

DECIPHERING THE CAUSES OF ADVANCED-STAGE DISEASE AT DIAGNOSIS AMONG BREAST CANCER PATIENTS WHO ATTENDED A SUBURBAN HOSPITAL IN BUENOS AIRES

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Abstract

Introduction: Breast cancer is still one of the main causes of cancer mortality in women worldwide, and death rates are even greater in vulnerable populations. A delay in diagnosis usually comes with advanced-stage disease, which impacts patient survival. The aim of this study was to evaluate the time for first medical consultation among women with breast cancer attending the Magdalena V. de Martínez Hospital and to determine the causes that may influence patient delay and its impact on cancer stage at diagnosis.

Materials and methods: Three hundred and six breast cancer patients were interviewed using a self-report questionnaire, and socioeconomic and demographic variables, namely, highest education level completed, employment status and breast cancer awareness, were collected. The answers were associated with patient clinical records, such as clinical staging and tumor size.

Results: Forty-nine percent of the patients were diagnosed with advanced-stage disease. These women had either a deficiency in breast cancer awareness, did not visit a gynecologist after age 40 or, were unemployed, while those patients diagnosed with early-stage breast cancer had nonpalpable tumors, declared a sufficient household income or delayed less than four weeks in seeking medical attention. Moreover, the delay in the first medical visit was more than one month in 78% of the patients, being disregard the most common cause of

postponement. Additionally, patient delays were associated with larger tumors and with incomplete education.

Discussion: These results indicate that early detection efforts should be made to reduce the disease stage at diagnosis, which may impact on overall survival.

Key words: breast cancer, late first medical consultation, advanced stage, suburban Buenos Aires public hospital

Resumen

Causas que llevan a un primer diagnóstico con enfermedad avanzada entre pacientes con cáncer de mama que asistieron a un hospital suburbano en Buenos Aires

Introducción: El cáncer de mama (CM) es una de las principales causas de mortalidad por cáncer en mujeres, y las tasas de mortalidad son aún mayores en poblaciones vulnerables. Un retraso en el diagnóstico suele acompañarse con estadios avanzados de la enfermedad, lo que impacta en la supervivencia del paciente. El objetivo fue evaluar el tiempo transcurrido para la primera consulta médica entre mujeres con CM que asisten al Hospital Magdalena V. de Martínez y determinar las causas que pueden influir en la demora del paciente y su impacto en el estadio al momento del diagnóstico.

Materiales y métodos: Se entrevistaron 306 pacientes con CM utilizando un cuestionario autoinformado, y se recopilaron variables socioeconómicas y demográficas, entre ellas, nivel educativo más alto completado, situación laboral y conocimiento sobre el CM. Las respuestas se asociaron con los registros clínicos de las pacientes.

Resultados: El 49% de las pacientes fueron diagnosticadas con enfermedad en estadios avanzados. Estas mujeres tenían deficiencias en el conocimiento sobre el CM, no consultó al ginecólogo después de los 40 años o estaba desempleada, mientras que aquellas diagnosticadas con CM en estadios tempranos tenían tumores no palpables, declaraban un ingreso familiar suficiente o demoraban menos de cuatro semanas en buscar atención médica. Además, la demora en la primera visita médica fue de más de un mes en el 78% de las pacientes, siendo el desinterés la causa más común de postergación. Asimismo, las demoras estaban asociadas con tumores más grandes y con una educación incompleta.

Discusión: Este estudio sugiere la necesidad de desarrollar estrategias de sensibilización y educación sobre el CM, así como de políticas para mejorar el acceso a la atención médica, especialmente para poblaciones vulnerables, con el fin de reducir el retraso en el diagnóstico y mejorar la salud de las pacientes con CM.

Palabras clave: cáncer de mama, primera consulta médica tardía, estadio avanzado, hospital público suburbano de Buenos Aires

KEY POINTS

Current knowledge

- While breast cancer death rates are declining in many developed countries, these rates remain high in socioeconomically disadvantaged patients from underdeveloped and developing countries, or even in low-income populations from high-income countries. It is generally accepted that these populations are diagnosed with an advanced disease.

Contribution of this article to current knowledge

- In Argentina, where reliable statistics on breast cancer are scarce, and socioeconomic information on low-income patients who

attend public hospitals is almost non-existent, collecting information related to reasons for delays in breast cancer diagnosis is imperative for proper policy development.

Breast cancer (BC) is still one of the main causes of cancer mortality in women worldwide¹. Delays in diagnosis and treatment impact patient survival, and thus, identifying women with a greater risk of late presentation may allow the design of preventive strategies. Delays in first medical consultation may arise from different causes, which may include socioeconomic factors and housing vulnerability².

Previous studies carried out almost a decade ago at the same medical center showed that a high percentage of patients arrived at the first consultation with palpable tumors, indicating failures in early detection³. Thus, the aim of our study was to determine the stage at diagnosis and to identify factors that may influence an advanced stage at first medical consultation among women with BC attending Magdalena V. de Martínez Hospital.

