

RESEARCH ARTICLE

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Breaking Barriers in Cancer Screening: Understanding Participant Dropout in Breast and Cervical Programs in Morocco

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Abstract

Objective: This study aimed to investigate loss to follow-up (LFU) rates within breast and cervical cancer screening programs in Kenitra-Morocco, identifying contributing factors from both patient and healthcare worker perspectives to enhance care continuity. **Methods:** The study was a non-experimental, mixed-methods design conducted in three-phases. We started by identifying LFU women and their characteristics from medical records, interviewing LFU women to ascertain reasons for discontinuation, and surveying healthcare workers for perceived determinants of LFU through semi-structured questionnaires. The study covered primary healthcare centers, the Reproductive Health Reference Center (RCRH) in Kenitra, and the National Institute of Oncology (NIO) in Rabat. **Results:** Of 1,225 women studied, 94 cancer cases were diagnosed, with LFU rates varying across care stages. Key factors associated with LFU included age ($p<0.005$, OR=1.67, CI[1.2-2.4]), marital status ($p<0.03$, OR=0.8, CI[0.65-0.98]), distance from healthcare facilities ($p<0.00$, OR=2, CI[1.3-4.0]), and medical coverage ($p<0.03$, OR=2.3, CI[1.3-4.0]). Healthcare workers cited poor communication, organizational issues, and staffing shortages as barriers to follow-up. **Conclusions:** The study underscores LFU's multifaceted reasons in Kenitra's cancer screening programs, suggesting improvements in communication after a positive screening test, re-engagement strategies, and financial accessibility. Addressing these issues is essential for reducing LFU rates, enhancing cancer care outcomes, and decreasing breast and cervical cancer mortality in Morocco.

Keywords: Screening program-breast cancer- cervical cancer- barriers, Loss to follow up

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Introduction

Cancer significantly impacts global health, with substantial morbidity and mortality rates. In 2020 alone, 19.3 million new cases were reported, half of which affected women, leading to 9.9 million deaths globally [1]. In Morocco, cancer poses a major public health challenge, being the second leading cause of death at a rate of 11.4% [2]. The age-standardized mortality rate is estimated at 87.9 per 100,000 according to Globocan 2020 [3]. Breast cancer, accounting for 22.5% of all cancer cases and 38.1% among women, is the most prevalent, followed by cervical cancer, the third most common among Moroccan women [4].

While screening and treatment advancements have reduced cancer incidence and mortality in developed countries [5-8], challenges persist in Morocco. The national breast and cervical cancer screening programs were implemented by the Ministry of Health in coordination

with the Lalla Selma Foundation - Prevention and Treatment of Cancers since 2010. The breast cancer screening program targets women aged 45 to 69, with screenings conducted biennially. If a breast examination reveals abnormalities, the patient is directed to undergo further diagnostic procedures, including a mammogram, mammary ultrasound, and biopsy. Following a confirmed breast cancer diagnosis, a multidisciplinary team determines the appropriate treatment protocol in a suitable healthcare facility [9]. The cervical cancer screening, Moroccan women aged 30 to 49 are screened every three years using visual inspection with acetic acid (VIA). Women with positive VIA results undergo colposcopy. If this procedure detects cervical intraepithelial neoplasia (CIN), loop electrosurgical excision procedure (LEEP) is offered as treatment. In cases where a biopsy confirms invasive cervical cancer, patients receive comprehensive support and treatment from a multidisciplinary team in a specialized healthcare setting [9].

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The national breast and cervical cancer screening programs aim to decrease morbidity and mortality through early detection and timely treatment [10]. However, a notable gap exists in the continuity of care, from screening to treatment, particularly in Kenitra Province. This study aims to investigate the frequency of loss to follow-up (LFU) in Kenitra's breast and cervical cancer screening processes, analyzing factors contributing to LFU from both patient and healthcare professional perspectives.

The choice of Kenitra province, with its diverse demographic and healthcare landscape, offers a unique opportunity to understand and address these challenges. By identifying specific barriers and facilitators within this region.

In Kenitra province, the screening program has been implemented in 2013. Three health care levels are identified. The primary health care centres at the urban or the rural areas, where the screening is performed, identified as Level 1. Reference Centre for Reproductive Health (RCRH) in Kenitra city where the diagnosis is carried out as the Level 2. Level 3 is the National Institute of Oncology (NIO) in Rabat city where the treatment of the diagnosed cancers is carried out. To reach the objectives of screening, continuity between these health care levels must be ensured. However, a lost-to-follow-up rate is observed between the test screening, diagnosis and treatment levels.

