-demographic and economic characteristics of respondents are displayed in Table 1.

3.1 Uptake of Cervical Cancer Screening

A majority of participants, 74% (92) were not tested for cervical cancer, with only 26% (33) being screened during interviews as illustrated in Table 2.

Table 1. Characteristics of study respondents

Variable		N=125	%
Age group	Mean	43.9	
	Std. Deviation	11.1	
	25-35	29	23.2%
	36-46	47	37.6%
	47-57	32	25.6%
	>58	17	13.6%
Education Level	Non-formal Education	14	11.2%
	Primary Level	67	53.6%
	Secondary Level	34	27.2%
	Tertiary Level	10	8.0%
Marital Status	Single	14	11.2%
	Married (monogamy)	69	55.2%
	Married (polygamy)	38	30.4%
	Divorced/separated	4	3.2%
Employment status	Employed	43	34.4%
	Others	26	20.8%
	Unemployed	56	44.8%
Annual Income	0-100,000	115	92%
	100,000-500,000	10	8%
Insurance Cover	Yes	33	26.4%
	No	92	72.8%

Table 2. Proportion of women that had ever been screened for cervical cancer

Ever been screened	Frequency	Percent
No	92	73.6%
Yes	33	26.4%
Total	125	100.0%

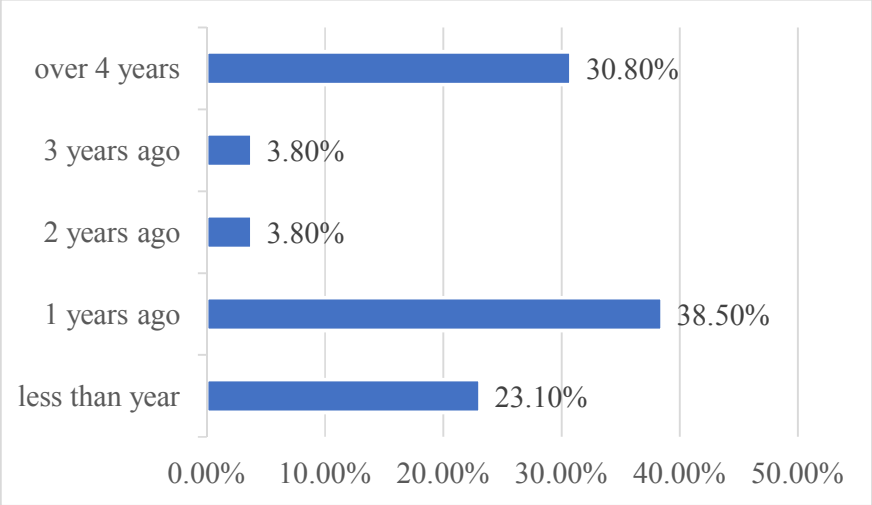


Fig. 1. Last time screened

3.2 Last Time Screened

From Table 3, of those who had ever been screen for cervical cancer (N=92), 23.1% reported to have been screened on the very same say year of the study (2018), 38.5% reported to have been screened a year preceding the study; 3.8% reported to have been

screened in 2 and 3 years ago respectively, while 30.8% reported having been screened for cervical cancer 5 years ago as demonstrated in Fig. 1.

3.3 Association between Age and Utilization of Screening Services

A significant relationship existed between age and the use of screening facilities ($\chi 2 = 9.425$, $p=0.05$) as shown in Table 3 hence more Women between the ages of 36-46 were more probable than their counterparts to go for testing.

There was no statistically significant association between the use of cervical cancer screening and the education level, marital status and occupation status. Chi-square test of independence shows that the level of respondents' income was found to be statistically significant with cervical cancer screening or not ($\chi^2 = 6.316$, $p=0.012$) as indicated in Table 5.

Health insurance ownership was observed to be associated with the use of screening facilities according to Chi-Square test as shown in Table 5 which suggested that women with an insurance cover were four times more likely to screen for cancer than those did not have a health insurance cover.

3.4 Social-cultural Factors

Underutilization of cervical cancer has often been compounded with women's social-cultural practices. The interviewer sort to ascertain whether cultural factors that would hinder uptake of screening services.

The participants were asked if there are cultural beliefs that could prevent them from using cervical cancer screening facilities, 8.8% said yes, 91.2% said no while.

Among the respondents who said yes, 45.5% (N=5) claimed that cervical cancer was a result of a curse hence not treatable, 18.5% (N=2) noted that it is their Christian belief not to go to hospitals but rather use herbs while 18.5% (N=2) stated that it was against their culture to have their private parts intruded. The respondents were asked if their religious affiliation encouraged them to seek cervical cancer screening. A majority, 62.4% said no, while the rest, 37.6% said yes. From the respondents who said yes, 34.0% (N=16) said their religious leaders provided education on cervical cancer, 52.1% (N=24) encouraged to them to seek screened while 15.2% [7] reported their religious leaders directed them on where to seek screening services.

3.5 Barriers to Cervical Cancer Screening

The participants quoted various obstacles to accessing cervical cancer screening, 37.8% explained that they needed more information pertaining the disease, 13.5% were concerned about their privacy which they considered as an intrusion, while 10.3% thought the test was too expensive and that they couldn't afford as shown in Fig. 2.

Table 3. Association between age and utilization of screening services

	Screened for cervical cancer %			
Age category	**No**	**Yes**	**Total**	
25-35	25(86.2%)	4(13.8%)	29(100%)	$\chi 2 = 9.425$,
36-46	29(61.7%)	18(38.3%)	47(100%)	$p = 0.05$
47-57	23(71.9%)	9(28.1%)	32(100%)	
58-68	14(93.3%)	1(6.7%)	15(100%)	
69 & Above	1(50%)	1(50%)	2(100%)	
Total	92(73.6%)	33(26.4%)	125(100%)	

Table 4. Association between income and utilization of screening services

	Screened cervical cancer			
Annual income	**No**	**Yes**	**Total**	
0-100,000	88(76.5%)	27(23.5%)	115(100%)	
100,000-500,000	4(40%)	6(60%)	10(100%)	($\chi^2 = 6.316$, $p=0.01$)
Total	92(73.6%)	33(26.4%)	125(100%)	

Table 5. Association between owning an insurance cover and screening

Have insurance cover	No	Yes	Total	
No	75(82.4%)	17(17.6%)	92(100%)	
Yes	17(51.5%)	16(48.5%)	33(100%)	(χ2 =14.713, p=0.01)
Total	92(73.6%)	33(26.4%)	125(100%)	

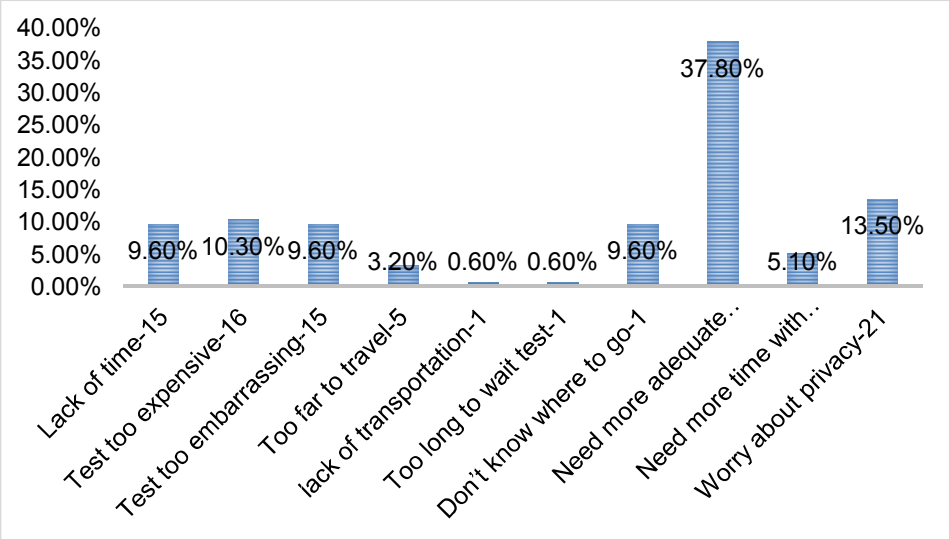


Fig. 2. Barriers to cervical cancer screening

Table 6. Proportion of women who had heard about cervical cancer

Heard about cervical cancer	Frequency	Per cent
No	23	18.4%
Yes	102	81.6%
Total	125	100.0%

3.6 The Level of Awareness

3.6.1 Heard about the screening of cervical cancer

Majority of respondents, 82% (102) had heard of cervical testing as opposed to 18% (23) who never heard of it. (Table 6).

3.6.2 Source of information on cervical cancer

Most of the study participants re-counted having learned about cervical cancer from the radio 43.0%, 31% from the hospitals, 14% from friends, 7% from community health workers, 3.10% from television and 0.80% from other sources (Fig. 3).

3.6.3 Risk factors for cervical cancer

Barriers to the screening of cervical cancer screening vary but not limited to knowledge. The research sort to assess the respondent's understanding of risk factors. Most participants 75.2%, were unaware of the predisposing factor linked to cervical cancer, 11.3% assert that cervical cancer is associated with multiple sexual partners, 5.30% to smoking or the use of tobacco, 3.8% (hereditary)Family history of cervical cancer while only 0.80% mentioned a woman having more than three pregnancies (Fig. 4).

3.6.4 Signs and symptoms of cervical cancer

It has been averred that the lack of understanding about signs and symptoms associated with cervical cancer is a significant reason why screening facilities are underutilized. The researcher sort to assess the knowledge regarding symptoms and signs. Most respondents were unaware of cervical cancer signs and symptoms 64.20%, 13.90% mentioned breeding between menstrual periods, 8.40% said

irregular menses while 5.30% said abnormal bleeding after intercourse after sexual intercourse, 2.60% indicated Vaginal discharge while fatigue, weight loss, loss of appetite and one swollen leg accounted for 0.70% each (Fig. 5).

3.6.5 Preventive measures for cervical cancer

The investigator questioned the participants whether they knew any ways to prevent cervical cancer, 83.7% of the participants knew no way to prevent cervical cancer., 10.6% saying the provision of condoms to sexually active couples while 3.2% and 2.4% saying vaccination and delayed the start of sexual activities respectively (Fig. 6).

3.6.6 Tests carried out during screening

Comprehension of the screening process bridges the gap between knowledge and preventive procedures. This increases the probability of women being involved in cervical cancer screening. Most participants were unaware of any screening options available 83.7%, 11.40% knew VIA/VILLI, while 4.90% knew Pap smear (Fig. 7).

3.6.7 Age for screening services

The success of screening programs is highly influenced by the screening of women who are a high risk as the best predictor of high risk has been affirmed by age. When asked which age women are encouraged to go for screen services, the most substantial proportion 70.40% did not know, 8% said the age between 10-20 years, 11.2% said the age between 21-30 years, 9.60% said the between the age of 41-50 years while the least proportion 0.80% said the age between 41-50% (Fig. 8).

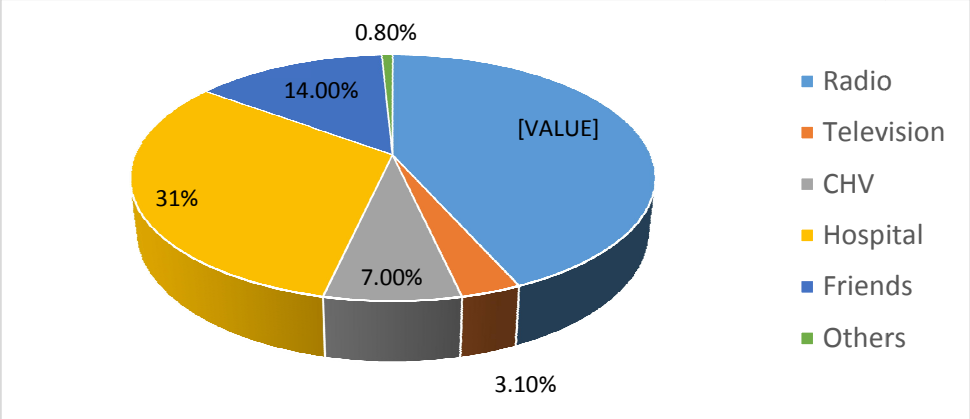


Fig. 3. Source of information

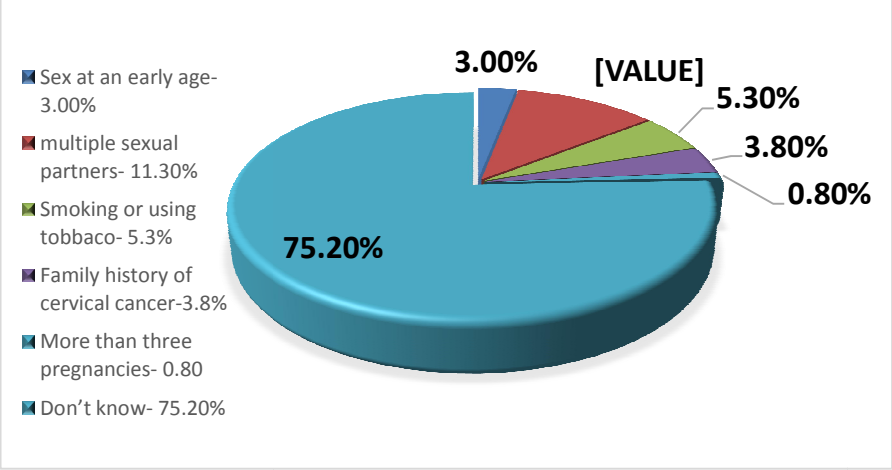


Fig. 4. Risk factors of cervical cancer

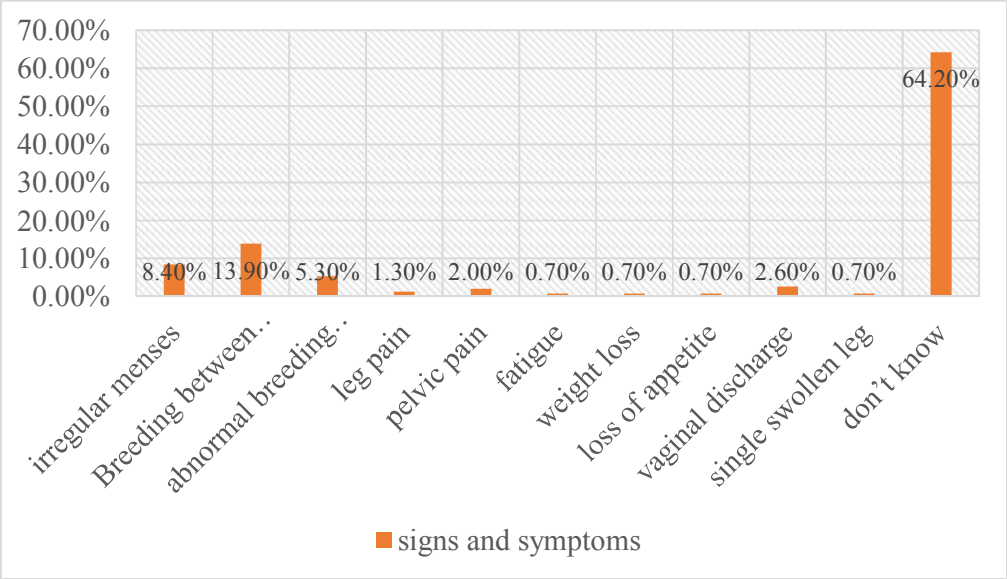


Fig. 5. Signs and symptoms of cervical cancer

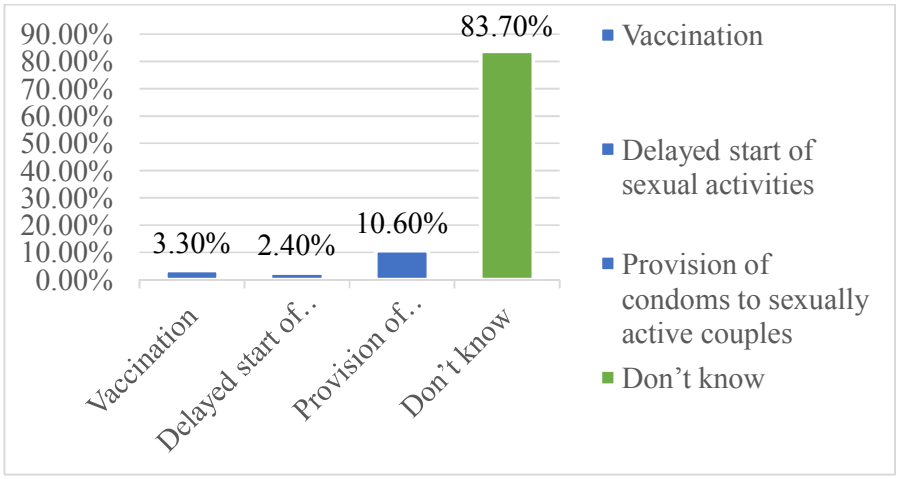


Fig. 6. Preventive measures of cervical cancer

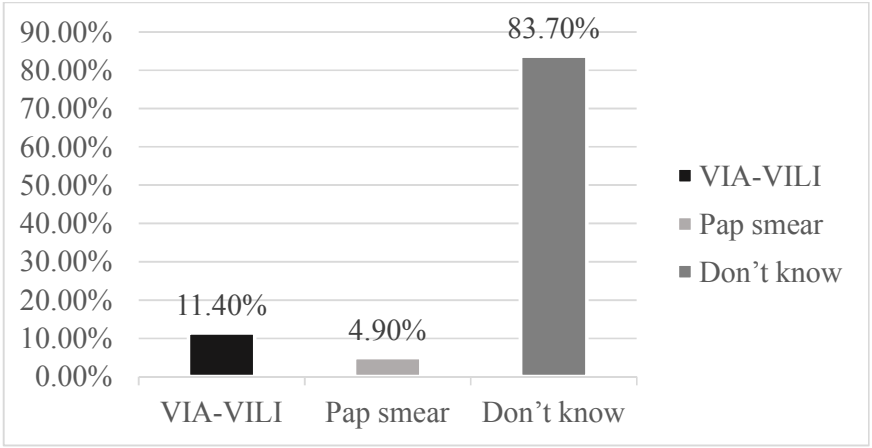


Fig. 7. Tests are carried out during screening

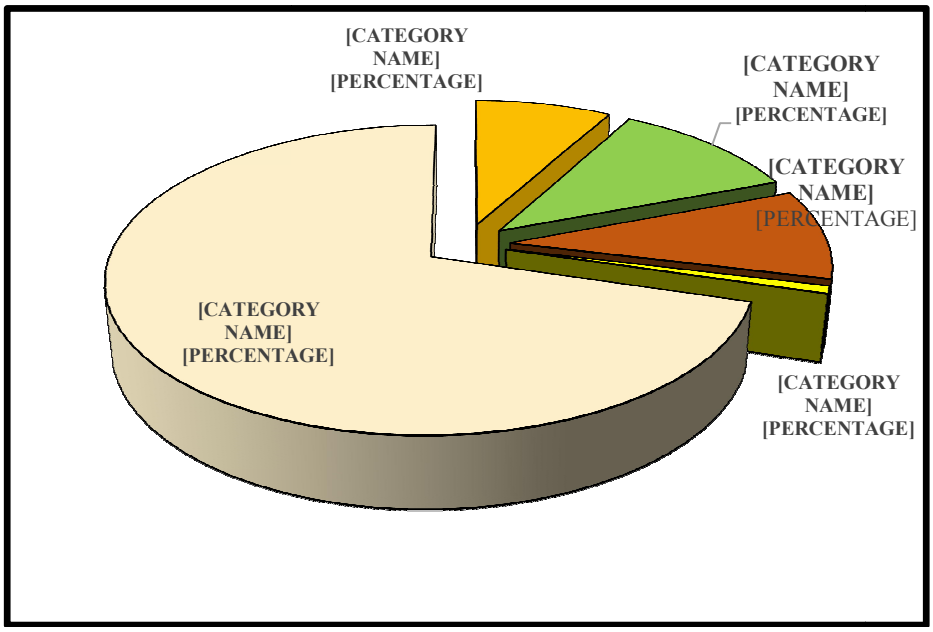


Fig. 8. Age which women are encouraged to go for screening services

Table 7. Number of visits to health care providers

	Responses	
	N	**Per cent**
Less than once a year	54	43.9%
Once a year	23	18.7%
More than once a year	46	37.4%
Total	123	100.0%

Table 8. Discussed cancer with the health provider on the last visit

	Frequency	**Per cent**
No	106	84.8
Yes	19	15.2
Total	125	100.0

Table 9. Charges for cervical cancer screening

	Frequency	**Per cent**
Don't know	28	22.4
No	69	55.2
Yes	28	22.4
Total	125	100.0

3.7 Health Care Facility Factors

3.7.1 Visits to the health care provider

While asked how often they see their health providers annually, 43.90% said less than once a year, 18.7% visited once, while 37.4% visited more than once (Table 7).