Materials and methods

Study population

BC patients who met the inclusion criteria were enrolled in the study. The inclusion criteria were women who (i) attended the Magdalena V. de Martínez Hospital with a BC diagnosis, (ii) were willing to participate in the study and provided written consent, (iii) had no other active cancer diagnosis and (iv) were capable of understanding and signing an informed consent. No specific exclusion criteria were defined. The hospital is in General Pacheco, a suburban neighborhood on the outskirts of Buenos Aires city. It serves as a health facility not only for people living within 30 km of the hospital but also for people living at larger distances, in areas where there are hospitals with no BC facility or even for people living abroad.

Study design

The Dr. Enrique Segura Ethics Committee approved this observational, prospective, cross-sectional study (Ref No: 002/07-2019). The study was conducted according to the Declaration of Helsinki and its later amendments. All patients provided written informed consent.

Data collection

From September 5, 2019, to February 2020 and from November 2021 to July 31, 2022 (delay due to restrictions during the SARS-CoV-2 pandemic quarantine), 346 patients were interviewed, 306 of whom met the inclusion criteria. Forty questionnaires were excluded after confirming in clinical records that the breast lumps were either benign lesions or other types of cancer. Thirteen questionnaires were administered twice and used to explore the extent to which the survey was repeatable. We developed a self-report questionnaire based on previous studies (see Additional file 1,⁴⁻⁸). Socioeconomic and demographic variables were collected, and BC awareness, health care access, and household and economic vulnerability were assessed. The first medical visit refers to the first time the patient seeks care from her primary caregiver or gynecologist regarding breast health care. The answers were associated with information from patient clinical records.

Statistical analysis

We used exploratory analysis and descriptive statistics for all qualitative and quantitative variables of interest. No qualitative research methods were applied. We computed means and medians for continuous variables and used the Mann-Whitney test to determine differences between groups. Spearman correlation was used to assess associations between nonnormal quantitative variables or ordinal variables. In 2x2 contingency tables, Pearson's chi-square test was used to examine differences in the proportions between categorical variables, and the two-proportion Z test was used to compare two groups for one characteristic. Analysis was performed using IBM SPSS Statistics for Windows, version 21.0, and GraphPad Prism version 8.0.1 for Windows.

Results

Descriptive analyses

The characteristics of the study population are summarized in Table 1.

Information on cancer stage at diagnosis was obtained for 191 of the 293 patients included in the study population. Among these patients, 97 (51%) were diagnosed with early-stage disease (0-IIa lymph node negative), and 94 (49%) were diagnosed with advanced-stage disease (stage IIa lymph node positive-IV). Overall, age was not associated with tumor size (not shown) or with an advanced stage at diagnosis. Other factors, such as early age at first birth, a high number

of live births, marital status and incomplete primary and/or high school education, were not associated with a late stage at diagnosis. Among the working population, both formally and informally employed patients had more chances to be diagnosed with early breast cancer, while unemployed patients were more likely to be diagnosed with advanced-stage disease at diagnosis. Although there was no association between the reasons for the first medical visit and stage, there was a significant association with bearing palpable tumors (T1c-T4) at diagnosis (Fig. 1A).

As expected, nonpalpable tumors (T1a-T1b) correlated with an early stage at diagnosis (Table 1, Fig. 1B), and a significant Spearman correlation coefficient was also obtained ($p < 0.0001$, $r_s = 0.75$).

Breast cancer awareness

Next, we evaluated the answers to questions related to BC knowledge or awareness. We found that patients who had no information on breast self-examination (BSE) were more likely to be diagnosed with advanced-stage disease than those who had knowledge of BSE (Table 2). Interestingly, even though most of the patients reported knowledge of BSE, only few practiced it. Other answers, such as not performing the BSE procedure, not hearing of, or knowing anyone with BC and not performing an internet search, were not associated with stage at diagnosis. However, women aged over 40 years who did not visit a gynecologist after age 40 years were also more likely to be diagnosed at an advanced stage (Table 2) and were also associated with an incomplete education (Fig. 2).

Socioeconomic vulnerability

As shown in Table 3, women who reported sufficient household income were most likely to be diagnosed with early-stage BC. Other lifestyle, household, and psychosocial characteristics, such as living alone, sharing a bedroom, family members depending on her, and feeling lonely, among others, were not associated with a late stage at diagnosis.