The study aim was to determine the rate of loss to follow-up (LFU) among women at various stages of breast and cervical cancer screening in Kenitra province. The goal is to uncover factors contributing to LFU, from the perspectives of both the patients and healthcare workers. Through this analysis, we intend to propose strategies and recommendations to decrease LFU rates in the screening program, thereby enhancing the continuity of care across different stages of the breast and cervical cancer screening process.

Materials and Methods

Our study was carried out in the three levels which are part of the screening program at the Kenitra province; 31 primary healthcare centres in the province, the Reproductive Health Reference Centre (RCRH) in Kenitra city, the Maternity Department of the Ibn Sina University Hospital Centre, and the National Institute of Oncology (NIO) in Rabat city. It was unfolded in three distinct phases. The initial phase focused on identifying women who were lost to follow-up (LFU). This was done by reviewing medical records to determine LFU cases based on predefined criteria. In the second phase, we conducted interviews with the women identified as LFU, from each level to understand the factors leading to their dropout. The final phase involved health workers, aiming to ascertain their perspectives on the determinants of LFU.

Study population:

In the first phase of our study, we included for analysis, all medical records of women who screened positive for breast or cervical cancer through clinical breast examination or visual inspection with acetic acid (VIA) at primary healthcare (Level 1) centers in 2015.

This included also records from the Reproductive Health Reference Center (RHRC; Level 2) dated between January 1, 2015, and June 30, 2016, records of women requiring further breast cancer diagnosis or treated for precancerous cervical lesions at the Ibn Sina University Hospital Center (Level 2; January 1, 2015, to September 30, 2016), and records from the National Institute of Oncology (NIO; Level 3) in Rabat (January 1, 2015, to September 30, 2016).

During the second phase, women referred from level 1 to level 2 are searched in the level 2 database performed in the phase 1 by name, age, national number or address. Idem for women referred from level 2 to level 3. Thereafter, women who have not been found in the databases are identified as lost to follow-up using the definitions below. In the same way, women who had not finished their diagnosis or treatment are also identified as lost to follow-up using the definitions below as well.

After that, we conducted interviews with women who were lost to follow-up and could be contacted through an available address or phone number. The final phase involved including all healthcare workers present at the health facilities during our visits to the various study sites.

Definition of LFU

The lost to follow-up women are:

- Women who received a clinical screening indicating abnormal breast findings or a positive VIA test at the first level and were referred to the second level but did not present themselves within six months of their referral date.
- Women who, after being clinically diagnosed with an abnormal breast or positive VIA at the first level, failed to return for follow-up visits at the second level within three months.
- Women who screened positive for breast or cervical cancer at the second level and were referred to the third level but did not appear within three months of their referral date.
- Women with confirmed breast or cervical cancer undergoing treatment at the third level who did not return for follow-up treatment at least one month after their last consultation.

Data collection

For data collection, we employed standardized forms tailored to each type of cancer (breast or cervix) and healthcare level (1, 2, or 3). These forms captured a range of information including sociodemographic details (age, sex, medical coverage, etc.), family cancer history, cancer site, distance from patient's home to healthcare centers, and diagnostic data (such as Ecography, Mammography, Biopsy, VIA, VIL (visual inspection with Lugol), Colposcopy, etc.), as well as details of any treatments received (Surgery, Radiotherapy, Chemotherapy, and other treatments). In the study's second phase, we conducted interviews using a structured questionnaire for each woman identified as lost to follow-up (LFU), either in person or via phone. For the third phase, healthcare workers completed a self-administered questionnaire.

This study was conducted with the approval of the Ethics Committee for Biomedical Research at the Faculty

of Medicine and Pharmacy in Rabat.

Data and statistical analysis

For our data analysis, we utilized Epi Info 7.2.5.0 and Excel for initial organization and preprocessing. Descriptive statistical analysis, including frequencies, percentages, means, and standard deviations, was performed to detail demographic characteristics, screening outcomes, and follow-up statuses. Bivariate statistics were applied to compare variables such as age, sex, medical coverage, and distance from healthcare centers, using chi-square tests or t-tests as appropriate. Multivariate analysis, specifically logistic regression [11] in IBM SPSS Statistics (version 25), was conducted to identify independent predictors of loss to follow-up, adjusting for potential confounders and assessing associations with odds ratios and 95% confidence intervals.