3.7.2 Discussed cancer with the health provider on the last visit

The participants were asked if they talked to the health care provider on their last visit about cervical cancer, 84.8% said no, while 15.2% said yes.

Table 10. Free cervical cancer screening

	Frequency	Per cent
Don't know	62	49.6
No	13	10.4
Yes	50	40.0
Total	125	100.0

3.7.3 Charges for cervical cancer screening

While asked if women are charged for cervical cancer screening, the most substantial proportion, 55.20% (69) said no while both those who said yes and don't know accounted for 22.40% each.

3.7.4 Free cancer screening

The respondents were asked if the facilities in which they seek services provide free cervical cancer screening 49.6% said didn't know, 40% said yes while 10.4% said no.

4. DISCUSSION

Screening rates of cervical cancer differ by socio-demographic variables; some of the social demographic variables that influence screening of cervical cancer produced significant results. Age and use of screening services for cervical cancer were found to have a statistical significance; women aged between 36 and 46 were more probable to be screened than their counterparts. Descriptive statistics illustrate, uptake of cervical cancer screening reduced with increase in age of respondents This finding collaborates a study in Maharashtra, India wherein that increasing age was found to have a relationship with a decline in utilization of screening services [7]. There was also a statistical association between annual income and screening; women with lower income were less likely to seek screening services. In line with the study, research on cervical cancer screening predictors among Kenyan females revealed more excellent screening rates among females in high-income quintile [8] health insurance ownership an insurance cover was established to a determinant to the use of screening facilities. This indicates considerable potential for improvement of cervical screening uptake in the study area if the economic factors are improved and increase of insurance covers ownership. A study on increasing testing and access on cervical cancer resonated with this study, it reported that in comparison with those without insurance, NHIF patients were more likely to be screened or finish a therapy [9]. Cultural convictions have often been ascribed to screening facilities; 91.20% reported that there were no cultural beliefs that would impede them from screening services. This result could have been due to limited knowledge of cervical cancer since most of the participants were uncertain of the predisposing factors, physical symptoms and preventive measures.

Results from the study show that while 81.6% of respondents learned about cervical cancer, 74% of participants had never been screened. The respondents between the ages of 36-46 had accounted for the most substantial proportion (38.3%) that had been screened. The Lack of adequate cervical cancer information, the cost of screening and worry about privacy were some of the primary reasons that respondents gave for having not been screened thus, increasing awareness and creation of an enabling environment would increase utilization. Mantula's study on the use of screening services for cervical cancer in a provincial hospital in Zimbabwe posited similar results wherein, 18.7% of survey participants had been screened while 62.2% had heard about cervical cancer [10].

Most women had heard of cervical cancer, 82% (102) while 18% (23) had not. A Chi-square test disclosed a statistical association between participants that had heard of cervical cancer and screening. It was more probable that women who had heard of cervical cancer had been screened. This corresponded to other studies [10]. In this study, the (43%) of participants quoted radio as their primary source of cervical cancer-related information, followed by hospitals 31%. This finding corroborates findings by Lukorto [11] in Dagoretti Kenya, wherein, 70% of respondents, asserted that radio was their primary source of cancer-related information. Most participants were unaware of any related predisposing factors associated with cervical cancer (75.2%). A plausible explanation for the low understanding of the factors predisposing one to cervical cancer was lack of information these findings are consistent with prior results [12].

Most participants (64.2%) lacked an understanding of the signs and symptoms of cervical disease, 13.9% mentioned breeding between menstrual period, and the results demonstrate two things. First, the women lack knowledge on cervical cancer, and second, the women are unable to go for timely screening because they could not identify signs and symptoms which is notable on the low utilization of screening services in this community, this was affirmed by a similar study in Kibera [13]. However, it is worth discussing that signs and symptoms are not the best indicators for cervical cancer and should not be relied on during the prevention as the disease will already have developed. Therefore, the research(er) concludes that there is a lack of understanding about signs and symptoms and that females should receive help and periodic health education on cervical cancer. The study found that 83.7% of participants did not understand ways preventing cervical cancer and could be a plausible explanation for the elevated incidence of cervical cancer in Rural Bungoma County and the low screening uptake. This study revealed low levels of awareness about cervical cancer causes, signs and symptoms, risk-related factors preventive measures, barriers and this negatively affected uptake of cervical cancer screening.

A study carried out in Ethiopia, whose objective was to determine preventive posited similar results [14]. The understanding of females with cervical cancer and screening tests is critical in strategies to prevent cervical cancer [15].

Most of the respondents did not know any of the available tests for screening at 87.7%. This is an essential finding in the understanding of the women's knowledge of the screening process having mentioned lack of information and worry about privacy as the significant barriers for using screening services. It is unlikely that women will seek screening services if they feel their privacy is intruded.

Approximately 70.40% of the participants did not understand which age females were encouraged to seek screening services. This may explain why uptake is low, the government of Kenya argues that any woman who has ever had sexual intercourse is eligible for cervical cancer screening but puts more emphasis for screening among women aged 25 to 49 years which is their target population. Women between the ages of 50 and 65 are still at danger of cervical cancer and are advised to seek screening facilities within five years with their resources [16].

Majority of the respondents reported to visit the health care providers less than once annually, 18.7% once annually, and 37.4% more than once. It has been observed that women who visit health care providers often are probable to have a higher understanding of cervical cancer as well as likely to seek screening services [17].

Most respondents (84.7%) stated that during their visits, they did not discuss cervical cancer with their health care provider, while 15.2% said yes.

However, when comparing our results with previous studies [18], it must be pointed out that there is need for client and health care provider discussion on cervical cancer mainly through a Client-centered approach and assist in overcoming concerns and misunderstandings.

About 22.4% respondents said that women are charged for screening services, 55.2% said no while 22.4% didn't know. Knowing the cost of testing is essential as it determines the affordability of screening services, other results were broadly in line with this study [19]. Screening cost was attributed as among the primary challenges in screening uptake.

5. CONCLUSIONS

The study concludes that Cervical cancer screening is low among women in the study area. The low level of understanding could have precipitated this. Most of them cited the absence of appropriate information as the primary screening obstacle to the screening of cervical cancer. A significant proportion of the women in Rural Bungoma County were less educated, and they possessed less information and experiences about cervical malignant growth and the screening programs. This research has shown that the majority of women in Bungoma had not heard of cancerous cervical growth, and neither had they thought about seeking screening services. despite having very limited or no knowledge of cervical cancer, the majority of women showed interest in seeking cervical cancer screening.

The study concludes that there is a significant/potential possibility of improving women's participation in cervical screening if regular best practices are embraced.

6. RECOMMENDATIONS

It is necessary to create awareness among females primarily through health discussions, awareness campaigns, and instructional programs about the advantages of seeking screening for cervical cancer.

The study recommends that health workers increase their engagement with women on cervical cancer issues during their regular visits.

The Ministry of Health and county governments should work together and involve other stakeholders in enhancing the use of screening for cervical cancer.

The government and other stakeholders should plan and provide screening services closer to the women as this will increase their uptake as a result of the reduced cost incurred in transport and time used to the facilities.

CONSENT

Study participants were taken through the information sheet and consent form where the study purpose, objectives, and voluntary participation were discussed. Permission from respondents was sought verbally and through a consent form.

ETHICAL APPROVAL

Ethical approval for conducting the research was acquired from Mount Kenya University Ethical and Research Committee and the School of Postgraduate Studies (MKU who issued an introductory letter to facilitate application for proper clearance to collect data for the study. The National Commission for Science, Technology, and Innovation (NACOSTI) granted a Research License for investigation, inquiry, an interview Permit No. NACOSTI/P/18/22250/ 24324. The County Government of the study area was informed of the intended study and the permission and co-operation sought.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Original Research Article

Effect of female partner-led brochures method on knowledge and intention for prostate cancer screening among men in Kiambu County, Kenya

Peterson K. Kimani[1]*, Joseph Muchiri[1], Margaret W. Nyongesa[2]

[1]School of Public Health, Mount Kenya University, Kenya
[2]School of Health and Biomedical Sciences, Technical University of Kenya, Kenya

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***Correspondence:**
Dr. Peterson K. Kimani,
E-mail: petersonpkk@gmail.com

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ABSTRACT

Background: Prostate cancer (PC) is a problem of public health concern globally. The problem is further complicated by the low rates of screening which results in late detection of the disease. Further, the misconception regarding PC screening (PCS) methods further makes men avoid screening. The main objective of the study was to evaluate the effect of female partner-led brochures method on knowledge and intention for PC screening among men in Kiambu County, Kenya.
Methods: The research adopted a randomized controlled trial study design. Multistage sampling was employed in this study. The sample size was determined using Magnani formulae and a total of 279 respondents were recruited in the study. The Chi-square test was used to assess the difference in intention and knowledge of PC between the control and intervention groups. Further difference in difference analysis was used to assess the overall effect of the female partner-specific gain-framed and loss-framed brochures intervention on the intention of PCS and knowledge on PC.
Results: The intervention groups had a significantly higher mean difference in difference in knowledge about PC than the control group with the group intervened using gain-framed and loss-framed brochures having a mean DID of 4.989 (3.561–6.418) and 5.264 (3.804–6.724) respectively. The increase in knowledge was more in the group intervened using loss-framed brochures.
Conclusions: The study recommends the utilization of a combined approach of gain and loss-framed messaging in enhancing PCS.

Keywords: Female intention, Knowledge, Partner-led, Prostate cancer, Screening

INTRODUCTION

Globally, prostate cancer (PC) is among the leading causes of cancer-related deaths among men.[1] In 2018 the global cancer projected report estimated that there were 1,276,106 new cases of cancer which accounted for about 7.1% of all cancer cases globally. The same report further estimated that there were 358, 989 prostate cancer-related deaths in 2018 which accounted for 3.8% of all cancer-related deaths worldwide. Similar to the global trend the burden of PC in Africa is considerably high with incidences and PC mortality rates of 26.6 and 14.6 per 100, 000 men respectively.[2] Evidence further suggests that Sub-Saharan Africa accounts for about 20.3% of all cancers among men globally.[3] Evidence indicates that early screening of PC is critical in reducing the burden of PC since it provides opportunities for early-stage detection as well as the use of first-line interventions aimed at controlling and increasing survival rates.[4]

In Kenya, PC screening (PCS) is extremely very low at about 4.4%.[5] The low rates of screening make it difficult

to detect PC early and thus higher chances for morbidity and mortality. Evidence suggests that an individual's decision for PCS is highly influenced by their intentions. According to the theory of reasoned action, intention is highly influenced by attitude towards the behavior as well as the opinion of other people on the outcome.[6] Evidence further suggests that the attitude towards PC screening is highly influenced by the nature of information patients have on PC screening. For instance, a Nigerian study concluded that when people are provided with the right information then they have increased intention for PCS.[7]

One innovative approach to address PCS is the use of female partner-led brochure interventions. This method leverages the influence of female partners in men's health decisions, recognizing their potential role as health advocates within the family unit. Previous studies have shown that involving female partners in health interventions can significantly impact men's health-seeking behaviors.[8] In the context of Kiambu County, Kenya, where traditional gender roles often influence healthcare decisions, this approach may prove particularly effective in promoting PCS. The female partner-led brochure method combines the power of targeted health information with interpersonal communication within intimate relationships. By equipping female partners with knowledge about PC and screening procedures, this approach aims to create a supportive environment for men to consider and pursue screening options. Furthermore, it aligns with the growing recognition of the importance of gender-sensitive approaches in public health interventions, particularly in addressing male-specific health issues.[9]

The main objective of the study was to assess the effect of female partner-led brochures method on knowledge and intention for PCS among men in Kiambu County, Kenya.

METHODS

Study design

The research adopted a randomized controlled trial study design. In order to carry out the study, study sites were randomly selected within Kiambu County whereby one sub-county was the control site and two other sub-counties were the intervention sites. In the control and intervention sites study, men who were above 40 years old and who had resided in Kiambu County for a minimum period of 6 months were randomly selected. In this study, the study participants in the intervention site received a series of intervention.

The intervention involved the use of female partner-specific gain-framed and loss-framed brochures. Precisely the study participants' female partners received gain-framed and loss-framed bronchures with health information on cancer of the prostate while female partners of study participants in the control group received brochures on a different health topic.

Study site

The study was conducted in Kiambu County. The county is located in the central region and spans a total area of 2543.5 km^2, of which 476.3 km^2 is covered in forest. According to the 2022 census, the population of Kiambu County is about 2,417,735 with 1,187,146 being males, 1,230,454 being females, and 135 intersex persons.[10]

The region, which is located between 1500 and 1800 meters above sea level, is primarily a tea and dairy zone, though some other activities like the farming of maize, fruits, and vegetables are also carried out there.[11]

Study population

This study targeted men aged 40 to 69 years from rural Kiambu County, Kenya. In addition, their female partners were also included as a secondary target population. The inclusion of female partners was based on evidence that suggests their critical role in promoting health behaviors in their male partners.

Sample size determination

The Magnani (1997) formula has been recommended as a good method for estimating the sample size when conducting an impact study.[12] As a result, the study recruited 279 study respondents.

Inclusion criteria

Men who lived in Kiambu County for at least six months during the study period. The study also looked at men between the ages of 40 and 69 who lived with a female partner. Furthermore, men who consented to sign the informed consent form were also included in the study.

Exclusion criteria

Participants who were too ill to communicate were not allowed to participate in the study. Men who fulfilled the study's inclusion requirements but lacked a typical female partner were also disqualified.

Sampling technique

Kiambu was purposefully picked based on the uptake of screening services and the high number of PSC-related deaths.[13] To recruit the intended study respondents, multi-stage sampling was used. At the household, couple/couples who met the inclusion criteria were encompassed in the research.

Where a couple in the household did not meet the inclusion criteria or were absent, they were replaced by their neighbors as long as they met the inclusion criteria. Since the study was an intervention research, the study was conducted between November 2023 to June 2024.

Data collection tools and procedures

A structured questionnaire was used. The tool comprised of items on awareness of cancer of the prostate screening and intention to prostate cancer screening. Intention to screen for cancer of the prostate was measured using a validated scale such as the prostate cancer screening decisional balance scale (PCS-DBS).[14] The intervention involved the use of female partner-specific brochures in different message frames(gain-framed and loss-framed). Female partners in the intervention group received female-specific brochures in different message frames, while those in the control group received brochures with simple 'normal' health education brochures with information on PC. After six months a posttest survey was conducted that collected data that determined the cancer of the prostate screening knowledge status among the respondents as well as their intent to screen for the disease.

Data analysis plan

Statistical package for the social sciences (SPSS) version 29 was employed in descriptive statistics while STATA version 15 was employed for inferential statistics. To measure the effect of the brochure type and message frame on the desire to screen for cancer of the prostate and awareness of cancer of the prostate, the Chi-square test was used to determine the differences in knowledge and intention for PCS between participants in the control and intervention sites pre and post-intervention. Furthermore, data was subjected to a difference in difference analysis to measure the overall effect of the female partner-specific gain-framed and loss-framed brochures intervention on the intention of PCS and knowledge of PC. A p value of ≤ 0.05 was set to determine the statistical significance. Data generated during the data analysis process is also presented using tables and bar graphs.

Ethical consideration

Ethical clearance to conduct the study was sought from the MKU Institutional and Ethical Review Committee (IERC) and the National Commission for Science, Technology, and Innovation (NACOSTI). Furthermore, permission was sought from the Kiambu County director of Health. Additionally, consent was also sought from the study participants. Participation in this study was voluntary.

RESULTS

Socio-demographic characteristics

As provided in Table 1, at baseline and end line there was a significant difference in age between the control and intervention groups ($p<0.05$). Respondents who were aged 40-49 years old in the group intervened using gain-framed brochures were over three quarters, those in the group intervened using loss-framed brochures were close to two-thirds while in the control group, they were close to half. There was no significant difference in the highest level of education, religion, occupation, and monthly income between the control and intervention groups at baseline and end line ($p>0.05$). It is worth noting that a majority of respondents in the control group at baseline and endline had primary education while a majority of respondents in the intervention groups had secondary education. In regards to religion, all the respondents in the control and intervention groups were Christians. A high number of respondents in the control and intervention groups at baseline and end line were self-employed. At baseline the mean monthly income in the control group was Ksh. 15707.7±10402.1, the monthly income in the group intervened using gain-framed brochures was Ksh. 16096.8±15006.7, while monthly income in the group intervened using loss-framed brochures, was Ksh. 16102.2±20975.2. At end line the mean monthly income in the control group was Ksh. 16000±10449.2, monthly income in the group intervened using gain-framed brochures was Ksh. 16208.8±15150.2, while monthly income in the group intervened using loss-framed brochures, was Ksh. 16329.7±21136.9.

Intention for prostate cancer screening

As provided in Figure 1, At baseline, there was no significant difference in intention for PCS among the respondents in the control and intervention groups (χ^2 (2, n=279) =0.462, p=0.794). At the end line, there was a significant difference in intention for PCS among respondents (χ^2 (2, n=279) =11.068, p=0.004). Over a half (54.9%) of respondents in the group intervened using loss-framed brochures had the intention for PCS, close to a half (48.4%) in the group intervened using gain-framed brochures had the intention for PCS while in the control only close to a third (31.1%) of the respondents had the intention for PCS.

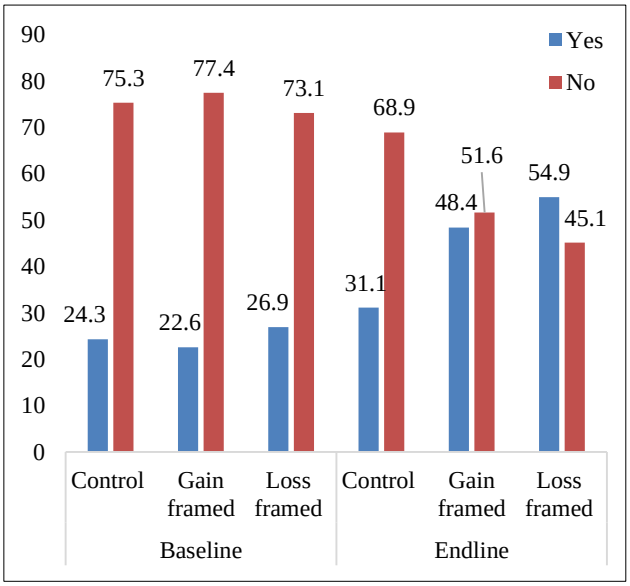


Figure 1: Intention to screen for the cancer of the prostate in control and intervention groups at baseline and end-line.

Table 1: Socio-demographic characteristics of the respondents.