Delay in first medical visit

Patients who took less than one month from the first detection of their breast symptoms to visit the hospital were more likely to be diag-

Table 1 | Patient sociodemographic and lifestyle characteristics and clinical factors

	Total (%)	Early stage (%)	Late stage (%)	p value
Median age at first medical visit (range)	59 (25-86)	59 (37-86)	59 (25-84)	MW-U 0.8446
Age at first medical visit				rs 0.9391
< 40	14 (7.5)	5 (5.2)	9 (9.9)	0.1310
40-49	35 (18.7)	22 (22.9)	13 (14.3)	0.0316
50-59	48 (25.7)	22 (22.9)	26 (28.6)	0.4122
60-69	52 (27.8)	29 (30.2)	23 (25.3)	0.2380
≥ 70	38 (20.3)	18 (18.8)	20 (22.0)	0.6455
Median age at first birth (range)	21 (14-42)	21 (14-42)	21 (15-40)	MW-U 0.6673
Age at first birth				
< 20	52 (34.9)	26 (32.9)	26 (37.1)	1.0000
≥ 20	97 (65.1)	53 (67.1)	44 (62.9)	0.1971
Median live births (range)	2 (0-15)	2.5 (0-15)	2 (0-12)	MW-U 0.3569
Live births				
< 3	90 (50.3)	47 (50.0)	43 (50.6)	0.5485
≥ 3	89 (49.7)	47 (50.0)	42 (49.4)	0.4533
Marital status				
Married or cohabiting	108 (57.1)	56 (57.7)	52 (56.5)	0.5892
Divorced/widowed	61 (32.3)	30 (30.9)	31 (33.7)	0.8572
Other	20 (10.6)	11 (11.3)	9 (9.8)	0.5287
Education level				
Complete (primary and secondary)	43 (22.5)	19 (19.6)	24 (25.5)	0.2801
Incomplete	148 (77.5)	78 (80.4)	70 (74.5)	0.3524
Employment status				
Formal employment	26 (13.6)	17 (17.5)	9 (9.6)	0.0264
Informal employment	26 (13.6)	18 (18.6)	8 (8.5)	0.0056
Unemployed	14 (7.3)	4 (4.1)	10 (10.6)	0.0232
Retired	125 (65.4)	58 (59.8)	67 (71.3)	0.2543
Reasons for first medical consultation				
Self-determination	147 (77.8)	74 (77.1)	73 (78.5)	0.9045
Medical consultation	42 (22.2)	22 (22.9)	20 (21.5)	0.65994
Tumor size				χ^2 0.0045*
T1a-T1b	20 (11.0)	16 (17.6)	4 (4.4)	0.0002
T1c-T4	162 (89.0)	75 (82.4)	87 (95.6)	0.1835
Time to first presentation				χ^2 0.0298*
< 1 month	28 (21.9)	21 (28.8)	7 (12.7)	0.0002
≥ 1 month	100 (78.1)	52 (71.2)	48 (87.3)	0.5687

The two-proportion Z test was performed unless otherwise specified. MW-U: Mann-Whitney U test. rs: Spearman correlation. χ^2 : chi square test is shown only in 2x2 contingency tables with significant differences. Significant values are highlighted in bold.

nosed with early-stage disease (Table 1), whereas those who delayed their first medical visit were more likely to have palpable tumors and incomplete primary and/or secondary education (Fig. 3A). Interestingly, as shown in Fig. 3B, when we asked patients who delayed their first medical

consultation, the 'reasons for their delay' most frequent answers were due to disregard (65.2%) or fear of diagnosis (16.7%).

Thus, answers to questions that were significantly associated with patients diagnosed with late-stage disease were further explored regard-

Figure 1 | Patients with palpable tumors were associated with self-determination and late-stage disease at diagnosis. **A:** Patients bearing tumors larger than 2 cm (T1c-T4) were grouped according to the reason for their first medical visit, either by doctor examination or self-determination. **B:** Stacked bar graph for patients with early-stage or late-stage disease according to tumor size. The numbers above the bars indicate the number of patients in each group

