


ORIGINAL ARTICLE

Patients' help-seeking experiences and delaying in breast cancer diagnosis: A qualitative study

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Abstract

Aim: To identify the influencing factors in help-seeking behavior by comparing delayers with non-delayers in Japanese female patients with breast cancer.

Methods: This is a descriptive qualitative study. A total of 21 female patients with breast cancer (nine delayers and 12 non-delayers) who were at least 3 months to 5 years postdiagnosis were recruited from two hospitals in Okinawa, Japan. Semistructured interviews were carried out and the results were analyzed by using a qualitative inductive approach.

Results: The comparison between the delayers and non-delayers showed eight barriers to help-seeking behavior that were unique to the delayers: (i) the appearance of symptoms that cannot be definitely linked to breast cancer; (ii) anxiety and fear; (iii) the necessity to prioritize the immediate needs of daily life; (iv) non-disclosure of the situation; (v) the view that medical care is a nuisance; (vi) a desire to surrender to the natural course of things; (vii) confidence that they would not develop cancer; and (viii) inaccessibility of medical facilities. A common trigger for help-seeking that was identified in both the delayers and the non-delayers was the presence of other persons who encouraged seeking a provider evaluation.

Conclusion: The barriers to help-seeking that were found in this study (namely, the emotional reaction and difficult living conditions) are common worldwide. The Japanese patients with breast cancer in the sample tended to emphasize their relationship with family and friends in their help-seeking behavior, which is a common content in Japanese and other Asian cultures. Therefore, health professionals should assess the social conditions of their patients.

Key words: delay, healthcare-seeking behavior, patients with breast cancer.

BACKGROUND

In Japan, the 5 year survival rate for breast cancer is 90.5% (National Cancer Center, 2006) and the 10 year survival rate, when detected at an early stage, is at least 90% (The Japanese Breast Cancer Society, 2011); thus, patients can expect long-term survival. However, for 34% of newly diagnosed patients, there is a period of ≥ 3 months between the time they first noticed a breast cancer symptom and their initial

seeking of a provider evaluation (Facione, 1993). According to previous research on the relationship between the help-seeking delay and the survival rate, when there is a delay of at least 3 months from the time that a breast cancer symptom is first noticed, the 5 year survival rate is adversely affected (Richards, Westcombe, Love, Littlejohns, & Ramirez, 1999); this indicates the importance of discussing the issue of patients with breast cancer who delay their initial seeking of a provider evaluation.

A comprehensive review of previous studies showed that the influencing factors in the delay in help-seeking for breast cancer symptoms are common worldwide; these include poverty, other priorities, fear and anxiety (Facione, 1993; Unger-Saldaña & Infante-Castaneda,

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2009; Westcombe, Burgess, Sutton, Littlejohns, & Richards, 1999), and cultural factors (Oshiro & Kamizato, 2015), such as the use of traditional Chinese medicine (Facione, Giancarlo, & Chan, 2000) and alternative medicine (Malik & Gopalan, 2003) and the stigma of cancer (Parsa, Kandiah, Abdul, & Zulkefli, 2006). In Egypt, the healthcare system, characterized by low economic capacity and public sector inefficiency, is a typical cause of delay in help-seeking for symptoms (McEwan, Underwood, & Corbex, 2014). In Iran, cultural elements, such as the taboo against discussing reproductive organs, have an effect on help-seeking for symptoms (Khakbazan, Roudsari, Taghipour, Mohammadi, & Pour, 2014; Montazeri, Ebrahimi, Mehrdad, Ansari, & Sajadian, 2003). Therefore, in discussing the problem of delaying help-seeking for symptoms, it is necessary to consider the sociocultural setting (Facione *et al.*). However, there is a lack of studies on patients with breast cancer in Japan who delay help-seeking.

The goal of delay research is the development of nursing strategies to shorten help-seeking delays. In order to provide nursing care that matches the Japanese sociocultural setting, it is necessary to understand the help-seeking experiences of Japanese women. Therefore, the purpose of this study was to identify the influencing factors in help-seeking behavior by comparing the delayers with the non-delayers in Japanese female patients with breast cancer.

