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Original article

# Impact of socio-economic status and other associated factors on women's access to mammography in Eastern Morocco

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**Abstract.** *Background and aim:* Breast cancer is an international public health problem. This study explored the association between the performance of mammography and the socio-economic status (SES) of participants and other associated factors. *Methods:* This prospective cohort study was spread over one year (November 2023 - October 2024), and included 103 women from the province of Taza, aged between 23 and 64 years, and of different SES. Data were collected from the patient's files and completed by a questionnaire with the participants. Statistical analyses, including univariate and multivariate methods, were conducted to assess the association between the investigated factors and the accessibility of mammography. *Results:* The study population consisted mainly of women aged 40-59 years (73.8%), married (75.7%), living in rural areas (62.3%), and representing various SES. Only 48.5% of the participants had mammograms, unevenly distributed according to SES. Women of low SES were two and a half times more likely not to have their mammograms, due to financial constraints, lack of awareness, and inaccessibility of services. Lack of awareness (ARR = 4.321, 95% CI: 1.753-10.653) and late appointments (ARR = 12.5, 95% CI: 2.711-57.644) were also among the main obstacles. Conversely, factors such as fear of a positive diagnosis (ARR = 0.071, 95% CI: 0.026-0.192) and financial support (ARR = 0.005, 95% CI: 0.001-0.044) proved protective. *Conclusion:* The study highlighted the importance of targeted interventions, such as financial support and awareness-raising, in removing barriers to screening and improving access to mammography for vulnerable populations. (www.actabiomedica.it)

**Key words:** breast cancer, screening, mammography, socio-economic status

## Introduction

Breast cancer (BC) is the predominant form of neoplastic disease in women worldwide, regardless of a country's level of economic development. In the Moroccan context, breast cancer appears to be the most common malignant tumor in the female population. It accounted for 39.1% of all cancers in women in 2022 (1). With 4044 deaths, it was the most common cause of cancer death in women, representing 25.6% of all cancer deaths in women in the same year (2). To reduce the morbidity and mortality associated with breast cancer, a comprehensive approach that takes account of its multifactorial nature is essential. Significant efforts have been devoted to primary prevention, aimed at reducing the incidence of the disease by acting on modifiable risk factors (3,4). At the same time, particular attention has been paid to

secondary prevention, with a focus on improving access to screening services, reinforcing early diagnosis, and ensuring rapid, integrated, and appropriate therapeutic management. These efforts are also aimed at mitigating the long-term side effects of cancer treatments, thus contributing to a better quality of life for patients (5,6). Moreover, early detection of this disease means an improved prognosis, which depends on the stage at which it is diagnosed. This is a major determinant of survival in BC (7,8). Since 2010, the Moroccan Ministry of Health has been committed to the fight against breast and cervical cancer through the launch of a National Breast and Cervical Cancer Screening Program (NBCCSP). Under this program, screening is funded by the state and includes a clinical breast examination (CBE), supplemented by a mammogram if any abnormalities are detected. This program forms part of the National Cancer Prevention and Control Plan (PNPCC1). (9). This plan continues with its 2nd version (PNPCC2) aimed at improving participation in screening and stepping up the fight against inequalities in access to and use of screening, early diagnosis, and quality care (10). In particular, after evaluating the performance of the 1st plan, which was marked by: a CBE coverage rate of 30%, a CBE positivity rate of 5.2%, and low BC detection rates (0.9/1000 people screened), which could be explained by a low level of participation by women in the most in-depth examinations (11). Only 18.1% of women with positive CBE underwent mammography, 18.7% breast ultrasound, and 2% microbiopsy (12). As a result, disparities in the stages of BC detection and survival among Moroccan women have been observed (11,13). It is therefore important to understand the determinants of these inequalities in screening and early diagnosis of BC to correct them. Numerous studies have analyzed the association between socioeconomic status (SES) and BC screening, suggesting that low SES is a major barrier to early detection of this disease. Indeed, socioeconomic inequalities in the adoption of BC screening practices have been marked by low uptake of CBE and mammography by the most deprived and lowest educated women (14–16). However, in their study of Chinese women, Zhang et al. found that women with average and high SES scores were 3.739 and 3.453 times more likely to undergo screening mammography than women with low scores. This influence varied according to the level of health education, marital status, and place of residence (17). Orsini et al. revealed that patients with low SES had twice the risk of having advanced BC, regardless of the characteristics of the cancer and the method of detection. This was explained by a lack of regular participation in screening or late screening in women with low SES, which may lead to a later diagnosis (7). However, there is a lack of studies exploring the association between SES and the use of early detection methods for BC in Morocco. The objective of the present study was to evaluate the impact of SES and associated factors on women's access to mammography for early detection of BC in the province of Taza.

