# ***Original Research Article***

Factors influencing the uptake of breast cancer screening services among women of reproductive age: A case study of Turbo sub-county, Kenya


## ABSTRACT

**Background:** Globally, breast cancer (BC) is a significant public health problem. According to GLOBOCAN statistics for 2020, the disease accounted for 2.3 million new cases and 685, 000 deaths. In the same year, 6,799 new cases of breast cancer were reported in Kenya. Uasin Gishu county is among Kenyan counties with a high prevalence of BC of 13.6%. Although Turbo Sub-County contributes a larger proportion of the reported cases of BC in Uasin Gishu county, the screening rates remain unknown.

**Objective:** To determine the prevalence, socio-demographic, and health system factors influencing the uptake of breast cancer screening (BCS) services among women of reproductive age (WRA).

**Methods:** An analytical cross-sectional research design was used which employed mixed-method approaches. Multi-stage and purposive sampling techniques were used to select the study location and to recruit study participants. A semi-structured questionnaire was administered by the researchers to women of reproductive age. A subset of respondents took part in the qualitative study.

**Results:** The final sample was 317 WRA women of reproductive of the utilization of breast cancer screening services was 29/284(10.2%). Being employed (OR=5.6, 95% CI: 1.81-17.47) and earning a high income (OR=4.9, 95% CI: 1.22-19.47) increased the utilization of BCS services. The presence of outreach programs (OR=3.8, 95% CI: 0.07-0.97), reduced screening charges (OR=1.1, 95% CI: 2.22-4.30), reduced distance to the health facilities (OR=3.2, 95% CI: 1.07-9.51), and reduced waiting time (OR=3.3, 95% CI: 0.10-0.96), influenced the utilization of BCS services.

**Conclusion:** In conclusion, the utilization of breast cancer screening services was low 29/284 (10.2%). The reasons for low uptake were unemployment, low income, lack of outreach programs, screening charges, and long waiting periods. Based on these findings, there is a need for empowerment of the vulnerable groups, increased accessibility of BCS services, and reduced waiting period.



***Keywords:*** *Breast cancer screening services, socio-demographic factors, health system factors, utilization of breast cancer screening services, women of reproductive age.*


## 1. INTRODUCTION

Breast cancer is a significant public health problem. It is the most prevalent cancer diagnosed among women and the leading cause of cancer mortality in the world (1). It accounts for 1 in 4 cancer cases and 1 for 6 cancer deaths among women positioning it 1$^{st}$ for incidence and 5$^{th}$ for mortality in 159 of 185 countries (2). Additionally, it accounted for 17.42 million years of disability-adjusted life years (DALYs) for all ages in 2017 in the world, with the highest number of 694.23 being from Sub-Saharan Africa (SSA) (3). In Africa, BCS has remained low. For example, in South Africa, the prevalence of mammography screening among women aged 30 years and above was 13.4% compared to the Papanicolaou smear test which was 52% (4). The low mammography screening rates were ascribed to high screening charges and decreased accessibility of breast cancer screening services (5).

In 2020, Kenya had a 5-year prevalence of BC of 57.28 per 100 000 (15,496) leading to 23% of all cancer cases (1). In the same year, 6799 (16.1%) new cases of breast cancer were diagnosed, while on the contrary 3,107 (11.5%) deaths due to breast cancer were recorded (6). In a recent study conducted at Kenyatta National Hospital (KNH), 7.4% of women were diagnosed with breast cancer in stage I, 33.7% in stage II, and 50.7% in stage III and IV (7). Uasin Gishu County which is one of the counties in Kenya has been ranked among the top western countries with a high prevalence of breast cancer at 13.6% (8). Moreover, it is 2$^{nd}$ most prevalent cancer among women in the county (8). Statistics from medical records have shown most of these cases are from Turbo sub-county. Furthermore, out of 10 breast cancer patients, 7 are diagnosed at a late stage (9).

Breast cancer screening rates for women have remained low in Kenya despite the national-level programs advocating for educational and mass screening activities in both national and community settings (10). Early screening improves survival rates, preserves the quality of life (QOL), and reduces the financial burden related to treatment (11). For example, it was reported that only 88% of the women in Kenya did not undergo any breast cancer screening before (12). This recent research aimed to elucidate the socio-demographic and health system factors influencing the uptake of breast cancer screening services among women of reproductive age in Turbo Sub-County in Kenya.

