

Survey on the Consciousness of Japanese Women Regarding Dense Breasts on Mammography

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Abstract

Patients with dense breasts on mammography have a higher risk of developing breast cancer and missing a tumor mass than those with non-dense breasts. Whether examinees who have dense breasts should be notified is currently under consideration in Japan; however, there is concern about the low level of understanding regarding dense breasts. A questionnaire survey on the degree of comprehension regarding dense breasts was conducted among 409 general women of >20 years of age in Hachinohe city in October 2017 and 2018. The results showed that the degree of comprehension was extremely low, as only 35 people (8.5%) responded with, "I know the meaning"; however, 32 of them (91.5%) stated that they would like to be notified in they had dense breasts. In addition, the degree of comprehension regarding dense breasts was significantly greater among those who had a breast cancer screening history (OR = 6.4; 95% CI = 2.0 - 19.8; P = 0.001) and a self-examination history than among those with no such history (OR = 2.5; 95% CI = 1.1 - 5.8; P = 0.03). However, the degree of comprehension did not differ between participants of <40 and ≥40 years of age or between participants with and without a breast cancer sufferer among their close blood relatives. The present findings to reflect a low understanding of dense breasts on mammography screening and suggest that the degree of comprehension is influenced by the presence or absence of a consultation history and a self-examination history.

Keywords

Dense Breasts, Comprehension, Notification, Breast Cancer Screening, Japan

1. Introduction

Although screening mammography is the only examination that has been proven to lead a decrease in the mortality rate of breast cancer patients [1] [2], it is difficult to detect mass lesions in patients with dense breasts [3]. Thus, the topic of dense breasts has been a frequent point of discussion since screening mammography was introduced for Japanese women in their 40 s [4] [5]. The screening sensitivity in patients with dense breasts is lower than that in patients with non-dense breasts [6]. The proportion of Japanese women with dense breasts is approximately 40%; importantly, 54.9% - 68.8% of Japanese women in their 40 s have dense breasts [7]. For this reason, the patient association wished to notify examinees with dense breasts. In 2018, the Ministry of Health, Labor and Welfare of Japan recommended that the recommendation of uniform notifications is premature. However, according to the survey, the notification of women with dense breasts had already been implemented by 13.5% of the 1700 municipalities that responded, and 7.8% of the municipalities that had not implemented this practice expected to do so in the future [8].

Currently, there is no evidence-based standard for the handling notifications regarding dense breasts. The practice varies from country to country. Notification has not been implemented in any countries in Europe [9]. In the United States, legislation on the notification of mammary gland density was enacted in 2009 (Breast Density Notification Laws), and 31 of the 50 states notify women about dense breasts [10]. A review reported that most women with dense breasts in the United States were unaware that they had dense breasts, and that some women do not understand the meaning of the term “dense breasts” [11]. Dense breasts are recognized as a risk factor for breast cancer [12]. Thus, more people feel uneasy about the risk of developing breast cancer when they learn about their mammary gland density [13]. It is possible that a low level of understanding regarding dense breasts, leads to increased anxiety and additional examinations. In Japan, the degree of comprehension regarding dense breasts is not clear. In addition, women under 40 of age will soon be subject to mammography and it is important to assess whether or not they understand the concept of dense breasts. However, little research has been done to investigate the actual level of understanding.

The aim of this study was to clarify the degree of comprehension regarding dense breasts, the wishes of women regarding notification about dense breasts, and the factors influencing the degree of comprehension regarding dense breasts among women older than 20 years of age.

2. Methods

2.1. Study Participants and Survey Method

This study examined women ≥ 20 years of age who visited a shopping mall in Hachinohe, and who agreed to participate in the questionnaire survey (the place of residence was not specified). We surveyed 187 women in October 2017 and 241 women in October 2018. Nineteen women who had been investigated at both points were excluded, giving a final sample of 409 women. The data were collected by four surveyors who were medical radiologists and clinical laboratory technicians. They asked the participants the questions on the sheet and filled in their answers. The questionnaires included three major items: 1) participant characteristics (age, birth experience, breast-feeding experience, presence of breast cancer sufferers among close blood relatives); 2) behavior regarding breast cancer screening (history of breast cancer screening, interval of examination, content of examination); and 3) questions related to dense breasts (degree of comprehension regarding dense breasts, sources of information about dense breasts, wishes regarding dense breast notification). The sources of information on dense breasts were only investigated in 2018.