METHODS

Conceptual and operational definitions

There is a lack of consensus on the definition of “delay” in patients with breast cancer (Lim, 2011). Many studies define delay as the interval between the time that the patient first noticed a breast cancer symptom and her initial seeking of a provider evaluation; delays of ≥ 3 months have been reported to be associated with a lower survival rate (Bish, Ramirez, Burgess, & Hunter, 2005). However, some studies have pointed out the limitation of using the convenient time-only description of delay, which is a complex phenomenon, and have suggested the significance of including patients’ perspectives and processes in the definition (Unger-Saldaña & Infante-Castañeda, 2011). Therefore, in this study, “delays” are defined as patients in which there was a prolonged interval between the time they first noticed a cancer symptom and their initial seeking of a provider evaluation; whereas, “non-delays” are those patients

who perceived a cancer symptom and immediately underwent a medical evaluation.

Recruitment of the participants

The study’s participants consisted of Japanese female patients with breast cancer who visited the Department of Breast Surgery at two general hospitals in Okinawa, Japan, between September and November 2015. The inclusion criteria were: (i) the patient was an adult; and (ii) ≥ 3 months, but less than 5 years, had passed from the time that the patient had been diagnosed with, and was informed of, the breast cancer. The second inclusion criterion was established to reduce the psychological burden on the patients and to ensure that the passage of time had not affected the accuracy of their memory. Those patients who were diagnosed by a doctor or nurse to have psychological, cognitive, or communication disorders were excluded from the study.

Of the 33 patients who were initially identified, 21 from whom consent was obtained participated in the interviews. Those who refused to participate in the interviews were “too busy” ($n = 5$), “too sick” ($n = 4$), or cited privacy concerns ($n = 3$).

Interview methods

A semistructured, face-to-face interview was carried out that lasted 20–100 min (mean: 39 min) per session with each patient. An interview guide was developed based on the McGill University interview (Division of Social and Transcultural Psychiatry, 2006), which reflected Kleinman’s methodology that provides patients’ insight as a framework (Kleinman, Eisenberg, & Good, 1978). Kleinman’s explanatory models provide insight into individual-level meaning creation. In this study, the patients’ illness experiences and how they perceived the delays or non-delays were explicated by this approach.

The interview questions were: (i) When did you notice the breast abnormality?; (ii) What was your situation when you noticed the breast abnormality?; (iii) What was the reason you decided to seek a provider evaluation?; (iv) What were the things that prevented you from deciding to seek a provider evaluation?; and (v) What encouraged you to seek a provider evaluation?

The patients’ basic attributes and the perceptions of the delayers and non-delayers were obtained from the questionnaires that the patients filled out during the interviews. The interviews were digitally recorded with the consent of the participants, who were each given a gift certificate worth \$10 as a token of gratitude. The

study was carried out with the approval of the Review Board of the authors' institution and the participating facilities.

Data analysis

The transcript data were subjected to a qualitative inductive analysis with the use of Nvivo software, v. 11 (QSR International, Tokyo/Japan). The transcripts were carefully read; the terms that related to the factors that prevented the delayers from seeking a provider evaluation, factors that encouraged the delayers to seek a provider evaluation, and factors that encouraged the non-delayers to seek a provider evaluation were codified. Then, the themes were identified. The structured coding themes were discussed and developed by nine members of the research team, which consisted of a nursing specialist and qualitative researchers, until consensus was achieved.

RESULTS

Participants' characteristics

Of the 21 patients, there were nine delayers (42.3%) and 12 non-delayers (57.1%). Their ages ranged from 40 to 70 years (Table 1).

Delayers and non-delayers experience different processes that take place up to the point when they seek a provider evaluation at a department of breast surgery (Tables 2, 3). The delayers sought a provider evaluation after their symptoms had worsened, whereas the non-delayers sought a provider evaluation as soon as possible as they were motivated by friends and family. For 88.9% of the delayers, the exacerbation of the symptoms was the characteristic trigger that caused them to decide to seek a provider evaluation. None of the delayers previously had undergone breast cancer screening.

Barriers to seeking a provider evaluation

There were various barriers to seeking a provider evaluation among the patients with breast cancer (Table 4).

