REVIEW

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Factors Influencing Patient and System Delays in Women with Breast Cancer in Morocco: A Systematic Review

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Abstract

Objective: In Morocco, Breast cancer is the most common cancer in women. In most cases, the disease is confirmed at an advanced stage. Delays in the presentation, diagnosis, and access to treatment for breast cancer significantly increase mortality and morbidity. This review aimed to identify the factors influencing patient and system delays in Moroccan women with breast cancer. **Methods:** A systematic review was conducted exploring three databases (PubMed, Science Direct, and Web of Science) using predefined Keywords related to breast cancer presentation and diagnosis. Additionally, the reference lists of pertinent papers were manually checked. The quality of papers selected was assessed using specific checklists, according to the study design. We conducted a qualitative synthesis using thematic analysis to compile the findings**.** **Results:** The review includes 7 studies that identified 45 barriers that could affect the patient and systems delay among women with breast cancer. The main factors cited were largely associated with healthcare accessibility, notably high costs, and geographical challenges, along with a lack of awareness and knowledge regarding breast cancer. **Conclusion:** Policymakers in Morocco should prioritize improving accessibility to the healthcare system in all its aspects financial, geographical, and patient pathways and take decisive actions to enhance awareness and knowledge about breast cancer and promote breast cancer screening.

Keywords: Breast cancer- factors- patient delay- system delay- Morocco

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Introduction

In the worldwide 20 million new cancer cases and about 9.7 million deaths are estimated by 2022. According to the GCO (Global Cancer Observatory) in 2022 ten sites of cancer, including (breast, prostate, cervix uteri, lung, liver, stomach, colorectum, and esophagus,) represent about 60 % of new cases and deaths globally [1].

Lung cancer is the major cancer worldwide with 2.5 million new cases, accounting for 12.4% of all new cases. Female breast cancer (BC) ranked second (2.3 million cases, 11.6%), followed by colorectal cancer (1.9 million cases, 9.6%), prostate cancer (1.5 million cases, 7.3%), and stomach cancer (970 000 cases, 4.9%) [1]. In Africa, the estimated age-standardized incidence rate (ASR) of breast cancer among females in 2022 is 40.5 per 100,000, compared to the global rate of 46.8 per 100,000 [2, 3]. In Morocco, the estimated age standardized incidence rate (ASR) of BC was about 58.4 per 100,000 [4].

BC can be prevented and treated through timely and comprehensive screening and management. Nevertheless, it remains a significant concern that in many developing countries, women are frequently diagnosed with breast cancer at advanced stages due to issues related to limited geographic and financial accessibility and limited awareness regarding early detection [5-7].

The patient delay is characterized by a prolonged interval between the onset of initial symptoms and the patient's engagement with a healthcare professional. This period is typically defined as exceeding 12 weeks, as empirical evidence suggests that extended intervals are associated with decreased survival rates [7]. The majority of studies conducted among African women primarily investigated patient delay factors (including sociodemographic, cultural, and economic factors), early detection [8, 9], as well as the knowledge, attitudes, and practices of women regarding breast cancer and self-examination [10, 11].

Furthermore, the majority of review studies conducted in the African region focused on the time taken for presentation, diagnosis, and associated factors, as well as the stages of diagnosis [8, 9]. However, numerous factors remain inadequately investigated. This is the first systematic review concentrating on factors potentially elucidating delays in diagnosis and treatment among Moroccan women with breast cancer. This review aimed to identify the factors influencing patient and system delays in Moroccan women with breast cancer and the outcomes of this study will contribute to enhancing breast cancer health policies and directing attention toward the

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pertinent factors that significantly impact diagnostic and treatment delays.

Materials and Methods

This systematic review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement by Moher et al. [12].

Data sources and search strategy

The MEDLINE database via PubMed, Science Direct, and Web of Science were consulted. To ensure a comprehensive search and identify additional articles, a supplementary manual search was conducted through references of the articles identified in those databases. The following keywords were combined using Boolean operators “AND” and “OR” to generate multiple search equations according to the databases:

“Breast cancer”; “Delayed diagnosis”; “Morocco”.

Inclusion and exclusion criteria

Studies were eligible for inclusion in this systematic review if they reported findings from research conducted in Morocco, identified barriers to presentation and diagnosis among women with breast cancer, and were published prior to October 2023. No language restrictions were imposed, and there were no a priori limitations regarding study design (qualitative, quantitative, or mixed methods). Furthermore, studies that combined female and male breast cancer in their results or that aggregated all types of cancers were excluded.

Study selection and data collection process

Eligible articles were identified in accordance with the PRISMA flow diagram. The first and second authors independently screened all titles and abstracts identified in the aforementioned databases, and those deemed clearly irrelevant to the topic were excluded. The full texts of all potentially eligible papers were subsequently retrieved and reviewed for inclusion in this review based on the predetermined inclusion criteria. All included studies were independently evaluated by two authors to confirm eligibility and assess quality.

Data extraction and items

For the included studies, two authors independently extracted data utilizing a standardized extraction template. This data encompassed various aspects, including study characteristics (title, authors, publication year, study design, population characteristics, and statistical methods), associated factors (barriers and facilitators). Any discrepancies in the selection and extraction process were resolved through discussion, and when necessary, in consultation with two additional authors.

Definition of Delays and Parameters

To summarize information and present it, we considered two delays:

The patient delay is defined as the time interval between the onset of the first symptoms and the date of the first medical consultation.

The system delay is defined as the interval of time from the first medical consultation until the date of treatment initiation (surgery). It includes the diagnostic delay, which is defined as the period between the patient’s perception of the initial symptoms and the date of histological confirmation.

