

## Breast Cancer Diagnosis Among Mexican Participants: A Qualitative Study

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**Abstract**

**Objective:** We aimed to describe the timely perceived diagnosis of Breast Cancer (BC) among fifteen participants living in western Mexico, as well as both the time points and intervals for diagnosing BC. **Design:** A qualitative study with a phenomenological approach was conducted. **Site:** Instituto Jalisciense de Cancerología (Cancer Institute of Jalisco, IJC per the Spanish acronym), a tertiary care hospital for cancer patients run by the Ministry of Health of the State of Jalisco, Mexico, located in the city of Guadalajara, which is the capital of the state. **Participants:** fifteen female participants living in the state of Jalisco and whose histopathological diagnosis of BC was made at IJC during the 2013-2017 period. **Methods:** semi-structured interviews were conducted. The ATLAS.ti program was used for content analysis. **Results:** twelve participants received a late diagnosis (stages IIB-IV). However, they considered that their diagnoses were timely. Most of the participants stated they perceived a positive timely diagnosis, because they considered that being alive is attributable to a timely diagnosis, which is related to seeking medical care quickly and the work and procedures made by the health professionals. **Conclusions:** the perception of the female participants regarding the diagnosis timeliness can be quite different from that of the clinical stage made by the doctors. A combination of beliefs, culture, inequities in access and quality of health services, as well as the fear of having BC contributed to increase the time spent when seeking and receiving medical care. Thus, health education for early BC diagnosis is strongly recommended.

**Keywords:** Breast Cancer; Screening and Prevention; lived Experience; Access to Health Care; Timely Diagnosis.

**Introduction**

In Mexico, Breast Cancer (BC) has posed a health issue for patients, particularly those in reproductive or advanced life stages. In 2014, BC represented 15.3% of all malignant neoplasms among patients in Mexico, with a mortality rate of 17.9 per 100,000 participants over the age of 20, as estimated by Reynoso & Torres [1, 2]. Early diagnosis has proven to be one of the most effective secondary prevention measures to treat BC timely and is now considered one of the most important prognostic criteria for survival [3, 4]. However, those participants who practice periodic

self-examination of their breasts and identify abnormalities have a greater chance of being diagnosed at an early stage of the disease if they visit their health services immediately.

The Official Mexican Regulation SSA-041-2011-2 for prevention, diagnosis, treatment, control, and epidemiological surveillance of BC (OMR-041) points out that a definitive diagnosis can only be made by a histopathological study and its correlation with the clinical manifestations [5]. This document states that an early diagnosis occurs when the result of the histopathological test of

a breast abnormality, combined with clinical signs and symptoms that are identified by the treating physician, scores a clinical stage of IIA or lower. A IIB clinical stage or higher is considered late diagnosis, which is the case of Mexico where 6 out of 10 participants are diagnosed with BC in this stage [2]. Thus, a late diagnosis and a survival prognosis of less than 5 years are expected when there is a time-lapse of more than three months between the first symptom discovered by the patient and the treatment initiation [6].

Despite these claims, patients who are actually diagnosed with BC may have a different perception regarding the process of BC diagnosis, its early or delayed diagnosis and the consecutive care they received [7]. Therefore, it is important to know how they explain timeliness when getting a clinical diagnosis regardless of the stage or place of residence. Other events experienced by patients and how they perceive those experiences inspired this study and, together with Webber et al.'s delay intervals are the basis for this analysis. Also, there is evidence that the delay in diagnosis and treatment for this disease affects mostly patients living in developing countries or rural areas. Regarding this point, Sanchez et al. suggest the premise that a higher level of information or better access to the means to deal with these gaps could improve the chance to get a timely diagnosis and receive the appropriate treatment [8-10].

Therefore, this paper is aimed at dealing with the following aspects: a) defining and explaining BC Perceived Timely Diagnosis (PTD) of participants living in western Mexico, b) describing the time points and intervals for BC diagnosis, and c) explaining the relationships between the PTD, intervals, care-seeking and diagnosis actions.

## Methods

In 2017 both the University of Guadalajara and Instituto Jalisciense de Cancerología (Cancer Institute of Jalisco, IJC per the Spanish acronym) conducted mixed methods research to identify the elements that related BC care-seeking to health service accessibility for participants in western Mexico. The quantitative phase results have been already published elsewhere [11]. On the other hand, the qualitative phase of the study aimed to explore the opinions of those participants about the current accessibility to BC health services [12]. Also, and according to Olesen et al.'s diagnosis and care delay model [13], we explored the time they spent seeking initial care and the time elapsed until the definitive diagnosis.