Qualitative data from interviews with healthcare workers and women lost to follow-up were integrated through thematic analysis, identifying patterns related to LFU determinants. These findings were then cross-referenced with quantitative results for a comprehensive understanding of LFU factors. Key insights and discrepancies between the data types were highlighted. Where applicable, sensitivity analyses tested the robustness of key findings. The study culminates in a coherent report discussing implications for breast and cervical cancer screening in Morocco and offering evidence-based recommendations to reduce LFU rates and enhance program effectiveness. This approach ensures a systematic and holistic understanding of the data, blending quantitative and qualitative methods.

Results

In our study of 1,225 women (Table 1), 865 were referred from primary healthcare (level 1) to the reference center for breast anomalies, while 360 were referred for a positive VIA test. The age distribution was aligned with the screening programs: 30-49 years for cervical cancer and 45-69 for breast cancer. Demographically, 22.4% were aged 30-45 years, 31.3% were 40-50 years old, and 46.3% were between 50-70 years. Most women were urban dwellers (82%), married (77%), and had medical coverage (75.9%). Proximity to healthcare facilities showed that more than 76% lived within 1-5km of primary healthcare, 73.9% within 1-5km of the RCRH, and 42% were 10-50km away from level 3 cancer treatment centers. A family history of cancer was present in 14.3% of the women.

Of these women, 94 cases of cancer were diagnosed (Table 1): 81 breast and 13 cervical cancers. A significant 73% of these cancers were diagnosed at early stages (stage 1 and 2), with average tumor sizes of 3.0 ± 1.9 cm for breast and 4.9 ± 1.7 cm for cervical cancer. The RCRH level saw 5 diagnosed CINs, 139 cases classified as non-suspicious, 24 biopsies with no malignancy signs, and 408 normal diagnoses.

The LFU rates varied across levels (Figure 1): 21.5% between primary care and the diagnosis center, with 19.3% for breast cancer and 26.7% for VIA+. At the

RCRH diagnostic level, the breast cancer LFU was 25.1%, significantly higher than the 4.2% for cervical cancer. For level 3 treatment, 12.4% of breast cancer referrals were LFU, while cervical cancer referrals achieved 0% LFU. However, at the NIO level, the LFU rates were 31% for breast cancer and 7.1% for cervical cancer treatment.

Univariate analysis (Table 2) showed higher LFU rates among women under 49 from primary care (23.8%) compared to 17.3% among those over 49 ($p=0.01$). At the RCRH level, LFU was higher for women over 49 (23.7%) than for those under 49 (17.1%) ($p=0.001$). Women living alone had a higher LFU rate of 23.7% compared to those in a couple (17.1%) ($p=0.03$). LFU was particularly high (40%) for women living more than 5km from primary healthcare compared to 20.3% for those within 5km ($p<0.001$). Medical coverage significantly impacted LFU rates at level 1-2 ($p=0.001$). The multivariate analysis (Table 2) revealed significant associations at different levels of the screening process. Between primary health care and the RCRH (level 1-2), loss to follow-up (LFU) was significantly linked to both the distance from healthcare facilities ($p<0.00$, OR=2, CI [1.3-4.0]) and the absence of medical coverage ($p<0.03$, OR=2.305, CI [1.3-4.0]). Model equation in Level 1-2 is:

Logit (number of LFU) = $-2.203 - 0.756 * \text{Medical coverage} + 0.835 * \text{Distance}$.

At the diagnostic stage (level 2), LFU correlated with age ($p<0.005$, OR=1.67, CI [1.2-2.4]), with having medical coverage and being in a relationship acting as protective factors ($p<0.03$, OR=0.798, CI [0.65-0.98]). Model equation in Level 2-2 is:

Logit (number of LFU) = $-1,949 + 0,512 * \text{Age} - 0.225 * \text{Medical coverage by Marital status}$

At the treatment stage (level 3), age was a significant factor; women older than 49 had a fourfold higher risk of LFU compared to younger women under 49 ($p<0.04$, OR=4.00, CI [1.03-15.5]). Model equation in Level 3-3 is: Logit (number of LFU) = $-3.332 + 1.386 * \text{Age}$.

Women reasons of treatment abandonment

In a detailed examination of treatment abandonment reasons among 170 women (Table 3) categorized by their urban/rural residency (103/65), level of loss (Level 1-2: 83, Level 2-2: 51; Level 2-3: 25; Level 3-3: 9), and type of cancer treated (Breast/Cervix: 120/48), we identified 30 women who were lost to follow-up (LFU) either through address traceability or telephone responsiveness. Of these, 23 were from the breast cancer screening cohort, and 7 from the cervical cancer screening group. The participants' average age was 55 ± 9.8 years, with only 10% employed; 87% were married, and over 70% had medical coverage. A majority, 63%, resided in urban areas, 63% had no formal education, and 43% were classified within a low socioeconomic tier.