*When the study adopted only one delay, we considered it as a patient delay.

We classified the stage at diagnosis as late if:

- The stage at diagnosis is classified as stage IIb, III, or IV.
- When no specification is mentioned about stage II (whether it is IIa or IIb), we considered it as IIa.

Quality assessment

The quality of the qualitative studies was assessed by using the Critical Appraisal Skills Program (CASP) Quality-Assessment Tool (http://www.caspuk.net).The quality of the quantitative studies was assessed using the National Institute of Health (NIH) Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies [13].

Study quality was assessed according to the following criteria: research question, study population, eligibility criteria of the population, sample size justification, outcome measures, response and follow-up rates, statistical analyses, and ethical issues.

Data synthesis

This step corresponds to a structured presentation of the essential characteristics of the studies. It started with a descriptive analysis of each included study, regarding the methodology employed, the research objectives, and the results found.

Results

The literature search identified a total of 45 studies. After excluding duplicate studies and those outside the scope of the review, 14 studies were selected for full-text review. Subsequently, 07 studies met the eligibility criteria for inclusion in the review (Figure 1).

Study characteristics

The main characteristics of the included studies are summarized in Table 1. Among the seven studies included in the review, six were quantitative, and one was qualitative. These studies were conducted across five cities in Morocco. The publication dates of the studies ranged from 2015 to 2024.

The sample sizes of the studies ranged from 81 to 1014 for the quantitative studies. According to their study design the six quantitative studies were cross sectional studies.

The qualitative study employed semi-structured interviews to investigate various factors influencing patient and system delay. In 5 studies, their study populations included exclusively women with breast cancer, whether newly diagnosed or not. In contrast, one

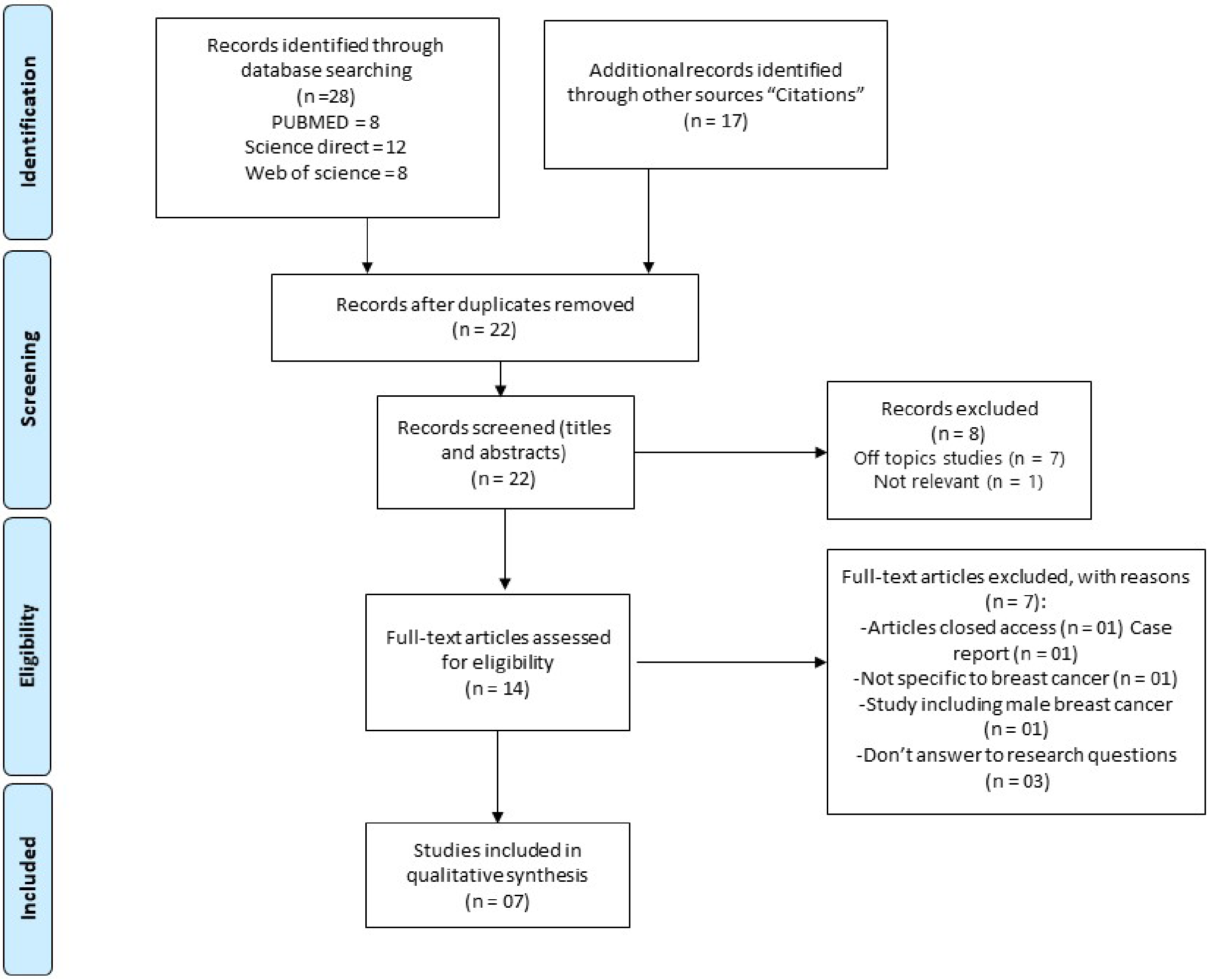

Figure 1. Flowchart Representing the Research Results and Different Steps of Inclusion and Exclusion of the Articles

