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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

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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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