## Materials and Methods

### *Study participants*

Spread over one year (November 2023 - October 2024), this prospective cohort study included 103 women aged between 23 and 64 years of different SES. These women were referred from urban and rural health centers in the province of Taza to the only Reproductive Health Reference Centre (CRSR) in the province, as part of the national BC early detection program during the study period. All women referred and admitted to the CRSR for mammography, who agreed to take part in the study, resided in Taza, and were members of a health insurance scheme, were included in the study. Compulsory health insurance (AMO) allows the SES of the participant to be determined based on her Household Score (SM) in Morocco (18,19). The study was undertaken following the CRSR's internal regulations. The confidentiality and anonymity of all the data collected were also respected. In addition, appropriate measures were taken in conformity with the Declaration of Helsinki (20) throughout the study.

### *Data collection*

Data was extracted from the patient files by a pre-trained nurse. Each participating woman was

registered at the center under a screening number. Her file included her socio-demographic characteristics (age, level of education, place of residence, occupation, marital status) and clinical characteristics following a clinical examination by the center's doctor. In order to gather the necessary data for the study, a questionnaire was administered to each of the participating women.

*Data analysis*

The patients' data were analyzed quantitatively and qualitatively using SPSS version 22 software. The quantitative variable 'age' was converted into a categorical qualitative variable. The Chi-squared test was then employed to ascertain which variables were significantly correlated with the target variable, 'performance of mammography'. Multivariate logistic regression was also implemented to ascertain the factors with a significant impact on mammography attendance. The study reported both crude relative risks (CRR) and adjusted relative risks (ARR), along with their respective 95% confidence intervals (CI), as a measure of association.

*Obligatory health insurance (AMO):*

This is now managed by the National Social Security Fund (CNSS) following the merger of all the social security funds. There are two types of AMO: paid AMO for employees in the public and private sectors, self-employed workers, and individuals able to pay their contributions without working. And non-paying AMO (AMO Tadamon) (19) whose state pays their contributions (22) to the CNSS, due to their situation of vulnerability according to the score attributed to their household (HS).

*Household score (HS):*

This is a numerical value assigned to each household registered in the Unified Social Register. This value is calculated based on data relating to their social and economic conditions, using a mathematical formula that is developed, modified, and updated by the High Commission for Planning (21). It determines the person's eligibility for non-paying AMO Tadamon and social assistance (22).

*Head of household:*

The person making the declaration on behalf of the household, in particular the father or mother or the spouse or one of the adult children residing with the woman or the woman herself (21).

*Socio-economic status SES:*

In our study, we referred to the type of AMO paid/non-paid to determine the SES of participants: Low SES for participants affiliated with the non-paying AMO Tadamon and high SES for participants affiliated with the paying AMO.

*Performing a mammogram:*

In Morocco, mammography is performed free of charge in the public sector, but only if an appointment is made. In the private sector, however, insured persons must pay the full cost in advance and then submit their physical care file, which includes the prescription and the invoice, to recover two-thirds of their care costs (19).

*Financial support:*

This is the financial help the patient needs to pay for the mammogram, which she can obtain from her family or other sources.

## Results

*Characteristics of the participants*

For this study, 103 women were recruited, of whom 75.7% were married, 66% illiterate, and 97.1% housewives. The population was predominantly in the 40-59 age group, with 76 women (73.8%). 61.2% of participants were referred from rural health centers, compared with 38.8% from urban health centers. However, 48 women (46.6%) stated that they only consulted a health center after the appearance of certain clinical signs. 81.6% said they had no family history of BC. As for SES, by categorizing the study participants into 2 groups (low SES and high SES), it was revealed that

52.4% of the women had a low SES and 47.6% a high SES. Finally, the survey results indicated that 67% of the women surveyed reported being aware of BC screening, while 33% reported never being informed of early BC screening. Table 1 presents the data from this analysis.