## Diagnosis and Care Delay Model

According to this model, two intervals consume most of the time and define the elapsed time between the onset of symptoms and treatment initiation for any disease: the interval attributable to the patient and the interval attributable to diagnosis. In the case of BC, three months is the time frame that must be kept to avoid late diagnosis or reduce the chances of survival [6, 13].

Webber et al. have identified three delay intervals: a) the one attributable to the patient, which begins when the person perceives

the initial symptoms of some disease and ends when visiting the family physician for the first time; b) the delay interval attributable to the diagnosis, which starts when the individual first visits his or her family physician to address his or her problem and ends when the definitive diagnosis is made [9]. This interval includes the initial consultation, laboratory and image studies, subsequent consultations, referral to a secondary or tertiary hospital, as well as confirmatory studies that lead to a definitive diagnosis by the treating physician; c) the third delay interval is attributable to treatment, which begins from the moment the definitive diagnosis is made until the moment the specific treatment for the disease begins. Patient and diagnosis delay intervals may decrease the probabilities of receiving an early cancer diagnosis, and consequently their survival chances may increase if patients are provided with prevention measures via health education so that they can take actions when they find any atypical BC symptoms, according to the Mexican health regulations [5].

## Participants and Study Area

The findings presented here are the result of the qualitative phase of a mixed sequential study [14] to identify statistical clusters of BC in the state of Jalisco. In this phase we explored the experiences of Mexican patients who received an early or late breast cancer diagnosis.

This study was carried out at IJC, which is a tertiary hospital for cancer patients run by the Ministry of Health of the State of Jalisco, Mexico, and it is located in the city of Guadalajara, capital of the state. This study was conducted in line with the principles of the Declaration of Helsinki, and was approved by the research and ethics committees of the Institute under the registry number PRO-12/16. It was also registered and approved by the research and ethics committees of University of Guadalajara in 2017 under the registry number CI-03920.

Participants were randomly selected from 2,385 records of users treated for BC at the IJC during a five-year period (2013-2017). However, the quantitative analysis of these bigger group has also been analyzed to obtain a better understanding of the problem, because they represent a wider range of ages, socioeconomic status and educational level. The comparative analysis of the two phases is currently in process.

By calculating a probabilistic representative sample from our study universe, 120 records were reviewed to meet the following criteria: a) their current address was within the limits of the State of Jalisco at the time of diagnosis, b) being diagnosed between 2013 and 2017 under the criteria of the OMR-041 and the National Comprehensive Cancer Network, c) had survived until the time of the study, and d) were still registered at IJC at the time of the study. 110 participants met these criteria.

First contact with the 110 selected participants was made after checking that they had a follow-up appointment with an oncologist at IJC between January and March 2018. We contacted them at the waiting room. Then, they were informed about the study and

asked to meet us in another area of the Institute after they had finished their appointment so that we could explain in private the goals of the study and invite them to participate. As a result, 21 participants agreed to participate and accepted a home visit over the next few weeks. Their contact information and addresses were registered and we told them that they would receive a phone call to confirm the date of our visit. For the study, we also sought participants who lived in one of the 13 health regions in which the State of Jalisco is divided, so that the results would represent the situation across the state. We called the participants to schedule the visits during the period from March to November 2018. Six of them were not interviewed, because they were not at home on the visit day, or they refused to be interviewed at that moment. Thus, we interviewed 15 participants according to our schedule. They were interviewed at their homes and asked to be accompanied by a relative or trusted person during the interview. Once again, they were informed of the objectives and procedures of the study and asked to sign an informed consent, which was obtained from all participants in this study.

A semi-structured guide for in-depth interviews was designed and validated prior to the study. Two researchers elaborated a pilot test to create and validate content with a small sampling that included six participants from the Institute, which led to adjustments on

the guide. On the other hand, a non-participant observation guide was also designed to collect non-verbal information during the interviews. Interviews had an average duration of two hours. All interviews were audio-recorded. To carry out the interviews, 11 municipalities in the state of Jalisco were visited.

The ATLAS.ti program was used for content analysis and according to the phenomenological approach. Thus, two researchers first analyzed the independent reproduction of the interviews, then we contrasted and identified the topics we found using the care delay model. We also followed the Aarhus statement to improve the design and report of studies on early cancer diagnosis to describe our findings [15].

