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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

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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.

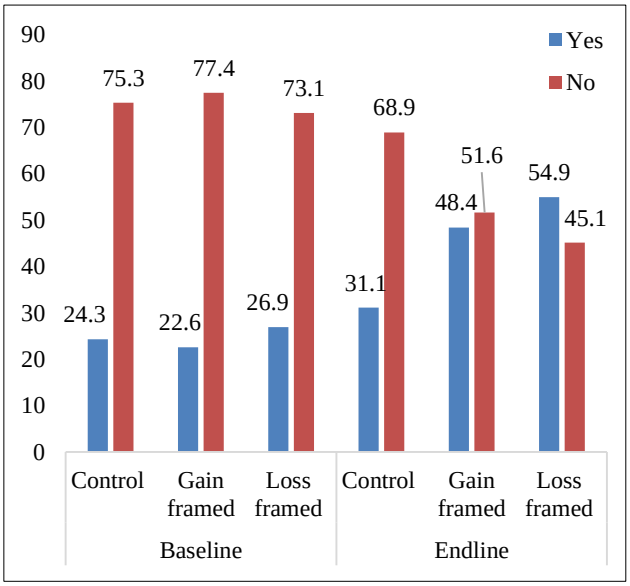

Figure 1: Intention to screen for the cancer of the prostate in control and intervention groups at baseline and end-line.

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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