*Performing a mammogram*

Of the 103 women who participated in the study, only 48.5% had undergone mammography, compared with 51.5% who had not (Figure 1).

A study of the factors correlated with mammography in the study population revealed that the rate of mammography varies significantly according to several characteristics. Univariate analysis (Chi-square test) was used to determine the association between mammography and the relevant factors in the study participants (Table 2). A substantial correlation has been identified between the performance of mammography and age was noted (p=0.05). In fact, the highest rates of mammography were recorded in the two age groups 40 to 59 years (33%) and under 40 years (12.6%), while the lowest rate was observed among the oldest women (60 and over) (3.9%). There was also a significant difference in the use of mammography according to marital status (p=0.001), indicating a tendency for married women (35%) to undergo mammography compared with women of other statuses. In addition,

**Table 1.** Socio-demographic and clinical characteristics of participants

| **Variables** | | **(n)** | **(%)** |
|---|---|---|---|
| **Age** | 20 to 39 years | 17 | 16.5 |
| | 40 to 59 years | 76 | 73.8 |
| | 60 years and older | 10 | 9.7 |
| **Marital status** | Married | 78 | 75.7 |
| | Divorced | 12 | 11.7 |
| | Widowed | 2 | 1.9 |
| | Single | 11 | 10.7 |
| **Residence** | Rural | 63 | 61.2 |
| | Urban | 40 | 38.8 |
| **Level of education** | Illiterate | 68 | 66 |
| | Primary | 18 | 17.5 |
| | Secondary | 11 | 10.6 |
| | Higher | 5 | 4.9 |
| **Patient's profession** | No | 100 | 97.1 |
| | Yes | 3 | 2.9 |
| **Profession head of household** | No | 16 | 15.5 |
| | Yes | 87 | 84.5 |
| **SES** | High SES | 49 | 47.6 |
| | Low SES | 54 | 52.4 |
| **Family history of BC** | No | 84 | 81.6 |
| | Yes | 19 | 18.4 |
| **Circumstances of discovery** | CBE | 55 | 53.4 |
| | Clinical signs | 48 | 46.6 |
| **Sensitized patient** | No | 34 | 33 |
| | Yes | 69 | 67 |

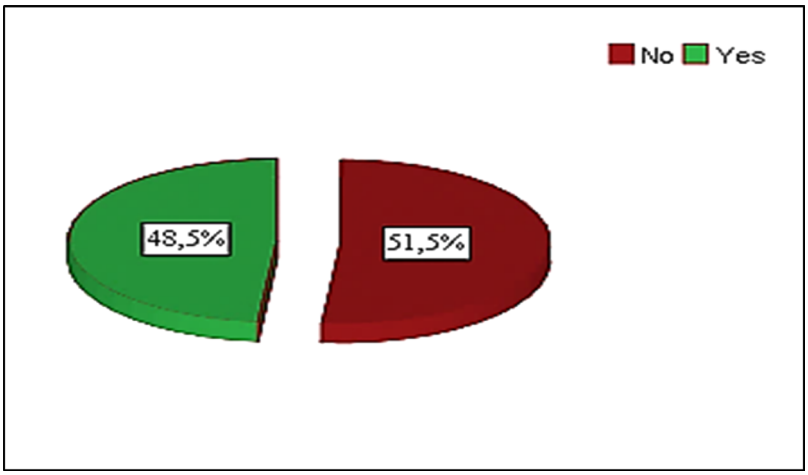


**Figure 1.** Performing a mammogram.

the study of the impact of SES and financial support on the rate of mammography shows a significant and positive effect of SES ($p = 0.01$) and financial support ($p < 0.001$). The higher the women's SES or the more financial support they received, the more likely they were to undergo mammography, and vice versa. Fear of a positive diagnosis of BC ($p < 0.001$) and awareness of BC and its screening ($p = 0.002$) were identified as having a statistically significant association with mammography. The more participants feared the disease or were aware of it, the more likely they were to undergo mammography. However, the appointment of the mammogram ($p < 0.001$), a factor linked to the healthcare system, was revealed as a factor with a significant impact on the performance of the mammogram.