## 2. METHODOLOGY

### 2.1 Research design

An analytical cross-sectional research design that employed both quantitative and qualitative approaches was used for triangulation purposes.

### 2.2 Study location

The research was carried out in Turbo sub-county of Uasin Gishu county because the sub-county contributes a larger portion of the BC cases (13). Turbo sub-county is located in the North West of Eldoret Town and it constitutes the largest population of Uasin Gishu County of 267,273, with females being 133,682 compared to males 133,597 (14).

### 2.3 Sample size

A total of 288 respondents were interviewed for quantitative data. The sample size was calculated using the Fisher formula for the year 2005. For qualitative research, six interviews comprising 26 respondents were conducted. It entailed four focus group discussions and two key informant interviews.

### 2.4 Target population

All women of reproductive age in Turbo sub-county were targeted for this study. Women of reproductive age were targeted because studies have shown that during the reproductive period steroid hormones are produced by ovaries that affect the growth and function of the breast, therefore, increasing the risk of breast cancer (15).

### 2.5 Sampling strategy

Women of reproductive age who were residents of Turbo Sub-County who were residents of the eight randomly selected villages and had lived in Turbo Sub-County for the past one year were recruited into this study. Only emancipated minors were recruited who were presented with an informed written consent form similarly to adult partakers.
Multistage sampling was used to recruit eligible respondents. A list of households having women of reproductive age was obtained from the chief, where a systematic method of sampling was used to select households. The sampling interval was determined by dividing the total number of households consisting of women of reproductive age by the calculated sample size. At the household level, in circumstances where more than one woman of reproductive age was found simple random sampling by lottery method was used to recruit one.

### 2.6 Data collection methods and procedures

A pre-tested researcher administered a semi-structured questionnaire, a focus group discussion guide, and a key informant interview guide were used in data collection. A semi-structured questionnaire was used to collect quantitative data from women of reproductive age. The tool focused on establishing the prevalence of utilization of breast cancer screening services. The respondents were required to recall and report if they have ever been screened by a health care provider for the past three years. Furthermore, the tool explored socio-demographic and lifestyle factors influencing the utilization of breast cancer screening services. Focus group discussions were done with women of reproductive age who voluntarily availed themselves of the scheduled focus group discussions. The discussions focused on understanding their opinions and experiences on the level of utilization of

breast cancer screening services and the associated factors. Key informant interviews were carried out with the clinical officer and nurse in-charge officer who were specialists in this subject matter. The interviews focused on understanding the utilization of breast cancer screening services, socio-demographic and health system factors influencing usage of these services.

### 2.7 Data analysis and presentation

Quantitative data was analyzed using SPSS IBM version 26. Cleaned data was imported from excel to statistical package deal for social sciences (SPSS) version 26 for analysis. Breast cancer prevention modalities including clinical breast examination, mammography, ultrasound, and biopsy were considered binary dependent variables. Independent variables were socio-demographic and health system factors. The data were analyzed at univariate, bivariate, and multivariate. Variables that had a p-value of less than 0.05 at bivariate analysis were considered for multivariable analysis. Indicators with a p-value of < 0.05 at multivariable analysis were statistically significant. This data was presented using tables and charts.

Regarding qualitative data, a thematic content analysis approach was used. Audio recorded data was transcribed into textual format. Transcripts were uploaded into NVIVO version 11 for analysis. Auto coding was done based on research questions. Similar responses under each sub-theme were identified and coded as grandchild code. Data was presented verbatim.

## 3.RESULTS

### 3.1 Prevalence of utilization of breast cancer screening services

As shown in table 1, only 29/284 (10.2%) of the participants responded to having ever been screened for breast cancer for the past three years. Of the screened participants, 69% were screened with the clinical breast examination, 27.6% mammography, and 0.4% biopsy. On the follow-up question, as indicated in table 2, early detection (38.7%) was the popular reason for the uptake of breast cancer screening services. Another 16.1% of them cited breast cancer history as their reason for seeking breast cancer screening services.