## Results

The cancer condition of the 15 participants who completed the study began sometime between 2008 and 2015. The demographic and clinical characteristics of our participants are presented in Table 1. Their diagnoses was given on average seven months after the initial symptoms. However, one of the participants was diagnosed only nine days after she detected the abnormality, while the participant who took the longest time spent 740 days to get a diagnosis.

Number of participants	15
Average age ( <i>Std. dev.</i> )	58.6 years (12.6)
Min and Max age ( <i>Range</i> )	40-79 years (39)
Marital status	
Married	12 (80.0%)
Single, widow, divorced	3 (20.0%)
Clinical stage at diagnosis ( <i>Type of Diagnosis</i> )	
0-IIA ( <i>Early diagnosis</i> )	3 (20.0%)
IIB-IV ( <i>Late diagnosis</i> )	12 (80.0%)

Source: Data obtained from interviews.

**Table 1. Demographic and clinical data of the fifteen participants with diagnosis of breast cancer (BC).**

## Definition and Explanations about Breast Cancer (BC) and Perceived Timely Diagnosis (PTD)

The participants perceived the timeliness of their BC diagnosis based on the clinical stage definition, the resulting TOD, and the BIRADS (Breast Imaging Reporting and Data System) report.

At the time of their BC diagnoses, 14 participants stated that they had practiced periodic self-examination and visited their physicians. However, not all of them underwent a screening

mammogram as suggested by the OMR [5]. According to the medical records of IJC, twelve (80%) participants received a late TOD, whereas only three (20%) received an early TOD.

When asked if they considered that their BC diagnoses were given in a timely manner, twelve (80%) answered affirmatively (positive PTD), while only three answered negatively (negative PTD). Nevertheless, we observed that, regardless of their specific PTD, twelve (80%) received a late TOD (see Table 2).

Participant	BIRADS	Clinical stage	TOD	PTD
PA	4	IA	Early	Timely
PB	4	IA	Early	Timely
PC	5	IIA	Early	Timely
PD	0	IIB	Late	Timely
PE	5	IIB	Late	Timely
PF	4	IIIA	Late	Timely
PH	4	IIIA	Late	Timely
PI	5	IIIA	Late	Timely
PJ	5	IIIA	Late	Not Timely
PK	5	IIIA	Late	Timely
PL	0	IIIB	Late	Timely
PM	4	IIIB	Late	Timely
PN	5	IIIB	Late	Timely
PO	4	IIIC	Late	Not Timely
PQ	5	IIIC	Late	Not Timely

Source: Data obtained from interviews.

**Table 2. Breast cancer (BC) clinical stage, Type of Diagnosis (TOD) and Perceived Timely Diagnosis (PTD) of the fifteen participants.**

The twelve participants with a positive PTD thought that BC developed very quickly and the time they had spent to decide if they would visit the doctor played a key role for their control and survival. In this regard, PE (62 years) pointed out the following: “It is a silent disease; you don’t feel it, so you don’t visit the doctor. When you finally feel something, you visit the doctor, but then the disease has already spread out.” Three participants that received a late TOD, according to the medical records, also had a negative PTD because, as they said, they had let pass a long time between the first symptom and their first appointment for medical care, and they did not pay much attention to the initial symptoms, so they put off visiting the doctor. For example, PO (52 years) said: “[...] I regret not doing it on time because the doctor told me that if I had visited him some days before, I wouldn’t have needed surgery and all of this could have been avoided just with medicine; but I let pass a long time, six or seven months.” Three participants went through a different, but better situation. They received an early TOD and expressed a positive PTD. Given that they had sought medical attention almost immediately after the onset of the first symptoms, this prevented their tumors from growing or spreading. Besides, medical services were close to their homes, hence, they could visit their physicians really soon, which contributed to getting a timely diagnosis and treatment.