Table 1. Main Characteristics of the Included Studies

Authors	Year of publication	Study design	Research method	Data collection methods.	site or city of study	Sample size	Participants
Sofia Aloulou et al. [18]	2015	Cross sectional study	Quantitative	Questionnaire Medical records	Mohammed VI University Hospital Marrakech	130	Patients with confirmed breast cancer within the oncology-radiotherapy department.
A. Maghous et al. [14]	2016	cross-sectional study	Quantitative	Face-to-Face Questionnaire Structure Medical Record Review	National Institute of Oncology in Rabat	137	Patients with advanced breast cancer (T3 or T4 or metastatic at the time of diagnosis)
B. Benbakhta et al. [16]	2015	cross-sectional study	Quantitative	Face-to-Face Questionnaire Structure Medical Record Review	National Institute of Oncology in Rabat	200	Women of Moroccan nationality admitted to the radiotherapy service, who have undergone surgery for invasive breast cancer and have signed an informed consent letter to participate in the study
Hind Mimouni et al. [17]	2022	cross sectional study	Quantitative	Medical records	FEZ Oncology Hospital	410	Women registered with the diagnosis of breast cancer
Mouna HANNAOUI et al. [20]	2022	Cross sectional study	Quantitative	Medical records	Reference and reproductive health center of Tetouan (RRHT)	81	Admitted patients for breast cancer at a reference center during the period from January 2017 until the first semester of 2018
Nadia Ouzennou et al. [19]	2024	cross-sectional analytical study	Quantitative	Structured interview	Essaouira, Morocco,	1014	Adult women residing in the city of Essaouira
Ann A. Soliman et al. [15]	2018	Interview	Qualitative	Semi-structured interviews	Mohammed VI University Hospital Marrakech	25	Women attending the hospital for routine breast cancer treatments

study included adult women, and only one study included exclusively those with an advanced stage of breast cancer.

In the large majority of included studies, women with breast cancer were aged 40 years and over.

Factors influencing diagnostic and treatment intervals in breast cancer patients

A total of 45 factors were identified across included studies.

These factors were classified into six categories (Social-demographic, Clinical, Personal and Psychological, factors related to treatments, medical care, and healthcare system, Socio-cultural and community factors, Factors related to knowledge and awareness) and are summarized in Table 2.

Among the barriers identified, socioeconomic status

Table 2. Factors and Barriers Explored

	factors and barriers of delayed diagnosis		Number of studies exploring Factors	(Percentage n=7)
Social-demographic Factors	V1	AGE	3	42.85
	V2	Education	3	42.85
	V3	Profession	3	42.85
	V4	Place of residence	2	28.57
	V5	Socioeconomic status	4	57.14
	V6	Marital status	1	14.28
	V7	Number of people living in the same household	1	14.28
	V8	Number of children	1	14.28
	V9	Constraints related to transportation and distance	2	28.57
Clinical Factors	V1	UICC stage	1	14.28
	V2	Histological stage	1	14.28
	V3	Tumor size	1	14.28
	V4	Method of disease discovery	1	14.28
	V5	Performance of biopsy	1	14.28
	V6	Presence of family history related to cancer	1	14.28
	V7	Painless nature of symptoms	1	14.28
	V8	Number of consultations before diagnosis confirmation	1	14.28
Personal and Psychological Factors	V1	Fear of diagnosis	3	42.85
	V2	Fear of death	1	14.28
	V3	Ignorance of breast cancer symptoms	2	28.57
	V4	Fear of treatment / female individuality and femininity / Fear of social exclusion	2	28.57
Factors related to treatments, medical care, and healthcare system	V01	Non-referral to a specialized service	1	14.28
	V02	Regular medical consultations	1	14.28
	V03	Fine-needle biopsy performed	1	14.28
	V04	Medical specialties visited	1	14.28
	V05	Role and specialty of the referrer	1	14.28
	V06	Reason for referral	1	14.28
	V07	Lack of medical care	1	14.28
	V08	Patient reassured after negative breast physical examination	2	28.57
	V09	Non-specific medical treatment without follow-up	1	14.28
	V10	Surgical excision without pathological examination	1	14.28
	V11	Lack of information	1	14.28
	V12	Appointment delays	2	28.57
	V13	Diagnostic errors / Misinterpreted mammography	2	28.57
	V14	Presence of investigations	1	14.28
	V15	Number of consultations before diagnosis confirmation	1	14.28
	V16	Medical coverage	1	14.28
	V17	Year of diagnosis	1	14.28
Socio-cultural and community factors	V01	Previous traditional treatments	2	28.57
	V02	Privacy issues related to examination	2	28.57
	V04	Community beliefs about the causes of the disease	1	14.28
	V05	Role of the homemaker (concern)	1	14.28
	V06	Recommendation on screening	1	14.28
Factors related to knowledge and awareness	V01	Knowledge of breast self-examination	1	14.28
	V02	Knowledge about breast cancer	1	14.28