Corroborating quantitative results, the majority of the participants in qualitative research indicated that most women were not screened for breast cancer as illustrated by one of the KII participants:

*"The uptake of breast cancer screening services is low. It's very low because of knowledge, women are not so much knowledgeable" (Nursing In-charge, KII1*

**Table 1. Prevalence of uptake of breast cancer screening services**

| Dependent variable | Categories | Frequency | Percentage% |
|---|---|---|---|
| Ever screened for breast cancer | Yes | 29 | 10.2 |
| | No | 255 | 86.78 |
| Screening methods | Clinical breast examination | 20 | 69 |
| | Mammography | 8 | 27.6 |
| | Biopsy | 1 | 0.4 |
| Reason for screening | Early detection | 12 | 38.7 |
| | Changes in the breast | 14 | 14.2 |

| | | | |
|---|---|---|---|
| | History of breast cancer | 5 | 16.1 |

### 3.2 Univariate analysis on socio-demographic factors

As illustrated in table 2, the age group sampled was between 15 and 49, with the majority being women between 20 - 29 years (35.9%). More than half of the women sampled were married (57.7%), and the rest were either single, divorced, widowed, or separated. Similarly, more than half of the respondents had more than one child (57.7%), while the rest were uniparous (18.0%) and nulliparous (24.3%). Only 21.5% were in formal employment, and most of the respondents (62.7%) earned below Ksh. 6000 per month. Also, close to half of the respondents (46.5%) had attained secondary school education, with most of them 76.4% reporting no history of breast cancer in their families. whereas 23.6% (n=67) reported a history of breast cancer in their heredity.

**Table 2. Univariate analysis on socio-demographic factors**

| **Independent variable** | **Categories** | **Frequency** | **Valid percentage %** |
|---|---|---|---|
| Age | 15-19 | 44 | 15.5 |
| | 20-29 | 102 | 35.9 |
| | 30-39 | 77 | 27.1 |
| | 40-49 | 61 | 21.5 |
| Marital status | Married | 164 | 56.9 |
| | Single | 92 | 31.9 |
| | Divorced | 15 | 5.2 |
| | Widowed | 7 | 2.4 |
| | Separated | 6 | 2.1 |
| Parity status | Nulliparous | 69 | 24.3 |
| | Uniparous | 51 | 18.0 |
| | Multiparous | 164 | 57.7 |
| Education level | None | 12 | 4.2 |
| | Primary | 80 | 28.2 |
| | Secondary | 132 | 46.5 |
| | Tertiary | 60 | 21.1 |
| Employment status | Employed | 61 | 21.5 |
| | Self-employed | 109 | 38.4 |

| | | | |
|---|---|---|---|
| | Unemployed | 97 | 34.2 |
| | Retired | 1 | 0.4 |
| | Student | 16 | 5.6 |
| Income | 6000 Ksh and below | 178 | 62.7 |
| | Above 6000Ksh | 106 | 37.3 |
| Family history of breast cancer | Yes | 67 | 23.6 |
| | No | 217 | 76.4 |

### 3.3 Bivariate and multivariable analysis on socio-demographic factors

According to table 3, the following socio-demographic variables run on chi-square test of independence revealed a significant relationship between seeking breast cancer screening services and the following independent variables: Age ($X^2$ =14.43, *df* =3, *p* =0.00), Marital Status ($X^2$ =13.85, *df* =4, *p* =.01), Parity Status ($X^2$ =6.94, *df* =2, *p* =.03), Level of education ($X^2$ =13.76, *df* =3, *p* =0.00), Employment Status ($X^2$ =25.73, df=4, *p*=0.00, and Income ($X^2$ =24.34, *df* =4, *p*=0.00).