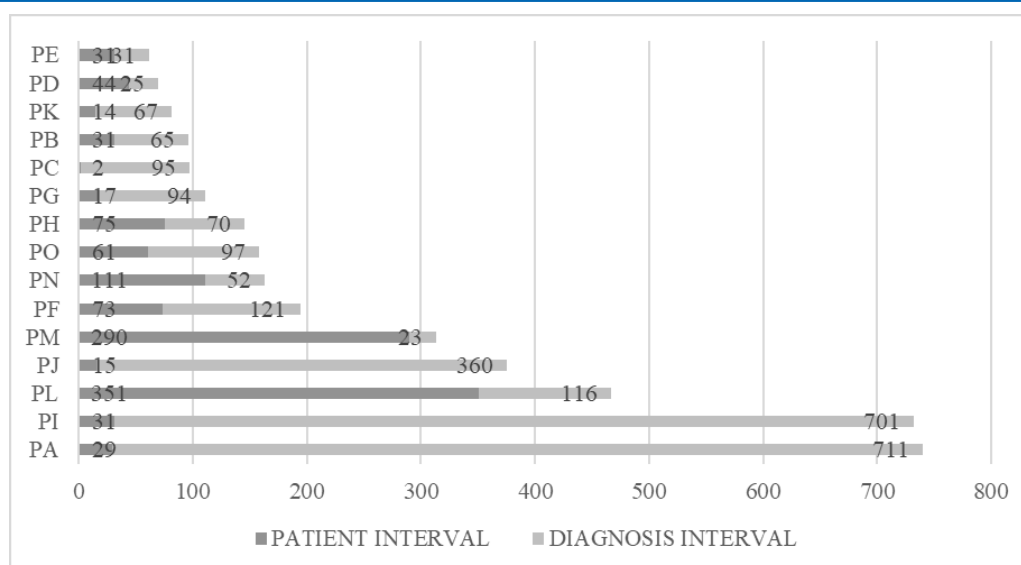
As a group, the narratives of these participants regarding their PTDs allowed us to recognize that receiving a BC diagnosis is an overwhelming experience, as one of our participants explained: “Knowing that I had cancer – because I thought I would not survive – was something dreadful, something exhausting,

disturbing.” (PD, 55 years). There is another element that helped us assess the relationship between the PTD and the TOD, that is the BIRADS report resulting from the screening mammogram. IJC conducts a confirmatory mammography on every woman that starts her BC diagnostic procedures at the institute. However, it is desirable that they are referred to the IJC with a previous screening mammography or ultrasound scan, with a BIRADS report of 4 or 5, which means they should have been referred to an oncologic medical facility for diagnostic procedures within 10 days. Thirteen participants had a BIRADS report of 4 or 5 (Table 2), of which ten received a late TOD and three received an early TOD. This could confirm that all of them had sought medical care in a short period of time. This issue will be addressed later.

Nevertheless, we found a BIRADS report of 0 (zero) in two of our participants; both of them had a late TOD but a positive PTD. This situation is explained by one of them: “It took a long time after the first discomfort began, which was a discharge from my nipple, before they detected it [the BC], because I got tested over and over again and they always told me that it was not cancer. But, if they had let me wait longer, maybe I would already be invaded [by cancer]” (P1, 55 years).

#### Time Points and Intervals for Breast Cancer (BC) Diagnosis

Patient and diagnosis intervals mostly represent the time spent by BC participants to receive a first consultation, diagnosis and treatment. Figure 1 shows these time intervals among the participants.



**Figure 1.** Time points and intervals for the diagnosis of breast cancer (BC) in the fifteen participants.

Source: Data obtained from interviews.

Based on the model of Olesen et al., our participants' interviews were analyzed to identify two elements: the time points and the time intervals that occurred in their diagnostic trajectories [13]. According to this model, all our participants waited on average 204 days from the appearance of the first symptom to the diagnosis; however, one of them only needed 62 days, while another waited 740 days to receive her BC diagnosis, as will be described further on this article.

According to the model by Olesen et al., the interviews of participants were analyzed to identify two elements: the time points and the time intervals that occurred during their diagnostic trajectories. All of our participants waited on average 204 days since the appearance of the first symptom until the diagnosis. However, one of them only needed 62 days, while another waited for 740 days to receive her BC diagnosis. This will be explained later [13].

According to the Olesen's et al. model mentioned above, the first time point occurs on the day when a woman perceives a symptom or a bodily change for the first time, or when she needs to deal with the healthcare professional, or when the first alarm symptom is noticed [13, 15]. The dates when our participants felt the first symptom occurred between February 1st, 2008, and February 15th, 2015. Some of them described that experience as follows: "The first thing I noticed was a little ball, which I thought was fat" (PJ, 47 years), or "[...] and then my breast started to hurt so badly, with very strong pangs" (PL, 79 years), which are examples of a sign (lump) or a symptom (pain). But others did not feel any of this, because they found out in a screening mammogram, as PB (54 years) said: "[...] my problem was in the right breast, but what happened is that I felt nothing. A friend came and invited me to practice the examination, [...] after two or three months they called me to notify me that they had found something in my breast."