Table 3. Definition of Delays Explored

	Delay						
Author of study	Diagnostic delay	Consultation delay	Patient delay	System delay	Treatment initiation delay	Total delay	Reference delay
Sofia Aloulou et al. (2015)	First symptom to histological confirmation	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
A. Maghous et al. (2016)	Not Applicable	Not Applicable	First symptoms to first medical consultation	First consultation to diagnosis or treatment	Not Applicable	Not Applicable	Not Applicable
Ann A. Soliman et al (2019)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
B. Benbakhta et al. (2015)	First consultation to histopathological confirmation (FNAC, or needle or surgical biopsy)	First symptoms to first medical consultation	First symptoms to first medical consultation	diagnostic delay and treatment initiation delay	Date of diagnosis to treatment initiation (surgery).	First symptoms to treatment initiation	Not Applicable
Hind Mimouni et al (2022)	the time for all the investigations carried out at the diagnostic centre	Not Applicable	Discovery of symptoms to first medical consultation	Not Applicable	Confirmation of the diagnosis to the start of treatment	Not Applicable	Not Applicable
Mouna Hannaoui et al (2022)	Total diagnostic delay : First symptoms to histological diagnosis Histological diagnosis : First medical consultation to histopathological confirmation	Not Applicable	First symptoms to the first medical consultation	Not Applicable	Not Applicable	Not Applicable	First medical consultation to access to the reference center
Nadia Ouzemmou et al (2024)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

was the most prevalent (4 studies), followed by level of education, age, profession, fear of diagnosis, and misdiagnosis (3 studies). Additional factors included residence area, lack of knowledge regarding breast cancer symptoms, fear of treatment, concerns about femininity, fear of social exclusion, patient reassurance after negative breast physical examination, appointment delays, previous traditional treatments, privacy issues related to examination (“unwillingness to expose body”), and constraints related to transportation and distance (2 studies). The representation of other factors was singular.

The delays explored

Seven delays were investigated in the studies presented in Table 3. Among these, diagnostic delay was the most frequently examined (7 studies), followed by patient delay (4 studies), and then system delay and treatment initiation delay (2 studies each). The remaining delays were investigated in individual studies (1 study). The median of patient delay ranged from 6 to 223 days among the studies included in the review (Table 4). The high standard deviations relative to the means associated with system delay indicate substantial variability in the data. In the work of Hind Mimouni et al. [17], specifically, a standard deviation of 337 days suggests a highly heterogeneous dataset, which may necessitate further investigation to identify any underlying factors or patterns influencing the delays (Table 5).

In the studies conducted by A. Maghous et al. [14] and Ann A. Soliman et al. [15], all participants were diagnosed at a late stage .

In contrast, in the studies conducted by B. Benbakhta et al. [16] and Hind Mimouni et al. [17], 46% (n=200) and 44.7% (n=410) of the participants, respectively, were diagnosed at a late stage (T3 or T4 or metastatic) . For the remaining studies included in the review, insufficient data were provided to classify the stage at diagnosis.

Factors related to patient delay

Numerous barriers impacting patient delays are categorized and summarized in Table 4.

These barriers are classified into five main categories:

-Accessibility to health services: Socioeconomic and geographic factors.

- Educational and awareness barriers.

-Cultural and traditional beliefs.

-Psychosocial factors.

-Factors related to the healthcare system.

Barriers

Accessibility to health services: Socioeconomic and Geographic Factors

Accessibility to health services significantly contributes to delays in seeking medical care, thereby impacting timely diagnosis. A lack of financial resources [18] and financial constraints [16] constitute key barriers that impede patients from accessing necessary healthcare services. The socioeconomic status is considered a barrier to accessing healthcare services [15, 16].

Geographic accessibility, such as living in rural areas

Table 4. Key Findings on Patient Delay

Patient Delay			
Author of study	Median and or Mean	Stade at diagnosis	Associated factors
Sofia Aloulou et al. (2015)	Mean 8,47 months	I.D.	Barriers : The lack of financial resources was reported by 76.92% of individuals who experienced a diagnostic delay of more than 6 months, compared to 23.07% of those with a delay of less than 6 months. The distance from healthcare facilities issues was reported by 46,66% of individuals who experienced a diagnostic delay of more than 6 months, compared to 53,33% of those with a delay of less than 6 months. Sociocultural habits favoring traditional treatments as a first option was reported by 53,84% of individuals who experienced a diagnostic delay of more than 6 months, compared to 46,15% of those with a delay of less than 6 months. Insufficient therapeutic care was reported by 55,55% of individuals who experienced a diagnostic delay of more than 6 months, compared to 44,44% of those with a delay of less than 6 months. Diagnostic errors was reported by 75% of individuals who experienced a diagnostic delay of more than 6 months, compared to 25% of those with a delay of less than 6 months. The Fear was reported by 60% of individuals who experienced a diagnostic delay of more than 6 months, compared to 40% of those with a delay of less than 6 months. Facilitators : N/A
A. Maghous et al. (2016)	Median 6[4, 12] months 223 day*	Late	Barriers : Symptoms not attributed to cancer (were reported in 55.9% of the study population.) Lack of information (were reported in 41.5% of the study population.) Symptoms related to breastfeeding (were reported in 10.2% of the study population) Symptoms related to a benign breast condition (were reported in 4.2% of the study population) Use of traditional methods (were reported in12.7% of the study population) Fear of cancer diagnosis and/or treatment (11.9% of the study population) Financial constraints (were reported in 6.8%of the study population) Competing life priorities (were reported in 6.8% of the study population) Embarrassment regarding breast examination (5.9% of the study population) * Population of the study : patients with advanced satge Facilitators : N/A
Ann A. Soliman et al. (2018)	N/A	Late	Barriers : High financial cost (treatment costs) Vulnerable socioeconomic status Distance between home and specialized center (the longer the distance, the higher the likelihood of late presentation) Appointment delays Misdiagnosis at the first contact with frontline professionals (health centers) Misassurance by professionals to avoid alarming patients Community beliefs about disease etiology The role of a woman (especially a mother, concerns of women about the impact on their children and husbands) strongly influenced the way and timing of seeking medical care Cultural ideas such as motherhood, female individuality, and femininity Fear of postoperative social reception leading to isolation Ignorance of symptoms and signs related to breast cancer Modesty of society preventing discussion of apparent signs and symptoms Painless nature of the symptoms Fear of death Fear of diagnostic results Facilitators : N/A

Abbreviation: N/A, not applicable, I.D., insufficient data.