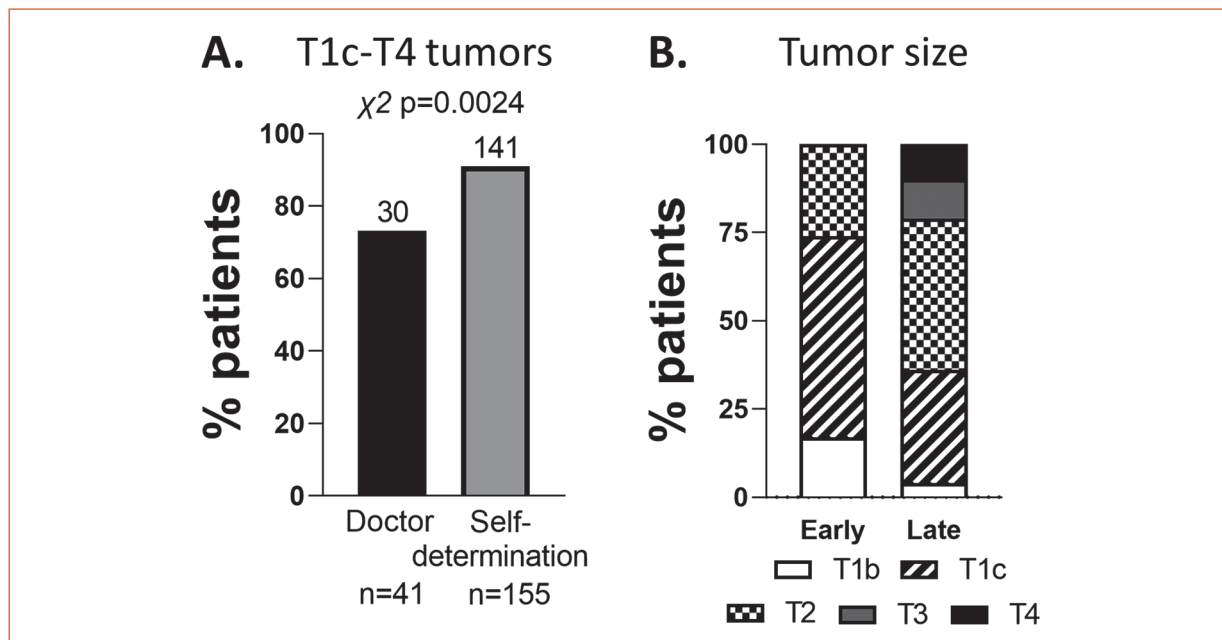


Table 2 | Patient responses to questions related to breast cancer awareness

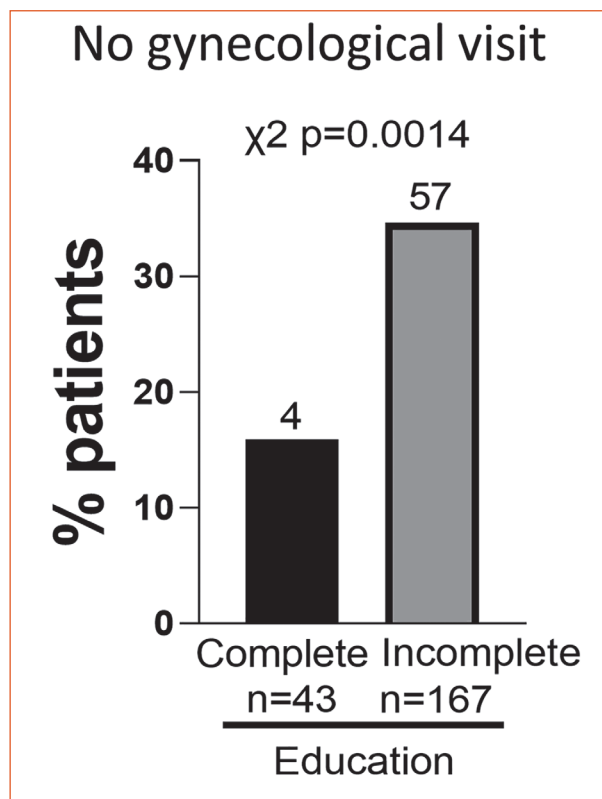
	Total (%)	Early stage (%)	Late stage (%)	p value
Knowledge of breast self-examination				χ^2 0.022*
Yes	143 (75.7)	80 (84.2)	63 (67.0)	0.0444
No	46 (24.3)	15 (15.8)	31 (33.0)	0.0008
Performed self-examination				
Yes	47 (25.0)	25 (26.3)	22 (23.7)	0.5353
No	141 (75.0)	70 (73.7)	71 (76.3)	0.9045
Heard of BC				
Yes	177 (93.7)	92 (94.8)	85 (92.4)	0.4593
No	12 (6.3)	5 (5.2)	7 (7.6)	0.4122
Knows someone with BC				
Yes	139 (73.5)	75 (77.3)	64 (69.6)	0.1868
No	50 (26.5)	22 (22.7)	28 (30.4)	0.2301
Performed internet search				
Yes	29 (16.7)	15 (17.2)	14 (16.1)	0.7949
No	145 (83.3)	72 (82.8)	73 (83.9)	0.9045
Visit to gynecologist after age 40				χ^2 0.021*
Yes	118 (69.4)	68 (77.3)	50 (61.0)	0.0193
No	52 (30.6)	20 (22.7)	32 (39.0)	0.0188

BC: breast cancer

The two-proportion Z test was performed unless otherwise specified. χ^2 : chi square test is shown only in 2x2 contingency tables with significant differences

Significant values are highlighted in bold

Figure 2 | Patients who did not visit a gynecologist after age 40 were associated with incomplete education. Patients (%) who did not visit a gynecologist after age 40 were grouped according to their education level: complete (at least primary and high school) or incomplete. The numbers above the bars indicate the number of patients in each group.



ing the delay in the first medical consultation. We found that knowledge of BSE, unemployment, insufficient household income, failure to visit a gynecologist and self-determination were all associated with a delay of at least one month in seeking medical attention (Table 4).