Variables that were found to have a significant relationship with the dependent variable were modeled into a binary logistic regression analysis to develop a prediction model as illustrated in the same table. The Wald criterion shows that monthly income (*p* =.025), and employment status (*p* =.012) contributed significantly to the prediction model. Individuals with high monthly income were 4.9 times more likely to seek breast cancer screening services compared with individuals with a low monthly income. Correspondingly, most of the women in the FGDs were of the opinion that income plays a critical role in the utilization of breast cancer screening services. They expressed that high income, in general, augments the usage of breast cancer screening services. One respondent narrated that:

*"Then another factor is income. Women whose income is low will budget that money on food. The money is not enough to cater for breast cancer screening services" (R2, 20-29, FGD2).*

Concerning employment, those in formal employment were 5.6 times more likely to seek screening services compared with students. There was no significant difference between the self-employed, unemployed, retired compared with students. In the same way, in all the FGDs, women associated employment with more financial power in catering to breast cancer screening services. A few of the participants opined that;

*"Another reason is employment. Unemployed women, like us who wash clothes for others, do business of selling vegetables, it is difficult to get enough money to cater for breast cancer screening services expenses" (R2, 15-19, FGD1).*

**Table 3. Bivariate and multivariable analysis of socio-demographic factors**

| **Independent variable** | **Chi-square test values** | **Binary logistic regression model analysis OR 95% CI** | **p-value** |
|---|---|---|---|
| Age | $X^2$=14.43 df=3 | | 0.39 |

| | | | |
|---|---|---|---|
| 15-49 | p*=0.00 | 17 (0.00) | 1.00 |
| 20-29 | | 2.25(0.58, 8.80) | 0.24 |
| 30-39 | | 0.73(0.23, 2.26) | 0.58 |
| 40-49 | | Reference | |
| Marital status | $X^2$= 13.85<br>df=4 | 0.00 (0.00) | 0.23 |
| Married | p=0.01 | 0.00 (0.00) | 1.00 |
| Single | | 0.00 (0.00) | 1.00 |
| Divorced | | 0.00 (0.00) | 1.00 |
| Widowed | | 0.00 (0.00) | 1.00 |
| Separated | | Reference | |
| Parity status | $X^2$=6.94<br>df=2 | | 0.63 |
| Nulliparous | p=0.03 | 2.31 (0.41, 12.97) | 0.34 |
| Uniparous | | 1.21 (0.29, 4.93) | 0.80 |
| Multiparous | | Reference | |
| Level of education | $X^2$=13.76<br>df=3 | | 0.34 |
| None | p*=0.00 | 1.42 (0.10, 19.40) | 0.79 |
| Primary | | 7.11 (0.63, 80.83) | 0.11 |
| Secondary | | 0.88 (0.29, 2.69) | 0.83 |
| Tertiary | | Reference | |
| Employment status | $X^2$=25.73<br>df=4 | | 0.01 |
| Employed | P*=0.00 | 5.62 (1.81, 17.47) | <0.001 |
| Self-employed | | 1.21 (0.23, 6.45) | 0.82 |
| Unemployed | | 53 (0.00) | 1.00 |
| Retired | | 0.04 (0.00, 1.57) | 0.09 |
| Student | | Reference | |

| | | | |
|---|---|---|---|
| Income | $X^2$=24.34 | | |
| ≤ 6,000 | Df=1 | 4.91 (1.22, 19.81) | 0.03 |
| >6,000 | P=0.00 | | |
| Family history | $X^2$=0.01 | - | - |
| | Df=1 | | |
| Yes | P=0.94 | - | - |
| No | | - | - |

### 3.4 Univariate analysis on health system factors

As demonstrated in table 4, radio was the most popular source of information 27.9%, followed by television 25.2%. Only 12% responded having had an outreach program targeted to breast cancer screening, with 20.8% of the respondents affirming having ever received social support from a healthcare provider on how to conduct a self-breast examination. Close to half the respondents (40.1%) had to commute for over 1 hour to access health facilities offering breast cancer screening services. Another 38.4% spent between 15- and 30-minutes accessing health facilities near them, and 10.9% spent between 31 and 60 minutes. A section of the respondents (10.6%) could not tell the duration they typically take to access their nearest health facilities offering breast cancer screening services. When asked about their perception of the distance to health facilities, close to half of them (46.1%) believed that the health facilities were near, while more than half thought it was far (53.9%).

Most of the respondents (62.3%) were not aware whether breast cancer screening services were charged or not; close to a quarter (23.2%) mentioned that it was not charged, and 14.4% responded that the services were charged. One-third of the respondents (33.8%) had health insurance covers. Only 19.4% of the respondents mentioned that facilities near their residence offer breast cancer screening services, while 61.3% do not provide the service. A section of them (19.4%) did not know whether the services were offered or not. On waiting time, 66.2% of the respondents had to wait for more than one hour to be attended to, and three-quarters thought this was indeed a long waiting time.