Presentation of symptoms

Delays. The appearance of symptoms that cannot be definitely linked to breast cancer: when symptoms other than those that are generally associated with breast cancer appeared, it took time for the patient to decide that a provider evaluation was necessary:

Table 1 Summary of the participants' characteristics ($n = 21$)

Variable	Delay ($n = 9$) N (%)	Non-delay ($n = 12$) N (%)
Age (years)		
40–49	1 (11.1)	2 (16.7)
50–59	3 (33.3)	6 (50.0)
60–69	4 (44.4)	3 (25.0)
70–79	1 (11.1)	1 (8.3)
Marital status		
Married	2 (22.2)	7 (58.3)
Separated/divorced/ widowed	5 (55.6)	4 (33.3)
Single	2 (22.2)	1 (8.3)
Education level		
Primary/secondary school	0 (0.0)	1 (8.3)
High school	5 (55.6)	5 (41.2)
Some college education	3 (33.3)	3 (25.0)
4 year degree	0 (0.0)	3 (25.0)
Missing	1 (11.1)	0 (0.0)
Income (\$)		
<30,000	8 (88.8)	6 (50.0)
30,000–50,000	1 (11.1)	3 (25.0)
50,000–100,000	0 (0.0)	1 (8.3)
≥100,000	0 (0.0)	1 (8.3)
Employment status		
Yes (full-time, part-time)	1 (11.1)	6 (50.0)
No (housewife, retired)	8 (88.8)	6 (50.0)
Cancer stage		
0	2 (22.2)	6 (50.0)
I	0 (0.0)	1 (8.3)
II	2 (22.2)	2 (16.7)
III	2 (22.2)	2 (16.7)
IV	2 (22.2)	0 (0.0)
Missing	1 (11.1)	1 (8.3)
Time between initial perception and first visit for symptoms (months)		
<1	0 (0.0)	12 (100.0)
1–2	1 (11.1)	0 (0.0)
2–3	0 (0.0)	0 (0.0)
≥3	8 (88.8)	0 (0.0)
Family history of breast cancer		
Yes	2 (22.2)	5 (41.2)
No	7 (77.8)	6 (50.0)
Missing	0 (0.0)	1 (8.3)

There was swelling. It was orange in color and slightly reddish. It was a symptom other than those generally known to be associated with breast cancer. I didn't know that there was a symptom like this for breast cancer. (DELAY: ID3)

Table 2 Breast cancer help-seeking process in the delayers

Pattern (n = 9)	Steps in the breast cancer help-seeking process				
1 (n = 2) Breast lump discovery	Non-disclosure of the situation	Worsening of symptoms	Encouragement from friends and family	Attending a Breast Oncology Department	
2 (n = 1) Breast lump discovery	Non-disclosure of the situation	Worsening of symptoms	–		
3 (n = 1) Breast lump discovery	Non-disclosure of the situation	Worsening of symptoms	Gynecology Department → consultation		
4 (n = 1) Breast lump discovery	Gynecology Department → healthcare provider told her it was no problem	Worsening of symptoms	The other Gynecology Department → consultation		
5 (n = 2) Breast lump discovery	Non-disclosure of the situation	Worsening of symptoms	She was carried by an ambulance → consultation		
6 (n = 1) Breast lump discovery	Non-disclosure of the situation	Worsening of symptoms	She talked to a physician → consultation		
7 (n = 1) Breast pain, swelling and redness discovery	Non-disclosure of the situation	Worsening of symptoms	–		
8 (n = 1) Swelling discovery	Non-disclosure of the situation	Wait until the next screening	–		

Common factor: ■ ; non-disclosure of the situation; ■ worsening of symptoms.

Table 3 Breast cancer help-seeking process in the non-delayers

Pattern (n = 12)	Steps in the breast cancer help-seeking process		
1 (n = 6) Breast lump discovery	Discussion of symptoms with friends and family	–	Attending a Breast Oncology Department
2 (n = 2) Breast lump discovery	–	–	
3 (n = 4) Encouragement from friends and family	Breast cancer screening	–	

Common factor; ■ social support.