The primary reasons for LFU, as elucidated by the interviewed women, encompassed issues related to the clarity and quality of information provided by health workers, care organization, and barriers of cultural, financial, and geographical nature (Table 3). A mere 44% of the women expressed satisfaction with the information relayed by health workers concerning the screening

Table 1. Sociodemographic and Medical Characteristics of the Study Population Participating in the Breast and Cervical Cancer Screening Program in Kenitra Province-Morocco (N=1225)

| | Global (N=1225) | | Breast (N=865) | | Cervix (N=360) | |
|--|--------------------|------|-------------------|------|-------------------|------|
| | Number | % | Number | % | Number | % |
| Age categories (years) | (n=1201) | | (n=846) | | (n=355) | |
| 30-40 | 167 | 13.9 | -- | -- | 167 | 47 |
| 40-45 | 102 | 8.5 | -- | -- | 100 | 28.2 |
| 45-50 | 376 | 31.3 | 292 | 34.5 | 88 | 24.8 |
| 50-60 | 403 | 33.6 | 401 | 47.4 | -- | -- |
| 60-70 | 153 | 12.7 | 153 | 18.1 | -- | -- |
| Residence | (n=1225) | | (n=865) | | (n=360) | |
| Urban | 1015 | 82.9 | 701 | 81 | 314 | 87.2 |
| Rural | 210 | 17.1 | 164 | 19 | 46 | 12.8 |
| Marital status | (n=1103) | | (n=802) | | (n=301) | |
| Single | 50 | 4.5 | 48 | 6 | 2 | 0.7 |
| Divorced | 98 | 8.9 | 75 | 9.3 | 23 | 7.6 |
| Married | 852 | 77.2 | 586 | 73.1 | 266 | 88.4 |
| Widow | 103 | 9.3 | 93 | 11.6 | 10 | 3.3 |
| Medical coverage | (n=982) | | (n=730) | | (n=252) | |
| No | 237 | 24.1 | 167 | 22.9 | 70 | 27.8 |
| Yes | 745 | 75.9 | 563 | 77.1 | 182 | 72.2 |
| RAMED | 404 | 55.8 | 313 | 57.2 | 91 | 51.4 |
| CNOPS | 122 | 16.8 | 98 | 17.9 | 24 | 13.6 |
| CNSS | 114 | 15.7 | 87 | 15.9 | 27 | 15.2 |
| Private insurance | 34 | 4.7 | 8 | 1.5 | 26 | 14.7 |
| Intern special insurance | 50 | 6.9 | 41 | 7.5 | 9 | 5.1 |
| Distance between residence and primary health care | (n=1123) | | (n=808) | | (n=315) | |
| <1km | 137 | 12.2 | 78 | 9.6 | 59 | 18.7 |
| 1-5km | 860 | 76.6 | 628 | 77.7 | 232 | 73.6 |
| 5-10km | 100 | 8.9 | 78 | 9.6 | 22 | 7 |
| 10-50km | 26 | 2.3 | 24 | 3 | 2 | 0.6 |
| Distance between residence and RCRH ¹ | (n=920) | | (n=698) | | (n=222) | |
| <1km | 9 | 1 | 7 | 1 | 2 | 0.9 |
| 1-5km | 680 | 73.9 | 505 | 72.3 | 175 | 78.8 |
| 5-10km | 45 | 4.9 | 29 | 4.1 | 16 | 7.21 |
| 10-50km | 125 | 13.6 | 103 | 14.8 | 22 | 9.9 |
| 50-100km | 61 | 6.6 | 54 | 7.7 | 7 | 3.1 |
| Distance between residence and NIO ² | (n=71) | | (n=57) | | (n=14) | |
| 10-50km | 30 | 42.3 | 29 | 50.9 | 1 | 7.1 |
| 50-100km | 28 | 39.4 | 20 | 35.1 | 8 | 57.1 |
| 100-200km | 13 | 18.3 | 8 | 14 | 5 | 35.7 |
| Family history of cancer | (n=892) | | (n=807) | | (n=85) | |
| Yes | 128 | 14.3 | 124 | 15.4 | 4 | 4.7 |
| Lesions diagnosed | (n=670) | | (n=472) | | (n=198) | |
| Carcinoma | 94 | 14 | 81 | 17.2 | 13 | 6.6 |
| Absence of signs of malignancy in biopsy | 24 | 3.6 | 8 | 1.7 | 16 | 8.1 |
| Cervical Intraepithelial Neoplasia (CIN) | 5 | 0.7 | -- | -- | 5 | 2.5 |
| Mammography not suspicious | 139 | 20.8 | 139 | 29.5 | -- | -- |
| Normal Mammography or Colposcopy | 408 | 60.9 | 244 | 51.7 | 164 | 82.8 |