This study received the approval of the Ethics Committee of the Graduate School of Health Sciences, Hirosaki University (Reference number: 2017-035). The choice to participate in the survey was freely made. The purpose of the survey was explained and informed consent was obtained from the study participants, including consent to participate and to publish the findings.

2.2. Data Analyses

The breast cancer screening behavior was compared between participants of <40 years of age and those of ≥ 40 years of age using the χ^2 test. The relationship between the degree of comprehension regarding dense breasts and the characteristics of the participants and the history of breast cancer screening was analyzed using a multivariate logistic regression analysis. The degree of comprehension regarding dense breasts was the objective variable. Participants were classified into three groups according to their degree of comprehension regarding dense breasts. Those who responded “I know the meaning of the term” were considered to understand the term, while those who responded that “I have only heard the term” and “I do not know the meaning of the term” were considered to not understand the meaning of the term and were grouped together. Four items were included as explanatory variables: <40 and ≥ 40 years of age, presence of breast cancer sufferers among close blood relatives (first-degree and second-degree relatives), history of breast cancer screening, and history of breast self-examination. All statistical analyses were performed using the Excel (Microsoft, Redmond, WA, USA) and R (version 2.8.1, The R Foundation for Statistical Computing, Vienna, Austria) software programs. P-value of <0.05 was considered to indicate statistical significance.

3. Results

3.1. Participant Characteristics

Table 1 shows the characteristics of the participants; 37.6% of the participants were in their 30 s and 22.7% were in their 40 s; these 2 groups accounted for 60.3% of the overall population. Among the participants 91.9% of the women had birth experience 89.2% had breast-feeding experience, and 13.0% had a breast cancer sufferer among their close blood relatives (first-degree and second-degree relatives; grandmother or aunt, 54.7%; mother, 30.2%).

3.2. Breast Cancer Screening Behavior

Table 2 shows the breast cancer screening behavior. In Japan, mammography screening for breast cancer is targeted at women ≥ 40 years of age. Therefore, we compared women < 40 years of age who were not targets of mammography screening and those ≥ 40 years of age who are targets. In the overall population, 57.5% of the women had experienced breast cancer screening, 49.8% of these women underwent regular screening (every year or every other year). 43.8% of the women received mammography alone, 13.2% of the women received ultrasonography alone, and 43.0% of the women received both. In the overall population, 53.8% of women performed self-examinations, with 20.0% performing self-examinations monthly. When the women were divided according to their

Table 1. Participant characteristics.

		n (%)	
Age	20 s	54	(13.2)
	30 s	154	(37.6)
	40 s	93	(22.7)
	50 s	35	(8.6)
	60 s	49	(12.0)
	70 s+	24	(5.9)
Birth experience	Yes	376	(91.9)
	No	33	(8.1)
Breastfeeding experience	Yes	365	(89.2)
	No	44	(10.8)
Presence of breast cancer sufferers	Yes	53	(13.0)
Among close blood relatives	mother	16	(30.2)
	sister	7	(13.2)
	children	1	(1.9)
	grandmother/aunt	29	(54.7)
	No	356	(87.0)
n = 409			

Table 2. Breast cancer screening behavior.

	Overall ^a n (%)	<40 ^b n (%)	≥40 ^c n (%)
Have you ever undergone breast cancer screening? screening? examination?			
Yes	235 (57.5)	69 (33.2)	166 (82.6) ^d
Interval of examination			
regularly	117 (49.8)	32 (46.4)	85 (51.2) ^d
sometimes	50 (21.3)	14 (20.3)	36 (21.7) ^d
previous once	68 (28.9)	23 (33.3)	45 (27.1) ^d
Content of examination			
mammography	103 (43.8)	18 (26.1)	85 (51.2) ^d
ultrasonography	31 (13.2)	27 (39.1) ^d	4 (2.4)
both	101 (43.0)	24 (34.8)	77 (46.4) ^d
No	174 (42.5)	139 (66.8) ^d	35 (17.4)
Do you conduct breast self-examination?			
Yes	220 (53.8)	93 (44.7)	127 (63.2) ^d
Interval of examination			
monthly	44 (20.0)	15 (16.1)	29 (22.8) ^d
sometimes	176 (80.0)	78 (83.9)	98 (77.2)
No	189 (46.2)	115 (55.3) ^d	74 (36.8)