Variables	Baseline, f (%)					Endline, f (%)				
	Control	Intervention (gain framed)	Intervention (loss framed)	χ^2	P value	Control	Intervention (gain framed)	Intervention (loss framed)	χ^2	P value
Age (years)										
40-49	45 (48.4)	73 (78.5)	60 (64.5)	19.639	0.001	44 (48.9)	71 (78.0)	60 (65.9)	17.975	0.001
50-59	31 (33.3)	11 (11.8)	24 (25.8)			29 (32.2)	11 (12.1)	22 (24.2)		
60-69	17 (18.3)	9 (9.7)	9 (9.7)			17 (18.9)	9 (9.9)	9 (9.9)		
Highest level of education										
No formal education	3 (3.2)	6 (6.5)	5 (5.4)	1.786	0.938	3 (3.3)	6 (6.6)	4 (4.4)	1.875	0.931
Primary	44 (47.3)	41 (44.1)	39 (41.9)			42 (46.7)	40 (44.0)	38 (41.8)		
Secondary	43 (46.2)	44 (47.3)	47 (50.5)			42 (46.7)	43 (47.3)	47 (51.6)		
Tertiary	3 (3.2)	2 (2.2)	2 (2.2)			3 (3.3)	2 (2.2)	2 (2.2)		
Religion										
Christian	93 (100)	93 (100)	93 (100)			90 (100)	91 (100)	91 (100)		
Occupation										
Unemployed	40 (43.0)	45 (48.4)	45 (48.4)	0.720	0.698	38 (42.2)	43 (47.3)	44 (48.4)	0.777	0.678
Self employed	53 (57.0)	48 (51.6)	48 (51.6)			52 (57.8)	48 (52.7)	47 (51.6)		
Monthly income										
Mean	15709.7	16096.8	16102.2			16000	16208.8	16329.7		
Standard deviation	10402.1	15006.7	20975.2			10449.2	15150.2	21136.9		
P value	0.982					0.990				

Table 2: Knowledge about prostate cancer.

Variables	Baseline, f (%)					Endline, f (%)				
	Control	Intervention (gain framed)	Intervention (loss framed)	χ^2	P value	Control	Intervention (gain framed)	Intervention (loss framed)	χ^2	P value
General knowledge on prostate cancer										
Yes	28 (30.1)	32 (34.4)	40 (43.0)	3.491	0.175	35 (38.9)	67 (73.6)	75 (82.4)	42.124	<0.001
No	65 (69.9)	61 (65.6)	53 (57.0)			55 (61.1)	24 (26.4)	16 (17.6)		
Knowledge on PC screening methods										
Yes	5 (5.4)	2 (2.2)	2 (2.2)	2.067	0.356	14 (15.6)	28 (30.8)	24 (26.4)	6.030	0.049
No	88 (94.6)	91 (97.8)	91 (97.8)			76 (84.4)	63 (69.2)	67 (73.6)		
Knowledge on early signs										
Yes	13 (14.0)	16 (17.2)	14 (15.1)	0.385	0.825	33 (36.7)	45 (49.5)	55 (60.4)	10.251	0.006
No	80 (86.0)	77 (82.8)	79 (84.9)			57 (63.3)	46 (50.5)	36 (39.6)		
Knowledge on risk factors										
Yes	15 (16.1)	19 (20.4)	24 (25.8)	2.655	0.265	18 (20.0)	41 (45.1)	35 (38.5)	13.481	0.001
No	78 (83.9)	74 (79.6)	69 (74.2)			72 (80.0)	50 (54.9)	56 (61.5)		

Knowledge about prostate cancer

As provided in Table 2, at baseline, there was no significant difference in general knowledge of PC, among respondents in the control and intervention groups while at the end line there was a significant difference ($p<0.05$). At the end line, a high number of respondents who had general knowledge of PC were those in the group intervened using loss-framed, followed by those in the group intervened using gain-frame brochure while the least was in the control. Knowledge of PCS methods differed significantly among respondents in the control and intervention groups at the end line ($p<0.05$). A high number of respondents who had knowledge of PCS methods were in the group

intervened using gain-framed brochures followed by those in the group intervened using loss-framed brochures while the least were in the control group. Furthermore, there was a significant difference in knowledge on early signs of PC among respondents in the control and intervention groups at the end line ($p<0.05$). A high number of respondents who had knowledge on early signs of PC were in the group intervened using loss-framed brochures followed by those in the group intervened using gain-framed brochures while the least number was in the control group. Additionally, knowledge of risk factors of PC differed significantly among respondents in the control and intervention groups at the end line ($p<0.05$). A high number of respondents who had knowledge of risk factors of PC were in the group intervened using a gain-framed brochure followed by those in the group intervened using a loss-framed brochure while the control had the least.

Follow-up comparison between groups post-intervention

As indicated in Table 3, the intervention groups had a significantly higher mean difference in difference in knowledge about prostate cancer than the control group with the group intervened using gain-framed and loss-framed brochures having a mean DID of 4.989 (3.561–6.418) and 5.264 (3.804–6.724) respectively. The increase in knowledge was more in the group intervened using loss-framed brochures. Intention for prostate cancer screening increased significantly in the intervention groups as compared to the control groups.

Table 3: Mean difference in difference analysis.

Variables	Mean difference in difference	Std error	T statistics	Sig.	95% CI	
					Lower	Upper
Knowledge						
Control	Reference					
GF	4.989	0.727	6.860	<0.001	3.561	6.418
LF	5.264	0.743	7.083	<0.001	3.804	6.724
Intention						
Control	Reference					
GF	0.935	0.190	4.917	<0.001	0.562	1.309
LF	0.484	0.190	2.543	0.011	0.110	0.858

DISCUSSION

The female partner-led brochure intervention resulted in a significant increase in intention for PCS among males in Kiambu County. In the group intervened using loss loss-framed bronchure there was a 28% increase in intention while in the group intervened using the gain-framed brochure method there was a 26% increase in intention. This outcome underscores the potential of involving female partners in men's health decisions, particularly in contexts where traditional gender roles may influence healthcare-seeking behaviors. The study findings were similar to those of a partner-led education intervention which was found to significantly increase intention of PCS.[15] The differential impact between loss-framed and gain-framed messaging, albeit slight, aligns with existing literature on health communication strategies. Loss-framed messages, which emphasize the potential negative consequences of not engaging in health behavior, appear to have a marginally stronger effect in this context. This finding is consistent with Prospect theory, which suggests that individuals are more responsive to potential losses than equivalent gains when making decisions under uncertainty.[16] Studies indicate that message framing is an effective way of changing health behavior.[17,18] Evidence suggests that health messaging either gain frames or loss-framed attempts to change people's intentions, attitudes, or behaviors towards health topics such as prostate cancer screening with the ultimate purpose being to persuade people to follow healthy guidelines.[19] According to a US study, both gain-framed and loss-framed messaging resulted in a similar increase in intention for cancer screening.[20] Similarly, a US study done among black Americans concluded that the use of female spouse to pass health messages on PCS to their male partners resulted in a significant increase in intention for PCS.[21] Interestingly a Kenyan study reported that men preferred positive messaging regarding PCS as well as man-to-man communication on PC.[22]

The female partner-led gain-framed and loss-framed brochure method resulted in a significant increase in knowledge on PC among men in Kiambu County. Similarly, a Jordanian study reported that interventions that combined brochures, booklets, and verbal information resulted in a significant increase in knowledge of PC among men.[23] Similarly, a meta-analysis documented that the use of decision aids significantly enhanced knowledge of PC among patients.[24] It is worth noting that the increase in knowledge was more in the group intervened using the loss-framed brochure method. Notably, the loss-framed approach appeared to be more effective in improving knowledge. This finding aligns with some existing research on message framing in health communication, particularly when addressing detection behaviors like cancer screening. A study found that loss-framed messages were more effective in promoting detection behaviors, such as cancer screening, compared to gain-framed messages.[25] This meta-analysis supports the observation that the loss-framed brochure method led to a greater

increase in knowledge about PC. However, it's important to note that the effectiveness of message framing can vary depending on the specific health behavior and target population. For instance, a study suggested that gain-framed messages might be more effective for prevention behaviors, while loss-framed messages work better for detection behaviors.[26]

The involvement of female partners in delivering the health information is an interesting aspect of this intervention. This approach is supported by research from a study, who found that social support, particularly from intimate partners, can positively influence men's health behaviors, including cancer screening.[27] Additionally, a study demonstrated that involving female partners in PC education interventions can lead to increased knowledge and screening intentions among men.[28] These findings collectively suggest that the combination of tailored message framing and partner involvement can be an effective strategy for improving PC knowledge and potentially promoting screening behaviors.

Limitations

Attrition bias was expected because this study employed a randomized controlled trial design. This was minimized by recruiting an additional 10% of the sample size. In addition, regular contact with the participants was maintained, which helped maintain their involvement in the study. Assessment bias was expected between the intervention and control arms. Nonetheless, bias was minimized by blinding both the evaluators and respondents. Volunteer bias was projected to occur; however, the researcher made it easier for a wider range of individuals to participate by addressing common barriers such as transportation, childcare, and time constraints. This was done by offering flexible scheduling and covering travel costs.

CONCLUSION

In conclusion, this study provides strong evidence for the efficacy of female partner-led interventions using framed brochures in enhancing PC knowledge and screening intentions among men. The loss-framed method appears to be particularly effective, though both framing approaches yielded significant improvements compared to no intervention. These findings have important implications for public health strategies aimed at increasing PC awareness and screening rates in similar populations.

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Assessment of Factors Influencing Utilization of Reproductive Health Services for Adolescents and Youth in Samburu County, Kenya

Halima Dahir Ali [a*], Dominic Mogere [b], Joseph Juma [b] and Peterson Kariuki [b]

[a] Department of Community Health, School of Public Health, Mount Kenya University, Kenya.
[b] School of Public Health, Mount Kenya University, Kenya.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: Globally, around 16 million teenagers give birth each year, with 95% of them coming from upcoming nations in developing nations like Kenya, youths deal with a variety of sexual and reproductive health issues. Youth in Kenya frequently experience serious health issues like unintended pregnancy, unsafe abortions, and sexually transmitted infections.
Objective: The study aimed to assess factors influencing the use of youth-friendly reproductive health services among youths and adolescents in Samburu County, Kenya.
Methods: The study employed an analytical cross-sectional study design. The Chi-square test for independence and binary logistic regression were employed to establish a relationship between independent and dependent variables.

**Corresponding author: Email: pkkariuki@mku.ac.ke, alihalima2013@gmail.com;*

Results: From this study, the presence of a reproductive health facility (OR=2.4,95%CI=0.220-0.801) and community mobilization campaigns (OR=4.7,95%CI=0.093-0.485) increased the odds of utilizing youth-friendly reproductive health services. The presence of peer pressure (OR=2,95%CI=0.266-0.971), healthcare providers' poor attitude (OR=2.1,95%CI=0.276-0.881), and lack of privacy (OR=2,95%CI=0.290-0.974) reduced the odds of utilizing youth-friendly reproductive health services.

Conclusion: In this study, the utilization of youth-friendly reproductive health services was 40.6%. The presence of a reproductive health facility, having visited a reproductive health facility, the presence of religious influence, and community mobilization campaigns increased the odds of utilizing youth-friendly reproductive health services. The presence of peer pressure, being male and single in the marital status category, healthcare providers' poor attitude, and lack of privacy reduced the odds of utilizing youth-friendly reproductive health services.

Keywords: Adolescents; reproductive health services; utilization; youths.

ABBREVIATIONS

ANC : Anti Natal Care,
NACOSTI : National Commission for Science Technology and Innovation,
RHS : Reproductive Health Services,
SPSS : Statistical Package for Social Sciences
WHO : World Health Organization.

1. INTRODUCTION

The World Health Organization (WHO) defines youths as those who are 10 to 24 years old, but the terms young people and youth (15 to 24 years old) are frequently used interchangeably to refer to young people [1]. Youth, who make up 25% of the global populace, are classified as a period of maximum health with several biological, mental, and societal changes that could expose them to hazardous sexual actions, such as early sexual activity participation, sex that is unsafe, and having sex several partners [2,3]. Despite a clear need for these services and they are urgently needed, the sexual and reproductive health (SRH) needs of adolescents and youth are often neglected and underappreciated in many African nations [4]. With 1.2 billion people on the continent, youth aged 15 to 24 make up the majority, with 226 million of them living in sub-Saharan Africa, which accounts for 19% of the global youth population [5].

In the world, around 16 million teenagers give birth each year, with 95% of them coming from upcoming nations. Nearly a quarter of girls between the ages of 15 and 19 are married (LMICs) [6]. Trends in an increased rate of un-marriages do not point to a reduction in the age at which youths first engage in sexual activity; instead, there is a need to improve access to SRH knowledge, services, and skills so that people can learn more about sexuality, avoid unintended pregnancies, and stop sexually transmitted diseases [7]. Elevated youth fertility rates in Sub-Saharan Africa are influenced by several factors including lack of information about sex and reproductive health, limited admittance to and use of birth control devices, condoms, and sex reproductive health services, gender disparity, and cultural customs like teenager matrimonial and initiation rites [8].

Adolescents in sub-Saharan Africa encounter numerous severe challenges in seeking sexual reproductive health services, which include restricted access to youth-friendly amenities (YFS), which include info on development, hazardous abortion, gender based violence, and family planning (FP). This has driven youths and adolescents to engage in hazardous sexual behavior, which has increased the prevalence of sexually transmitted infections and HIV in young people as well as their susceptibility to early pregnancy and delivery difficulties that have high mortality and disability rates [9]. The majority of young men and females surveyed in LMICs said they used condoms for their most recent sexual activity, according to several polls. Only 33% of young males and 20% of young females in these countries have a thorough awareness of HIV [10]. Only 10% of young males and 15% of young females were attentive to their status concerning HIV, which presents a significant obstacle to ensuring optimal reproductive health and wellness for all, according to UNAIDS' 2016 gaps report [5]. Females below the age of 19 who become expectant have a 50% greater chance of miscarriages and newborn deaths accompanied by an increased risk of preterm birth, less birth mass, and asphyxia, all of which have a detrimental effect on the unborn child's health and contribute to the cycle of poverty [2].

Studies on STIs among youth in Kenya are scarce, however, the most recent data suggests, 36% of Kenya's population is aged between the ages of 10 and 24. This means that almost 40% of Kenya's population is under the age of 18 [11]. Godia et al. observed that the use of youth-friendly reproductive health amenities in Kenya faces a variety of challenges, ranging from the adolescent who has little knowledge of or needs information on such services, to the youthful and prosperity office perspective where there is no obligation regarding organizations, limited organization support, and helpful resources [12]. Studies have indicated that teenage mothers are more likely to drop out of school, have fewer opportunities for job advancement, and have less economic empowerment, which keeps them in poverty [13].

2. METHODOLOGY

2.1 Research Design

The study employed an analytical cross-sectional study design to assess the factors that affect the utilization of reproductive health services among youths and adolescents

2.2 Study Area

One of the designated 47 Counties in Kenya is Samburu County. It is situated in Kenya's semi-arid and arid regions in the northern portion of the Great Rift Valley, about 300 kilometers north of Nairobi. The county shares borders with Laikipia County to the south, Turkana County to the northwest, Baringo County to the southwest, Marsabit County to the northeast, and Isiolo County to the east. Kenya's geographical area (roughly 541,416 square kilometers), 21,126 square kilometers constitutes Samburu County.

2.3 Study Population

The all-out target population for this research was youths and adolescents attending Samburu County referral hospital seeking reproductive health services and this service includes Counseling services, family planning, VCT, management of STIs, and antenatal and prenatal care services.

2.4 Sample Size Determination

The study employed the fischer formula to compute the sample size of this research. As a result, 235 study participants and clients made up the final sample size for this study.

2.5 Sampling Technique

Samburu County Referral Hospital was purposefully selected for the study as it serves a diverse set of population including the pastoral community. Participant selection was done by systematic sampling. To determine the initial point, the first participant was randomly selected. Participants who were assigned an even number will participate in the study.

2.6 Data Collection Method and Instruments

Both techniques of quantitative and qualitative methods of data collection were employed whereby semi-structured study-administered questionnaires were used to collect quantitative data. Both Key informant interviews and Focused group discussions were employed to obtain qualitative data.

2.7 Validity and Reliability

A counselor reviewed the research questionnaires before data collection. This was necessary to ensure consistency and also to create room for additional info needed to ensure the success of this research. Refers to the extent to which a study tool yields reliable outcomes after repeated trials. Twenty-five study respondents from the neighboring county were employed for pretesting the data collection tool. The study participants who were employed in this exercise were not employed in the data collection phase. Both internal consistency and equivalence were done to ensure the questionnaire is reliable. A coefficient alpha of above 70% was acceptable in this study. The reliability test results showed that a score of 0.81 was obtained, indicating that the tools were reliable for gathering data.

2.8 Data Processing and Analysis

The quantitative data in this study were analyzed by descriptive statistics using the statistical package for social sciences SPSS (V25). The Chi-square test for independence and binary logistic regression were employed to establish a relationship between independent and dependent variables. Thematic analysis was used to analyze the focused group discussion and key informant interview audio. Emerging themes were guided by the research objectives. The researcher then integrated the qualitative and quantitative data to answer the study objectives.

3. RESULTS

3.1 Utilization of Youth Reproductive Health Services

The utilization of youth-friendly reproductive health services was 40.6% which is way less as compared to the national target.

3.2 Reproductive Health Services Utilized

As indicated in Table 1, regarding the type of youth-friendly reproductive health services utilized, the majority (96.8%) of the study respondents reported utilizing voluntary and counseling services, this was closely (76.6%) followed by family planning and maternal and child health services standing at (72.3%). The least (14.9%) utilized youth-friendly reproductive health service in this study was general counseling.

3.3 Social Demographic Characteristics of the Study Respondents

As indicated in Table 2, this section provides the social demographic characteristics of the study respondents. From this study, the majority (74.5%) of the study respondents were youths aged 20-24. Regarding gender, the majority (78.3%) of the study respondents were female. Regarding marital status more than half (63%) of the study respondents were single. In this study majority (91.1%) of the study respondents were Christians. Regarding schooling status, more than half (69.4%) of the study respondents not being in school. Concerning the level of education, the majority of the study respondents had attained a secondary school education level. Lastly, regarding parents' occupations, more than half (55.3%) of the study respondents reported that their parents had not been employed.

3.4 Bivariate and Multivariate Analysis of Social Demographic Factors

In the social demographic factor, the following variables were found to be significantly associated with the utilization of youth-friendly reproductive health services; age (*X^2=21.635, df=2,p=0.000*), gender(*X^2=16.533,df=1,p=0.000*), marital status(*X^2=32.661,df=2, P*=0.000*), and the schooling status(X^2=21.569,df=1,p=0.000), of the study respondents hence these variables were imported to binary logistic regression for further analysis. Education level (X^2=7.372, df=4, p*=0.109), religion (*X^2=2.676, df=1, p=0.102*), and parents' occupation (*X^2=7.298, df=4, p*=0.116*) were found not to be statistically associated with the utilization of youth-friendly reproductive health services.