Non-delays. Discovery of a lump: the non-delayers reported that they considered the discovery of a lump to be a trigger that led them to suspect breast cancer and they therefore decided to seek a provider evaluation:

I sought provider evaluation because I found a lump while showering. (NON-DELAY: ID10)

Anxiety and fear of cancer

Delays. Anxiety and fear: the delayers reported that they were unable to face the problem because they felt a

vague anxiety and fear, although they understood the reality of the situation:

It was scary, after all. Scary. (DELAY: ID4)
I didn't want to believe it. I didn't want to accept it. But, I knew that in reality it was [breast cancer]. (DELAY: ID9)

Non-delays. Handling anxiety and fear: the non-delayers reported that they became anxious and fearful when they noticed breast abnormalities, but they were

Table 4 Summary of the themes

	Theme	Delayer	Non-delayer
Barrier	Presentation of symptoms	The appearance of symptoms that cannot be definitely linked to breast cancer	Discovery of a lump
	Anxiety and fear of cancer	Anxiety and fear	Handling anxiety and fear
	Living conditions	The necessity to prioritize the immediate needs of daily life	The ability to face health problems
	Disclosure of symptoms	Non-disclosure of the situation	Discussing the situation with someone
	Coping	The view that medical care is a nuisance	Recognizing the problem and taking proactive action
	Beliefs	A desire to surrender to the natural course of things	–
	Risk perception	Confidence that they would not develop cancer	Possibility of developing breast cancer
	Distance to medical care	Inaccessibility of medical facilities	Medical examinations lead to relief because of trust in the medical specialist
Trigger	The presence of other persons who encourage seeking a provider evaluation	The intervention of others dispelled doubts about seeking a provider evaluation	Other persons encouraged seeking a provider evaluation
	Worsening of symptoms	Worsening symptoms	–
	Surrounding circumstances	Not wanting to be a nuisance to anyone	–

■ Common trigger.

able to face reality by consciously shifting their feelings into a more positive outlook:

I was very nervous. I was scared. I was scared, but later I resigned myself to the facts by telling myself that I have to just do my best. (NON-DELAY: ID12)

Living conditions

Delays. The necessity to prioritize the immediate needs of daily life: the delayers reported that although they noticed the breast cancer symptoms, they were unable to seek medical care, even if they wanted to, because of financial, time, or mental issues:

It's just me and my child. I was overworking. I thought our life would have to come first. If I went to the hospital, it would cost me money, money that I didn't have. (DELAY: ID9)

Non-delays. Ability to face health problems: the non-delayers expected to be able to pay for treatment and receive support (psychological, instrumental, and spiritual). The anticipation that they would be able to manage somehow, even if they received a diagnosis of breast cancer, was important toward seeking medical care:

Since I had a life insurance policy, I thought it [paying for the cost of treatment] would work out. (NON-DELAY: ID7)

My sons and husband told me that I would be okay. If I became unable to do housework, I would trust in my family and leave it up to them. (NON-DELAY: ID10)

Disclosure of symptoms

Delays. Non-disclosure of the situation: the delayers did not disclose the situation prior to the symptoms worsening either because they did not have anyone to discuss it with or because they wanted to avoid placing the burden on their family members. As a result, it was difficult to receive support or advice from those around them and they therefore dealt with the problem alone:

I always thought to myself that if I don't take care of my own issues by myself, I will be a nuisance to others. (DELAY: ID5)
I didn't tell anyone. (DELAY: ID9)

Non-delays. Discussing the situation with someone: the non-delayers obtained various information from

persons around them by discussing their breast abnormalities with others. This information helped them to make the decision to seek medical care:

I was constantly on the phone with friends and my siblings and I got information from people at work, as well. So, I heard from many people that I should go to the hospital as soon as possible. (NON-DELAY: ID8)

Coping

Delays. The view that medical care is a nuisance: Regardless of whether or not they had any knowledge about breast cancer, the delayers reported that it was a nuisance to deal with a problem that had not yet manifested itself:

Although I did know some information, I didn't feel that I had to go to the hospital anytime soon. At the time, I thought there were no clear signs of cancer, so I would be fine. It was a nuisance [to go to the hospital]. (DELAY: ID3)

Non-delays. Recognizing the problem and taking proactive action: the non-delayers reported that they recognized the breast abnormalities as a problem that needed to be solved and quickly took action:

I wasn't convinced [of the diagnosis]. I requested additional testing. Then, I knew that, as I expected, it was cancer. (NON-DELAY: ID3)

Beliefs

Delays. A desire to surrender to the natural course of things: some of the delayers reported that they wanted to simply allow the natural course of things to unfold, rather than undergo treatment:

I thought I would leave it up to nature [without seeking treatment]. (DELAY: ID5)