^an = 409; ^bn = 208; ^cn = 201; ^dP < 0.05 < 40 vs. ≥ 40.

age (<40 and ≥40 years of age), the percentages of women ≥ 40 years of age with a history of breast cancer screening and self-examination were 82.6% and 63.2%, respectively. The percentages of women with a history of breast cancer screening and self-examination in this age group were significantly larger in comparison to the women of <40 years of age (P < 0.05). Among women who were <40 years of age, 33.2% of the participants had a history of breast cancer screening, with 46.4% undergoing regular screening. Ultrasonography was the most frequent mode of examination; only 26.1% received mammography alone. Among women of <40 years of age, 44.7% of the participants performed self-examinations, with 16.1% performing monthly examinations.

3.3. Degree of Comprehension Regarding Dense Breasts and Desires Regarding Notification

Figure 1 shows the degree of comprehension regarding dense breasts among the overall population, women of <40 years of age and women of ≥40 years of age. We divided and compared women < 40 years of age who were not targets of mammography screening and those ≥ 40 years of age who were targets. **Figure 2** illustrates the desires of the respondents regarding notification about dense breasts. Regarding the degree of comprehension among women of all ages, 8.5% indi

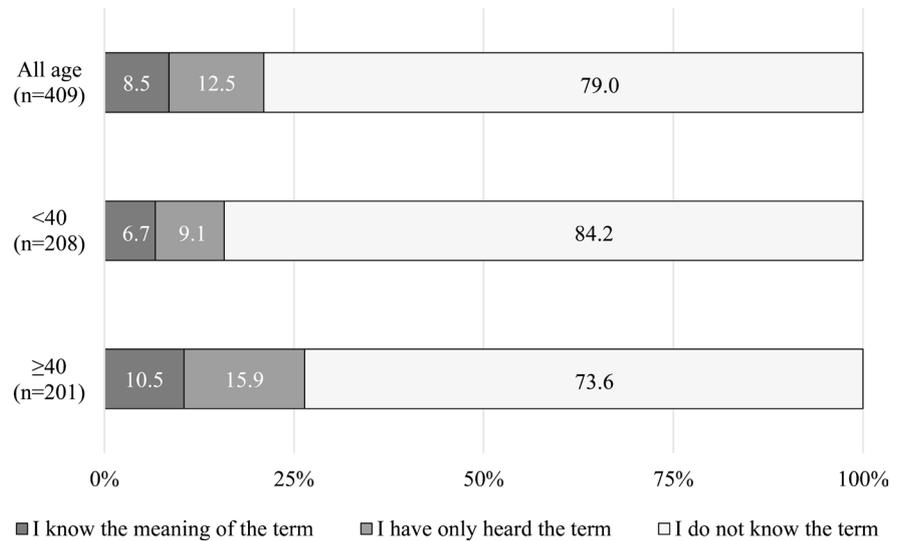


Figure 1. Degree of comprehension regarding dense breasts (n = 409). We conducted a survey in which subjects were asked if they knew the meaning of the term “dense breasts”? As a result, 35 people (8.5%) indicated that they knew the meaning of the term, 51 people (12.5%) indicated that they had only heard the term, and 323 people (79.0%) indicated that they did not know the term. Among the participants of <40 years of age, 14/208 (6.7%) indicated that they understood the term “dense breasts”, and 19/208 (9.1%) indicated that they had only heard the term. Among the participants of >40 years of age, 21/201 (10.5%) indicated that they understood the term and 32/201 (15.9%) indicated that they had only heard the term.