As indicated in Table 3, Males were more than 4 times less likely to utilize youth-friendly reproductive health services as compared to females. Furthermore, single study respondents were 2 times less likely to utilize youth-friendly reproductive health services as compared to those who were married. This was in agreement with the qualitative findings where the majority of the discussants in the focused group discussion noted that

> *"I would say being married makes you more sexually active and as a result, you have to seek the necessary reproductive health services. for instance, you have to seek family planning to prevent an unwanted child further more you have to know your HIV status to protect your loved ones. So I have to keep constant use of these services where possible"*

Table 1. Multiple responses on reproductive health services utilized

Reproductive health services	Categories	Frequency of responses	Percentage of cases%
	Voluntary counseling and testing services	91	96.8
	Sexually and transmitted infection treatment	18	19.1
	Maternal and child health services	68	72.3
	Counseling	14	14.9
	Family planning	72	76.6
Total		263	279.8

Table 2. Social demographic characteristics

Variable	Categories	Frequency	Valid Percentage%
Age	10-14	19	8.1
	15-19	41	17.4
	20-24	175	74.5
Gender	Male	51	21.7
	Female	184	78.3
Marital status	Single	148	63
	Separated	2	0.9
	Married	85	36.2
Religion	Muslim	21	8.9
	Christian	214	91.1
Schooling status	Yes	72	30.6
	No	163	69.4
Education level	No formal education	8	3.4
	Primary	37	15.7
	Secondary	142	60.4
	Vocational	42	17.9
	University	6	2.6
Parents occupation	Formal employment	42	17.9
	farmer	33	14
	Casual labor	19	8.1
	Self-employment	11	4.7
	Not employed	130	55.3

Table 3. Multivariate analysis of social demographic factors

Step 1a	Variables	B	S.E	Wald	Df	Sig	Exp(B)	95% C.I for EXP(B)	
								Lower	Upper
	age			2.335	2	.311			
	Age (1)	.860	.793	1.175	1	.278	2.36	.499	11.183
	Age (2)	.894	.625	2.045	1	.153	2.446	.718	8.332
	gender	1.388	.437	10.109	1	.001	4.008	1.703	9.433
							ref		
	schooling	0.578	.511	1.276	1	.259	1.782	.654	4.852
	Marital status					.012			
	Marital status(1)	.977	.33	8.782	1	.003	2.655	1.382	5.066
	Marital status(2)	22.02	28.420	0.000	1	.999	3648	.000	
							ref		
	Constant	-.815	.240	11.486	1	0.001	.443		

3.5 Bivariate and Multivariate Analysis of Social-Cultural Factors

In the social-cultural factors, the following variable was found to be significantly associated with the utilization of youth-friendly reproductive health services; myths and misconceptions (*X^2=7.599,df=1, p=0.006*), the presence of community mobilization campaigns(X^2=33.997, df=1, p=0.000), the presence of religious influence(*X^2=29.262,df=1, p=0.000*), and peer pressure(*X^2=11.89,df=1, p=0.001*). Fear (*X^2=0.11, df=1,p=0.741*) was found not to be statistically associated with the utilization of youth-friendly reproductive health services.

As indicated in Table 4, youths and adolescents who reported experiencing peer pressure were 2 times less likely to utilize the youth-friendly reproductive health services as compared to their fellow counterparts. Furthermore, the presence of a community mobilization campaign increased the odds of utilizing reproductive health services by 4.7.

Table 4. Multivariate analysis of the social-cultural factors

Step 1a	Variables	B	S.E	Wald	Df	Sig	Exp(B)	95% C.I for EXP(B)	
								Lower	Upper
	Presence of a Mobilization campaign	-1.55	.422	13.52	1	0.00	4.7	.093	0.485
							ref		
	Presence of Peer pressure	0.732	.303	5.84	1	0.02	2	.266	.971
							ref		
	Presence of Religion influence	-1.29	.357	13.05	1	0.00	3.6	.137	.555
							ref		
	Myths & misconception	-.384	.353	1.19	1	0.28	0.68	.341	1.359
							ref		
	Constant	1.651	0.34	23.93	1	0.00	5.21		

This finding was consistent with the qualitative data where one of the key informants noted that

> "*The presence of these community mobilization campaigns has a key role in the utilization of the reproductive health services, you find that, the youth gets a lot of knowledge and awareness on the existence of these services and why they need to utilize them. The presence of these services encourages the eradication of fear of bad traditions within the community. There is a need to ensure more effort on this campaign to enhance increased uptake of these services"*

The presence of religious influence increased the odds of utilizing reproductive health services by 3.6. These findings were not in agreement with the qualitative findings as the majority of the respondent noted that

> *"I would say, today religion has not prioritized health matters as compared to the earlier days and this could be linked to a lack of health education and promotion forums in churches. Don't forget the church is a youth catchment area where it's easy to convey information related to reproductive health matters. I feel church leaders should do something to capture this area which will have a lot of benefits to the youths and the adolescents"*

3.6 Bivariate and Multivariate Analysis of Health System Factors

In the health system factor, the following variables were found to be significantly associated with the utilization of youth-friendly reproductive health services; healthcare workers' attitude($X^2=8.492,df=1,p=0.004$), level of privacy at the health facility($X^2=7.704,df=1,p=0.006$), presence of long distances($X^2=9.679, df=1,p=0.002$), whether the study respondent had visited a reproductive health facility (X^2=12.777,df=1,p=0.000) and the presence of a reproductive health facility($X^2=8.982,df=1, p=0.003$). Use of Unfriendly language($X^2=1.810, df=1,p=0.178$) was found not to be statistically associated with the utilization of youth-friendly reproductive health services. As indicated in Table 5, The absence of privacy at the health facility reduced the odds of utilizing youth-friendly reproductive health services by 2. The presence of reproductive health facilities increased the odds of the utilization of youth-friendly reproductive health services by 2.4. Furthermore, the presence of bad healthcare providers' attitudes reduced the odds of utilizing youth-friendly reproductive healthcare services by 2. These findings were in agreement with the qualitative data where the majority of the discussants in the focused group discussion noted that:

> *"Health care worker's attitude has a key role whether we seek for this reproductive health services or not. Trying to imagine you have*

gone for HIV testing and met a health care worker with a bad attitude. If things go south you might end up being hurt to the extent of thinking of committing suicide .so I feel a doctor's attitude is of importance as far as the provision of this services is concerned"

Visiting a Reproductive Health Facility increased the odds of utilizing youth-friendly reproductive healthcare services by 3.1. This was not in agreement with the qualitative findings where one of the key informants noted that:

"I would say youths paying a visit to a health care facility does not necessarily mean they will use this youth-friendly reproductive health services, you find people seek services when they need them, yes, they might visit the hospital but for other medical reasons.so I would say it's a personal decision on whether to use this reproductive health services or not"

4. DISCUSSION

From this study, the utilization of youth-friendly reproductive health services was 40.6% which is way less as compared to the national target. These findings were similar to a study done in Ethiopia which reported a 44.4% utilization of youth-friendly reproductive health services [14]. Males were more than 4 times less likely to utilize youth-friendly reproductive health services as compared to females, this could be linked to males being less concerned about their reproductive health status. These findings were in agreement with a study done in Kenya [10]. Single study respondents were (two) times less likely to utilize youth-friendly reproductive health services as compared to those who were married. The probable reason for this, married people are more sexually active as compared to singles hence the urge to seek reproductive health services. This was contrary to a study done in Nigeria [15].

Furthermore, the presence of a community mobilization campaign increased the odds of utilizing reproductive health services by 4.7. The presence of community mobilization campaigns increased awareness and benefits of youth-friendly reproductive health services. These findings were in harmony with a study done in Ethiopia [16]. The presence of religious influence increased the odds of utilizing reproductive health services by 3.6. These research findings were in agreement with a study done in Nigeria [17]. Furthermore, youths and adolescents who reported experiencing peer pressure were (two) times less likely to utilize the youth-friendly reproductive health services as compared to their counterparts. This was contrary to a study done in Ghana [8].

The presence of reproductive health facilities increased the odds of utilization of youth-friendly reproductive health services by 2.4. The presence of these facilities ensures the necessary health services needed by youths are available when needed. These findings were in agreement with a study done in Ghana [18]. From this study absence of privacy reduced the odds of utilizing youth-friendly reproductive

Table 5. Multivariate analysis of health system factors

Variables	B	S.E	Wald	Df	Sig	Exp(B)	95% C.I for EXP(B)	
							Lower	Upper
Presence of RH facility	-.87	0.33	6.94	1	0.008	2.4	.220	.801
						ref		
Having visited RH facility	-1.13	.34	10.88	1	.001	3.1	.285	1.079
						ref		
Healthcare worker attitude	0.707	.296	5.692	1	0.017	2.1	.276	0.881
						ref		
Absence of privacy	0.632	0.31	4.18	1	0.041	2	0.290	0.974
						ref		
Presence of long distance	0.589	.339	3.015	1	0.08	.555	.285	1.079
Constant	2.634	0.46	33.43	1	0.00	13.92		

health services by 2. These findings were in agreement with other two studies done in Kenya and Tanzania where lack of privacy reduced the odds of using reproductive health services, Youths are very sensitive to their private health information and it has to be safeguarded with a lot of privacy [11], [19]. The presence of bad healthcare providers' attitudes reduced the odds of utilizing youth-friendly reproductive healthcare services by 2. Poor attitude tends to repel youths and adolescents from seeking these essential health services as they tend to have a fear of rejection. This was contrary to a study done in Ethiopia [14]. Visiting a reproductive health facility was found to increase the odds of utilizing youth-friendly reproductive healthcare services by 3.1. This could be linked to the motivation of utilizing health care services that are of benefit to the youths and of which the majority are provided for free. However, These findings were not in harmony with a study done in Brazil [20].

5. CONCLUSION

In this study, the utilization of youth-friendly reproductive health services was 40.6%. VCT was the most utilized youth-friendly reproductive health service. In the social demographic factors, Being male and single in the marital status category reduced the odds of utilizing youth-friendly reproductive health services. Under the social-cultural factors, the presence of peer pressure reduced the odds of utilizing youth-friendly reproductive health services while the presence of religious influence and community mobilization campaigns increased the odds of utilizing youth-friendly reproductive health services, in the health system factors, the presence of an RH facility and having visited an RH facility increased the odds of utilizing youth-friendly reproductive health services while healthcare providers bad attitude and lack of privacy reduced the odds of utilizing youth-friendly reproductive health services.

CONSENT AND ETHICAL APPROVAL

To make sure that the study was carried out in a manner that does not contravene the ethics, the researcher obtained a letter from Mount Kenya University's ethical review office. Also, a letter of approval from the National Council of Science and Technology (NACOSTI) was also obtained and a letter from relevant country government offices, permitting the study to be carried out was also obtained. Moreover, due to the confidentiality of some data that was collected, the investigator assured the participants of the privacy of the info they provided. Since some of the participants were not willing to give out some info openly, the research assured that the info was to be treated with utmost privacy. The study acknowledged that under Kenya's Constitution, adolescents under the age of 18 are not considered adults. Before interviewing and audio recording the participants, written informed consent was obtained from their parents or legal guardians and from adult participants in accordance with accepted ethical research standards.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Assessment of Use of Medical Forensic Evidence in Investigation and Prosecution Process of Defilement Perpetrators, A Case Study of Ruiru Sub-County, Kenya

Rose Waruguru Muchemi [a], John Kariuki [b], Zakayo Thaimuta [c] and Peterson Kariuki [b*]

[a] Department of Clinical Sciences, School of Clinical Medicine, Mount Kenya University, Kenya.
[b] School of Public Health, Mount Kenya University, Kenya.
[c] Department of Human Pathology, The University of Nairobi. Kenya.

Authors' contributions

This work was carried out in collaboration among all authors. Authors' RWM, JGK and ZTL participated in the entire research process. Author's RWM participated in the data analysis process. Authors' RWM and JGK played a key role in drafting the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Background: Defilement has been recognized as one of the crimes in which such a ceiling in evidential presentation is critical. According to WHO statistics, More than 95 million children are abused annually, Where Africa is the most affected continent. Defilement incidences are alarming globally, regionally, and locally. There are new cases of defilement reported every week with 83 % emanating from a well-known perpetrator to the survivor.

**Corresponding author: Email: pkkariuki@mku.ac.ke;*

Objective: The study aimed to assess the use of medical forensic evidence in the investigation and prosecution process of defilement perpetrators, A case study of Ruiru Sub-County, Kenya.
Method: Research was conducted using an analytical cross-sectional approach. Sixty-six participants in the study were chosen using a stratified random sampling technique. The techniques used to collect the data were both qualitative and quantitative. The strength of the relationship between the dependent and independent variables was assessed using the Pearson correlation. The threshold for statistical significance was set at 0.05.
Results: There was a significant correlation between Compliant with set standards against investigation and the prosecution of defilement incidences(p=.005). There was a significant Correlation between the Availability of forensic tools against investigation and the prosecution of defilement incidents(p=.000). Concerning the correlation between knowledge of the guardians against investigation and prosecution of defilement Incidents there was no significant association(p=.630).
Conclusion: From this research, compliance with set standards and procedures for evidence admissibility of defilement evidence was adequate. Study respondents had good knowledge of the use of medical forensic evidence during the investigation and prosecution of defilement incidences. The study concluded that most of the facilities and officers are not equipped with materials for the collection of evidence.

Keywords: Crime; defilement; perpetrator; and prosecution.

ABBREVIATIONS

CA : Children Act;
FDG : Focused Group Discussions;
KII : Key Informant Interview;
NACOSTI : National Commission for Science Technology and Innovation;
PRC : Post rape care form;
SGBV : Sexual gender-based violence;
SPM : Senior Principal magistrate;
SPSS : Statistical Package for Social Sciences.

1. INTRODUCTION

Defilement remains a devastating incident for sexually abused among children with deleterious emotional, social, educational, and physical health outcomes that are injurious to the affected child, their families, and the community as a whole [1]. According to UNAID, Globally an estimated 736 million women almost one in three have been subjected to intimate partner violence, non-partner sexual violence, or both at least once in their life and this constitutes 30 percent of women aged 15 and older [2]. More than 640 million or 26 percent of women aged 15 years and older have been subjected to intimate partner violence. Approximately 87,000 women were killed worldwide, 50,000 of whom were killed by their intimate partners or family members, in the year 2017; while an estimated 137 women are killed by a member of their family daily [3]. At least 200 million women and girls, aged 15–49 years, have undergone female genital mutilation in 31 countries where the practice is concentrated [4]. Among children, up to 1 billion children aged 2–17 years, have experienced physical, sexual, or emotional violence or neglect in the past year globally. 15 million adolescent girls have experienced forced sex [4].

The attainment of sustainable development goals especially in good children's health has been significantly affected by child abuse which is rampant in Africa. Annually more than 95 million cases of childhood abuse are reported, with Africa leading this specific problem [5]. For instance, a study conducted in South Africa [6], reported more than 18 cases of child abuse being reported at Cape Town, whereby 34% of the reported cases were physical abuse,16% accounted for emotional abuse, and lastly, 20% accounted for sexual abuse. In West and East Africa, child abuse is rampant and accounts for 33% of the cases [7].

There is a legal framework locally and internationally that grants rights to minors sanctioning their justice and health care [8]. Through good operational healthcare system equipped with adequate medical supplies, medical equipment, and enough skilled healthcare providers is the only way to quality healthcare systems [9]. Nevertheless, research work has noted few studies have focused on sexual reproductive health services giving focus on those under 18 years' right to privacy are scarce, and the verdicts that are trusted to protect those under 18 from sexual abuse are

delicately administered [10]. Investigation of victims of sexual violence involves a sequence of proficiencies in clinical history taking, adequate physical investigation, assortment, and safeguarding of significant physical evidence for criminological evaluation. Enhanced and good medics' capacity in managing sexual offenses, in the collection, and safeguarding of physical evidence, adequate analysis, reporting and adequate conclusion of the investigation process are key for sexual violence cases [11].

Defilement has been recognized as one of the crimes in which such a ceiling in evidential presentation is critical. According to WHO statistics, More than 95 million children are abused annually, Where Africa is the most affected continent [5]. In Kenya, the magnitude of defilement cases among young female children is very high at 55% [12]. Defilement cases have been on the rise at Ruiru Sub-County in Kiambu. Current statistics have shown that Kiambu County is among the leading counties in Kenya with between 30 and 40 cases every month. Furthermore, from the Health Records Department, defilement cases among minors increased from 185 in the year 2020 to 228 in the year 2021 in Ruiru Level Four Hospital.

Kiambu County records between 30 and 40 cases every month, According to Annual Crime Reports [13], Ruiru police station records between three to seven cases of defilement every week as per their occurrence book. This study looked into the disconnect between the Police Station Ruiru and Ruiru Level Four Hospital from the time of incidence and reporting by the caregiver. Sexual violence offenses have been covered in the Kenya Sexual Offences Act 2006. It is estimated that the overall number of sexual violence cases presented to the court of law in Kenya is 25%. This low outcome is associated with dismal skills among health workers and investigative agencies to collect, assess, and organize evidence from victims promptly and ineffectively [11]. From the above background literature the evidence collection for medical forensic evidence in the investigation prosecution process of the perpetrator of defilement is weak hence the need for this study.

2. METHODOLOGY

2.1 Research Design

An analytical cross-sectional study design was adopted. According to Mugenda & Mugenda [14], this design was regarded as appropriate because data was collected at one point in time. The research design also gave a snapshot of the level of compliance with set standards and procedures for evidence admissibility of defilement evidence logs gathered by the Guardians, Gender Police Officer, and clinicians in Ruiru Level Four Hospital Kenya. The study design applied both qualitative and quantitative techniques. This was important for triangulation. Both primary and secondary data were utilized in this research.

2.2 Research Questions

1. Are the defilement evidence logs gathered by the Guardians, Gender Police Officer, and clinicians in Ruiru Sub-County Kiambu, compliant with set standards and procedures for evidence admissibility?
2. What is the knowledge of the Guardians, Gender Police Officers, and Clinicians in the preservation, collection, and use of medical forensic evidence during the investigation and prosecution of defilement incidences?
3. Are the tools and equipment adequate and available for medical forensic evidence during the investigation and prosecution of defilement incidences?

2.3 Study Area

The study site was Ruiru level four facility situated in the Ruiru sub-county in Kiambu County. The sub-county measures 292 square km with a population of 445,000 [15]. Among the thirteen sub-counties of Kiambu County, Ruiru Sub-county has the largest population making it most appropriate for the study [15]. The high population is characterized by greater diversity and numerous socio-cultural and economic activities such as industrial factories, and coffee and tea farms where the middle and low-income population works. The high number of employees in the estates, factories, and farms makes the residents dwell in informal settlement areas in small overly crowded areas with families sharing common rooms in proximity to proliferating sexual crimes.

2.4 Study Population

The main study population was guardians/caregivers of the defiled minors as captured in Gender-based violence registers at Ruiru level-four facility, the study also gathered essential information from Gender-based Police Officers and Clinicians from Ruiru Sub-County. In

2021, the total number of cases reported was 228 in the facility.

2.5 Sample Size Determination

The Cochran formula for smaller populations was used to calculate sample size because the study population was relatively small. The researcher was able to estimate the proportions of an attribute present in the population and calculate the sample size with the desired level of significance and precision. Because of that, A sample size of 66 study participants was obtained. In addition, two key formant interviews and four focused group discussions were also conducted.

2.6 Sampling Technique

Ruiru sub-county hospital was selected purposively because of the high incidences of defilement in the area. Study respondents were selected by using a stratified sampling technique to categorize the respondents into different occupations, after which a random sampling technique was used to select the study participants and those who were assigned odd numbers participated in the study. For the qualitative research, study respondents were purposefully selected to be part of the focused group discussions and key informants. The focused group discussion consisted of 6-12 respondents, key informants were Clinicians and Gender-based Police Officers selected purposefully.

2.7 Data Collection Method and Instruments

The study utilized questionnaires generated from the post-rape (PPRC) form (MOH 363) and the Sexual Gender-Based Violence Register (SGBV) Form (MOH 365) for data collection. As Creswell (2010) recommends the questionnaires were standardized and close-ended to ensure the collection of the required information. Apart from the questionnaires, the researcher also used observation checklists to counter-check defilement data from the post-rape (PPRC) form (MOH 363), and the Sex Gender-Based Violence (SGBV) Form (MOH 365). The data picked included clinician notes on examination, the specimen collected, the date of incident and reporting, packaging and transportation of the forensic specimen, and the turnaround time between the incident and reporting. This was used to corroborate data collected from the respondents.

2.8 Validity and Reliability

The extent to which research equipment measures what is envisioned to measure is termed validity, as such the instruments were scrutinized by the supervisors and a team of experts from the hospital and police department dealing with defilement cases to ensure their accuracy [16]. Reliability is the extent to which research equipment produces similar findings over and over again [14]. Ten percent of the sample size, that is, seven respondents from Thika level five hospital was used in the pretesting of the tools. Cronbach's alpha, the universal measure of internal consistency (reliability), was used to calculate the reliability index. The acceptable reliable value was 0.89 meaning the tools were reliable.