The second time point is the date of the first medical consultation, which is the moment when the clinician starts investigating the patient's signs, symptoms, history or other risk factors, or when the patient is referred to another level of care to study a possible cancer or other pathologies of the breast [15]. This date is related to the patient interval, which is the time between the date of the first symptom and the date of the first consultation. The dates when our participants first consulted the clinician for investigation occurred between March 1st 2008, and November 1st 2015. However, we found some differences among our participants regarding their patient intervals, because those with an early TOD had a patient interval of 32 days on average, while those with a late TOD had a patient interval of 93 days, which is almost three times that of the former group. That difference is because the three participants in the early TOD group had their first consultation within 39 days after the date of the first symptom, while the late TOD group had their first appointment from 30 to 351 days after the first symptom. On the contrary, PM (76 years) had a very long patient interval of 290 days, as her daughter told us:

"We did not know that my mother had a problem; she bathed alone and knew what she had, but she did not tell my sister or my father. Thus, it had passed a long time before she told us about the cracks and the bleeding or the discharge from her breast. One day, I had to bathe her and I asked her what she had there, we took her for a mammogram and she was given an appointment with the doctor." These two stories are very different and clearly exemplify the situations that can encourage a woman to visit a clinician immediately or hinder her in searching for help due poor knowledge or misconceptions about the disease.

The third time point in these trajectories is the date of diagnosis, which is related to the diagnostic interval. The date of diagnosis is a spectrum or hierarchy of definitions that has been proposed by the European Network of Cancer Registries [cited in 15], ranging



from the date of the first histological or cytological confirmation of this malignancy to the date of diagnosis, or the date of death if the malignancy is discovered by autopsy.

Our participants' date of diagnosis occurred between October 10th, 2010, and November 24th, 2015, and each diagnosis occurred with the first histological confirmation of their malignancies at the IJC. This diagnosis date is also related to the diagnostic interval, which is the elapsed time between the date of the first appointment and the date of diagnosis. Once again, we found a significant difference between the participants with an early TOD, which had an average diagnostic interval of 310 days, and the participants with a late TOD, which had an average diagnostic interval of 239 days. It is surprising to see that the first group had a higher interval average than the late TOD group, when it is expected to be lower. The reason is that two of them had only a 96-day diagnostic interval, while the third one had the highest interval of all our participants, with 740 days. Surprisingly, she received an early TOD with a clinical stage of IIA. She stated the following: "It took a long time before I had the first discomfort, which was a discharge from my breast, and before they had detected it, because they repeated the studies over and over again, and they always told me that it was not cancer. But if they had let me wait longer, perhaps I would already be invaded [by cancer]" (PA, 55 years). On the other hand, those participants that received a late TOD had an average diagnostic interval of 239 days. PO (52 years) explains that she had let time pass because she noticed a lump but did not give it any importance.

As a group, despite having waited on average more time before getting a diagnosis and initiating their treatments, those participants with an early TOD took almost twice the time to get it than the late TOD group. Nevertheless, both groups were far from the recommended time, which should be 90 days or less [5]. However, if we do not include here the two participants who waited for more than 400 days to get their diagnosis (one from each group), we can see that the participants in the early TOD group waited only 95.5 days on average, whereas the late TOD group waited for 218.5 days, revealing that those in the early TOD group are very close to the recommended time limit for early-stage BC diagnosis.

#### *Perceived Timely Diagnosis (PTD), Intervals, Care-Seeking and Diagnosis Actions*

According to the previous findings, participants with a positive and negative PTD (and their relatives) went through their own experiences, which often included different ways when seeking care, thus defining their PTDs and determining patient and diagnostic time intervals.

Twelve participants with positive PTDs spent 229 days on average (7.6 months) for the patient interval, whereas three participants who had negative PTDs spent 351 days on average (11.7 months). That is a difference of 122 days on average. However, this difference was established mostly by the diagnostic interval, because participants with positive PTDs spent only 81 days on average for the patient interval and 148 days for the diagnostic interval, while those with negative PTDs spent only 68 days for

the patient interval, but 283 on average for the diagnostic interval. We found that most participants with positive PTDs reacted almost immediately to the first symptoms and sought care sooner than the other group. For instance, PG (42 years) said:

"One day I felt a sharp pain in my breast. Then, the next day I underwent a mammogram and, with the results at hand, I visited a doctor, who happened to be a friend of mine, on the following day. He examined me and told me that I had to undergo a series of tests to find out whether or not it was cancer." She spent only two days during the patient interval -which was the shortest for our participants-, but on the contrary she spent 95 days to get her diagnosis because of the medical service availability."