Following the identification of the factors affecting mammography by univariate analysis, these were subsequently included in a multivariate logistic regression analysis (Table 3). The risk of not having a mammogram was reduced to 42.2% in young women under 40 years (CRR=0.578, 95% CI: 0.405 - 0.824), while women who were 60 years of age and older had a relative risk of 1.263 (95% CI: 0.576 - 2.771). Similarly, for marital status, single women had a 57.1% reduced risk (CRR=0.429, 95% CI: 0.338 - 0.543) of not having their mammograms compared with divorced and widowed women, who had a relative risk of (CRR=0.990; 95% CI: 0.244 - 4.014) and (CRR=2.929, 95% CI: 0.824 -10.411) respectively. In contrast with women possessing a high SES, women with a low SES demonstrated a 1.5 times higher risk of failing to undergo a mammogram (CRR = 1.643, 95% CI: 1.092 - 2.471). Women whose scheduled appointments had not yet arrived also had a 5.5 times greater risk of not having their mammograms (CRR=5.655; 95% CI: 1.506 - 21.226) than women whose appointments had already taken place. The absence of awareness among women regarding the early detection of BC also increased the risk of not having a mammogram by about two times (CRR = 1.879; 95% CI: 1.315-2.685). However, women's financial support and their fear of a positive diagnosis of BC proved to be protective factors. Significant reductions in the risk of not undergoing mammography at 81.8% (CRR = 0.182; 95% CI: 0.106-0.311) and 68.5% (CRR = 0.315; 95% CI: 0.202-0.490) were associated, respectively, with financial support and fear of a positive diagnosis of BC. Multivariate analysis using logistic regression of the various factors impacting the performance of mammography among participants revealed the same trends and the relative risk of not performing mammography increased. Women with a low SES had a 2.5-fold higher risk of not having their mammograms (ARR = 2.692; 95% CI: 1.214-5.971) compared with those with a high SES. Similarly, women whose scheduled appointments had not yet arrived also had an increased risk twelve and a half fold higher (ARR = 12.5; 95% CI: 2.711-57.644) than women whose appointments had already

**Table 2.** Performing a mammogram and associated factors

| Variables | | Mammography | | p-value |
|---|---|---|---|---|
| | | No (%) | Yes (%) | |
| **Age** | 20 to 39 years | 3.9 | 12.6 | 0.05 |
| | 40 to 59 years | 40.8 | 33 | |
| | 60 years and older | 5.8 | 3.9 | |
| **Marital status** | Married | 40.8 | 35 | 0.001 |
| | Divorced | 0 | 11.7 | |
| | Widowed | 1 | 1 | |
| | Single | 8.7 | 1.9 | |
| **Residence** | Rural | 33 | 28.1 | 0.422 |
| | Urban | 17.5 | 21.4 | |
| **Level of education** | Illiterate | 36.9 | 29.1 | 0.083 |
| | Primary | 9.7 | 7.8 | |
| | Secondary | 1.9 | 9.7 | |
| | Higher | 1.9 | 2.9 | |
| **Patient's profession** | No | 49.5 | 47.6 | 0.618 |
| | Yes | 1 | 1.9 | |
| **Profession head of household** | No | 8.7 | 6.8 | 0.787 |
| | Yes | 41.7 | 42.8 | |
| **SES** | High SES | 32.1 | 19.4 | 0.01 |
| | Low SES | 19.4 | 29.1 | |
| **Family history of BC** | No | 40.8 | 40.8 | 1.000 |
| | Yes | 9.7 | 8.7 | |
| **Circumstances of discovery** | CBE | 30.1 | 23.3 | 0.238 |
| | Clinical signs | 20.4 | 26.2 | |
| **Mammography appointment arrived** | No | 48.5 | 33.1 | < 0.001 |
| | Yes | 1.9 | 16.5 | |
| **Fear of positive BC diagnosis** | No | 43.7 | 15.5 | < 0.001 |
| | Yes | 6.8 | 34 | |
| **Financial support** | No | 49.5 | 10.7 | < 0.001 |
| | Yes | 1 | 38.8 | |
| **Sensitized patient** | No | 24.3 | 8.7 | 0.002 |
| | Yes | 26,2 | 40,8 | |

taken place. Women's lack of awareness of the importance of early screening for BC also increased the risk of not having a mammogram by about four-fold (ARR= 4.321; 95% CI: 1.753-10.653). Conversely, the relative risk of not having a mammogram is reduced to 75.6% (ARR=0.244; 95% CI: 0.073-0.808) for women under 40 years of age, relative to women who are 60 years of age and over (ARR=0.824; 95% CI: 0.215-3.156). Thus, single women had an almost zero relative risk (ARR=0.00; 95% CI: 0.000) of not having their mammograms compared with divorced and widowed women, who had an adjusted relative risk (ARR=0.857; 95% CI: 0.052-14.199) and (ARR=3.857; 95% CI: 0.782-19.019) respectively. Similarly, women's fear of