Table 1. Continued

| | Global (N=1225) | | Breast (N=865) | | Cervix (N=360) | |
|--|--------------------|------|-------------------|------|-------------------|------|
| | Number | % | Number | % | Number | % |
| Cancer diagnosis stage | (n=41) | | (n=37) | | (n=4) | |
| Early stage ³ | 30 | 73.2 | 28 | 75.7 | 2 | 50 |
| Advanced stage ⁴ | 11 | 26.9 | 9 | 24.3 | 2 | 50 |
| Size | (n=91) | | (n=83) | | (n=8) | |
| Average size | 3.2±1.9cm | | 3.0±1.9cm | | 4.9±1.7cm | |
| Treatment received | (n=57) | | (n=48) | | (n=9) | |
| Surgery only | 4 | 5.5 | 2 | 3.4 | 2 | 14.3 |
| Surgery and chemotherapy | 10 | 13.7 | 10 | 17 | 0 | 0 |
| Surgery and radiotherapy | 7 | 9.5 | 4 | 6.8 | 3 | 2.2 |
| Surgery, chemotherapy and radiotherapy | 24 | 32.9 | 24 | 40.7 | 0 | 0 |
| Chemotherapy and radiotherapy | 3 | 4.1 | 2 | 3.4 | 1 | 7.2 |
| Radiotherapy only | 4 | 4.5 | 1 | 1.7 | 3 | 42.9 |
| Chemotherapy only | 5 | 6.8 | 5 | 8.5 | 0 | 0 |

¹RCRH, Reference Center for Reproductive Health; ²NIO, National Institute of Oncology; ³Early Stage, stage 1-2; ⁴Advanced stage, stage 3-4.

program. A significant portion, 37%, admitted to not comprehending the information regarding their screening results, and 39% felt that healthcare workers' efforts to alleviate their concerns were inadequate (Table 3).

Concerns regarding healthcare organization were also prevalent, with 53% reporting prolonged waits for appointments at secondary and tertiary care levels. Furthermore, 30% were dissatisfied with the quality of care received at the Regional Cancer Reference Hospital (RCRH). A staggering 95% noted the unavailability or partial charges for additional diagnostic tests at the RCRH, such as mammography and pathological examinations, highlighting a gap in the provision of comprehensive care. Despite mammography being free, radiologist interpretations incurred charges and were predominantly conducted in the private sector (Table 3).

Additionally, 43% of the participants showed a preference for continuing their treatment in the private sector, citing various subjective reasons, including denial of the disease and perceived unnecessary continuation of treatment, accounting for 16% of responses.

Geographical accessibility was a lesser concern, with 76% reporting no transportation issues and 96% finding primary healthcare facilities conveniently located. Yet, financial constraints emerged as a significant barrier, with 46% attributing their abandonment of breast or cervical cancer screening and treatment to economic difficulties (Table 3).

Data collected from healthcare workers

In this study, 71 healthcare workers were interviewed (Table 3), comprising 46% general practitioners, 47% nurses, and 7% midwives, with 86% operating in urban areas. The participants' average age was 47.6±8.9 years, ranging from 27 to 60 years old. The median tenure in their current roles was 8 years, with an interquartile range of 4.5 to 15 years. Since the launch of the breast and cervical cancer screening program at the provincial level in 2013, 75% of the respondents had received training specific to the program (Table 3).