Discussion

Early staging of BC is associated with improved survival^{9,10}. In this study, we found that BC patients from a suburban Buenos Aires hospital that reached for the first time the medical facility with advanced-stage disease were mostly those with deficiencies in BC awareness, who did not assist a gynecologist after age 40 or who were unemployed. Moreover, patients who were diagnosed with early-stage BC had nonpalpable tumors, declared a sufficient household income

or delayed less than four weeks in seeking medical attention.

At Guy's Hospital in the United Kingdom, Burgess et al. reported that 58% of women diagnosed with invasive BC presented to the hospital within four weeks after the discovery of their breast symptoms. They also found that prolonged delays were associated with increased tumor size and advanced stage¹¹. Danish¹² and Estonian¹³ studies, which included 7608 and 703 patients, respectively, reported that only 34-36% of the women experienced a delay of more than one month between the first symptom and the first visit to a doctor. Most strikingly, in our cohort, 78% of the patients delayed at least one month in seeking medical care, and this delay was also associated with larger tumors (89% palpable tumors). A previous study performed at the same hospital and published in 2014 revealed that 87% of women had palpable tumors, and 55% delayed the first medical consultation by more than six months³, suggesting that no significant improvements had occurred in the last ten years, at least for patients within the hospital's radius of influence. We found that almost the same variables that are associated with a late stage at first presentation are also associated with a delay of at least one month in looking for hospital attendance. Moreover, this delay was associated with bearing palpable tumors and incomplete education, which may be linked to the fact that the most frequent reason for this delay was disregard. This may be motivated by different circumstances, such as lack of information, time, money or even many times, some of these patients argue that they must deal with too many stressful situations and personal problems so that they are forced not to give their own health the importance it deserves. Incomplete education was also associated with the failure to visit a gynecologist after age 40, which was again associated with advanced-stage disease at diagnosis. In many suburban neighborhoods in Argentina, most patients first consult a primary care facility that refers the patient to the nearest hospital when the patient cannot be treated in primary care. Thus, other reasons that were not quantified in this study may include delays in primary health care centers to book appointments and in referring patients

Table 3 | Patient responses to questions related to socioeconomic vulnerability

	Total (%)	Early stage (%)	Late stage (%)	p value
Household income				χ^2 0.012*
Insufficient	145 (77.5)	68 (71.6)	77 (83.7)	0.2891
Sufficient	42 (22.5)	27 (28.4)	15 (16.3)	0.0088
Strategy to overcome low income				
Yes	130 (69.9)	62 (67.4)	68 (72.3)	0.4593
No	56 (30.1)	30 (32.6)	26 (27.7)	0.4473
Lives alone				
Yes	39 (20.4)	17 (17.5)	22 (23.4)	0.2585
No	152 (79.6)	80 (82.5)	72 (76.6)	0.3576
Shares bedroom				
Yes	108 (57.1)	52 (54.7)	56 (59.6)	0.5892
No	81 (42.9)	43 (45.3)	38 (40.4)	0.4295
Family members who depend on her				
0	47 (24.7)	24 (25.0)	23 (24.5)	0.8337
≥ 1	143 (75.3)	72 (75.0)	71 (75.5)	0.9045
Suffered the loss of a close person				
Yes	118 (68.2)	62 (72.1)	56 (64.4)	0.4354
No	55 (31.8)	24 (27.9)	31 (35.6)	0.1835
Suffered loss by cancer				
Yes	32 (42.1)	13 (36.1)	19 (47.5)	0.1336
No	44 (57.9)	23 (63.9)	21 (52.5)	0.6672
Feels lonely				
Yes	8 (4.2)	4 (4.2)	4 (4.3)	1.0000
No	181 (95.8)	92 (95.8)	89 (95.7)	0.7490
Accompanied				
Yes	181 (95.8)	92 (95.8)	89 (95.7)	0.7490
No	8 (4.2)	4 (4.2)	4 (4.3)	1.0000

The two-proportion Z test was performed unless otherwise specified. χ^2 : chi square test is shown only in 2x2 contingency tables with significant differences

Significant values are highlighted in bold

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Significant values are highlighted in bold

to hospitals. Failures in primary care facilities should be identified so that unnecessary delays are avoided.

According to the World Health Organization, in several developed countries, there has been a decrease in BC-related deaths, probably because of early diagnosis, among other reasons^{14,15}. In the United States, Foy et al. reported that up to 80% of patients were diagnosed with *in situ* or localized BC¹⁶, while in India, where health is low on priority, only 29% of women are diagnosed with this stage¹⁷. Our results are similar to those reported by Joffe et al. in a public hospital in South

Africa¹⁸. We found that 51% of the women were diagnosed at early stages, which suggests that in the hospital's intervention area, much effort can still be made to reach the figures achieved by developed countries. Crucial requirements for early BC detection include guaranteeing BC education and awareness, supporting women seeking medical care, and providing appropriate infrastructure and health workers for BC diagnosis and screening.