**Table 3.** Adjusted and unadjusted relative risk of the association between the performance of mammography and the factors influencing it

| Variables | | CRR | 95% CI | | ARR | 95% CI | |
|---|---|---|---|---|---|---|---|
| **Age** | 40 to 59 years | Ref. | Ref. | Ref. | Ref. | Ref. | Ref. |
| | 20 to 39 years | 0.578 | 0.405 | 0.824 | 0.244 | 0.073 | 0.808 |
| | 60 years and older | 1.263 | 0.576 | 2.771 | 0.824 | 0.215 | 3.156 |
| **Marital status** | Married | Ref. | Ref. | Ref. | Ref. | Ref. | Ref. |
| | Divorced | 0.429 | 0.338 | 0.543 | 0.000 | 0.000 | |
| | Widowed | 0.990 | 0.244 | 4.014 | 0.857 | 0.052 | 14.199 |
| | Single | 2.929 | 0.824 | 10.411 | 3.857 | 0.782 | 19.019 |
| **SES** | Low SES | Ref. | Ref. | Ref. | Ref. | Ref. | Ref. |
| | High SES | 1.643 | 1.092 | 2.471 | 2.692 | 1.214 | 5.971 |
| **Mammography appointment arrived** | Yes | Ref. | Ref. | Ref. | Ref. | Ref. | Ref. |
| | No | 5.655 | 1.506 | 21.226 | 12.5 | 2.711 | 57.644 |
| **Fear of positive BC diagnosis** | No | Ref. | Ref. | Ref. | Ref. | Ref. | Ref. |
| | Yes | 0.315 | 0.202 | 0.490 | 0.071 | 0.026 | 0.192 |
| **Financial support** | No | Ref. | Ref. | Ref. | Ref. | Ref. | Ref. |
| | Yes | 0.182 | 0.106 | 0.311 | 0.005 | 0.001 | 0.044 |
| **Sensitized patient** | Yes | Ref. | Ref. | Ref. | Ref. | Ref. | Ref. |
| | No | 1.879 | 1.315 | 2.685 | 4.321 | 1.753 | 10.653 |

a positive CS diagnosis and financial support were correlated with a highly significantly reduced risk of not having a mammogram at 92.9% (ARR=0.071; 95% CI: 0.026-0.192) and 99.5% (ARR=0.005; 95% CI: 0.001-0.044), respectively.

## Discussion

This study explored the correlation between mammography performance and participants' SES, as well as other associated factors. The study population was characterized by a predominance of women aged between 40 and 59 years (73.8%), which is the age group most targeted by the NBCCSP in Morocco (23), Married women (75.7%) and rural women (62.3%) are more involved in screening activities. This corroborates other studies indicating that married women, women in committed relationships, and rural women are more likely to undergo regular screening (15,24). However, our survey revealed significant inequalities. 66% of female participants are illiterate and 97.1% are unemployed, compared with only 15.5% of heads of household. These figures reflect socio-economic disparities, particularly in education, which affect women's professional opportunities in Morocco and limit their access to employment (25). In terms of health, 81.6% of the women said they had no family history of BC. As for the circumstances of discovery, 46.6% of the participants stated that they only consulted a professional of health after the onset of clinical symptoms. This observation is consistent with the findings of Mahjoub et al. in a research study that was undertaken in Tunisia, potentially reflecting a lack of awareness of BC and early detection methods such as breast self-examination and CBE (26). In fact, 33% of the participants in our survey stated that they had never taken part in any awareness-raising initiatives concerning the early detection of BC. A study of women in Jeddah, Saudi Arabia, confirmed this statement, revealing a major gap in BC awareness that negatively influences the adoption of early mammography screening practices (27). Our survey revealed