However, another participant from the same group had the longest patient interval, more than 350 days, and her diagnostic interval was just 116 days. Her story shows how she was aware of her problem and tried to take care of it, but everyday circumstances hindered her from visiting the doctor for a long period of time. Nevertheless, she had a positive PTD, because she definitely considered that being treated at IJC was essential for her to stay alive.

On the other hand, participants with negative PTDs were not very different from the other group regarding the actions they took to deal with their problems. For example, PO (52 years), who had a 61-day patient interval and a not too long 97-day diagnostic interval. Although she had waited less than 2 months before visiting her doctor, she considered it was a very long time, because she did nothing to take care of the lump in her breast during that period.

The story of PH (54 years) is very surprising, because she had a short patient interval (31 days), but a very long diagnostic interval (701 days). She visited her doctor on time, but the doctor referred her to another city for the screening mammogram. The results were never sent to the doctor, so he requested another clinic for another screening mammogram, but the results were never reported to her. She then went to IJC, where they analyzed her problem and, finally, more than two years later, she received her diagnosis and treatment.

These situations also raise the problem of health service accessibility and availability. Our participants' interviews were analyzed to find accessibility issues, means of transportation, cost, time, distance, problems about the availability and location of clinics, hospitals, laboratory services, as well as availability of doctors and nurses for consultation. These factors affected our participants' actions and the time they waited before visiting a doctor or receiving a diagnosis. This will be discussed in the next section.

#### **Discussion**

Receiving a BC diagnosis may be a shocking experience that unfortunately a lot of participants have to deal with every year [16]. Whether the diagnosis is early or late, the perception of the participants about timeliness can be quite different from that of the clinician, as we found out in our study. Thus, we will discuss the

three topics that were presented in our results.

### Explanations about Breast Cancer PTD

Despite receiving a late diagnosis (stages IIB-IV), twelve participants got a positive PTD. It is clear that our participants considered that being alive was mainly attributable to a timely diagnosis, which is related to seeking medical care quickly [8] and the good work of the doctors, particularly if the service was provided at a public tertiary care facility, which is the case of most of our participants. On the other hand, the three participants with a negative PTD, who also received a late diagnosis, attributed it to four reasons: 1) not paying attention to the symptoms, the same situation found in Bradley's study [17]; 2) putting off the first medical visit, which is related to a lack of information about the consequences of cancer [18]; 3) the fear of the illness [19], which has also been reported as a "death sentence" in the study conducted by Hammoudeh and cols. on Palestinian participants [16]; and, 4) poor service provided by the healthcare system [20] and medical malpractice, a problem that has put participants on trials in the USA, which also is very frequent in Mexico, where it is aggravated by the healthcare system's poor service control.

Another issue is that our findings allowed us to recognize that PTD is not equally measured by physicians and the participants with BC in this study. Medical procedures and survival expectations are related to BC characteristics, which are determined by the clinical assessment, the BIRADS report, and the histopathological results, among other parameters [5], whereas the PTD of BC participants is related to the survival chance and the number and type of interventions they undergo.

### Delay Intervals for BC Diagnosis

Even though an early BC diagnosis (Stages I – IIA) does not guarantee complete recovery from an oncological experience [8], getting an early BC diagnosis from the clinicians can bring comforting news. According to that premise, only three of our participants received an early BC diagnosis, but their diagnosis delay intervals were longer than 90 days, which exceeds the recommendations of the OMR-041 [5]. They were fortunate enough to receive an early BC diagnosis and be treated according to that result.

In contrast, we found that only three of our participants waited for less than 3 months to receive their diagnosis. However, they got a late BC diagnosis. Again, these findings are not in line with what has been suggested by the OMR-041 or the findings by Richards et al. [6], who have reported that delays in diagnosis longer than 3 months were associated with clinical stages IIB or higher. In these three participants, it can be said that each case is different from the rest, perhaps because of their own individual response to cancer and their particular social circumstances or clinical trajectories. For example, we could not specify whether the participants were referred to the IJC because of the BIRADS report, the clinical findings or the dates in the medical records might have been inaccurately registered.