2.9 Data Processing and Analysis

Statistical Package for Social Sciences (SPSS) version 26 was used to manage quantitative data. To ensure the cleaning of data, data will be entered into an Excel spreadsheet. Extreme cases, missing values, and inconsistent data will be addressed and edited. After cleaning, data was imported into SPSS version 26. Percentages, frequencies, and numbers were used to describe categorical data in univariate analysis. To check for any relationship between independent variables and the outcome of interest, A Pearson correlation analysis was carried out where a p-value of ≤0.05 was considered significant.

Concerning qualitative data, transcription was done to convert audio-recorded data into transcripts. The transcripts were uploaded into Excel for cleaning. During data cleaning, unreadable data was removed and transcripts were aligned with research questions. The cleaned data was imported into NVIVO version 11. Auto coding based on research questions will be done. Coding of the data based on parent codes, child codes, and grandchild codes was done. The coded data was auto-generated, and triangulation followed thereafter with quantitative findings.

3. RESULTS

3.1 Awareness of the Defilement

As indicated in Table 1, The study wanted to assess the awareness of the respondents and after deploying a close-ended questionnaire with a Yes and No answer with a minimum of 1 and a

maximum of 2, the study found that a mean of 1.55 with a standard deviation of 0.50 of the respondents were aware of defilement. A mean of 1.53 with a standard deviation of 0.50 was aware of the period/amount of time that is required to report a defilement case. The studies also found that a mean number of 1.50 of the respondents with a standard deviation of 0.50 have encountered a defilement case. A lesser number with a mean of 1.45 of the respondents and a standard deviation of 0.50 of the respondents were aware of offices/agencies to report such matters at the time of that defilement case. A mean of 1.57 with a standard deviation of 0.49 of the respondents indicated that they took action to preserve evidence at the time of that defilement case, and most of them indicated that they took a picture or took a note.

3.2 Investigation and Prosecution of Defilement Incidents

The study found that a mean number of 3.30 with a standard deviation of 1.48 of the respondents have faced forensic cases while working in your institution. While a mean of 3.35 respondents with a standard deviation of 1.53 believe information on the process management regarding forensic cases also the study noted that a mean number of 2.52 respondents with a standard deviation of 1.54 indicated that there is management procedure regarding forensic cases. Table 2 shows more details regarding the Investigation and Prosecution of Defilement Incidents.

3.3 Compliance with Set Forensic Standards

The study deployed some questionnaires with the following key: 1 = strongly disagree 2 = disagree 3= neutral 4=agree while 5 = strongly agree. From this questionnaire with a minimum of 1 and a maximum of 5, the study found out that a mean of 2.39 with a standard deviation of 1.42 has undergone forensic training in defilement investigation. A mean of 3.89 with a standard deviation of 1.42 of the respondents thought there was a need for both victims and witness protection during defilement cases investigation. In terms of the diligence put on defilement case impact on prosecution, the study found out that was a mean number of 3.24 with a standard deviation of 1.73. A mean of 3.18 with a standard deviation of 1.82 indicated that there are challenges in handling witnesses and victims of defilement during the investigation of sexual crimes among both genders. Table 3 shows a descriptive analysis done on compliance with set standards. From the analysis, the study found out that most of the respondent believes that they comply with the set forensic Standards.

3.4 Correlation between Compliant with set Standards against Investigation and prosecution of Defilement Incidences

As indicated in Table 4, A Pearson correlation analysis done on the study is with compliance with set standards being the study's independent variable against the investigation and prosecution of defilement incidences as the study's dependent variable, The study found that there was a($r=-0.343$, $p< 0.05$) relation between our variable with a Correlation is significant of 0.05 level (2-tailed) while N was 66. These findings were not in agreement with qualitative data where one of the key informants noted that;

> *"Even though victims of sexual assault want to use normal legal procedures to deal with the horrible crime, they run into many problems. This makes it take a long time to get justice for the victims. Sexual crimes are often hard to investigate, especially when it comes to gathering evidence and witness statements. How these cases of sexual assault are dealt with is affected by political power and armed conflict that revolves around the power structure"*

3.5 Tools and Equipment and Availability of Medical Forensic

The study found that a mean of 2.28 with a standard deviation of 1.51 of the respondents are well equipped with materials for the collection of evidence while investigating defilement cases. A total mean of 2.30 with a standard deviation of 1.49 of the respondents believe that investigators are well equipped with forensic tools to be used in the collection, preservation, and transportation of forensic laboratories. When it comes to whether or not the laboratory is equipped with forensic analysis tools, equipment, or regimens for use in conducting forensic analysis, a mean of 2.21 with a standard deviation of 1.54 respondents took its side. The study also found that a mean of 2.26 respondents with a standard deviation of 1.52 indicated that the tools have enough space for reporting defilement cases while a mean of 2.32 with a standard deviation of 1.51 indicated that the tools do not have missing

spaces for reporting defilement cases. From these findings, the study shows that most of the respondents do not have tools and equipment nor do they have availability of medical forensics. A descriptive analysis is well explained in Table 5.

Table 1. Awareness of the defilement

	N	Minimum	Maximum	Mean	Std. Deviation
Awareness of the defilement	66	1.00	2.00	1.56	.50
Time taken to report a defilement case	66	1.00	2.00	1.53	.50
encounter a defilement case	66	1.00	2.00	1.50	.503
Were you aware of offices to report such matter	66	1.00	2.00	1.45	.50
Action taken to preserve evidence	66	1.00	2.00	1.57	.498
Valid N (listwise)	66				

Table 2. Investigation and prosecution of defilement incidents

	N	Minimum	Maximum	Mean	Std. Deviation
Presence of forensic cases during my duties.	66	1.00	5.00	3.30	1.48
information on the process management regarding forensic cases.	66	1.00	5.00	3.35	1.53
Presence of management procedure regarding forensic cases.	66	1.00	5.00	2.52	1.54
Valid N (listwise)	66				

Table 3. Compliance with set standards

	N	Minimum	Maximum	Mean	Std. Deviation
Trained on defilement investigation.	66	1.00	5.00	2.39	1.42
need for victims and witness protection during the investigation	66	1.00	5.00	3.89	1.42
The diligence put on defilement cases will impact the prosecution.	66	1.00	5.00	3.24	1.73
Presence of challenges in handling victims	66	1.00	5.00	3.18	1.82
Valid N (listwise)	66				

Table 4. Correlation between compliant with set standards against investigation and prosecution of defilement incidences

		Compliant with set standard	Investigation and prosecution of defilement incidents
Compliant with set standard	Pearson Correlation	1	-0.343**
	Sig. (2-tailed)		.005
	N	66	66

***. Correlation is significant at the 0.05 level (2-tailed)*

Table 5. Tools and equipment and availability of medical forensic

	N	Minimum	Maximum	Mean	Std. Deviation
I'm equipped with materials for the collection of evidence	66	1.00	5.00	2.28	1.51
Investigators are well-equipped with forensic tools	66	1.00	5.00	2.30	1.49
The laboratory is equipped with forensic analysis tools	66	1.00	5.00	2.21	1.54
The tools have enough space for reporting defilement cases	66	1.00	5.00	2.26	1.52
The tools do not have missing spaces for reporting defilement	66	1.00	5.00	2.32	1.51
Valid N (listwise)	66				

3.6 Correlation between Availability of Tools Against Investigation and prosecution of Defilement Incidents

As indicated in Table 6, A Pearson correlation analysis done on the study is with the Availability of tools being the study's independent variable against the investigation and prosecution of defilement incidences as the study's dependent variable, The study found that there was a ($r=0.654$, $p=<0.05$) relation between our variable with a Correlation is significant of 0.01 level (2-tailed) while N was 66. These findings agreed with qualitative data where one of the key informants noted that;

> *"Forensic lab equipment is used to detect, collect, and process samples and evidence from crime scenes, suspects, and victims. Crime lab analysts apply the principles of biochemistry, genetics, and molecular biology in the search for results. Forensic scientists are tasked with investigating a multitude of crimes using advanced technologies in every subfield of forensic science it is very bad when some of them are missing. Some of the key measurements forensic labs perform that are missing or enough include"*

3.7 Knowledge of the Guardians

The study found that a mean of 3.4 with a standard deviation of 1.54 has a structured framework with resources at their disposal to ensure the safety and security of witnesses and victims of crime, a mean number of 2.5 with a standard deviation of 1.6 respondents are provided with tools for evidence collection and preservation for defilement cases while a mean of 2.6 respondent with a standard deviation of 1.6 believe their station has a structured way of reporting defilement cases. From Table 7, the Descriptive Statistics study shows that most of the respondents have a framework to ensure the safety of witnesses but at the same time a much bigger number of respondents lack support from their station.

3.8 Correlation between Knowledge of the Guardians against Investigation and Prosecution of Defilement Incidences

The study also performed another correlation analysis where knowledge of the guardians was the study independent variable and investigation and prosecution of defilement incidences was the study dependent variable and found out that where N was 66, the study was not correlated with ($r=0.060$, $p<0.05$) with a significant correlation of 0.630. Table 8 with more details.

4. DISCUSSION

From the analysis, the study found out that most of the respondents believe that they comply with the set Standards. This study was concurrent with two other studies [12], [17]. Despite their determination to pursue a standard legal process to address the horrible crime, victims of sexual assault face several obstacles, which results in a significant delay in providing justice to those who have been harmed. The process of investigating sexual crimes is often accompanied by a great deal of difficulty, most notably in the gathering of evidence and testimony in instances of sexual assault and other forms of sexual violence. Most of the respondents had a framework to ensure the safety of witnesses but at the same time, a much bigger number of respondents lacked

Table 6. Correlation between availability of tools against Investigation and prosecution of defilement incidences

		Availability of tools	Investigation and prosecution of defilement incidents
Availability of tools	Pearson Correlation	1	.654**
	Sig. (2-tailed)		.000
	N	66	66

***. Correlation is significant at the 0.01 level (2-tailed).*

Table 7. Knowledge of the guardians

	N	Minimum	Maximum	Mean	Std. Deviation
I have a framework to ensure the safety of witnesses and victims	66	1.00	5.00	3.4091	1.54897
I'm provided with evidence for defilement cases	66	1.00	5.00	2.5455	1.61894
My station has a structured way of reporting defilement cases	66	1.00	5.00	2.6212	1.60542
Valid N (listwise)	66				

Table 8. Correlation between knowledge of the guardians against investigation and prosecution of defilement incidences

		Knowledge of the guardians	Investigation and prosecution of defilement incidents
Knowledge of the guardians	Pearson Correlation	1	.060
	Sig. (2-tailed)		.630
	N	66	66

support from their station. According to the findings of research conducted by Brito et al. [18], relatively few academic forums provide instruction in forensic medical investigation, and the vast majority of forensic specialists obtained the bulk of their knowledge and abilities from hands-on experience in the field. Brito et al. [18] pointed out that there is very little evidence to suggest that the present educational systems play a role in ensuring that forensic specialists are well-versed and up to date with the most recent rules.

According to Rossy and Ribaux [19], forensic specialists who have received adequate training report having an easier time carrying out their responsibilities. Only a small percentage of people have received training in forensic medicine. This phenomenon has been connected to the stringent restrictions placed on prospective forensic science students by educational institutions when they are applying for enrollment [20] From these findings, the study shows that most of the respondents do not have tools and equipment nor do they have the availability of medical forensics. The study findings were concurrent with another study [21] where forensic tools are a critical method in the enactment of various aims within a majority of institutions and organizations. Resources needed in the security sector include; facilities, personnel, and tools necessary for the enactment of various security actions that are needed by the community at large which entails steering forensic science events. In cases where there are inadequate tools to collect the samples for forensic studies, a lot of evidence and proof are affected. This occurs as a result of inadequate genuine equipment and instruments of work. Studies have indicated that enough equipment for gathering evidence in crime areas affects forensic science in criminal examination. Good availability and necessary evidence-collection tools govern how forensic scientists conduct their efforts efficiently [22].

5. CONCLUSION

The study concluded that most of the respondents have undergone thorough training

which enabled compliance with the set standards although there exist challenges that hinder the level of compliance with the set standards. Concerning knowledge of the guardians, gender Police Officers, and Clinicians in the collection and use of medical forensic evidence during the investigation and prosecution of defilement incidences, The study concluded that most of the respondents have skills and a framework to ensure the safety of witnesses and victims. The study also concluded that most of the facilities and officers are not equipped with materials for the collection of evidence, investigators are not well equipped with forensic tools, and the laboratories are not well equipped with forensic analysis.

CONSENT AND ETHICAL ISSUES

For the study to be carried out, ethical approval was sought from the Institutional Research and Review Committee for Mount Kenya University. In addition, the license needed to carry out this study was obtained from the National Commission for Science, Technology, and Innovation (NACOSTI). Also, authorization was attained from the relevant bodies in the County Government of Kiambu and the County Commissioner of Kiambu. Moreover, Respondents have requested authorization to participate in the study. Questionnaires were serialized to safeguard the confidentiality of the respondents. The study acknowledged that the majority of its participants were not adults. According to Kenya's Constitution. Under accepted ethical research standards, parental or guardian written consent was obtained before conducting interviews and audio recording participants in the study.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Factors Associated with Non-adherence to Anti-Retroviral Therapy among Clients in Lodwar County and Referral Hospital, Turkana County, Kenya

Nadio Etabo Clement[1*], Peter Edome Akwee[2], Josephat Bitok[1] and Peterson Kariuki[1]

[1]School of Health Science, Mount Kenya University, Kenya.
[2]School of Science, Turkana University College, Kenya.

Authors' contributions

This work was carried out in collaboration among all authors. Author NEC designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors PEA and JB managed the analyses of the study. Author PK managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Patient, Health-facility and Socio-cultural related factors associated with non-adherence have contributed to poor management of ART among HIV/AIDS clients. In Lodwar County and Referral Hospital, Turkana County, a significantly high number of clients on ARV therapy have defaulted treatment. The purpose of this study was to investigate the factors associated with non-adherence to anti-retroviral treatment in Lodwar County and Referral Hospital (LCRH), Turkana, Kenya. The study was guided by cross sectional descriptive study design where qualitative and quantitative data were collected. The research instruments used for data collection consisted of structured questionnaires, interview schedules among clients on ARV therapy and documents analysis. The sample size was obtained using the modified Fishers formula at 95% level of confidence. The

**Corresponding author: E-mail: clementetabonadio@gmail.com;*

Statistical package for Social Sciences (SPSS) and descriptive statistics were used to analyze the data. The findings in the study revealed that there are many patient, health system and socio-cultural related factors associated with non-adherence. From the study document analysis at LCRH there should be 5243 people on ARVs, however, as at January 2018 there were 1551 (30%) who were actively on ARVs this shows that there is 70 % default rate. The study found that, Patients' related factors that are causing non-adherence include; lack of education, lack of support, the distance to facility, lack of food, the side effects, alcohol use among many others. The study concluded that, health facility should improve their service delivery to the patients, change attitude and conduct adherence counseling. There is need to sensitize the community members to accept the HIV+ people to enable them express their health issues. They should support them and ensure that they are trained on how to use ARVs and not seek the tradition herbs and medicine men.

Keywords: HIV/AIDS; anti-retroviral therapy; cross sectional descriptive; health system; socio-cultural.

1. INTRODUCTION

The Human immunodeficiency virus (HIV) remains an issue of global public health concern. According to Joint United Nations Programme on HIV/AIDS (UNAIDS, 2016), there were about 1.9 million new HIV infections among adults in 2015. In the same period, a total of 36.7 million people living with HIV (PLWHA) were recorded (UNAIDS, 2016). This indicates that Sub-Saharan Africa (SSA) region carries the greatest burden of HIV/AIDS pandemic worldwide and is often regarded as the 'epicenter' of the global HIV epidemic (UNAIDS, 2016).

According to World Health Organization Swaziland and South Africa has the highest HIV prevalence globally WHO, [1]. HIV prevalence in Western and Eastern Africa are generally low to moderate. Currently, Kenya's national HIV prevalence stands 6% (UNAIDS, 2016). The high risk groups include commercial sex workers, young women, children, sex workers, homosexuals and injection drug users WHO, [1]. An estimated 1.5 million people are living with HIV, around 1.2 million children have been orphaned by AIDS, and in 2009 80,000 people died from AIDS related illness (UNAIDS, 2010). In Kenya, HIV prevalence in urban areas ranges from 11% to 29% in 2001, while in rural Centre's surveillance sites the prevalence ranged from 20% to 31% in the same year (NASCOP, 2003).

Poor adherence will result in sub-therapeutic plasma ARV drug concentrations, facilitating development of drug resistance to one or more drugs in a given regimen, and possibly cross-resistance to other drugs in the same class. Multiple factors (including regimen potency, pharmacokinetics, drug interactions, viral fitness, and the genetic barrier to ARV resistance) influence the adherence-resistance relationship Gardner, Burman, Steiner, Anderson, & Bangsberg, [2]. In addition to compromising the efficacy of the current regimen, suboptimal adherence has implications for limiting future effective drug regimens in patients who develop multidrug-resistant HIV and for increasing the risk of secondary transmission.

Patients who discontinue treatment are at high risk of illness and death because of AIDS-related conditions. Consequently, many studies have attempted to quantify and ascertain the status of patients reported as lost to follow-up, including several in South Africa MacPherson et al. [3], Dahab et al. [4]. At a large public hospital, 31% of patients who defaulted soon after ART initiation had died, 25% had transferred and 44% had discontinued treatment voluntarily or could not be found Dahab et al. [4]. Another public sector clinic in South Africa obtained similar results after tracing patients who were at least 1 month late for their last clinic visit 6 months after starting ART: 41% had died, 7% had transferred, and 52% had voluntarily discontinued treatment or could not be found Dahab et al. [4]. Studies from other countries report similar outcomes after actively tracing those initially reported as lost to follow-up Maskew et al. [5].

Previous research mainly provides clinical, immunological and virological data, but little is known about factors linked to non-adherence and loss to follow-up. Besides, most previous studies on ART adherence in Kenya are limited to urban settings mainly in Nairobi, Central, Rift Valley, and Coast regions. The current study will investigate the retention level of clients on anti-retroviral treatment in Lodwar County and Referral Hospital, Turkana, Kenya.

1.1 Statement of the Problem

Despite access to HIV treatment and care among clients in Kenya, HIV infection has been on the

rise, and adherence to the subscribed medicines remains a big challenge. As ART is becoming progressively more available, the challenge of non-adherence calls for even greater attention. Patient retention and linkage throughout the cascade of HIV care remains very low, placing the concept of 'test and treat' as part of the solution to ending the AIDS epidemic in question.

Previous research mainly provides clinical, immunological and virological data, but little is known about factors linked to non-adherence and loss to follow-up. Besides, most previous studies on ART adherence in Kenya are limited to urban settings mainly in Nairobi, Central, Rift Valley, and Coast regions. Owing to the strong correlation between adherence and clinical outcomes among PLWHA, there is need to generate credible knowledge necessary for policy makers and programme managers before scaling up ART programmes. The National Aids Control programme in 2015 reported that, Turkana County is top ten in HIV prevalence with high defaulter rate.

This calls for an in-depth analysis of factors hindering adherence in order to improve the ART adherence among patients. As it is crucial for the success of treatment that patients stay on therapy, There is need to investigate a wide array of factors hampering clients on ART.

Moreover, by the virtues of Turkana community respecting and honoring its cultural practices, this could contribute to interference with ART uptake. Against this background, the researcher is compelled to conduct a study which seeks to explore the factors leading to non-adherence to ART among clients enrolled in LCRH.

1.2 Justification of the Study

Although NASCOP Kenya and Turkana County is accelerating ART coverage and opening many ART sites in the county, adherence of clients into HIV/AIDS care and treatment needs to be known and necessary measures to be put in place to retain them into follow up.

Retention in care after enrollment is necessary for optimal clinical outcomes, monitoring treatment response, social support and education among others. For those on ART, loss to follow up implies stopping ART with resultant disease progression, development of drug resistance and eventually increased mortality. This study was necessary as it could assist in understanding the factors accounting for non-adherence to anti-retroviral treatment in Lodwar County and Referral Hospital, Turkana County.