Table 4. Continued

Patient Delay			
Author of study	Median and or Mean	Stade at diagnosis	Associated factors
B. Benbakhta et al. (2015)	Median 65 [31–121] days Mean 94,97 sd 71,80 day	late for 46%	Barriers : Living in a rural area is associated with a 3.00 times higher likelihood of experiencing a delay of 65 days or more compared to living in an urban area ($p < 0.05$) Law education level [Individuals illetrete and with primary, education are respectively 4.90 and 4.51 times more likely to experience a delay of 65 days or more compared to those with secondary/university education (ORa) = 4.51 (95% CI: 1.50–4.70),p=0.03, (ORa)=4.90 (95% CI: 2.50–6.30), p<0.001]. Law Socioeconomic status (Individuals with a low socioeconomic status are 7,60 times more likely to experience a delay of 65 days or more compared to those with a medium socioeconomic status. (ORa) = 7,60 (2,24–25,77)p<0.05).) Absence of a Family history of cancer (Individuals without a family history of cancer are 2.11 times more likely to experience a delay of 65 days or more compared to those with a family history of cancer.)ORa=2.11 (95% CI: 1.10–4.16), p=0.04. Lack of knowledge of breast self-examination (the individuals without knowledge of self-examination are 11,51 times more likely to experience a delay of 65 days or more compared to those how have knowledge of self examination(ORa) = 11.51 (95% CI: 5.18–25.57), p<0.001. * (A patient delay of more than 65 days significantly increased the risk of being diagnosed at an advanced stage ORb = 6,82 ; IC 95% 3,65–12,73)) Facilitators : N/A
Hind Mimouni et al (2022)	Median 6 (1–48) day Mean 6.9 sd 5.4	late for 44,7%	Barriers The Year of diagnosis (Individuals diagnosed in the years 2014 and 2017 are respectively 0.59 and 0.65 times more likely to experience a long delay compared to those diagnosed in other years of the study (Coef = 0.59, P-value = 0.006; Coef = 0.65, P-value = 0.019)). Facilitators N/A
Mouna Hannaoui et al (2022)	Median 90 day Mean 260.8 ± 345	I.D.	Barriers Lower levels of education (especially no qualification) are associated with longer delays p=0.020 Advanced Age (p-value = 0.05, indicating a statistically significant difference in patient delays across different age groups) Facilitators N/A
Nadia Ouzennou et al (2024)	N/A	N/A	Barriers : N/A Facilitators : Factors strongly associated with an intention for early screening: Regular medical consultations (Individuals who have regular medical consultations are 15.3 times more likely to experience timely diagnosis, screening compared to those who do not have regular consultations (OR): 15.295 (95% CI: 6.369–36.731) (P= 0.000) Good knowledge about breast cancer, its factors, diagnosis, symptoms, and screening [Individuals with good knowledge about breast cancer are 8.26 times more likely to experience the timely diagnosis, screening compared to those with poor knowledge. (OR): 8.255 (95% CI: 5.303–12.850)(P= 0.000). Being advised to undergo screening by healthcare professionals or family members (Individuals who receive a recommendation to undergo screening are 3.29 times more likely to undergo early screening compared to those who did not receive such a recommendation. (OR): 3.291 (95% CI: 1.976–5.482)(P= 0.000). Being employed (Individuals involved in professional activities are 2.82 times more likely to undergo early screening compared to those not involved in professional activities.) (OR): 2.820 (95% CI: 1.680–4.733) (P=0.000). Number of children: Number of children has varying effects, with individuals who have 1 or 3 children being more likely to intend to undergo screening. 1 (P=0.013) OR 3.235 CI: 1.285–8.143, 3 OR 2.937 CI : 1.397–6.175 (P= 0.004). The level of education (individuals with illiteracy and higher education are 1.93 and 2.74 times more likely to intend to undergo screening, while those with primary education illiteracy OR 1.931 CI: 1.068–3.492 (P= 0.030) Higher education level OR : 2.748 CI: 1.208–6.251 (P=0.016)

Abbreviation: N/A, not applicable, I.D., insufficient data.