A significant majority, 88%, of healthcare workers believed that women in their communities were well-

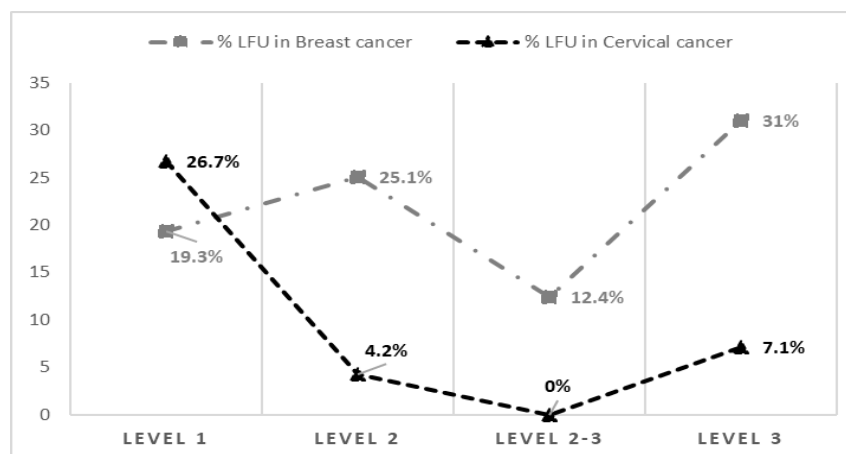


Figure 1. Percentage of Women Lost to Follow-up in the Breast and Cervical Cancer Screening Program in Kenitra province by the Level of Health Care and Type of Cancer.

Table 2. Women Lost to Follow up According to the Different Determinants by Level of Health Care

| | Level 1-2 | | | Level 2 | | | Level 2-3 | | | Level 3 | | |
|-------------------|----------------------|-------|--------------------------------------|----------------------|-------|--|----------------------|------|----------------------|---------|--------------------------------------|--|
| | Univariate LFU(%) | p | Multivariate P-value: OR (95% CI) | Univariate LFU(%) | p | Multivariate P-value: OR (95% CI) | Univariate LFU(%) | p | Univariate LFU(%) | p | Multivariate P-value: OR (95% CI) | |
| Age | n=1196 | | | n=951 | | | n=106 | | n=72 | | | |
| <=49 | 154 (23.8%) | 0.01 | | 74 (15.1%) | 0.001 | p<0.005 OR=1.67 | 3(8.33%) | 0.45 | 3 (12.5%) | 0.06 | p<0.04 OR=4.00 | |
| >49 | 95 (17.3%) | | | 109 (23.7%) | | CI [1.2-2.4] | 8 (11.4%) | | 16 (33.3%) | | CI [1.03-15.5] | |
| Area of residence | n=1225 | | | n=986 | | | n=108 | | n=72 | | | |
| Rural | 46 (22.2%) | 0.77 | | 25 (15.4%) | 0.17 | | 0 (0.0%) | 0.02 | 3 (13.0%) | 0.07 | | |
| Urban | 217 (21.3%) | | | 161 (20.1%) | | | 11 (14.1%) | | 16 (32.6%) | | | |
| Distance | n=1121 | | | n=952 | | | n=108 | | n=48 | | | |
| <5km | 202 (20.3%) | 0.00 | p<0.00 | 146 (20.4%) | 0.15 | | 0 (0.0%) | 0.07 | 0 (0.0%) | 0.21 | | |
| 5-50km | 51 (40.5%) | | OR=2 | 34 (19.4%) | | | 11 (14.7%) | | 13 (32.5%) | | | |
| 50-100Km | 0 (0.0%) | | CI [1.3-4.0] | 6 (10.0%) | | | 0 (0.0%) | | 0 (0.0%) | | | |
| >100km | 0 (0.0%) | | | 0 (0.0%) | | | 0 (0.0%) | | 3 (60.0%) | | | |
| Medical coverage | n=864 | | | n=858 | | | n=95 | | n=64 | | | |
| No | 46 (19.6%) | 0.001 | p<0.03 OR=2.305 | 43 (21.6%) | 0.31 | Medical coverage by Marital status p<0.03 | 2 (11.1%) | 0.65 | 2 (50.0%) | 0.2 | | |
| Yes | 71 (11.3%) | | CI [1.3-4.0] | 121 (18.4%) | | OR=0.798 | 9 (11.7%) | | 12 (20.0%) | | | |
| Marital status | n=1080 | | | n=902 | | CI [0.65-0.98] | n=105 | | n=68 | | | |
| Life in couple | 160 (19.4%) | 0.09 | | 118 (17.1%) | 0.03 | | 8 (11.1%) | 0.52 | 12 (26.1%) | 0.62 | | |
| Life alone | 38 (14.8%) | | | 50 (23.7%) | | | 3(9.1%) | | 7 (31.8%) | | | |
| Family history | n=918 | | | n=702 | | | n=89 | | n=38 | | | |
| No | 150 (19.13%) | 0.06 | | 137 (22.5%) | 0.14 | | 9 (11.5%) | 0.41 | 7 (20.5%) | 0.4 | | |
| Yes | 35 (26.12%) | | | 27 (29.3%) | | | 2 (18.2%) | | 0 (0.0%) | | | |
| Localisation | n=1225 | | | n=962 | | | n=108 | | n=72 | | | |
| Cervix | 96 (26.7%) | 0.004 | | 11 (4.17%) | 0.00 | | 0 (0.0%) | 0.11 | 1 (7.1%) | 0.06 | | |
| Breast cancer | 167 (19.3%) | | | 175 (25.1%) | | | 11 (12.4%) | | 18 (31.0%) | | | |
| Diagnostic Stage | | | | | | | | | n=41 | | | |
| Early* | — | | | — | | | — | | 7 (23.3%) | 0.09 | | |
| Advanced** | — | | | — | | | — | | 0 (0.0%) | | | |