1.3 Research Gaps

From the literature review, there exist a big challenge on non-adherence prevalence and its implications to be a persistent problem, studies about factors linked to failure are still new and scarce in Kenya, particularly in Turkana County. Previous research mainly provides clinical, immunological and virological data, but little is known about factors linked to non-adherence and loss to follow-up. Besides, most previous studies on ART adherence in Kenya are limited to urban settings mainly in Nairobi, Central, Rift Valley, and Coast regions. Owing to the strong correlation between adherence and clinical outcomes among PLWHA, there is need to generate credible knowledge necessary for policy makers and programme managers before scaling up ART programmes.

2. RESEARCH DESIGN

The research study adopted a cross-sectional descriptive design. It was explorative in nature because it explained more information in patient related factors, Health facility related factors and socio-cultural factors associated with non-adherence at LCRH. This design was used to collect both qualitative and quantitative data. This design was appropriate since it enabled the researcher to reach so many respondents within the shortest time.

A descriptive survey seeks to obtain information that describes existing phenomena by asking individuals about their perceptions, attitude, behavior or values Mugenda & Mugenda, [6].

2.1 Target Population

The target population for the study was the entire clients diagnosed with HIV/AIDS and are on ARVs in Lodwar County Referral Hospital. The total number of clients on ARVs at the hospital is 5243 as per the records at the hospital (LCRH Report January, 2018).

2.2 Sample Size Determination

The sample size for this study was based on the formula suggested by Fishers formula at 95% level of confidence and a sampling error of 5%. The formula is given as;

$$n = \frac{z^2(pq)}{d^2}$$

Where: n = sample size
Z= 1.96 (statistical constant at 95% confidence interval)
P= Prevalence of non-adherence to ARVs which is estimated to range from 15% – 30% in studies conducted by Wakibi et al., (2011) outside Turkana County.

In this study the prevalence was taken to be 18% (0.18).

q = 1- p
d = 5% (0.05) sampling error

Therefore:

N=1.96*1.96(0.18*.82)/0.05*.05
Sample size =227

The study population is less than 10,000 and therefore and adjustment factor was considered.

The adjustment formula was;

$$n_1 = \frac{n}{1 + \frac{n}{N}}$$

Where:

n1 = New sample size
n = Initial Calculated Sample size
N = total population of patients on ARV treatment

$$n_1 = \frac{227}{1 + \frac{227}{5243}} = \mathbf{218}$$

Therefore, the adjusted sample size was 218 respondents

2.3 Instruments of Data Collection

The research instruments that were used for the study included both open ended and structured questions. Section A of the questionnaire contained items related to social demographic characteristics of the patients while section B contained questions on the retention level of clients on anti-retroviral treatment in Lodwar County and Referral Hospital, Turkana, Kenya. To complement these data, qualitative data was collected through interviews. The key informant interview was administered to HIV/AIDS counselors to provide more information on the retention level of clients on anti-retroviral treatment in Lodwar County and Referral Hospital, Turkana, Kenya.

2.4 Validity of the Research Instruments

The researcher sought expert opinion on content and construct validity. Comments solicited from them were used to improve the research instrument before commencing data collection. Content is a non-statistical type of validity that involves the systematic examination of the test content to determine whether it covers a representative sample of behavior domain to be measured (Anastasi & Urbina, 1997). Content validity evidence involves the degree to which the content of the test matches a content domain associated with the construct.

A test has content validity built into it by careful selection of which items to include (Anastasi & Urbina 1997). Items are chosen so that they comply with the test specification which is drawn up through a thorough examination of subject domain. Foxcroft (2004), note that by using a panel of experts to review the test specifications and the selection of items, the content validity of a test can be improved. The experts were able to review the items and comment on whether the items cover a representative sample of the behavior domain. To test the validity of the instruments was used in the study; the questionnaire was availed to supervisors together with a panel of experienced researchers of Mount Kenya University to review the instruments. The comments from the experts were incorporated in the final instrument revisions to improve its validity.

2.5 Reliability of the Research Instruments

To determine the reliability of the instruments, the questionnaire was piloted using 30 clients in Lokichogio Sub-County hospital who were not be part of this research study. The test-retest method was employed to test the reliability of questionnaires. The first test was administered to the respondents and after two weeks a second test were given to the same respondents. The two tests were analyzed separately. Corrections and adjustments on areas of weakness were made to the instruments. The Pearson's Product Moment Correlation (r) was used to calculate the reliability coefficient between the first and second scores. The formula is as shown below;

$$r = \frac{N\sum xy - \sum x \sum y}{N\sum x^2 - (\sum x)^2 - (\sum y)^2}$$

Where;
r = Coefficient of reliability
N = Total number of subjects
x = Rated values of 1st administered test
y = Rated values of 2nd administered test
∑ = Summation

The coefficient obtained was then be converted into an appropriate correlation for the entire test using the Spearman and Brown prophecy shown below;

rxx = 2roe
1 + roe

Where;

rxx = reliability coefficient for two tests
roe = reliability coefficient obtained by the squares of the 1st and 2nd administered tests.

According to Cronbach alpha of 0.7, is considered reliable and this study adopted a Cronbach alpha of 0.7, as shown in Table 1 which implies that all the variables were reliable and thus adopted for data collection, Orodho, [7] supports that a correlation coefficient of (r) 0.75 or more is considered appropriate to ascertain the reliability of the instruments.

3. RESPONSE RATE

Out of the sampled 218 clients on ART, 205 questionnaires were properly filled and returned. This represented 94% overall successful response rate which was attributed to use of self-administered questionnaire. This response rate was very good, according to Babbie (1990) who classified response rates of 50% as adequate, 60% good and 70% very good for analysis.

3.1 Patient-Related Factors

This shows that while in relationship most of patients 77.1% had informed their spouses that they were on ARVs as compared to 19% who had not disclosed that they were on ARVs.

3.1.1 Reasons for non-disclosure to spouse

The respondents were further asked reasons for not disclosing their status and taking ARVs as shown in Fig. 1.

This means that patients under ARVs do not disclose their taking ARVs for fear of separation, fear of sex denial, personal problem and no need to tell others and disclosure challenge respectively.

3.1.2 Knowledge of ART

The study further sought to establish if the respondents know how ARVs are essential to patients as shown in Fig. 3.

This implies that most of patients 72.7% know that it suppresses virus load in the body.

3.1.3 Alcohol use by clients

In relation to alcohol use 148(72.2%) use alcohol or any other substances as shown in Fig. 4.

3.1.4 Alcohol drinking effect on ARV uptake

And when asked if the use of alcohol affect their ARVs uptake, 122(59.5%) agree while 36(17.6%) disagree as shown in Fig. 5.

3.1.5 How alcohol drinking affect ARV uptake

Those who agree 73(35.6%) support that alcohol usage make them forget to take their ARVs, 29(14.1%) agree that it makes them forget their clinic day, 8(3.9%) agree that it leads to over or under-dosage respectively.

This means that although most of patients 72.2% use alcohol and other substances 59.5% are aware that it affects their ARVs uptake because it makes them forget to take drugs and also forget the clinic days and also it leads to either over or under dosage of ARVS as shown in Fig. 6.

3.1.6 Relationship between patient-related factors and ARVs disclosure

This section sought to establish the patient related factors and its influence on the disclosure of the ARVs usage the results are illustrated in Table 2.

Table 1. Reliability of results

Variable	Cronbach's alpha	No of items
Patient-related factors	0.950	15
System-related factors	0.866	15
Socio-cultural factors	0.789	20

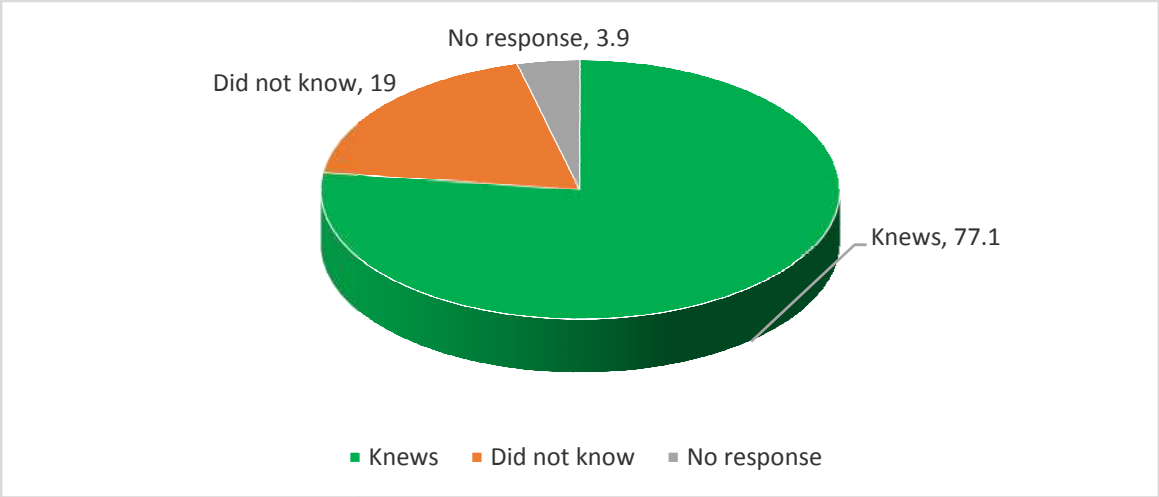


Fig. 1. Spouse knowledge on ARVs

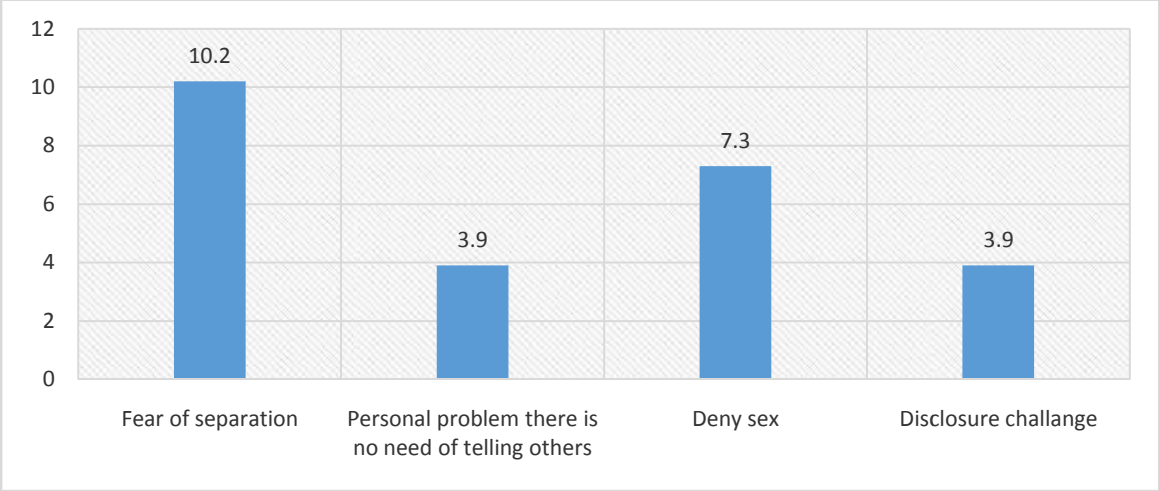


Fig. 2. Reasons for non-disclosure to spouse

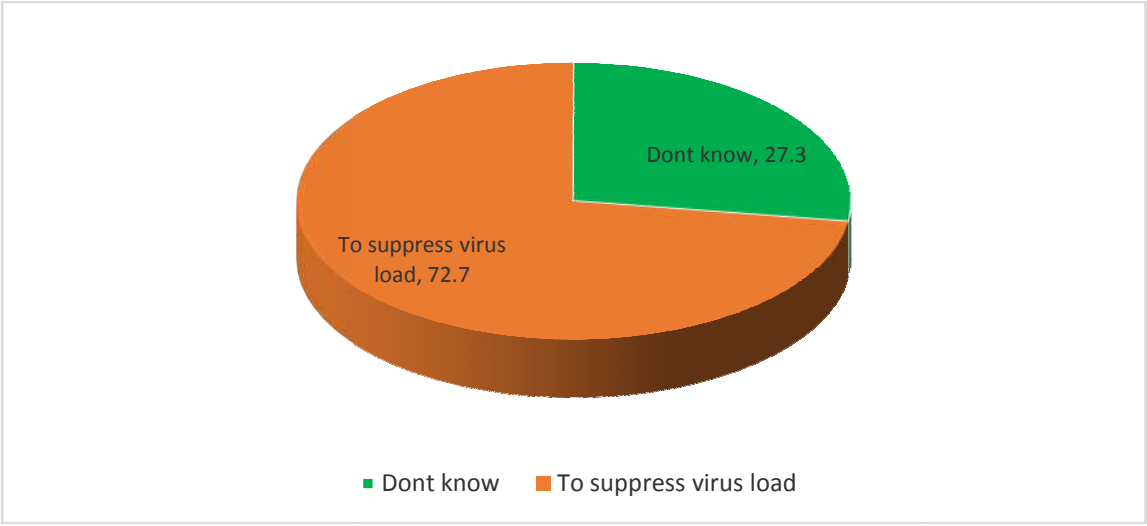


Fig. 3. Importance of ARV to HIV patient

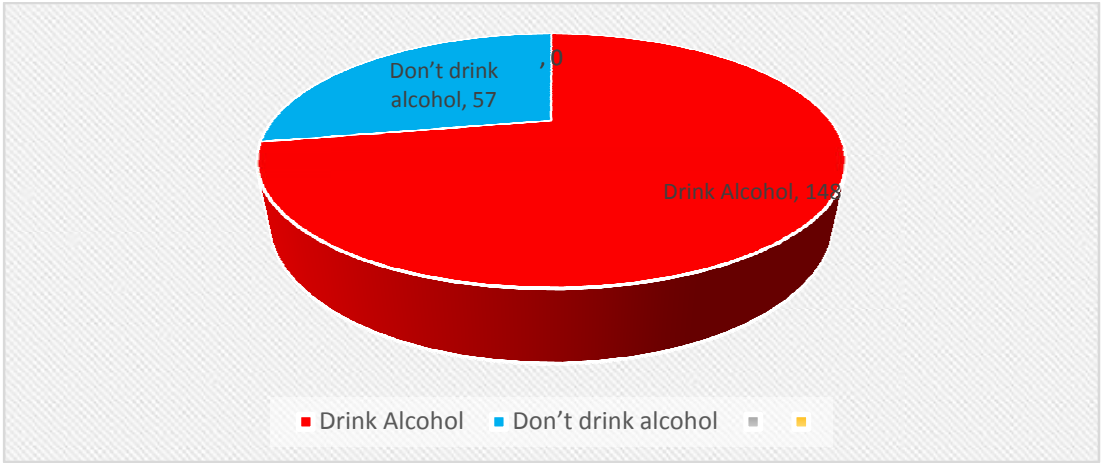


Fig. 4. Alcohol use by clients

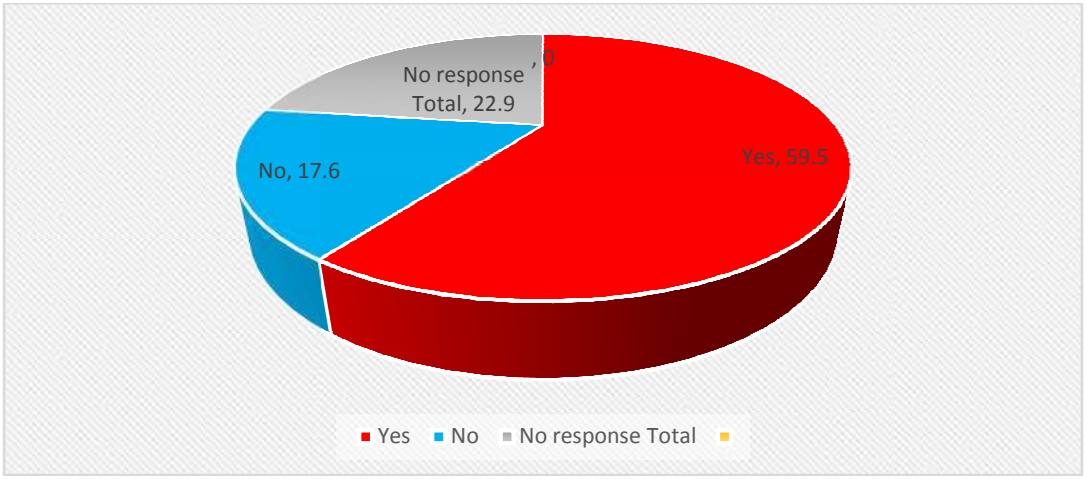


Fig. 5. Alcohol drinking effect on ARV uptake

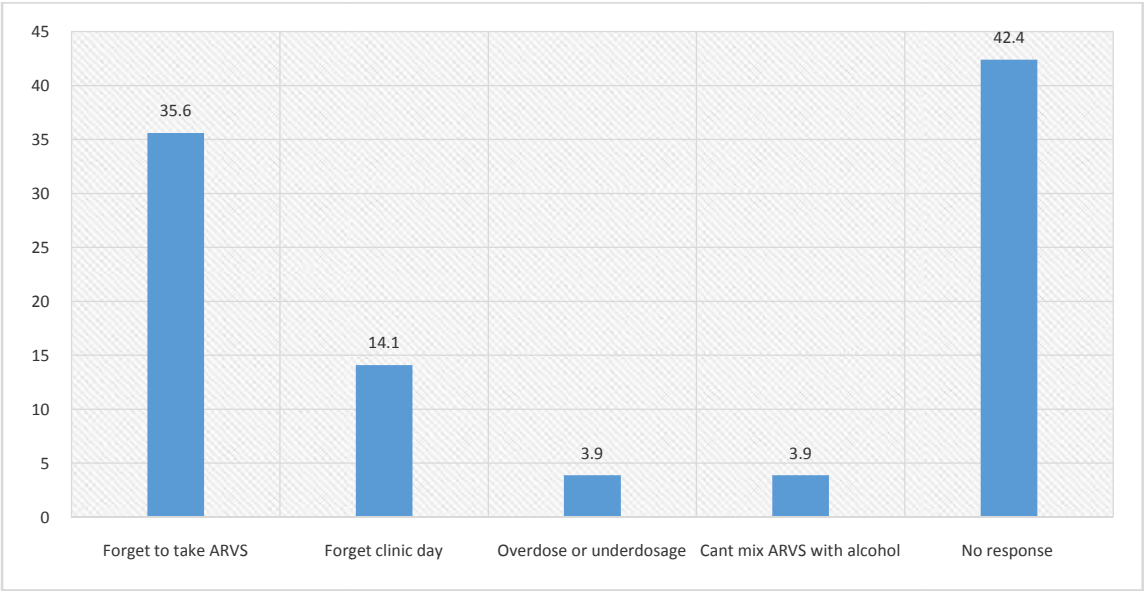


Fig. 6. How alcohol drinking affect ARV uptake

The results indicate that there is a significant relation between the respondent's religion. Marital status, education level and their employment status in relation to ability to disclose their status to their spouses.

3.1.7 Relationship between patient-related factors and ARVS knowledge

Study sought to establish the significance of relationship between patient related factors and knowledge on importance of ARVS as shown in Table 3.

The survey shows that there is a relationship between gender, marital status, education and employment status with the respondent's knowledge on how essential ARVs are to the patients who are HIV+.

3.1.8 Patient related factors that affects HIV adherence

This section provides survey results on the individual factors that causes ARVs non-adherence by patients and results are illustrated in Table 4.

This implies that the respondents neither agree nor disagree that they find the hospital convenient and they are not satisfied with the healthcare workers in LCRH. However, the respondents agree that the healthcare facility is never out of stock of ARVs. But other factors cause non-adherence such as the healthcare worker's attitude, lack of proper nutrition and enough food, the side effects caused by the drugs and hiding of HIV status are some of causes of non-adherence. Also others factors are like lack of counselling and proper information regarding adherence, cultural issues use of herbal drugs, lack of education and training and lack of transport. The other factors causing non-adherence were clinic being in open area and also that sometimes clinic day falling in same day as food distribution day and therefore making it hard to attend both.