Table 5. Key Findings on System Delay

System Delay			
Author of study	Median and or Mean	Stade at diagnosis	Factors Associated
A. Maghous et al. (2016)	N/A	Late	Barriers Negative breast physical examination (was reported in 24.4% of the study population) Non-specific medical treatment without follow-up (was reported in 19.5%) of the study population Negative fine-needle biopsy (was reported in 19.5%) of the study population) Appointment delay (was reported in 19.5%) of the study population) Misinterpreted mammography (was reported in 9.8% of the study population) Surgical excision without pathological examination (was reported in 2.4% of the study population) Lack of information (was reported in 4.9% of the study population) * Population of the study : patients with advanced satge Facilitators N/A
B. Benbakhta et al. (2015)	Median 50 [29–77] days Mean 66,70 sd 54 days	late for 46%	Barriers Advanced age (Individuals aged 65 and older have a significantly longer system delay and are about 2.5 times more likely to experience a delay of 50 days or more compared to those younger than 65 years. ORa=2,51 CI: (1,50–11,42) P=0,04. long Distance to the diagnostic site (Individuals living 100 km or more from the diagnosis site have a significantly longer health system delay and are about 2.5 times more likely to experience a delay of 50 days or more compared to those living less than 100 km away.) ORa=2,58 CI: (1,12–3,56) P=0,04. low socioeconomic status (Individuals with a low socioeconomic status have a significantly longer system delay and are about 2.5 times more likely to experience a delay of 50 days or more compared to those with a medium socioeconomic status.) ORa=2,59 CI: (1,04–6,50) P=0,04. Having three or more consultations before diagnosis. (Individuals who had three or more consultations before their diagnosis have a significantly longer system delay and are about 11 times more likely to experience a delay of 50 days or more compared to those who had one to two consultations.) ORa=11,27 CI: (4,12–28,34) P < 0,001 Facilitators N/A
Hind Mimouni and al (2022)	Median 97 day (1–2950) Mean 178 sd 337	late for 44,7%	Barriers Age (Individuals aged under 34, between 35–44, and between 45–54 years, are respectively 3.34, 5.61 and 2.10 times more likely to experience a long delay compared to those in the 55–64 year reference group. (Coef=3.34 P-value=0.032)(Coef=5.610 P-value=0.000) (Coef=2.10 P-value=0.047)). Consultations with general practitioners (Individuals consulting a general practitioner are 2.12 times more likely to experience a long System delay compared to those consulting a specialist. (Coef=2.12, P-value=0.016). Absence of family history of breast cancer (Individuals with no family history of cancer are 2.22 times more likely to experience a long System delay compared to those with a family history of cancer. (Coef=2.22, P-value=0.051) Facilitators N/A
Mouna Hannaoui et al (2022)	Median 10 days Mean 21.6 ± 26.6 day	I.D.	Barriers A low Socioeconomic status (Individuals with a very low socioeconomic status experience significantly longer delays in histological diagnosis compared to those with low or medium status). (P=0.004), Mann–Whitney U Test (N= 58, U= 181.500, p = 0.001). The level of education (Individuals with no qualifications experience significantly longer system delays (432.67 days) compared to those with primary school education (212.88 days) and higher education (322.4 days), with p=0.026. Significance: Mann–Whitney U Test (N=58, U=260.500, p = .009) for No qualification vs Primary school; Mann–Whitney U Test (N=37, U=32.000, p = .032) for No qualification vs Higher education. The type of referent is significantly associated with system delay, with patients as the referent experiencing the shortest delays. p-value = 0.014. Significance: Mann–Whitney U Test (N=33, U=17.500, p = .006) for Patient vs. Hospital; Mann–Whitney U Test (N=29, U=5.000, p = 0.001) for Patient vs. Health staff; Mann–Whitney U Test (N=29, U=10.000, p = 0.003) for Patient vs. Association. Facilitators N/A

Abbreviation: N/A, not applicable, I.D., insufficient data.

Table 6. NIH Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies

Author/ Reference	Was the research question or objective in this paper clearly stated?	Was the study population clearly specified and defined?	Was the participation rate of eligible persons at least 50%?	Were all the subjects selected or recruited from the same or similar populations (including the same time period)? Were inclusion and exclusion criteria for being in the study prespecified and applied uniformly to all participants?	Was a sample size justification, power description, or variance and effect estimates provided?	For the analyses in this paper, were the exposure(s) of interest measured prior to the outcome(s) being measured?	Was the timeframe sufficient so that one could reasonably expect to see an association between exposure and outcome if it existed?	For exposures that can vary in amount or level, did the study examine different levels of the exposure as related to the outcome (e.g., categories of exposure, or exposure measured as continuous variable)?	Were the exposure measures (independent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?	Was the exposure(s) assessed more than once over time?	Were the outcome measures (dependent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?	Were the outcome assessors blinded to the exposure status of participants?	Was loss to follow-up after baseline 20% or less?	Were key potential confounding variables measured and adjusted statistically for their impact on the relationship between exposure(s) and outcome(s)?	Overall
Sofia Aloulou et al. (2015)	Yes	Yes	Yes	Yes	No	NA	NA	NA	NA	NA	Yes	NA	NA	No	Fair
A. Maghous et al. (2016)	Yes	Yes	Yes	Yes	No	NA	NA	NA	NA	NA	Yes	NA	NA	Yes	Good
B. Benbakhta et al. (2015)	Yes	Yes	Yes	Yes	No	NA	NA	NA	NA	NA	Yes	NA	NA	Yes	Good
H. Mimouni et al (2022)	Yes	Yes	Yes	Yes	Yes	NA	NA	NA	NA	NA	Yes	NA	NA	Yes	Good
M. Hannaoui et al (2022)	Yes	Yes	Yes	Yes	No	NA	NA	NA	NA	NA	Yes	NA	NA	Yes	Good
N. Ouzennou et al (2024)	Yes	Yes	NA	Yes	Yes	NA	NA	NA	NA	NA	Yes	NA	NA	Yes	Good

[16] with a large distance from healthcare institutions [15, 18], reduces the ability to access healthcare services.

The level of education and Awareness about BC

A low level of education, such as being illiterate or having only primary schooling, is correlated with a low level of awareness about alarming signs and symptoms, leading to misinterpretation issues and a low level of practice of breast self-examination (BSE) [14-16]. Having a family history of breast cancer positively affects the patient's delay [16].

Cultural and Traditional Practices

Sofia Aloulou [18] and A. Maghous [14] highlight, respectively, that 20% (n=130) and 12.7% (n=137) of the participants in their studies prioritized traditional treatments and practices as their primary treatment option [15].

Psychosocial Factors

In the work of Sofia Aloulou [18], the fear of being diagnosed with cancer, along with associated issues and competing life priorities, was mentioned as a barrier to seeking healthcare services. Similar findings were highlighted in the work of A. Maghous et al.[14], where an aspect of embarrassment regarding breast examinations was reported by 5.9% (n=137) of participants [14, 15, 18].