*Early Stage, stage 1-2; **Advanced stage, stage 3-4.

Table 3. Perception Elements on the Reasons for Loss to Follow-up of Health Workers and Women Participating on the Breast and Cervical Cancer Screening Program in the Province of Kenitra, Morocco

| | Yes | No |
|--|--------|--------|
| Women participating in the program | | |
| Received information | | |
| Satisfied with the efforts made by the medical staff to inform you in intelligible words | 44.80% | 55.20% |
| Satisfied with the information received about the test result | 62.10% | 37.90% |
| Satisfied with the information on the screening program organization | 57.20% | 42.80% |
| Satisfied with the efforts made by medical staff to calm your concerns | 60.70% | 39.30% |
| Health care organisation | | |
| The time to have appointments is long | 53.30% | 46.70% |
| The time to have results is long | 50.00% | 50.00% |
| Dissatisfied with the quality of care at the RCRH level | 30.00% | 70.00% |
| Cultural accessibility | | |
| I feel discomfort | 0.00% | 100% |
| I am healthy | 36.70% | 63.30% |
| The care is too painful | 16.70% | 83.30% |
| Chances of curing breast/cervical cancer are minimal | 10.00% | 90.00% |
| I have other health problems | 10.00% | 90.00% |
| I'm busy do not have time | 16.70% | 83.30% |
| I am treated in the private health sector | 43.30% | 56.70% |
| Financial and geographic accessibility | | |
| The primary health center is very far | 3.30% | 96.70% |
| I have a transport problem | 23.30% | 76.70% |
| Additional examinations are available and completely free at the RCRH level. | 1.20% | 95.80% |
| I have no money, health care is expensive | 46.70% | 53.30% |
| Health workers | | |
| Women are informed of the benefits of screening and the program circuit | 88% | 12% |
| Women accept the screening test VIA | 95% | 5% |
| Agree with the organization of the circuit proposed by the program | 88% | 12% |
| Agree with the system of references between level 1 and 2 | 68% | 32% |
| Follow-up of women after a positive test is carried out | 31% | 43% |
| Reception of feedback on the diagnosis is done | 3% | 81% |
| The work condition don't help to follow up the women | 40% | 60% |

informed about the screening program's benefits and procedures. Furthermore, they estimated that 95% of women were receptive to undergoing the screening test (visual inspection with acetic acid - VIA) (Table 3).

When discussing the care pathway organization set by the program, 88% of the professionals expressed satisfaction with the current system, and 68% approved of the referral process between primary and secondary care levels. However, only 3% reported receiving feedback from the higher-level facilities (Table 3). Regarding follow-up practices, 31% actively tracked the progress of women they referred, contrasted with 29% who did not engage in such follow-ups and 27% who stated they were not involved in these processes. Additionally, 40% of healthcare workers indicated that their working conditions were not conducive to performing follow-ups effectively (Table 3). Among these, 23% attributed the challenges to referral issues and a lack of care level coordination, while 58% pointed to staffing shortages and high workloads as

primary reasons for the insufficient follow-up of women within the healthcare structure.

Discussion

This study has provided a comprehensive analysis of loss to follow-up (LFU) rates among women enrolled in breast and cervical cancer screening programs in Kenitra, Morocco, during 2015. By comparing these rates with previous studies, particularly the LFU proportions identified in the Meknes province in 2016, we've established a contextual framework that highlights regional variations in LFU rates [12]. Notably, cervical cancer screenings demonstrated a significant LFU at 26.7%, underscoring the urgency of addressing this issue at a systemic level.