3.1.9 Discussion of patient-related factors

The study found that 77.1% of married or in relationship disclosed to their partners their ART status. Studies conducted in Nigeria and Benin revealed varying levels of adherence which ranged from 44% to 80 % Erah and Arute, [8]. To support above study in Southern Malawi, although healthcare providers advocate for disclosure of HIV status to family members, more than half of the providers interviewed stated that some of the women fear disclosing their HIV status to their spouses because their husbands may leave them McKinney et al.,[9].

With means >3.0 it implies that most respondents were in agreement with below statements for example, according to 94.2% agree that the attitude towards the patients (stigma, discrimination and isolation by family) affects their adherence, Yang et al. (2007: 1526) argue that stigma conveys the risk of being devalued through the process of cultural stereotypes that influence appraisal of threat to one's well-being.

Also 98.1% agree that lack of proper nutrition and enough food causes non-adherence, lack of food contributes to non-adherence to ARVs dosing schedule. For example, Ssewaya (2011:59) found that some PLWHA, mainly in the rural setting, failed to swallow their ARVs due to food shortage related problems. The results of a survey conducted in Lusaka, Zambia, by Koethe et al. [10] indicate that 9 per cent of adults who were newly initiated on ART were diagnosed with severe malnutrition.

Also 76.6% site the mishandling by the healthcare providers, 90.2% lack of counselling and proper information regarding adherence, a study in Nairobi found that where early intensive adherence counseling services were given when a patient was being started on HAART, it resulted in a significant reduction in poor adherence and virologic failure Chung *et al*.,[11].

It was also 86.3% cultural issues use of herbal drugs, 95.6% lack of education and training and 85.9% lack of transport as the main causes that affects their adherence to ARVs. Poverty has been found to prevent PLWHA from accessing money to use for transportation to health facilities thus greatly reducing their adherence to clinical appointments and drug refills. Similarly, patient-related factors such as lack of transport, shortage of food, use of traditional medicine, alcohol abuse, depression, stigma and discrimination, and lack of social support undermine adherence Merten *et al*., [12].

3.2 Health System-Related Factors Associated with Non-Adherence

The study second objective was to establish the health-system related factors associated with the respondent's non-adherence and the results is as illustrated in Table 5.

Table 2. Relationship between patients related factors and ARVs disclosure

		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
If married or currently in relationship was your spouse aware you are on ARV * What is your religion	Pearson Chi-Square	9.322[a]	1	.002		
	Continuity Correction[b]	8.249	1	.004		
	Likelihood Ratio	9.993	1	.002		
	Fisher's Exact Test				.002	.002
	Linear-by-Linear Association	9.275	1	.002		
	N of Valid Cases	197				
If married or currently in relationship was your spouse aware you are on ARV * What is your marital status	Pearson Chi-Square	63.903[a]	3	.000		
	Likelihood Ratio	58.076	3	.000		
	Linear-by-Linear Association	.404	1	.525		
	N of Valid Cases	197				
If married or currently in relationship was your spouse aware you are on ARV * What is your highest level of education	Pearson Chi-Square	11.874[a]	3	.008		
	Likelihood Ratio	12.408	3	.006		
	Linear-by-Linear Association	4.884	1	.027		
	N of Valid Cases	197				
If married or currently in relationship was your spouse aware you are on ARV * What is your current employment status	Pearson Chi-Square	12.736[a]	3	.005		
	Likelihood Ratio	16.720	3	.001		
	Linear-by-Linear Association	.000	1	.992		
	N of Valid Cases	197			.001	.001
	Linear-by-Linear Association	14.272	1	.000		
	N of Valid Cases	197				

Table 3. Relationship between patient-related factors and ARVS knowledge

		Value	df	Asymp. Sig. (2-sided)
Is ART essential for the HIV patient * Sex of respondent	Pearson Chi-Square	9.761[a]	2	.008
	Likelihood Ratio	11.582	2	.003
	Linear-by-Linear Association	1.449	1	.229
	N of Valid Cases	205		
Is ART essential for the HIV patient * What is your religion	Pearson Chi-Square	5.862[a]	2	.053
	Likelihood Ratio	10.051	2	.007
	Linear-by-Linear Association	4.298	1	.038
	N of Valid Cases	205		
Is ART essential for the HIV patient * What is your marital status	Pearson Chi-Square	20.147[a]	6	.003
	Likelihood Ratio	24.992	6	.000
	Linear-by-Linear Association	10.206	1	.001
	N of Valid Cases	205		
Is ART essential for the HIV patient * What is your highest level of education	Pearson Chi-Square	49.801[a]	6	.000
	Likelihood Ratio	31.867	6	.000
	Linear-by-Linear Association	4.595	1	.032
	N of Valid Cases	205		
Is ART essential for the HIV patient * What is your current employment status	Pearson Chi-Square	99.182[a]	6	.000
	Likelihood Ratio	80.836	6	.000
	Linear-by-Linear Association	7.734	1	.005
	N of Valid Cases	205		

Source: Field Data (2019)

Table 4. Patient related factors that affects HIV adherence

Patient related factors that affects HIV adherence		Strongly disagree	disagree	Neither agree nor disagree	Agree	Strongly agree	Mean	Standard Deviation
How convenient do you find this hospital for your HIV care services?	**Freq**	27	75	25	37	41	**2.951**	**1.371**
	%	13.2	36.6	12.2	18	20		
How satisfied are you with the healthcare workers in this facility?	**Freq**	16	89	30	46	24	**2.868**	**1.195**
	%	7.8	43.4	14.6	22.4	11.7		
Have you ever found the facility out of stock of your ARVs?	**Freq**	74	89	33	4	5	**1.835**	**0.769**
	%	36.1	43.4	16.1	2	2.4		
Attitude towards the patients (stigma, discrimination and isolation by family)	**Freq**	4	8	4	116	73	**4.200**	**0.819**
	%	2	3.9	2	56.6	35.6		
Lack of proper nutrition and enough food	**Freq**		4	4	116	81	**4.337**	**0.617**
	%		2	2	56.6	39.5		
The side effects of the drugs (dizziness and loss of appetite)	**Freq**			4	116	85	**4.395**	**0.529**
	%			2	56.6	41.5		
Hiding HIV status from spouse	**Freq**			28	148	29	**4.005**	**0.529**
	%			13.7	72.2	14.1		
Mishandling by the healthcare providers	**Freq**	12	36	32	100	25	**3.439**	**1.095**
	%	5.9	17.6	15.6	48.8	12.2		
Lack of counselling and proper information regarding adherence	**Freq**		20	152	28	5	**3.940**	**0.734**
	%		9.8	74.1	13.7	2.4		
Cultural issues use of herbal drugs	**Freq**		24	61	111	5	**3.475**	**0.729**
	%		11.7	29.8	54.1	2.4		
Lack of education and training	**Freq**		4	15	157	24	**4.005**	**0.526**
	%		2	7.3	76.6	11.7		
Lack of transport to the facility	**Freq**	8	16	9	155	12	**3.735**	**0.848**
	%	3.9	7.8	4.4	75.6	5.9		

Table 5. Health system-related factors associated with non-adherence

Health System-Related Factors		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Mean	Standard Deviation
How convenient do you find this hospital for your HIV care services?	**Freq**	24	79	25	37	37	**2.054**	**1.718**
	%	11.7	38.5	12.2	18	18		

Health System-Related Factors		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Mean	Standard Deviation
How satisfied are you with the healthcare workers in this facility?	**Freq**	19	86	30	46	24	**2.854**	**1.212**
	%	9.3	42	14.6	22.4	11.7		
Have you ever found the facility out of stock of your ARVs?	**Freq**	76	84	33	12		**1.907**	**0.872**
	%	37.1	41	16.1	5.9			
Distance to the health facility	**Freq**	21	32	4	108	36	**3.527**	**1.249**
	%	10.2	15.6	2	52.7	17.6		
Lack of confidentiality in the facility	**Freq**	21	24	11	137	8	**3.433**	**1.094**
	%	10.2	11.7	5.4	66.8	3.9		
No psycho-social support in the health facility	**Freq**	16	16	24	121	28	**3.629**	**1.066**
	%	7.8	7.8	11.7	59	13.7		
Discrimination and isolation in the facility	**Freq**	36	40	37	88	4	**2.922**	**1.186**
	%	17.6	19.5	18	42.9	2		
Lack of enough qualified staffs to handle our issues	**Freq**	20	60	8	89	24	**3.184**	**1.261**
	%	9.8	29.3	3.9	43.4	11.7		
Lack of adherence counselling services	**Freq**	8	8	20	129	36	**3.881**	**0.886**
	%	3.9	3.9	9.8	62.9	17.6		
Lack of nutritional support services	**Freq**		8	4	83	106	**4.388**	**0.871**
	%		3.9	2	40.5	51.7		
There is lack of access to the health facility	**Freq**	44	59	35	34	29	**2.726**	**1.360**
	%	21.5	28.8	17.1	16.6	14.1		
Lack of express services in the clinic	**Freq**		8	8	85	100	**4.378**	**0.746**
	%		3.9	3.9	41.5	48.8		
Lack of adequate preparation	**Freq**		12	4	117	68	**4.199**	**0.748**
	%		5.9	2	57.1	33.2		
Lack comprehensive HIV care services	**Freq**	20	20	42	103	20	**3.405**	**1.106**
	%	9.8	9.8	20.5	50.2	9.8		
GOK staff attitude	**Freq**	12	24	25	128	16	**3.546**	**0.997**
	%	5.9	11.7	12.2	62.4	7.8		
Negligence of MOH and government staff the don't have time for patience	**Freq**	24	20	33	104	24	**3.410**	**1.175**
	%	11.7	9.8	16.1	50.7	11.7		
The service quality in public is very poor	**Freq**	28	49	59	52	17	**2.907**	**1.170**
	%	13.7	23.9	28.8	25.4	8.3		

Source: Field Data (2019)

Table 6. Socio-cultural factors associated with non-adherence

Socio-Cultural Factors		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Mean	Standard Deviation
Does taking ARV medicines offend any of your cultural beliefs?	**Freq**	20	113	52	8	8	**2.358**	**0.867**
	%	9.8	55.1	25.4	3.9	3.9		
Do you think HIV/AIDS infection can be treated by cultural methods without ARV medicines?	**Freq**	28	93	60	16	8	**2.429**	**0.955**
	%	13.7	45.4	29.3	7.8	3.9		
Does taking ARV medicines offend any of your religious beliefs?	**Freq**	24	111	62	4	4	**2.439**	**1.538**
	%	11.7	54.1	30.2	2	2		
Do you think HIV/AIDS infection can be treated by religious methods without using ARVs?	**Freq**	8	16	79	86	16	**3.420**	**0.891**
	%	3.9	7.8	38.5	42	7.8		
Transport cost to the health facility	**Freq**		16	4	153	32	**3.981**	**0.700**
	%		7.8	2	74.6	15.6		
How the HIV people are viewed in community	**Freq**	4	12	8	129	52	**4.039**	**0.839**
	%	2	5.9	3.9	62.9	25.4		
Alternatives to the ARVs drugs such as herbs	**Freq**	8	20	36	129	12	**3.571**	**0.892**
	%	3.9	9.8	17.6	62.9	5.9		
Preference of traditional healers to the ARVs	**Freq**	8	36	59	85	17	**3.327**	**0.988**
	%	3.9	17.6	28.8	41.5	8.3		
Religion does not allow visiting health facility	**Freq**	36	84	48	28	9	**2.463**	**1.069**
	%	17.6	41	23.4	13.7	4.4		
The community relate HIV to prostitution	**Freq**	12	7	20	104	62	**3.961**	**1.033**
	%	5.9	3.4	9.8	50.7	30.2		
Community view HIV as punishment from God	**Freq**	24	15	24	104	38	**3.571**	**1.213**
	%	11.7	7.3	11.7	50.7	18.5		

From the results it was shown that; lack of confidentiality, lack of psycho-social support, discrimination and isolation, lack of enough qualified staffs to handle our issues, lack of adherence counselling, lack of nutritional support services, lack of access to the health facility, the lack of express services in the clinic, GOK staff attitude, lack of adequate preparation, lack comprehensive HIV care services and the negligence of MOH and government staff they don't have time for patience causes non-adherence. Also the health facility is not convenient, healthcare workers in facility causes non-adherence and that there is always drugs in the facilities which does not cause non-adherence.

3.2.1 Discussion of health system-related factors associated with non-adherence

Adherence requires collaboration between the patient and health-care provider in addition to sticking to medications and other health services (Laufs et al., 2011:267). Study findings as supported by means >3.0 shows that respondents agree that distance 70.3%, lack of confidentiality in facility 70.7%, Amsalu, (2012: 60) support that organisational arrangements that inadvertently discriminate against PLWHA in institutions such as hospitals, may lead to an inert form of stigma.

Lack of enough qualified staffs to handle our issues 55.1%, lack of adherence counselling services 80.5%, lack of nutritional support services 92.2% as some of causes of the non-adherence to ARVS. Although revealing status can expose one to stigma, having someone to assist in adhering to medication and treatment requirements can enable PLWHIV adhere to ART. Good social support predicts better adherence Afolabi, Afolabi, MA, & Olowookere, [13].

3.3 Socio-Cultural Factors Associated with Non-adherence

The study third and final objective was to examine the socio-cultural factors associated with non-adherence. Results were analyzed and presented under this section in Table 6.

The results conclude that lack of transport, view of community people, alternative drugs to ARVs such as herbs, preference for traditional healers and the fact that community view HIV+ infection with prostitution as socio-cultural factors causing non-adherence. However, lack of ARVs in facilities, believe that ARV medicines offend religious beliefs and religion prohibiting visiting the health facility does not cause non-adherence by respondents.

3.3.1 Discussion of socio-cultural factors associated with non-adherence

With mean>3.0 most of the respondents were in agreement with statements that follow. According to 49.8% they agree that HIV/AIDS infection cannot be treated by religious methods without using ARVs, 90.2% agree that transport cost to the health facility, 88.3% how the HIV people are viewed in community, Sayles et al., [14] argues that lack of cooperation from those close to the PLWHA and especially family members promotes non-adherence to ART.

According to study; lack of ARVs in facilities 64.9%, perception that HIV/AIDS infection can be treated by cultural methods without ARV medicines 59.1%, taking ARV medicines offend any of your religious beliefs 65.8% and religion does not allow visiting health facility 58.6% according to the respondents disagreed when asked if the above factors affects their ARVs adherence. Sayles et al., [14] support that some PLWHA abandoned antiretroviral therapies after joining various religious organizations but only resumed when their health changed for the worse. PLWHA rely on a number of social support systems ranging from the health care providers, family members, communities, friends, treatment partners and support groups.

This is support from document analysis and interviews it was revealed at LCRH there should be 3741 people on ARVs, however, as at January 2018 there were 1551(41.4%) who were actively on ARVs this shows that there is 58.6% default rate. A study in Brazil showed that the cumulative incidence of non-adherence to be 36.9% Nachega, Stein and Lahnan (2004). Adherence among patient's in Soweto, South Africa was 88%.

4. SUMMARY OF THE RESULT FINDINGS

4.1 Patient-related Factors Associated with Non-adherence

Tests shows that there is a significant relation between the respondent's religion. Marital status, education level and their employment status in relation to ability to disclose their status to their

spouses. Also it was shown that there is a relationship between gender, marital status, education and employment status with the respondent's knowledge on how essential ARVs are to the patients who are HIV+.

The respondents neither agree nor disagree that they find the hospital convenient and they are not satisfied with the healthcare workers in LCRH. However, the respondents agree that the healthcare facility is never out of stock of ARVs. But other factors cause non-adherence such as the healthcare worker's attitude, lack of proper nutrition and enough food, the side effects caused by the drugs and hiding of HIV status are some of causes of non-adherence.

4.2 Health System-related Factors Associated with Non-adherence

The results further revealed that; lack of confidentiality, lack of psycho-social support, discrimination and isolation, lack of enough qualified staffs to handle our issues, lack of adherence counseling, lack of nutritional support services, lack of access to the health facility, the lack of express services in the clinic, GOK staff attitude, lack of adequate preparation, lack comprehensive HIV care services and the negligence of MOH and government staff don't have time for patience causes non-adherence. Also the health facility is not convenient, healthcare workers in facility causes non-adherence and that there is always drugs in the facilities which does not cause non-adherence.

4.3 Socio-cultural Factors Associated with Non-adherence

The socio-cultural factors causing non-adherence to ARVs are; lack of transport, view of community people, alternative drugs to ARVs such as herbs, preference for traditional healers and the fact that community view HIV+ infection with prostitution as socio-cultural factors causing non-adherence. However, lack of ARVs in facilities, believe that ARV medicines offend religious beliefs and religion prohibiting visiting the health facility does not cause non-adherence by respondents.

5. CONCLUSION

From the findings of the study the following conclusions were made;

i. The LCRH has 70% default rate. The study sought to examine three factors and results indicates that there is a relationship between patient-related factors associated with non-adherence as shown by the tests undertaken. The results showed that gender, education, religion, employment status and age have a significant relationship to patients disclosing their status to the spouses and the knowledge they have on benefits of ARVs to HIV+ patients. Also lack of support, the distance to facility, lack of food, the side effects, alcohol use among many others causes non-adherence.
ii. Health system-related factors associated with non-adherence are; lack of confidentiality, psycho-social support, discrimination and isolation, lack of enough qualified staffs, lack of adherence counselling, nutritional support services, access to the health facility, express services in the clinic and the GOK staff attitude causes non-adherence.
iii. In relation to socio-cultural factors associated with non-adherence, this were; view of community people, alternative drugs to ARVs such as herbs, preference for traditional healers and the fact that community view HIV+ infection with prostitution as socio-cultural factors causing non-adherence.

6. RECOMMENDATIONS

From the study findings the following recommendations were reached;

i. There is need to empower the community members because there are many patients related factors that are causing non-adherence such as lack of education, lack of support, the side effects, alcohol use among many others. These factors can be eliminated through training, counselling and offering support to the respondents.
ii. The health facility should improve their service delivery to the patients by taking into consideration schedule such as to ensure that drug taking day does not coincide with the day that they are picking and therefore making it hard to attend both.
iii. There is need to sensitize the community members to accept the HIV+ people to enable them express their health issues. They should support them and ensure that

they are trained on how to use ARVs and not seek the tradition herbs and medicine men. They should also encourage them to live openly.

6.1 Recommendation for Further Research

From the findings of the study the following suggestions on PRF are made. These suggestions are for further research.

i. The relationship between non-adherence and fear of exposure at workplace
ii. To examine the effects of herbal drugs on the health status of HIV infected person

CONSENT AND ETHICAL APPROVAL

As per international standard or university standard guideline participant consent and ethical approval has been collected and preserved by the authors.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Original Research Article

Leveraging female partner influence in health interventions: a study on prostate cancer screening uptake among men in rural Kiambu County, Kenya

Peterson K. Kimani[1]*, Joseph Muchiri[1], Margaret W. Nyongesa[2]

[1]School of Public Health, Mount Kenya University, Kenya
[2]School of Health and Biomedical Sciences, Technical University of Kenya, Kenya

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***Correspondence:**
Dr. Peterson K. Kimani,
E-mail: petersonpkk@gmail.com

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ABSTRACT

Background: Globally, prostate cancer is the second most common cancer affecting men, with considerably high fatality rates. The aim of this study was to assess the effect of a female partner-led brochure method on perception, attitude, and cultural beliefs toward the intention of prostate cancer screening among men in rural Kiambu County, Kenya.
Methods: The research adopted a randomized controlled trial design. Multistage sampling was employed in this study. The Chi-square test was used to assess differences in perception, attitude, and cultural beliefs towards intention to undergo prostate cancer screening (PCS) between the control and intervention groups at baseline and end line. Further, data were subjected to structural equation modeling to assess the influence of perception, attitude, and cultural beliefs on PCS intention pre-and post-intervention.
Results: The results revealed no significant difference in perception between the control and intervention groups at baseline and end-line. Regarding attitude, there was a 39.8% and 24.7% increase in positive attitudes in the group that used gain-framed and loss-framed brochure methods, respectively, at the end line. In the end, there was a significant reduction in the number of respondents who had fatalistic beliefs, whereby 23.1% and 13.2% of the respondents in the groups' intervention used gain-framed and loss-framed brochures, respectively.
Conclusions: The study recommends the implementation of female partner-led interventions using gain-framed messaging in prostate cancer screening campaigns, as this approach demonstrated superior effectiveness in improving attitudes, reducing fatalism beliefs, and increasing the perceived benefits of screening among men.