Healthcare System

The healthcare system factors were illustrated by an inadequate therapeutic strategy reported by 7% (n=130) in the work of Aloulou et al. [18]. Furthermore, issues related to the diagnosis process, such as misdiagnosis and misinterpretation of symptoms, were reported by a few participants: 6% (n=130) and 4.2% (n=137), respectively, in the works of S. Aloulou [18] and A. Maghous [14, 15].

Facilitators

Regular medical consultations and comprehensive knowledge about BC, encompassing its risk factors, diagnosis, symptoms, and screening methods, exhibit strong correlation with a positive attitude toward screening intentions. Recommendations from healthcare professionals or family members also exert substantial influence.

Furthermore, employment status and the number of children specifically having at least one but no more than three (P = 0.013 for one child; P = 0.004 for three children) are associated with increased screening intentions [19].

Factors Related to System Delay in Breast Cancer Diagnosis

Numerous barriers impacting system delays are categorized and summarized in Table 5. These barriers are classified into two main categories: healthcare system factors and patient characteristics. The healthcare system factors are further divided into three subgroups: diagnostic challenges, treatment-related issues, and access and information barriers.

Barriers

Healthcare System Factors

Diagnostic Challenges

Research has identified several factors contributing to these difficulties. A study included in the review reported that 24.4% (n=130) of cases exhibited negative breast physical examinations, potentially fostering a false sense of security [14]. Furthermore, 19.5% (n=130) of patients presented with negative fine-needle biopsies, which may lead to overlooked diagnoses [14].

9.8% (n=130) of the participants in the study of A. Maghous et al. (2016) were affected by the misinterpretation of mammography [14]. furthermore, visiting in first presentation toward general practitioners may expose the patient to substantial delays [15, 17].

Treatment-Related Issues

Receiving non-specific medical care and performing a surgical excision without conducting a pathological examination were the main issues related to therapeutic strategies, reported by 19.5% (n=130) and 2.4% (n=130) of the studied population in the work of A. Maghous [14].

Access and Information Barriers

Maghous et al. [14] in his work report that (19.5%) (n=130) of the participants faced an appointment delay. In addition of a lack of communication regarding available diagnostic pathway and process of treatment was highlighted by 4.9 % of the studied population .

The involvement of diverse stakeholders including patients, healthcare institution, healthcare workers, and professional associations was associated with delays in patient care, highlighting the emergency needs for enhanced communication and support strategies and procedures [20].

Patient Characteristics

Individuals residing more than 100 km away from diagnostic facilities may encounter logistical challenges that impede their access to care. Moreover, low socioeconomic status is often associated with limited healthcare resources, which can result in delays in diagnosis and treatment [16, 20]. Additionally, the absence of familial breast cancer history may reduce awareness of risk, leading to reduced vigilance in pursuing timely screenings or medical consultations [17]. Age has also been identified as a factor contributing to increased delays in the healthcare system [16, 17].

Quality of papers reviewed

We assessed the majority of the studies as being of good quality based on the NIH study quality assessment tools for Observational Cohort and Cross-Sectional Studies (Table 6). The qualitative study was of high quality based on the CASP checklists (Table 6 Bis.). These studies provided comprehensive details regarding their design and methodology, participant recruitment processes, study settings, and delivered clear and thorough presentations of their findings. Consequently, they were unlikely to compromise the reliability and validity of the results.

Discussion

This review aimed to summarize the factors influencing both patient and system delays among women with breast cancer in Morocco. A qualitative synthesis of studies identified 45 factors, consisting of 43 barriers and 2 facilitators. The factors related to system delays include Access and Information Barriers, Diagnostic Challenges, Treatment-Related Issues, and patient characteristics. In contrast, the factors associated with patient delays pertain to Socioeconomic and Geographic Factors, Educational and Awareness Barriers, Cultural and Traditional Beliefs, Psychosocial Factors, and Healthcare System issues.

Factors related to patient delay

Accessibility factors

Living in rural areas or at a significant distance from specialized care was a notable predictor of longer patient delays in our review. These findings are consistent with those reported in the work of Benoit Conti et al. [21], which showed that women with high levels of geographic access considering factors such as travel distance, time distance, and spatial modeling based on population demand and healthcare availability had a statistically significant higher rate of cancer screenings in one study (out of four). They were also diagnosed at earlier stages of cancer (n = 8 out of 17) and underwent fewer mastectomies (n = 4 out of 6) compared to women with lower levels of geographic access [21].

The high costs associated with medication and treatment, along with low socioeconomic status, are identified as significant factors contributing to patient delays in diagnosis. These findings align with other studies in the literature [22-24].

Education and awareness barriers

The results of our review indicate that a low education level, along with the lack of breast self-examination (BSE) practice, may be a potential predictor for delayed presentation. Similar studies in the literature confirm these findings [25-27].

Raising awareness about breast cancer through health education is crucial for enhancing women's health and saving lives. This effort is essential for achieving a significant reduction in the future incidence of breast cancer [27-32].

In our review, we found that the absence of a family history of BC can influence the likelihood of early medical presentation, serving as a factor in patient delays. Research by Jane A. Buxton et al. [33] and Kami J. Silk et al. [34] highlights that woman often base their perception of risk on their family history of breast cancer.

Cultural and Traditional Beliefs

A significant proportion of women prefer using traditional methods initially. This preference was highlighted in two studies included in the review and is consistent with numerous studies identifying the prior use of unconventional and alternative therapies as a significant factor contributing to delays in seeking medical advice [29, 35-39].