**Table 4. Health system factors and utilization of breast cancer screening services**

| **Independent variable** | **Categories** | **Frequency (N)** | **Valid percentage %** |
|---|---|---|---|
| Source of information | Television | 75 | 25.2 |
| | Radio | 83 | 27.9 |
| | Internet | 14 | 4.7 |
| | Hospital | 39 | 13.1 |
| | Family/Relatives | 46 | 15.4 |
| | Schools | 12 | 4.1 |
| | Friends | 13 | 4 |
| | Church | 8 | 2.7 |

| | | | |
|---|---|---|---|
| | I have never heard | 8 | 2.7 |
| Outreach programs | Yes | 34 | 12 |
| | No | 250 | 88 |
| Frequency of outreach programs | Monthly | 2 | 5.9 |
| | Yearly | 14 | 17.6 |
| | Once in a while | 26 | 76.5 |
| Social support for SBE | Yes | 50 | 17.6 |
| | No | 234 | 82.4 |
| Distance to the nearest hospital that offers breast cancer screening services | Near | 117 | 46.1 |
| | Far | 137 | 53.9 |
| Breast cancer screening charges | Yes | 41 | 14.4 |
| | No | 66 | 23.2 |
| | I don't know | 177 | 62.3 |
| Insurance cover | Yes | 96 | 33.8 |
| | No | 188 | 66.2 |
| Presence of specialized BCS services in the nearby hospital | Yes | 55 | 19.4 |
| | No | 174 | 61.3 |
| | I don't know | 55 | 19.4 |
| Waiting time | 0-30 minutes | 69 | 24.3 |
| | 31-60 minutes | 27 | 9.5 |
| | >1 hour | 188 | 66.2 |



### 3.5 Bivariate and multivariable analysis on health system factors

As indicated in table 5, when the various health system factors were analyzed with the Chi-square test for independence, it revealed a significant relationship between the dependent variable and the following independent variables: Outreach programs ($X^2$ =11.14, *df* =1, *p*=0.00), social support by healthcare providers on how to conduct a self-breast examination ($X^2$ =44.02, *df* =1, *p=0.*00), distance to health facility offering breast cancer screening services ($X^2$ =5.62, *df* =1, *p*=0.02), breast cancer screening services charges ($X^2$ =43.44, *df* =2, *p*<.001), health insurance covers ($X^2$ =17.85, *df* =1, *p*=0.00), Availability of specialized breast cancer screening services near their residence ($X^2$ =7.16, *df* =2, *p* =0.03) and waiting time ($X^2$ =9.73, *df* =2, *p* =.01). After adjusting for confounders as shown in table 6, availability of outreach programs (p=0.04), social support on how to conduct self-breast

examination by healthcare providers (*p* =.001), distance to the hospital (*p* =.04), and Screening Services Charges (*p* =.01), waiting time (*p* =.01), contributed significantly to the prediction model

In line with bivariate analysis, the availability of outreaches increased the odds of seeking breast cancer screening services by 3.8 in reference to the unavailability of outreach programs. Consistently, most of the participants cited inadequate outreach programs that hindered most of the women from seeking breast cancer screening services due to low awareness levels. One of the KII participants supposed:

*"For now, we don't have outreach programs making most of the women to lack knowledge. This is attributed to insufficient funds. It is good if the health management consider adding outreach services" (Clinical officer, KII2)*

In reference to the unavailability of social support, the presence of social support on SBE increased the odds of seeking breast cancer screening services by 7.14 times. In keeping with quantitative findings, there was a prevailing notion among the FGDs participants on low levels of utilization of breast cancer screening services due to a lack of adequate support by health care providers on how to conduct a self-breast examination. One of the in-depth participants stressed:

*"Lack of information. If doctors and nurses could educate us on what we are supposed to do as mothers, where to get these services, the importance of seeking them, how to do a self-breast examination, general knowledge on breast cancer and screening services, it will assist greatly" (R2,20-29, FGD2).*