Keywords: Attitude, Cultural belief, Intention for prostate cancer screening and perception

INTRODUCTION

Globally, prostate cancer is the second most prevalent cancer in men.[1] Evidence suggests that the incidence, mortality, and disability-adjusted years of prostate cancer have increased over the last three decades.[2] For instance, in 2020 there were 1.41 million new cases of prostate cancer and 375, 304 prostate cancer-related deaths globally.[3] Further evidence suggests a strong positive correlation between prostate cancer and age, whereby over 85% of reported prostate cancer cases are usually among men over the age of 60 years.[4] Similarly, evidence indicates that in sub-Saharan Africa, the incidence of prostate cancer and mortality related to prostate cancer is considerably high. [5,6]

In low- and middle-income countries, such as Kenya, the burden of prostate cancer is significant and has been associated with genetic, socioeconomic, and sociocultural factors.[7,8]

In Kenya, the uptake of prostate cancer screening is extremely low (4.4%), which implies that there is a low detection of prostate cancer cases.[9] Further evidence indicates that in many of the countries in Sub-Saharan Africa, prostate cancer screening is considerably low, possibly because the lack of a robust healthcare system in these countries is one of the major contributors to the poor diagnosis of screening.[10] Other barriers to prostate cancer screening in the region include poor education, which impacts patients' attitudes and perceptions towards prostate cancer screening, and cultural beliefs such as traditional beliefs about masculinity and the desire not to look weak.[11,12] Evidence further indicates that traditional beliefs normally result in a late diagnosis of prostate cancer and other non-communicable diseases.[13] These cultural and traditional beliefs and a lack of knowledge about chronic diseases create a perception of witchcraft and traditional taboos as the cause of cancer.[14] These myths and cultural beliefs further result in patients seeking help from men in traditional medicine, which further aggravates the disease and results in late diagnosis.[15] Studies have therefore recommended the need for interventions in Kenya to improve the uptake of prostate cancer screening, such as national advocacy campaigns, as well as the use of digital, mainstream, and print media to raise awareness.[9] The objective of this study was to leverage female partner influence on health interventions on prostate cancer screening uptake among men in rural Kiambu County, Kenya.

METHODS

Study design

A randomized controlled trial study design was used in the study. Kiambu County study sites were chosen at random to conduct the study; two sub-counties were designated as intervention sites and one sub-county as the control. Men over 40 who had lived in Kiambu County for at least six months were randomly chosen to participate in the control and intervention sites study. A number of interventions were given to the study participants in the intervention site in this investigation. Brochures with gain and loss-framed images tailored specifically for female partners were used in the intervention. The study participants' female partners were given gain- and loss-framed brochures containing health information about prostate cancer, whereas the control group's female partners were given brochures about a different health issue.

Study site

Kiambu County was the site of the study. Situated in the center of the region, the county covers a total area of 2543.5 km^2, of which 476.3 km^2 is forested. Kiambu County has a population of approximately 2,417,735 as of the 2022 census, with 1,187,146 men, 1,230,454 women, and 135 intersex persons.[16] Situated at an elevation of 1500–1800 meters above sea level, the region is mainly used for tea and dairy production, though other agricultural activities include the cultivation of maize, fruits, and vegetables.[17]

Study population

The men in rural Kiambu County, Kenya, between the ages of 40 and 69 were the study's participant sample. Furthermore, as a secondary target population, their female partners were also considered. Research suggests that women play a crucial role in encouraging their male partners to adopt healthy habits, which is why women's participation was included.

Sample size determination

When conducting an impact study, the Magnani (1997) formula has been suggested as a useful technique for estimating the sample size.[18] As a result, the study recruited 272 study respondents.

Sampling technique

Kiambu was purposefully picked based on the uptake of screening services and the high number of PSC-related deaths.[19] To recruit the intended study respondents, multi-stage sampling was used. At the household, couple/couples who met the inclusion criteria were encompassed in the research. Where a couple in the household did not meet the inclusion criteria or were absent, they were replaced by their neighbors as long as they met the inclusion criteria.

Inclusion criteria

Men who were residents of Kiambu County for six months and above during the study period. Men aged 40-69 years and living together with a female partner were included in the study. In addition, men who agreed to sign the informed consent form were also included.

Exclusion criteria

Extremely sick participants were excluded from the research due to their inability to express themselves. In addition, men who met the inclusion criteria but didn't have a regular female partner were also excluded from the study.

Data collection tools and procedures

A structured questionnaire was used. The tool comprised of items on awareness of cancer of the prostate screening and intention to prostate cancer screening. Intention to screen for cancer of the prostate was measured using a validated scale such as the prostate cancer screening decisional balance scale (PCS-DBS).[20] The intervention involved the use of female partner-specific brochures in different message frames(gain-framed and loss-framed). Female partners in the intervention group received female-specific brochures in different message frames, while those in the control group received brochures with simple 'normal' health education brochures with information on

prostate cancer. After six months a posttest survey was conducted that collected data that determined the cancer of the prostate screening perception, attitude, and cultural beliefs among the respondents as well as their intent to screen for the disease.

Data analysis plan

Statistical package for the social sciences (SPSS) version 29 was employed in descriptive statistics while STATA version 15 was employed for inferential statistics. To measure the effect of the brochure type and message frame on the desire to screen for cancer of the prostate and awareness of cancer of the prostate, the Chi-square test was used to determine the differences in Knowledge and intention for prostate cancer screening between participants in the control and intervention sites pre and post-intervention. The Chi-square test was used to determine the differences in perception, attitude, and cultural beliefs regarding prostate cancer screening between participants in the control and intervention groups pre-and post-intervention. Furthermore, structural equation modeling was performed to measure the influence of perception, attitude, and cultural beliefs on intention to undergo prostate cancer screening at baseline and end line. A p value of ≤ 0.05 was set to determine the statistical significance. Data generated during the data analysis process is also presented using tables and bar graphs.

Ethical consideration

Ethical clearance to conduct the study was sought from the MKU Institutional and Ethical Review Committee (MKU/ISERC/3124) and the National Commission for Science, Technology, and Innovation (NACOSTI/P/23/29822). Furthermore, permission was sought from the Kiambu County director of Health. Additionally, consent was also sought from the study participants. Participation in this study was voluntary.

RESULTS

Socio-demographic characteristics

As provided in Table 1, at baseline and end line there was a significant difference in age between the control and intervention groups ($p<0.05$). Respondents who were aged 40-49 years old in the group intervened using gain-framed brochures were over three quarters, those in the group intervened using loss-framed brochures were close to two-thirds while in the control group, they were close to half. There was no significant difference in the highest level of education, religion, occupation, and monthly income between the control and intervention groups at baseline and end line ($p>0.05$). It is worth noting that a majority of respondents in the control group at baseline and endline had primary education while a majority of respondents in the intervention groups had secondary education. In regards to religion, all the respondents in the control and intervention groups were Christians. A high number of respondents in the control and intervention groups at baseline and end line were self-employed. At baseline the mean monthly income in the control group was Ksh 15707.7±10402.1, the monthly income in the group intervened using gain-framed brochures was Ksh 16096.8±15006.7, while monthly income in the group intervened using loss-framed brochures, was Ksh 16102.2±20975.2. At endline, the mean monthly income in the control group was Ksh 16000±10449.2, monthly income in the group intervened using gain-framed brochures was Ksh 16208.8±15150.2, while monthly income in the group intervened using loss-framed brochures, was Ksh 16329.7±21136.9.

Perception and attitude towards prostate cancer screening

As provided in Table 2, There was no significant difference in the perception of prostate cancer screening among the respondents in the control and intervention groups at baseline and endline ($p<0.05$). Attitudes towards prostate cancer screening differed significantly among respondents in the control and intervention groups at the end ($p<0.05$). Slightly above half of the respondents (52.7%) in the group intervened using gain-framed brochures had a positive attitude towards prostate cancer screening, and close to half (46.2%) of respondents in the group intervened using loss-framed brochures had a positive attitude towards prostate cancer screening, while in the control group, only a fifth of the respondents had a positive attitude towards prostate cancer screening at the end.

Cultural beliefs towards prostate cancer screening

As provided in Table 3, There was a significant difference in belief in fatalism among respondents in the control and intervention groups at the baseline and end line ($p<0.05$). At baseline, 84.9% of respondents in the control group had fatalistic beliefs, 77.4% in the group intervened using loss-framed brochures, and 65.6% in the group intervened using gain-framed brochures. In the end, there was a significant reduction in the number of respondents who had fatalistic beliefs, whereby 23.1% and 13.2% of the respondents in the groups' intervention used gain-framed and loss-framed brochures, respectively. The perceived benefits of prostate cancer screening differed significantly among respondents in the control and intervention groups at the end ($p<0.05$). Respondents in the group that used gain-framed brochures had higher perceived benefits towards prostate cancer screening, followed by the group that intervened using loss-framed brochures, while respondents in the control group had the least. The fear of prostate cancer screening differed significantly among respondents in the control and intervention groups ($p<0.05$). In the end, there was a significant reduction in fear of prostate cancer screening, whereby respondents in the group intervened using loss-framed brochures had the less fear as compared to the group intervened using loss-framed brochures and the control groups.

Multi-group analysis

As provided in Table 4, In the multigroup analysis, we checked for the variation between the control and intervention groups with regard to the effect of attitude, perception, and culture on intention to undergo prostate cancer screening at baseline and end line. At baseline, there were no differences in the influence of attitude, perception, and culture on intention to undergo prostate cancer screening between the control and intervention groups.

Perception was found to have a more significant influence on intention to undergo prostate cancer screening in the control group than in the group treated with gain-framed brochures. Path coefficients also indicate that perception had more influence on the intention for prostate cancer screening among respondents in the group that used loss-framed brochures as compared to the group that used gain-framed brochures at the endline. Similarly, culture was found to have a more significant influence on the intention to undergo prostate cancer screening in the control group than in the group treated with gain-framed brochures. Path coefficients also indicate that culture had more influence on the intention for prostate cancer screening among respondents in the group treated with loss-framed brochures than in the group that used gain-framed brochures. Similarly, culture was found to have a more significant influence on the intention to undergo prostate cancer screening in the control group than in the group treated with gain-framed brochures. The culture was also found to have a greater influence on the intention for prostate cancer screening among respondents in the group treated with loss-framed brochures than in the group that used gain-framed brochures.

Table 1: Socio-demographic characteristics of the respondents.

Variables	Baseline, f (%)					Endline, f (%)				
	Control	Intervention (gain framed)	Intervention (loss framed)	χ^2	P value	Control	Intervention (gain framed)	Intervention (loss framed)	χ^2	P value
Age (years)										
40-49	45 (48.4)	73 (78.5)	60 (64.5)	19.639	0.001	44 (48.9)	71 (78.0)	60 (65.9)	17.975	0.001
50-59	31 (33.3)	11 (11.8)	24 (25.8)			29 (32.2)	11 (12.1)	22 (24.2)		
60-69	17 (18.3)	9 (9.7)	9 (9.7)			17 (18.9)	9 (9.9)	9 (9.9)		
Highest level of education										
No formal education	3 (3.2)	6 (6.5)	5 (5.4)	1.786	0.938	3 (3.3)	6 (6.6)	4 (4.4)	1.875	0.931
Primary	44 (47.3)	41 (44.1)	39 (41.9)			42 (46.7)	40 (44.0)	38 (41.8)		
Secondary	43 (46.2)	44 (47.3)	47 (50.5)			42 (46.7)	43 (47.3)	47 (51.6)		
Tertiary	3 (3.2)	2 (2.2)	2 (2.2)			3 (3.3)	2 (2.2)	2 (2.2)		
Religion										
Christian	93 (100)	93 (100)	93 (100)			90 (100)	91 (100)	91 (100)		
Occupation										
Unemplo-yed	40 (43.0)	45 (48.4)	45 (48.4)	0.720	0.698	38 (42.2)	43 (47.3)	44 (48.4)	0.777	0.678
Self employed	53 (57.0)	48 (51.6)	48 (51.6)			52 (57.8)	48 (52.7)	47 (51.6)		
Monthly income										
Mean	15709.7	16096.8	16102.2			16000	16208.8	16329.7		
Standard deviation	10402.1	15006.7	20975.2			10449.2	15150.2	21136.9		
P value	0.982					0.990				

Table 2: Respondents perception and attitude towards prostate cancer screening.

Variables	Baseline, f (%)					Endline, f (%)				
	Control	Intervention (gain framed)	Intervention (loss framed)	χ^2	P value	Control	Intervention (gain framed)	Intervention (loss framed)	χ^2	P value
Perception										
Positive	43 (46.2)	31 (33.3)	32 (34.4)	4.047	0.132	46 (51.1)	55 (60.4)	46 (50.4)	2.258	0.323
Negative	50 (53.8)	62 (66.7)	61 (65.6)			44 (48.9)	36 (39.6)	45 (49.5)		
Attitude										
Positive	10 (10.8)	12 (12.9)	20 (21.5)			18 (20.0)	48 (52.7)	42 (46.2)		

Continued.

Variables	Baseline, f (%)					Endline, f (%)				
	Control	Intervention (gain framed)	Intervention (loss framed)	χ^2	P value	Control	Intervention (gain framed)	Intervention (loss framed)	χ^2	P value
Negative	83 (89.2)	81 (87.1)	73 (78.5)	4.709	0.095	72 (80.0)	43 (47.3)	49 (53.8)	24.155	<0.001

Table 3: Cultural beliefs towards prostate cancer screening.

Variables	Baseline, f (%)					Endline, f (%)				
	Control	Intervention (gain framed)	Intervention (loss framed)	χ^2	P value	Control	Intervention (gain framed)	Intervention (loss framed)	χ^2	P value
Fatalism belief										
Yes	79 (84.9)	61 (65.6)	72 (77.4)	9.703	0.008	68 (75.6)	21 (23.1)	12 (13.2)	86.971	<0.001
No	14 (15.1)	32 (34.4)	21 (22.6)			22 (24.4)	70 (76.9)	79 (86.8)		
Perceived benefits										
Yes	16 (17.2)	17 (18.3)	27 (29.0)	4.714	0.095	31 (34.4)	70 (76.9)	54 (59.3)	33.619	<0.001
No	77 (82.8)	76 (81.7)	66 (71.0)			59 (65.6)	21 (23.1)	37 (40.7)		
Fear										
Yes	67 (72.0)	70 (75.3)	72 (77.4)	0.725	0.696	44 (48.9)	15 (16.5)	10 (11.0)	40.031	<0.001
No	26 (28.0)	23 (24.7)	21 (22.6)			46 (51.1)	76 (83.5)	81 (89.0)		

Table 4: Multi-group analysis.

Variables	Baseline		Endline	
	β	P value	β	P value
Perception > intention				
Control-intervention (gain framed)	-0.022	0.428	0.114	<0.001
Control-intervention (loss framed)	-0.162	0.123	0.017	0.462
Intervention (GF)-intervention (LF)	-0.140	0.147	-0.097	<0.001
Attitude > intention				
Control-intervention (gain framed)	-0.055	0.312	-0.062	<0.001
Control-intervention (loss framed)	0.075	0.278	-0.063	0.315
Intervention (GF)-intervention (LF)	0.130	0.135	-0.002	<0.001
Culture > intention				
Control-intervention (gain framed)	-0.335	0.059	-0.218	<0.001
Control-intervention (loss framed)	-0.363	0.043	-0.251	0.154
Intervention (GF)-intervention (LF)	-0.028	0.440	-0.033	<0.001

DISCUSSION

The results suggested that both female partner-led gain-framed and loss-framed messages were more effective than no intervention in promoting positive attitudes, with gain-framed messages showing a slight edge. This aligns with findings from other studies, in Kenya, which found that educational interventions could significantly improve knowledge and attitudes towards prostate cancer screening.[21] Similarly, findings from a Kenyan study documented that female-led interventions would significantly change perceptions and attitudes towards cancer screening among men.[22] Compared with international studies, the results from Kiambu County show some similarities. For instance, a Chinese study reported that gain frame was more effective in increasing men's attitudes toward breast cancer screening.[23]

The baseline results, showing no significant differences between the control and intervention groups in terms of how attitudes and perceptions influence screening intentions, establish a crucial starting point. This equivalence at baseline strengthens the validity of any subsequent differences observed post-intervention. The finding that perception had a more significant influence on screening intentions in the control group than in the gain-framed brochure group is intriguing. This finding suggests that the gain-framed intervention might have introduced other factors that competed with or moderated the influence of perception on intentions. This aligns with research by, who found that gain-framed messages can

shift focus from risk perception to potential benefits in cancer screening decisions.[24] The observation that perception had a stronger influence on screening intentions in the loss-framed group than in the gain-framed group at the end is particularly noteworthy. This outcome suggests that loss-framed messages may heighten the role of risk perception in decision-making regarding screening for prostate cancer.

The significant difference in fatalism beliefs between the control and intervention groups at both the baseline and end-line was a crucial finding. The marked reduction in fatalistic beliefs in both intervention groups (gain-framed and loss-framed) compared to the control group suggests that targeted health communication can effectively combat fatalistic attitudes towards cancer. This aligns with the recent research by, who found that culturally tailored interventions can significantly reduce cancer fatalism among minority populations.[25]

The greater reduction in fatalism beliefs in the loss-framed group (from 77.4% to 13.2%) than in the gain-framed group (from 65.6% to 23.1%) is particularly noteworthy. This suggests that loss-framed messages may be more effective in challenging fatalistic beliefs about prostate cancer. This finding resonates with the work of, [26] who observed that emphasizing the consequences of inaction (loss-framing) was more effective in reducing fatalism in colorectal cancer screening campaigns.

The significant difference in the perceived benefits of prostate cancer screening at the end line, with the gain-framed group showing the highest perceived benefits, followed by the loss-framed group, aligns with the principles of prospect theory in health communication. This outcome supports recent findings that demonstrated that gain-framed messages were more effective in enhancing the perceived benefits of HPV vaccination intentions.[27] A meta-analysis documented that gain-framed messaging was more effective in encouraging preventative behaviors, especially skin cancer prevention.[28]

The present study's findings align with recent research emphasizing the importance of culturally tailored health interventions in African contexts. For instance, a Kenyan study highlighted the role of cultural beliefs in shaping prostate cancer screening behaviors among East African men.[29] Furthermore, a US study found that partner involvement in health decision-making can be influenced by cultural norms.[30]

These results underscore the need for healthcare providers and policymakers to consider cultural nuances when designing prostate cancer screening interventions in Kenya and other similar settings.

Limitations

Attrition bias was expected because this research employed a randomized controlled trial design. This was minimized by recruiting an additional 10% of the sample size. In addition, regular contact with participants was maintained which helped maintain their involvement in the study.

Assessment bias was expected to occur between the intervention and control arms. Nonetheless, the bias was minimized by blinding both the evaluators and the respondents.

Volunteer bias was projected to occur; however, the researcher made it easier for a wider range of individuals to participate by addressing common barriers, such as transportation, childcare, or time constraints. This was done by offering flexible scheduling and covering travel costs.

CONCLUSION

From this research, while perception remained consistent across groups, the interventions using female partners led to framed brochures (both gain- and loss-framed) and led to more positive attitudes towards screening compared to the control group. Notably, there was a marked reduction in fatalist beliefs among the intervention groups, with gain-framed brochures showing slightly better results. The perceived benefits of screening were highest in the gain-framed group, followed by the loss-framed group. The loss-framed intervention was the most effective in reducing the fear of prostate cancer screening.

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