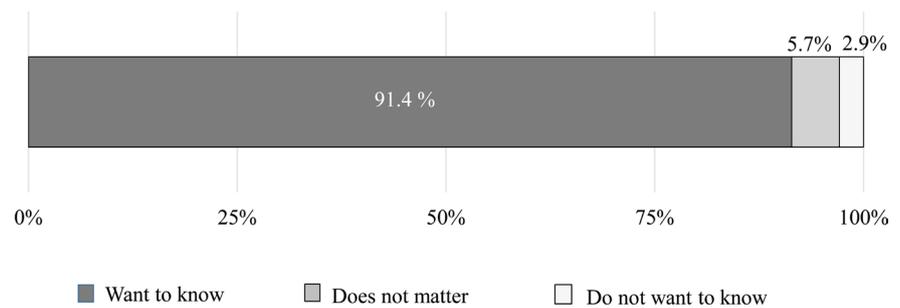


Figure 2. Desires regarding notification (n = 35). A survey was conducted of 35 people who indicated that they knew the meaning of dense breasts. When asked “If you were judged to have dense breasts, would you wish to be notified?”, 32 people (91.4%) indicated that they would want to know, 2 (5.7%) indicated that it did not matter (either way), and 1 person (2.9%) indicated that they would not want to know.

cated that they knew the meaning of the term, 12.5% had only heard the term, and 79.0% did not know the term. Among women of <40 years of age, 6.7% understood the term, 9.1% had only heard the term, and 84.2% did not know the term. Among women of >40 years of age, 10.5% understood the term, 15.9% had only heard the term, and 73.6% did not know the term (Figure 1). Sources of information regarding dense breasts included media (TV/magazines) 60.0%, the place of examination 6.7%, and other 33.3%.

Among the women who knew the meaning of the term “dense breasts”, we examined the proportion of women who indicated that they wished to be noti-

fied about dense breasts. As a result, if it was judged 91.4% would want to know if they had dense breasts, 5.7% indicated that it would not matter, and 2.9% indicated that they would not want to know (**Figure 2**).

3.4. Factors Related to the Degree of Comprehension Concerning Dense Breasts

Table 3 shows the factors related to the degree of comprehension regarding dense breasts among the characteristics of participants and the behavior of breast cancer screening. A correlation was identified between the degree of comprehension and a history of breast cancer screening and self-examination. The degree of comprehension was significantly greater among women with a breast cancer screening history than in those with no breast cancer screening history (OR = 6.4; 95% CI = 2.0 - 19.8; $P < 0.05$), and those who had a self-examination history than in those with no self-examination history (OR = 2.5; 95% CI = 1.1 - 5.8; $P < 0.05$). However, there was no significant difference in the degree of comprehension of dense breast between participants of <40 and ≥ 40 years of age, between participants with and without a breast cancer sufferer among their close blood relatives.

4. Discussion

In this study, we conducted a survey to investigate the comprehension regarding dense breasts among women (over 20 years of age) in the general population. Although we found that the degree of comprehension regarding dense breasts was low, most of the women who understood the meaning indicated that they would like to be notified if they were found to have dense breasts. Furthermore, the degree of comprehension was related to the history of breast cancer screening and self-examination.

A previous study in the United States reported that 58% of women “had heard” about dense breasts, 62% “had heard” about the risk of dense breasts, and 49% - 53% “knew” about the risk of dense breasts [14] [15]. However, a recent study reported that women who “knew” about the risk of dense breasts tended to increase [16]. The degree of comprehension regarding dense breasts in this study population was extremely low in comparison to the United States. This discrepancy is due in part to differences in breast cancer screening behavior among

Table 3. Relationship to the degree of comprehension on dense breasts

		Odds ratio	95% CI		P-value
			low	up	
<40 vs. ≥ 40		0.7	0.3	1.5	0.39
Breast cancer sufferers	Yes vs. No	1.4	0.6	3.2	0.48
Examination history	Yes vs. No	6.4	2.0	19.8	0.001
Self-examination history	Yes vs. No	2.5	1.1	5.8	0.03

participants in the study. Participants in the study in the United States, 83.3% - 91% received breast cancer screening within 1 - 2 years [14] [15]. In this study, 42.3% (85/201) of participants over 40 years old regularly received for breast cancer screening.

Factors reported to be related to the understanding of dense breasts were reported to include age, academic background, income, race/ethnicity, which are also factors that influence whether patients undergo breast screening examinations [11]. In this study and a previous study, comprehension of the term “dense breasts” was associated with a breast cancer screening history [17]. A close relationship can be presumed to exist between the comprehension of the term “dense breasts” and breast cancer screening history. However, more than half of the participants indicated that the media was their source of knowledge on dense breasts, and few were indicated that they received information from the place of examination. Thus, many of the participants who understood the term “dense breasts” did not receive their information from the place of examination. The participants who understood the term “dense breasts” were presumed to be interested in breast cancer screening.