Risk perception

Delays. Confidence that they would not develop cancer: the delayers underestimated their risk of cancer because of mistaken perceptions and overconfidence in their health:

I come from a healthy family, so I thought I would be okay. (DELAY: ID8)

Non-delays. Possibility of developing breast cancer: based on their family history or the experiences of persons close to them, the non-delayers were aware that there was a possibility that they could develop cancer:

My family has a history of cancer. So [when I noticed the symptoms], I thought perhaps [it was breast cancer]. I sought medical care right away. (NON-DELAY: ID11)

Distance to medical care

Delays. Inaccessibility of medical facilities: having unpleasant past experiences at medical facilities was a factor that led the delayers to hesitate about undergoing medical care. The patients who lived on remote islands said they did not have access to specialized medical facilities, which led to postponing medical examinations:

[In the past, a doctor] asked me to come to his office and asked what I wanted to have done, even though there was nothing wrong. After experiencing that sort of thing several times, I didn't know where I should go for a medical examination. (DELAY: ID3)

I didn't get an examination because there are no medical specialists on the island where I live. (DELAY: ID1)

Non-delays. Medical examinations lead to relief because of a trust in the medical specialist: the non-delayers trusted medical personnel. They understood that undergoing a medical examination was a way for them to help themselves:

I couldn't get better on my own, so all I could do was depend on the hospital because I trust doctors. (NON-DELAY: ID12)

Triggers for seeking a provider evaluation

There were various triggers for the patients with breast cancer to seek a provider evaluation (Table 4).

Presence of other persons who encouraged seeking a provider evaluation

Delays. The intervention of others dispelled doubts about seeking a provider evaluation: in the case of the delayers, time passed while they were having doubts on seeking medical care. Worsening symptoms and other events that made it clear that they could not handle the problem on their own served as triggers for them to request the help of others and the information and intervention they then received encouraged them to seek medical care:

Once I heard what people around me were saying about my situation, I became determined to visit the hospital. (DELAY: ID5)

Non-delays. Other persons encouraged seeking a provider evaluation: the non-delayers received information and encouragement from persons around them because they spoke to these persons soon after noticing the abnormalities. This then led to their seeking a provider evaluation:

I went to the hospital because my husband told me to go. (NON-DELAY: ID4)

Worsening of symptoms

Delays. Worsening symptoms: the delayers appropriately assessed their symptoms after noticing them. When the symptoms worsened or when the symptoms that they found difficult to manage appeared, the patients decided to seek medical care:

I sought provider evaluation after I noticed that my left and right breasts had developed different shapes. (DELAY: ID2)

I sought provider evaluation because the pain did not go away and I couldn't stand it any longer. (DELAY: ID5)

Surrounding circumstances

Delays. Not wanting to be a nuisance to anyone: the delayers prioritized maintaining harmonious relationships with others and those around them over their own concerns. It was important to the delayers that their seeking a provider evaluation would not cause trouble for anyone else:

[I sought provider evaluation] because I wasn't working at the time. If I had just started working when the pain became intense, I probably would have not taken time off work and simply endured the pain. (DELAY: ID3)

DISCUSSION

To the best of the authors' knowledge, this study is the first to identify the factors that serve as barriers to, and triggers for, help-seeking behavior in Japanese female patients with breast cancer. These factors were determined through a comparison of delayers and non-delayers.

Barriers to seeking a provider evaluation

A particularly interesting point in this study was the fact that it was identified that “not disclosing the situation they found themselves in” was a barrier to seeking a provider evaluation. A failure to disclose their symptoms to others makes it difficult for patients to obtain cooperation and information from others, which then makes them more liable to postpone seeking a provider evaluation (Burgess, Ramirez, Richards, & Love, 1998). In particular, Japanese persons place more importance on their relations with others than on themselves (Miyashita, Sanjo, Morita, Hirai, & Uchitomi, 2007). Patients do not disclose their situation to others because they do not want to place a burden on those around them, as was observed in the participants in this study. In this study, the unmarried women had a higher rate of delaying. Perhaps, one might argue that this could be explained by the fact that unmarried women do not have anyone to consult with, to seek help from, and they also lack support.

Those delayers who were experiencing difficult “living conditions” postponed dealing with health problems because they were unable to address them immediately. The delayers had many problems, which complicated seeking a provider evaluation. Previous studies reported the delay as a multidimensional problem (Unger-Saldaña & Infante-Castaneda, 2009). Comprehensive intervention is necessary in order to prevent the prolonged seeking of a provider evaluation.