that out of a total of 103 participants, 48.5% had undergone a mammogram after more than a year, a figure well above the national average in Morocco 18.1% (12), and is comparable to the results reported for the Lyon metropolitan area in France, which stands at 48.3% (15). This outcome can be attributed to the observation that in our series, this rate includes women who underwent mammography as part of organized screening in public hospitals or individual screening in private practices. This means that the rate is much lower for women of low SES because mammography is not covered by health insurance, as it is in other countries (28), which forces women to pay in advance for this examination in the private sector or to wait for their appointment in the public health establishment. These results are consistent with data from low- and middle-income countries, where mammography screening is often limited due to inaccessible services, insufficient awareness, and prohibitive costs (29). Our analyses revealed significant correlations between the performance of mammography and various factors: age ($p = 0.05$), marital status ($p = 0.001$), SES ($p = 0.01$), appointment for mammography ($p < 0.001$), fear of a positive diagnosis of BC ($p < 0.001$), financial support ($p < 0.001$) and patient awareness ($p = 0.002$). Univariate and multivariate analyses identified several factors associated with participants not undergoing mammography. Although these results are specific to our population, they are for the most part in line with trends observed in the international literature, although they do have certain specific features. Univariate and multivariate analyses revealed that younger women (< 40 years) have a reduced risk of not having a mammogram, while older women (≥ 60 years) have an increased risk. Single women also had a negligible risk of not having a mammogram, compared with divorced or widowed women, who are often at a psychological or financial disadvantage. This observation can be attributed to a multiplicity of factors. Younger women often benefit from better access to health information, a higher level of education, and, in an increasing proportion, financial autonomy, enabling them to adopt preventive behaviors more easily (30). A systematic review showed that women with higher levels of education were more likely to participate in breast cancer screening, underlining the importance of education in promoting preventive health behaviors(31). In contrast, women aged 60 and over face specific barriers that may limit their participation in screening. These findings align with those of Constantinou et al (2024), who found that older women were more likely to forgo screening due to factors such as beliefs that screening is no longer necessary with advanced age, concerns about results, or physical limitations. In addition, screening guidelines often vary for older women, which can lead to confusion about the need to continue screening after a certain age (32). On the other hand, they differ from those reported by Znati et al. (2014), who reported lower participation of younger women in screening (33). This discrepancy could be explained by contextual differences - notably cultural or structural - between the populations studied, or by recent changes in health behaviors among young women in certain regions. Concerning marital status, the data collected indicate that married women make significantly more use of screening than their divorced or widowed counterparts. These results corroborate the findings of Miller et al (2014), who highlighted the positive effect of marriage on the use of preventive health services. Marital support - both psychological and logistical - appears to play a decisive role in the adoption of preventive behaviors. Conversely, divorced or widowed women are often faced with cumulative obstacles, including social isolation, limited economic resources, and an increased psychological burden, all of which reduce their propensity to seek screening services (34). However, young single women are a special case: their economic and decision-making independence, coupled with increased exposure to prevention messages, may compensate for the lack of marital support, making it easier for them to take part in screening. These observations suggest that marital status, in interaction with other social determinants, plays a structuring role in access to preventive care (13).These results highlight the need to adapt public health policies to the specific socio-demographic characteristics of the women targeted. Particular attention should be paid to older, widowed, or divorced women, through reinforced communication and support strategies, possibly including psychosocial support (32). Such personalised approaches could help to reduce inequalities in access to mammography and improve the effectiveness of the breast cancer screening