The breast cancer screening rate in Japan is 41%, which is lower than the rate in the United States (80.8%; OECD, Health Statistics 2017 [18]). In addition, as a result of this survey, the degree of comprehension regarding dense breasts among women of <40 years of age was lower than among women of ≥40 years of age. In order to improve the degree of understanding regarding dense breasts, it is necessary for women, including young women, to have more interest in breast cancer screening.

This study revealed that a large percentage of women would wish to be notified if they had dense breasts. In the United States, a survey indicated that 43% of women had an increased feeling of unease about developing breast cancer when they were informed that they had dense breasts [13]. Furthermore, notification was associated with an increase in the number of additional examinations [19]. There is a possibility that notification may be a cause of unease for the examinee and lead to an increase in additional examinations. Further studies are needed to investigate approaches regarding the notification of women with dense breasts.

This study is associated with some important limitations. The data were small and only obtained from one area of the countryside in Japan. In the future, consideration should be given to making the sample size more appropriate. The present findings, therefore, cannot be generalized to studies conducted in other regions of Japan. However, it was confirmed that these research data were similar to the data from Kawasaki City obtained by the examination committee of cancer screening of the Ministry of Health, Labor and Welfare. The data from Kawasaki City showed that, of the 1064 women who received a medical examination, 10.1% - 20.2% understood the meaning of breast density [20]. According to the data from the present study, 13.2% of women who had a breast cancer

screening history understood the meaning of dense breasts. This suggests that the degree of understanding the meaning of dense breast does not differ by area. Also, the breast cancer screening rate in the surveyed region is almost the same as the average breast cancer screening rate in Japan [18].

5. Conclusion

Our investigation showed that the degree of comprehension regarding dense breasts was low, but that most women would wish to be notified of dense breasts. It is important that many women improve their understanding of dense breasts, become interested in breast cancer screening, and undergo breast cancer screening.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix

Question item	Selection item
Q1 Age	<input type="checkbox"/> 20 s <input type="checkbox"/> 30 s <input type="checkbox"/> 40 s <input type="checkbox"/> 50 s <input type="checkbox"/> 60 s <input type="checkbox"/> 70 s+
Birth experience	<input type="checkbox"/> YES <input type="checkbox"/> NO
Breastfeeding experience	<input type="checkbox"/> YES <input type="checkbox"/> NO
Q2 Have you ever undergone breast cancer screening?	<input type="checkbox"/> YES
What content of examination did you receive?	<input type="checkbox"/> Mammography only <input type="checkbox"/> Ultrasonography only <input type="checkbox"/> Both <input type="checkbox"/> NO
What is the interval of examinations?	<input type="checkbox"/> Regularly (every year & every other year) <input type="checkbox"/> Sometimes <input type="checkbox"/> Previous once
Q3 Do you know "dense breasts"?	<input type="checkbox"/> I know the meaning the term <input type="checkbox"/> I had only heard the term <input type="checkbox"/> I do not know the term
If you know the meaning, where?	<input type="checkbox"/> Consultation <input type="checkbox"/> Media (TV·Magazine) <input type="checkbox"/> Acquaintance <input type="checkbox"/> Other ()
If you know the meaning, would you wish to be notified?	<input type="checkbox"/> I would want to know <input type="checkbox"/> It did not matter <input type="checkbox"/> I would not want to know.
Do you know that ultrasound can also breast cancer screening?	<input type="checkbox"/> YES <input type="checkbox"/> NO
Q4 Do you conduct breast self-examination?	<input type="checkbox"/> Monthly <input type="checkbox"/> Sometimes <input type="checkbox"/> NO
If you answer NO, why?	<input type="checkbox"/> Bothersome <input type="checkbox"/> Forget <input type="checkbox"/> I do not know how <input type="checkbox"/> I'm scared to find <input type="checkbox"/> Unnecessary
Q5 Do you have presence of breast cancer sufferers among close blood relatives	<input type="checkbox"/> YES <input type="checkbox"/> Mother <input type="checkbox"/> Sister <input type="checkbox"/> Children <input type="checkbox"/> Grandmother/aunt <input type="checkbox"/> NO