Some delayers reported that they decided to let things take their natural course without actively seeking a provider evaluation. This belief has a cultural component. African-Americans have been reported to be likely to postpone seeking medical care because of their belief in fatalism (Jones *et al.*, 2014). Chinese-Americans tend to

select traditional Chinese remedies over “Western medicine” (Facione *et al.*, 2000). In Europe and the USA, putting off seeking a provider evaluation also has been reported to be related to the belief that God has abandoned the patient (Facione, 2002). The participants in the present study said that instead of seeking medical treatment, they would rather let things take their natural course, which indicates that in Japan, attitudes based on “belief in nature” have an effect on delays. Ensuring that physicians have a deep understanding of the individual beliefs of their patients regarding medical examinations and treatment is therefore important in encouraging persons to seek a provider evaluation.

An inaccessibility to medical facilities is a barrier to help-seeking behavior. Okinawa, where this survey was carried out, is an island region that includes remote islands. There is no breast cancer specialist in these remote islands and therefore visits to a specialized facility require a plane or boat trip. Due to the geographic conditions, which individuals have no control over, the women have to manage several factors related to their daily life, including time and financial burdens, which in turn increase the risk of help-seeking delay. Previous studies have reported that accessibility to medical facilities has an effect on help-seeking behavior (Unger-Saldaña & Infante-Castaneda, 2009). The authors believe that it is necessary to change the infrastructure and reform government social policies in remote island areas. In addition to the physical inaccessibility of medical facilities, their psychological remoteness is also a barrier to seeking a provider evaluation. A previous study identified having a sense of shame toward male physicians (Khakbazan *et al.*, 2014; Montazeri *et al.*, 2003) as a factor that led to psychological distance. Considering that the present study identified having unpleasant healthcare-related experiences in the past as a factor that prevents seeking a provider evaluation, it is important for medical personnel to be aware of the effect that their relationship with patients has on the help-seeking behavior of the latter.

In this study, symptoms that cannot be definitely linked to breast cancer (Khakbazan *et al.*, 2014), anxiety and fear (Gould, Fitzgerald, Fergus, Clemons, & Baig, 2010), avoidance coping behaviors when faced with difficult situations (Nosarti, Crayford, & Roberts, 2000), and the interpretation of a low risk (Facione, 2002; McEwan *et al.*, 2014) were identified as factors that prevent seeking a provider evaluation. These factors are common to all countries and must be considered when investigating policies that are designed to prevent delays in seeking a provider evaluation.

Based on the above discussion, the authors believe that the results of this study can be useful in the development of a program that is designed to prevent delays in seeking a provider evaluation in patients with breast cancer.

Nursing implications

Focusing on the factors that lead to seeking a provider evaluation, not only in non-delayers but also in delayers, is important to the development of nursing care support techniques that are designed to prevent delays in seeking such an evaluation.

In this study, obtaining information and direct encouragement from others encouraged both the delayers and the non-delayers to seek a provider evaluation. This finding is consistent with the results of previous studies (Poum, Promthet, Duffy, & Parkin, 2014; Taib, Yip, & Low, 2011; Unger-Saldaña & Infante-Castañeda, 2011). Two characteristics that are particular to Asian cultures were prioritizing harmonious relationships with others when seeking medical care and tending to solve problems in cooperation with others (Obeidat, Homish, & Lally, 2013). In this study, the obtained results were similar to those in other Asian countries, which indicates that, in Japan as well, the intervention of other persons is an important factor that encourages seeking a provider evaluation.

Limitations of the study

The participants in this study were limited to patients at general hospitals in two areas in Okinawa, Japan. Therefore, there might have been a bias in the data related to the regional and background characteristics of the patients. In addition, because this was a retrospective study, the accuracy of the data could be lower than that of prospective research.

However, this work was successful in obtaining basic data that are related to the help-seeking behaviors of Japanese female patients with breast cancer. Further investigation with a more representative sample and quantitative prospective research with more respondents are necessary and would be useful in the development of nursing strategies to shorten delays.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

M. O. designed the study, gathered and analyzed the data, and wrote the manuscript ; M. K. also designed the study, interpreted the data, and supervised the research project.

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