Psychosocial Factors

The fear of a cancer diagnosis and treatment, partner abandonment, disfigurement from surgery, and social isolation are significant reasons for late presentation and limited access to healthcare services, according to numerous studies conducted [39–45].

Healthcare system Factors related to delay in presentation, diagnosis and treatment of breast cancer

Inefficient organization in health service delivery has contributed to longer waiting times for various procedures, such as biopsies, consultations, surgery appointments, and referrals. This issue is primarily linked to misdiagnosis, mismanagement, misinterpretation, and prolonged intervals in primary care. Additionally, geographical barriers and high costs have been significant obstacles to accessing care.

Financial and Geographic Accessibility

The presented findings offer a credible representation of the phenomenon under examination. These results are substantiated by quantitative and mixed-methods investigations, predominantly assessed as high-quality studies.

The observed outcomes align with those reported in a recently systematic review by Nathan R. Brand et al. focusing on low- and middle-income countries (LMICs). Their analysis, encompassing 92 breast cancer studies, revealed that 10 studies identified diminished access to primary care, 6 noted constrained access to diagnostic services, and 14 highlighted geographic inaccessibility as significant health system factors [46].

Comparable results have emerged from studies conducted in various African contexts [47, 48, 49]. These insights emphasize the necessity for policymakers to implement targeted measures to enhance the accessibility and quality of breast cancer screening services.

Mis management or diagnoses challenges

Our review identified diagnostic challenges as significant contributors to prolonged system and patient delays. Notably, these challenges encompass diagnostic errors and suboptimal care, particularly during the initial encounter with healthcare providers.

Unger-Saldaña K.'s critical analysis revealed that medical errors in preliminary diagnosis, interpretation of screening results, and pathology assessments were associated with deficiencies in access to or quality of care. These factors influenced diagnostic and treatment timelines across diverse nations, including the United States, England, Thailand, Scotland, Netherlands, Canada, and Mexico [50]. Similar findings were observed in research conducted within African countries [48, 49 , 51-53].

These alarming revelations should stimulate healthcare professionals and policymakers to emphasize the importance of comprehensive and continuous medical education in breast cancer management.

Financial and cost issues

In relation to financing factors, our review highlighted the potential influence of treatment costs and socioeconomic status. These findings align with the results of a review conducted in the Middle East and North Africa (MENA) region [54] and with a comparable study conducted in several African countries [49-50, 55].

Lack of information

The lack of access to information, such as diagnostic pathways, affects the delays and was identified as a barrier in our review. In the work of C. Pomaa Akuoko et al., the unawareness of appropriate facilities and procedures for accessing health services related to breast cancer was highlighted in 4 studies [56].

Strengths and limitations of this review

The studies included in this review predominantly demonstrated sound methodological rigor. However, this review also exhibits certain limitations. Notably, the restricted number of databases consulted may limit access to the entirety of available articles. Furthermore, the exclusion of grey literature does not preclude the risk of publication bias.

Additionally, the inclusion criteria in the majority of studies incorporated in the review, which encompassed only women who successfully accessed healthcare facilities and received a diagnosis, further limit the representativeness and generalizability of the results.

Despite the heterogeneity observed in defining and quantifying different time intervals, it did not diminish the significance of the identified factors or detract from our primary objective, which was to identify any factors influencing women's access to diagnosis and treatment.

Implications for health system research and health policies

Despite the methodological limitations found in some studies, our review highlights the need for developing effective BC policies. These policies should focus on reducing financial and geographical barriers to access, improving health service delivery management to ensure the availability and quality of timely screening services, and providing specialized and comprehensive care for BC.

Furthermore, effort should be directed towards continuing education and formative supervision for frontline health workers.

A comprehensive initiative must be implemented regarding health education, particularly targeting populations at high risk of breast cancer. Social media platforms should be utilized to enhance awareness and knowledge among the general population, promoting health-promoting behaviors and advocating for regular breast self-examinations.

These results highlight the urgent need for policymakers and decision-makers to adopt and prioritize preventive measures and public health interventions in order to reduce incidence rates.

Moreover, an effective intervention must be planned to promote information about screening programs, the care pathway, and administrative facilities related to breast cancer. This intervention should be conceived with a comprehensive global approach, incorporating behavioral theories, public marketing strategies, and essential elements of social intervention to ensure maximum effectiveness of outcomes.

In conclusion, our review reports the barriers and facilitators that influence the patient and the system delay in Morocco. The low socioeconomic status, the low level of education and awareness toward breast cancer were the major factors impacting the bout of delays.

Educational intervention is needed to be implemented in order to enhance Moroccan women's knowledge related breast cancer, the benefits of early diagnosis, and promoting the attitude of performing BSE, as an effective approach.

Author Contribution Statement

All authors jointly contributed to the conceptualization and methodology of this systematic review. Mohammed Sbabou and Karima Bendahhou conducted the literature search, study screening, data extraction, validation, and formal analysis. Mohammed Sbabou and Karima Bendahhou drafted the manuscript. All authors critically revised the intellectual content and approved the final version of the manuscript.

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None.

Ethical Declaration

As a systematic review of publicly available published literature, this study did not involve human participants, animal experimentation, or primary data collection, therefore no ethical permission was required for the study.

Data Availability

All data supporting this systematic review are included in the manuscript, supplementary materials, or cited primary studies. Additional details regarding the analyzed datasets can be obtained from the corresponding author upon reasonable request.

Conflict of Interest

All authors declare no financial, professional, or personal conflicts of interest that could influence the design, execution, or interpretation of this research.

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