program (35). Our study shows a significant association between low SES and non-use of mammography screening. Women from the most disadvantaged backgrounds were around two and a half times more likely not to undergo mammography, compared with those with a high SES. These results are in line with the literature, which consistently identifies SES as a fundamental determinant of access to preventive care, particularly for breast cancer (36,37).In particular, the survey conducted by Chappuis et al (2014) in France highlighted a significantly lower uptake of screening among women in precarious situations, compared with the general population (38). Other studies, conducted in various socioeconomic and cultural contexts, have confirmed that low-SES women face multifactorial barriers, including direct financial limitations (cost of transport, lack of supplementary cover), a low level of information, poor health literacy, and prioritisation of other day-to-day emergencies (7,17). In addition, structural inequalities in access to the healthcare system tend to reinforce these disparities(39).These findings call for the development of targeted interventions tailored to the needs of the most vulnerable populations. The World Health Organisation (WHO) recommends the implementation of strategies proportionate to needs, such as personalised information campaigns, free screening tests and the deployment of mobile outreach services in underserved areas (WHO, 2017) (40). An equitable and contextual approach to screening is therefore essential to guarantee universal access to breast cancer prevention. Lack of awareness is also a key factor in women not undergoing mammography screening. Our results show that women who are insufficiently informed about the issues involved in screening have a significantly increased risk of not undergoing screening. This finding is corroborated by numerous studies which emphasise the central role of knowledge and perception of risk in adherence to screening programmes, particularly among women with little education or living in disadvantaged contexts (41,42). Low health literacy and the absence of targeted information campaigns contribute to reinforcing inequalities in access to screening. As Nadine et al (2023) demonstrate, the level of awareness has a direct influence not only on the intention to undergo screening, but also on its effectiveness over time (30). Our study also showed that women whose mammography appointments had not yet arrived at the time of the survey had a significantly higher risk of not undergoing the examination. This observation highlights the importance of organisational barriers to access to healthcare services. Delays in booking appointments, limited availability of screening centers, or restrictive logistics (distance, timetables) can alter patients' healthcare trajectories (13). These factors are consistent with the conclusions of Masson (2006), who shows that missed or postponed appointments can lead to a form of gradual disengagement on the part of women, by reinforcing their anxiety or the perception that screening is a low priority on their daily agenda (28). These results argue in favour of optimising appointment scheduling, introducing active reminders and personalised support systems to maintain women's commitment throughout the screening process (14). Financial support plays a decisive role in improving participation in breast cancer screening, particularly among women from disadvantaged socio-economic backgrounds (34,41). A study conducted in the Orne département in France on the mammobile's experience of breast cancer screening over several years showed that it is capable of reducing or even eliminating social and territorial inequalities at a reasonable cost to society and increasing women's participation in mammography (14). Similarly, a study carried out in the radiology department of the Treichville University Hospital in Abidjan revealed that women with health insurance and financial support were more likely to take part in screening, underlining the importance of economic empowerment in access to preventive care (30). Fear of a positive diagnosis also influences uptake of screening, although its effects are ambivalent. A critical review of the literature has shown that moderate levels of fear can motivate women to undergo screening (43,44), while excessive fear can act as a brake, leading to avoidance of screening (45). In addition, a qualitative study in Jordan revealed that fear of breast cancer, exacerbated by social stigma and cultural taboos, dissuades some women from taking part in screening, despite an awareness of the importance of early detection (46). These findings suggest that targeted interventions, combining financial support and culturally appropriate awareness campaigns, could significantly improve breast cancer screening uptake rates

(35). It is essential to develop strategies that not only reduce economic barriers but also address the fears and cultural beliefs surrounding breast cancer, in order to promote proactive participation in screening. The results of our study are broadly in line with observations in the literature regarding the role of SES, awareness and financial support. However, certain particularities, such as the low risk of young or single women, merit further exploration in order to understand the dynamics specific to our local context. These insights underline the importance of interventions tailored to the needs of populations to improve participation rates in breast cancer screening. This study is subject to certain constraints, including the limited size of the sample, the exclusion of women not affiliated with any health insurance plan, and the absence of a longitudinal evaluation, which means that it is not possible to monitor changes in patient's behavior over the long term. Also, although it is representative of our region, extrapolation of the results to other geographical or cultural contexts must be carried out with caution. Nonetheless, the present study is the inaugural investigation in the region to use the Household score (SM) recently adopted in Morocco to determine patient SES and offers important insights to guide public health policies aimed at reducing inequalities in access to BC screening. Future studies could explore the most effective interventions to address the specific needs of the most vulnerable women and reduce health inequalities.

## Conclusion

This study identifies key factors affecting mammography uptake, including SES, marital status, age, awareness, and financial support. It finds that women in economically disadvantaged situations face barriers like financial constraints, lack of information, and long wait times, limiting access to screening. Financial support and awareness initiatives are essential to improve screening access in vulnerable populations. This includes tailored educational programs, subsidies or full coverage of mammography, and better appointment management to reduce waiting times and dropout rates. Additionally, vulnerable groups (widows, divorcees, and elderly women) need psychological and social support to encourage participation in screening.

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