Besides, Short distances to health facilities also increased the odds of uptake of breast cancer screening services by 3.19 in comparison to long distances which was the reference category. Similarly, a larger percentage of the participants cited that breast cancer screening services were not offered in their vicinity, hence contributing to the low screening rates. One of the discussants narrated:

*"The distance of Ziwa hospital from town is far, it is relatively 800 shillings. That is where the county mammography machine is located. The distance is a challenge to most of the women, as the majority are of low socioeconomic status". (Nursing officer-in-charge, KII1)*

Regarding breast cancer screening charges, free BCS services increased the uptake odds by 7.14 in reference to charged screening services. These results agreed with qualitative findings as opined by most participants in both KII and FGDs. The nursing in-charge officer and one discussant cited that:

*"Mammography in Ziwa hospital is around 800 shillings plus transport which adds up to roughly 1500. That is a bit cheap compared to other hospitals" (Nursing officer-in-charge, KII1)*

Pertaining to waiting period, a short waiting time (0-30 minutes) increased the odds of uptake of BCS services by 3.23 times compared to the long waiting period. in concordance with quantitative results, participants cited long waiting hours in the hospital before they are attended for breast cancer screening services. They further stressed that this contributed greatly to the low screening rates among women. A discussant perceived that:

*"Another thing that discourages women is waiting period. Majority of women have many activities to do, waiting for hours before being attended, is purely wasting time" (R5, 20-29, FGD2)*

**Table 6. Bivariate and Multivariable analysis of health system factors**

| **Independent variable** | **Chi-square test values** | **Binary logistic regression model values OR 95% CI** | **p-value** |
|---|---|---|---|
| Outreach programs | $X^2$=11.14<br>df=1 | | 0.04 |
| Yes | p*=0.00 | 3.84 (0.07, 0.97) | 0.04 |

| | | | |
|---|---|---|---|
| No | | Reference | |
| Source of information | $X^2$=9.40<br>df=6<br>p*=0.15 | - | - |
| Television | | - | - |
| Radio | | - | - |
| Hospital | | - | - |
| Relatives and friends | | - | - |
| Church | | - | - |
| Schools | | - | - |
| I have never heard | | - | - |
| Social support on SBE | $X^2$=44.02<br>df=1<br>p=0.00 | | < 0.001 |
| Yes | | 7.14 (0.04, 0.42) | < 0.001 |
| No | | Reference | |
| Distance to the nearest health facility | $X^2$=5.62<br>df=1<br>P=0.02 | | 0.04 |
| Near | | 3.19 (1.07, 9.51) | 0.04 |
| Far | | Reference | |
| Breast cancer screening services charges | $X^2$=43.44<br>df=2<br>p*=0.00 | | 0.01 |
| I don't know | | 1.12 (2.22, 4.30) | < 0.001 |
| Yes | | 7.14 (0.29, 0.51) | < 0.001 |
| No | | Reference | |
| Health insurance cover | $X^2$=17.85<br>df=1<br>P=0.00 | | 0.09 |
| Yes | | 0.40 (0.14, 1.15) | 0.09 |
| No | | Reference | |
| Presence of | $X^2$= 7.16 | | |

| | | | |
|---|---|---|---|
| specialized BCS services | df=2<br>p=0.03 | | 0.69 |
| I don't know | | 2.05 (0.36, 11.74) | 0.42 |
| Yes | | 1.26 (0.29, 5.46) | 0.76 |
| No | | Reference | |
| Waiting time | $X^2$=9.73<br>df=2<br>P*=0.01 | | 0.01 |
| 0-30 minutes | | 3.23 (0.10, 0.96) | 0.04 |
| 31-60 minutes | | 0.12 (0.03, 0.58) | 0.01 |
| >1 hour | | Reference | |

## 4. DISCUSSION

This analytical cross-sectional research of 317 women of reproductive age in Turbo sub-county determined the prevalence of uptake of breast cancer screening and its associated socio-demographic and health system factors. The general prevalence of breast cancer screening was 10.2% during the research period. The low utilization of BCS services was not astounding, as the results were in consonance with earlier results from Ba *et al* analysis on the prevalence of BCS services in four selected African countries which found a prevalence of 12% (16). In contrast, uptake of BCS services was much lower than those of studies done in Australia(88%) and Germany(84.9%) (17,18). The discrepancies in the reported findings could be attributed to breast cancer screening charges, inadequate human resources, poor physical resources, socio-demographic and socio-economic variations (16).