It is interesting to note that employment (either formal or informal) was associated with early diagnosis. This may be related to a more

Figure 3 | Patients who took at least one month to visit the hospital were associated with palpable tumors and incomplete education. **A:** Patients who took one month or more to visit the hospital were grouped according to tumor size (palpable or nonpalpable) or education level: complete (at least primary and secondary) or incomplete. **B:** Reasons for delay among patients who attended the hospital late. The numbers above the bars indicate the number of patients in each group.

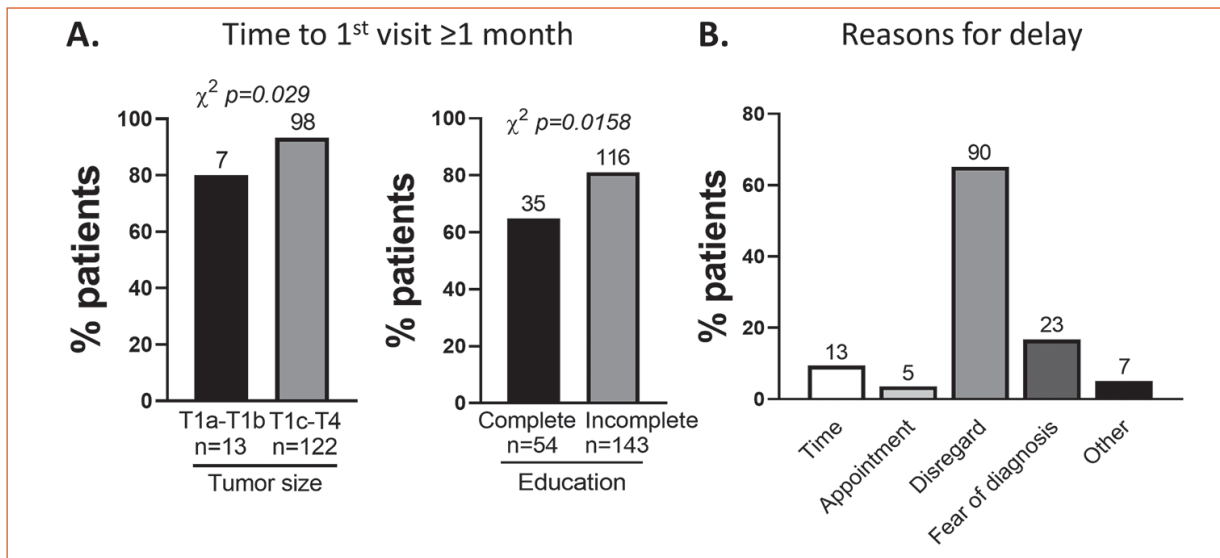


Table 4 | Statistical analysis of patient responses associated with late-stage disease regarding delay in first medical visit

	Total (%)	< 1 month (%)	≥ 1 month (%)	p value
No knowledge of breast self- examination	50 (25.6)	8 (17.4)	42 (28.2)	< 0.00001
Unemployed	19 (9.7)	4 (8.7)	15 (10)	0.0004
Insufficient household income	151 (78.6)	34 (75.6)	117 (79.6)	0.0004
No visit to gynecologist after age 40	63 (32.5)	9 (20)	54 (36.2)	< 0.00001
Self-determination	196 (100)	46 (100)	150 (100)	< 0.00001

The two-proportion Z test was performed
Significant values are highlighted in bold

proactive stance of people who have social relationships outside the domestic world. Since sufficient household income was associated with an early stage of presentation, the data suggest that policies must be designed to bring medical care even closer to economically vulnerable women. Patients with economic vulnerability are more susceptible to experiencing transportation-related obstacles when trying to reach health care. Perhaps policies in the neighborhoods that bring the mammograph and the ultrasound machine there, such as campaigns carried out by public or private institutions in other counties (<https://fundacionavon.org.ar/tag/mamografo-movil/>,

<https://www.lalcec.org.ar/cáncer-de-mama>), but much more extended to cover all, especially the most vulnerable neighborhoods, could improve the situation of these individuals, favoring early detection of the disease.

Another factor that was associated with advanced-stage disease at diagnosis was a lack of knowledge about BSE. However, only 23.0% of the patients reported not having information on BSE. Most patients expressed having knowledge about BSE (77.0%), having heard of BC (95.2%) or knowing someone (78.6%) with BC. However, only 23.7% of these patients underwent BSE. Similar results were reported in vulnerable com-