Key Factors Influencing LFU

Our investigation into the factors contributing to LFU

reveals a complex interplay of barriers. Geographical accessibility and the absence of medical coverage emerge as significant obstacles, echoing findings from other research that link poor patient-healthcare worker communication to increased LFU rates [13-15]. This issue is compounded by health workers' accounts of discouraging working conditions, including staff shortages and heavy workloads, which resonate with broader challenges in healthcare delivery [16-17].

Divergent LFU Rates Between Cancer Types

The distinction between breast and cervical cancer screenings in terms of LFU rates points to the specific challenges inherent in breast cancer diagnosis. The necessity for more comprehensive, yet often inaccessible, diagnostic tests for breast cancer highlights a critical gap in the healthcare system's ability to provide equitable care.

Economic and Socio-Demographic Barriers

Economic barriers significantly impact LFU rates, with the cost of diagnostic and treatment services posing a prohibitive challenge for many women. This financial strain is particularly evident in the context of breast cancer, where essential diagnostic procedures are not universally free of charge. Moreover, the influence of socio-demographic factors, such as age, marital status, and educational level, on LFU rates underscores the need for targeted interventions that consider the diverse needs of women across different life stages and social circumstances [18-23].

Addressing Advanced Stage Cancer LFU

Interestingly, advanced stages of cancer were not associated with higher LFU rates in our study, primarily because those individuals had unfortunately passed away by the time of the investigation. This stark finding highlights the critical need for timely intervention and continuous care to improve survival outcomes.

Implications for Policy and Practice

The socioeconomic conditions, including low income and literacy levels, significantly contribute to LFU rates, suggesting that educational and financial support strategies could mitigate these barriers. The launch of the HPV vaccination program in Morocco represents a proactive step towards reducing cervical cancer incidence, yet our findings indicate that comprehensive care pathways, including accessible diagnostics and treatments, are essential to address the current LFU challenges effectively.

Overview of Findings

This study has meticulously examined the complex factors leading to loss to follow-up (LFU) within breast and cervical cancer screening programs in Kenitra, Morocco. It reveals that addressing LFU requires a holistic approach that focuses on improving communication, eliminating financial hurdles, and enhancing coordination across the healthcare spectrum. Such interventions are crucial for reducing LFU rates, bolstering cancer care effectiveness, and ultimately aiming to decrease cancer

mortality in Morocco.

Highlighting the Issue of LFU

Our findings indicate variable LFU rates between breast and cervical cancer screenings, with breast cancer screenings showing notably higher rates of discontinuation. This disparity underscores the urgency of implementing focused interventions to combat LFU and ensure women complete their recommended screening, diagnosis, and treatment pathways.

Strategic Recommendations

Enhanced Communication

Strengthening the delivery of results after a positive screening test is paramount. We advocate for a strategy that not only informs women of their need for further evaluation but also actively engages and encourages them to attend designated diagnostic centers for follow-up.

Active Re-engagement

Healthcare professionals play a pivotal role in reaching out to women who have disengaged from the screening process. Initiatives to re-engage these women are essential at all stages from screening through to diagnosis and treatment to support them in completing their care continuum.

Financial Accessibility

The provision of cost-free supplementary diagnostic examinations, especially for breast cancer, is identified as a key requirement. Removing financial barriers to these essential services is vital for encouraging continued participation in diagnostic processes.

Leveraging Recent Healthcare Advances

Morocco's efforts in expanding medical coverage in recent years provide a solid foundation for improving access to healthcare services. These advances, alongside the introduction of the HPV vaccination program for young girls in 2022, represent significant steps towards comprehensive cancer prevention and care. Enhanced medical coverage is instrumental for the success of Morocco's screening programs in achieving their objectives of reducing cancer mortality and, potentially, eradicating cervical cancer.

Final Thoughts

While challenges persist in maintaining patient engagement in cancer screening programs, the path forward is clear. Through targeted improvements in communication, patient re-engagement strategies, and the removal of economic barriers to diagnostic services, coupled with advancements in healthcare coverage and preventative measures, Morocco can significantly improve cancer care outcomes.

By implementing these recommendations, Morocco can make substantial progress in its fight against cancer, improving the lives of women across the nation.

Author Contribution Statement

Nadya Mezzoug is the principal investigator in the study, all auteurs has contributing in the protocol design of the study, analysis of data, interpretation and redaction of the report.

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Ethical Declaration

This study was conducted with the approval of the Ethics Committee for Biomedical Research at the Faculty of Medicine and Pharmacy in Rabat, Morocco; Number 42/17.

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Conflict of Interest

The Corresponding author and the co-authors have any competing interests to declare.

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