The multivariable analysis for socio-demographic factors indicated employment and income influenced the uptake of breast cancer screening services. The positive association between employment and increased rates of breast cancer screening could be explained by employed women having the financial capacity to pay for screening expenses. These findings were in agreement with the aforementioned works from Antabe and Ampofo et.al (12,19). Elsewhere, a non-significant relationship was discovered in both variables (20). As expected, earning a high income was positively associated with increased usage of breast cancer screening services. Women earning high income have more financial power to pay for preventive services. Similarly, Antabe, (2020) in his research found that women in the highest wealth quantile were 1.33 times more likely to undergo BCS services than those in the lowest wealth quantile. However, research carried out in France and Nigeria found no difference between women with high income and those with low income in regard to utilization of BCS services (21,22).

Our study found that the availability of outreach programs was associated with increased screening rates. The study findings were consistent with results from previous studies which found that the availability of outreach programs increased the likelihood of women seeking breast cancer screening services services (23–25). However, this study was divergent from a study done by Olasehinde *et al.* (26).

We also found social support for SBE by health care providers increased the odds of seeking breast cancer screening services. These steady results can be accredited to the inadequate number of health care providers. Social support has been observed in many studies to increase the frequent utilization of BCS services (27–29). Nevertheless, these results contrasted with an earlier done study (30).

Additionally, our findings indicated short distances to health facilities increased the odds of breast cancer screening by 3.2. Consistently, these findings concur with Salama (2020), Diab, *et al* (2018), and Ondimu (2016) who established uptake of breast cancer screening services was higher in women who accessed breast cancer screening services than in those who did not. This was attributed to expenses influenced by the distance between the residence and the screening unit. On the contrary, research carried out in Brazil, Canada and Denmark reported a non-significant association between distance and utilization of BCS services (31–33).

In keeping with earlier done studies (22,25), we also found free breast cancer screening services increased the uptake odds. One possible explanation for the above findings is that screenings charges limit socio-economically disadvantaged women hence providing higher economic power and better access to these services to those with high income. However, this contrasted earlier done study (34).

Lastly, on health system factors we established that a short waiting time increased the odds of the uptake of breast cancer screening services by 3.3 times compared to a long waiting period. Other authors who have reported similar findings noted that waiting time influence the uptake of breast cancer screening services (35,36). Nevertheless, these results contrasted with an earlier done study (37). The agreement and divergence between this study and previous works could be explicated by the number of patients served in hospitals, number of health facilities offering these services, number of healthcare professionals providing these services, and time of visit to the health facility.

## 5. LIMITATIONS OF THE STUDY

The snapshot nature of the study design did not allow for temporal and causative inferences between independent variables and the uptake of BCS services. Moreover, there might have been social desirability bias influenced by self-reporting information.

## 6. CONCLUSION

This study concluded that utilization of breast cancer screening services in Turbo Sub-County was low at 10.2%. To improve the low screening rates, the government should subsidize screening services for low-income earners and unemployed women. The county government should improve access to breast cancer screening services by making health facilities bring services closer to people. The ministry of health should consider revising the working service charter by reducing the waiting period.

## Ethical consideration

The study was approved by Mount Kenya (MKU) Institutional Research Ethics and Review Committee (IREC) of reference number MKU/ERC/1890. Permit to carry out the study was provided by National Commission for Science, Technology, and Innovation (NACOSTI) of license number NACOSTI/P/21/12804. Legal documents required to conduct the research were sought county government of Uasin Gishu. Discretion of the respondent's information was vastly upheld. Respondent's participation in the study was purely voluntary and the investigator requested study participants (adult partakers and emancipated minors) to sign informed written consent.

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## ABBREVIATIONS

BC; Breast cancer; BCS; Breast Cancer Screening; CBE; Clinical Breast Examination, MMG; Mammography, SBE; Self Breast Examination, WRA; Women of Reproductive Age, FGD; Focus group discussions