munities from different countries¹⁹⁻²². The results from a health center that attends mainly to low-income patients in the United States²³ showed that 85% of women of different ethnicities had undergone BSE. Of these, 86% of Latin participants living in the United States answered that they had done BSE, and 64% said they had done it at least every two months. Most importantly, they found that women with adequate health literacy were more likely to perform BSE than those with poor health literacy. Given the differences found in women of the same ethnicity living in developed or developing countries, many questions arise. How are BSE and BC awareness approached in the United States? In Argentina, do doctors remind women to practice BSE? Are health professionals and workers trained to face and treat socially vulnerable patients²⁴? Are there health education programs for high school students focused not only on raising the level of BC awareness but also on teaching how to perform BSE? Is it plausible to recruit famous people or influencers who have survived BC to act as ambassadors giving BC health messages? In the era of social media, people in poor neighborhoods use social networks as much as rich people do²⁵; this means of communication may be a valuable tool for accessing more vulnerable communities. In summary, even though BSE is not a substitute for clinical breast exams performed by a doctor, in socially and economically vulnerable communities where many barriers limit timely healthcare assistance, implementing early BC detection strategies such as BC awareness, which should also include “non-lump” symptoms of BC, and BSE are crucial to achieve reductions in BC mortality¹⁰.

Some limitations of the study should be acknowledged. First, it should be noted that this study included patients from only one suburban hospital that treats mostly low-income patients who are usually unable to pay for private healthcare services. Thus, both high-income and marginalized or socially excluded patients, mainly due to lack of access to rights and structural economic vulnerabilities, are mostly underrep-

resented in our cohort, which may limit its generalizability. Second, although unavoidable, a potential limitation of the study is that the delay in the first medical visit relies on the patient's ability to recall those dates, which may have introduced recall bias. Third, even though early first consultation is a crucial step to prevent advanced-stage disease and high mortality rates, other parameters that are related to hospital or system-related delays, such as time to biopsy, diagnosis and first treatment, are also key determinants of patient prognosis¹² and were not evaluated in this study.

The advanced stage of presentation in BC patients remains a serious public health problem. This study provides evidence that in vulnerable suburban areas near Buenos Aires city, patients have a delayed presentation compared to women with BC in developed countries, which may be influenced by several factors. The results presented herein show that several factors, mainly related to BC awareness and economic vulnerability, appear to be associated with delays in diagnosis and late-stage disease at the first medical consultation. In conclusion, efforts should be made to identify women with an increased risk of delay and to design health programs that may improve and favor timely access to medical care. In places where BC awareness is poor and medical access is restricted due to low income and/or the scarcity of adequate facilities for detection and diagnosis, informative campaigns, and education in BSE for patients should be prioritized.

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References

1. Sung H, Ferlay J, Siegel RL, et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin* 2021; 71: 209-49.
2. Tiwari V, Yogi V, Ghori HU, et al. Identifying the factors causing delayed presentation of cancer patients to a government medical college of Central India. *J Clin Diagn Res* 2015; 9: XC09-XC12.
3. Burruchaga HJ, Martínez Vázquez P, Di Vincenti L, et al. Características de los tumores mamarios en la primera consulta en el hospital provincial de Pacheco. *Rev Arg Mastol* 2014; 33: 156-65.
4. Couto MSA, Guerra MR, Firme VAC, Bustamante-Teixeira MT. Breast cancer mortality in Brazilian municipalities and associated factors. *Rev Panam Salud Publica* 2017; 41: e168.
5. Castel R. Las metamorfosis de la cuestión social, 1st ed. España: Editorial Ediciones Paidós Ibérica, 1997.
6. Castel R. La inseguridad social ¿Qué es estar protegido?, 1ra ed. Buenos Aires: Manantial, 2004.
7. Golovanevsky L. Vulnerabilidad social: Una propuesta para su medición en Argentina. *Revista de Economía y Estadística* 2007; 45: 53-94.
8. Caponi S. La salud como apertura al riesgo, 1st ed. Buenos Aires: Editorial Lugar, 2006.
9. Shulman LN, Willett W, Sievers A, Knaul FM. Breast cancer in developing countries: opportunities for improved survival. *J Oncol* 2010: 595167.
10. Ginsburg O, Yip CH, Brooks A, et al. Breast cancer early detection: A phased approach to implementation. *Cancer* 2020; 126: 2379-93.
11. Burgess CC, Ramirez AJ, Richards MA, Love SB. Who and what influences delayed presentation in breast cancer? *Br J Cancer* 1998; 77: 1343-8.
12. Afzelius P, Zedeler K, Sommer H, Mouridsen HT, Blichert-Toft M. Patient's and doctor's delay in primary breast cancer. Prognostic implications. *Acta Oncol* 1994; 33: 345-51.
13. Innos K, Padrik P, Valvere V, et al. Identifying women at risk for delayed presentation of breast cancer: a cross-sectional study in Estonia. *BMC Public Health* 2013; 13: 947.
14. Breast cancer inequities. In: <https://www.who.int/initiatives/global-breast-cancer-initiative/breast-cancer-inequities>; accessed February 2024.
15. Francies FZ, Hull R, Khanyile R, Dlamini Z. Breast cancer in low-middle income countries: abnormality in splicing and lack of targeted treatment options. *Am J Cancer Res* 2020; 10: 1568-91.
16. Foy KC, Fisher JL, Lustberg MB, et al. Disparities in breast cancer tumor characteristics, treatment, time to treatment, and survival probability among African American and white women. *NPJ Breast Cancer* 2018; 4: 7.
17. Rai A, Sharda P, Aggarwal P, Ravi B. Study of diagnostic delay among symptomatic breast cancer patients in Northern India: A mixed-methods analysis from a dedicated breast cancer centre. *Asian Pac J Cancer Prev* 2022; 23: 893-904.
18. Joffe M, Ayeni O, Norris SA, et al. Barriers to early presentation of breast cancer among women in Soweto, South Africa. *PLoS One* 2018; 13: e0192071.
19. Petro-Nustus W, Mikhail BI. Factors associated with breast self-examination among Jordanian women. *Public Health Nurs* 2002; 19: 263-71.
20. Jirojwong S, MacLennan R. Health beliefs, perceived self-efficacy, and breast self-examination among Thai migrants in Brisbane. *J Adv Nurs* 2003; 41: 241-9.
21. Wardle J, Steptoe A, Smith H, et al. Breast self-examination: attitudes and practices among young women in Europe. *Eur J Cancer Prev* 1995; 4: 61-8.
22. Johnson OE. Awareness and practice of breast self examination among women in different African countries: A 10-year review of literature. *Niger Med J* 2019; 60: 219-25.
23. Armin J, Torres CH, Vivian J, Vergara C, Shaw SJ. Breast self-examination beliefs and practices, ethnicity, and health literacy: Implications for health education to reduce disparities. *Health Educ J* 2014; 73: 274-84.
24. Andermann A, Collaboration C. Taking action on the social determinants of health in clinical practice: a framework for health professionals. *CMAJ* 2016; 188: E474-E483.
25. Ucar I, Gramaglia M, Fiore M, Smoreda Z, Moro E. News or social media? Socio-economic divide of mobile service consumption. *J R Soc Interface* 2021; 18: 20210350.