### PTDs, Intervals, and Care-Seeking and Diagnosis Actions

In low-income and low/middle-income countries, problems to access health care services are very frequent, which Sánchez and cols. [10] refer to them as gaps in access to health services. When working with Colombian participants suffering from breast cancer, they recognized that most of these gaps were based on the social determinants of health and, more specifically, on structural and intermediate barriers, such as their socio-economic status, working situation, geographic location of facilities, and the administrative or informative characteristics of the offered services. Our participants also mentioned some of these situations referring to them as the problems they faced to get health care, which affected the patient and diagnosis delay intervals. Additionally, they identified that these barriers interact with the activities that participants performed to have access to health services, which affected their chance of getting diagnosis and treatment [10].

Furthermore, our study found that participants described the effect of "psychological self-barriers" as "fear of medical settings and treatments, delaying medical appointments because work and family commitments are considered a priority, and negative therapeutic experiences" [21]. These types of barriers hinder timely BC diagnosis and treatment, which cannot be explained from a simplistic and isolated point of view. According to that, our participants' thoughts and actions should be considered the result of the influence of their socio-geographical context, their personal experiences, and their relationship with others which, in turn, is reflected on the elapsing time before their first medical visit and the time they must wait to get a diagnosis. This is also influenced by the history of breast cancer among relatives or friends, education on breast health and age [10].

Lawton et al. have reported that there are two types of responsibility notions and blame for the onset and development of diabetes mellitus [22]. According to the perceptions and understanding of individuals undergoing that illness: the internalized responsibility, reflected by those who attribute their illness to their own health actions and lifestyles, and the externalized responsibility, manifested by those who attribute it to external factors, such as family history and occasionally to health services. Thus, our findings showed that regardless of our participants' positive or negative PTDs, most of them attributed the onset of their BC to several types of responsibility, characterized by how fast they reacted to the first symptoms and the problems they faced to get a diagnosis. Finally, it is necessary to point out that our participants considered the economic situation as an important external factor, because they perceived that the treatment for their illness was very expensive, which often reflects the reality of their daily lives.

### Conclusions

In Mexico, the fusion of cultural and social beliefs, gaps in access to health services, differences in service quality, as well as economic restrictions determine how fast a person carries out the entire process when seeking and receiving health care. In the case of breast cancer, the combination of these elements

and participants' fear of having breast cancer often leads to an increase in delay intervals and much longer waiting periods than expected. From a public health point of view, health programs and policies should offer more educational programs for participants (including men) to incorporate breast self-examination and clinical examination practices in their routines. Moreover, those programs should provide information on alarming signals to seek immediate professional help, which is education for internalized responsibility. We propose specific intervention strategies suited to the local context of the 13 state regions, which the Ministry of health should define depending on the human resources they assign to each region for educational purposes, as well as the cultural and religious-ideological beliefs of the communities. Besides, the educational programs might consider community-based awareness programs, training for healthcare professionals on culturally sensitive communication, and improved access to screening services in rural areas. All of them supported with local organizations and digital health platforms to further enhance the reach and impact of these interventions.

Most of the breast cancer control and care programs implemented in Mexico and Latin America consider these issues and establish actions to reduce patient and diagnosis delay intervals. However, the results shown here can help public health authorities understand participants' viewpoint about the problem and correct all the deficiencies in the programs and services, as well as the difficulties they encounter in order to design better programs. But that would require a more extensive study, including participants from different socio-economic status and educational backgrounds, in order to reflect more precisely the educational profiles to develop better oriented programs.

These results will be useful to support decisions about screening, referral, and timely care services. Also, further qualitative studies are necessary to explore the late diagnosis phenomenon and recognize whether the situation has change positively or not, because responsibility does not fall solely on participants suffering from BC. Therefore, the results of the quantitative phase of this study will be contrasted with the results here presented in order to obtain a broader and more exact picture of the problem in our state. If services improve, so will their survival chances.

#### Conflict of interest

The author(s) declare that they have no conflict of interest.

#### Financial conflict of interest

The research did not receive any funding.

Detailed information about individual contributions to the work  
Igor Martín Ramos Herrera: conceptualization, data curation, formal analysis, investigation, methodology, project administration, supervision, validation, writing – original draft preparation, writing review & editing.

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