Supplementary material

Questionnaire providing details of the questions and response categories

Identification number:.....

1. Educational level

- Illiterate
 Primary incomplete Primary Complete
 Secondary Incompl. Secondary Compl.
 Tertiary Incompl. Tertiary Compl.
 University Incompl. University Compl.

2. Marital status

- Married or co-habiting Widow
 Divorced Other

3. Household material

- Timber Brick with plaster
 Brick without plaster Sheet metal
 Other

4. Household income

- Formal salary Odd jobs
 Informal salary Other

HEALTH CARE AND ACCESSIBILITY

5. What motivated you to the first consultation?

- Self-determination Medical consultation

6. How long did it take to consult a doctor?

- Days Weeks Months Years

If months or years, why?

- Disregard Appointment
 Time Fear Other

If fear, why? _____

7. Did you check the internet before seeing your doctor?

- YES NO

8. Before your diagnosis, have you heard of breast cancer?

- YES NO

9. Did you know of any case of breast cancer?

- YES NO

10. Have you had any known relatives with breast cancer?

- YES NO

11. Have you ever been to the gynecologist?

- YES NO

12. Did he/she recommend any study?

- YES NO

Which one/s?

- Mammography PAP Other

13. Did you know about breast self-exam?

- YES NO

Did you do it?

- YES NO

14. Were you aware of the benefits of mammography?

- YES NO

15. Where did you get preventative information from?

- Doctor Talk Bulletin
 TV Radio Other

16. Did you go to an institution to get a mammogram?

- YES NO

17. Did you encounter any difficulties in carrying out your studies or accessing appointments?

- YES NO

¿Which one/s?

- Appointment suspension
 No appointments
 Could not attend the day of the appointment
 Other

18. Do you currently feel accompanied?

- YES NO

By whom?

- Relative Non-relative

If relative, which bond?

- Couple Son/daughter
 Parents Other

ECONOMIC VULNERABILITY SITUATION

19. You are currently...

- EMPLOYED
 Formal Informal
 UNEMPLOYED
 With social benefits
 Without social benefits
 INACTIVE

20. Could you say that with the income you have at home, you meet your daily needs?

- YES NO

21. Have you or any member of your household suffered job losses or changes?

- YES NO

22. Have you developed with other people some strategy to face their needs?

- YES NO

HOUSING VULNERABILITY SITUATION

23. In which neighborhood do you live?.....

24. You can say that your housing condition in recent years has...

- Improved Deteriorated
 Still the same

FAMILY VULNERABILITY SITUATION

25. How many people live in your house?

1 2 3 4 5
+ de 5

26. Do you share your room with other members of your household?

YES NO

With whom?.....

27. Do you share your bed with other members of your household?

YES NO

¿With whom?.....

28. How many members of your household are under your attention?

1 2 3 4 5 + de 5

29. Have you suffered the loss of a family member or other important person in recent years?

YES NO