

# Would Women Who Have Been Informed About Automated Breast Ultrasound Prefer This Method to Hand-held Ultrasound?

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## ABSTRACT

**Objective:** To search, whether women would prefer a new method after they have been informed about automated breast ultrasound (US) examination, their perspective on technological developments and whether they make decisions based on their psychological and physical conditions.

**Methods:** Between 17.02.2023-17.03.2023, 118 women have visited our clinic for breast examination and 91 of them filled the questionnaire-based survey and have been included into the study. Questions of the survey consisted of three parts. Questions related to hand-held breast US were: "Do you feel relaxed while chatting with the physician during the examination?", "Do want to get information from the physician during or after the US examination?", "Do the physician's facial expressions have an effect on you?". Questions related to automated US were: "Would you change your mind if there was pain while the procedure was applied and your breasts were compressed?", "Would you think that this machine will give you more detailed information because it is a newer technology?", "Does any machine need to be widely used to be reliable or does it need to be available in a low number of imaging clinics?". Questions related to both methods were: "Does it make any difference to you whether the physician performs the procedure or not?", "Do you have any tolerance level for the duration of the US examination?", "Do you decide according to your own preference or the preference of the physician who referred you to have an US examination?".

**Results:** Mean age was 47.8 (22-74). Twelve out of 91 (13.1%) women had a history of breast cancer in their family. Seventy nine (86.8%) had a previous breast examination. Previous interventional procedures such as cyst aspiration or biopsy were applied for 5 (5.4%) women. When evaluating the questions about the physician as yes/no; the ratio of 'yes' answer was very high: Do want to get information from the physician during or after the US examination? (97.8% vs. 2.1%), Do you feel relaxed while chatting with the physician during the examination? (82.4% vs. 17.4%), Do the physician's facial expressions have an effect on you? (83.5% vs. 16.4%), does it make any difference to you whether the physician performs the procedure or not (83.5% vs. 16.5%). When both examinations were evaluated jointly; the ratio of the women who do not care about the duration of the procedure was higher than the ratio of who care (85.7% vs. 14.2%), and who care about the decision of the physician who refers her was higher than her own choice (80.1% vs. 19.7%).

**Conclusion:** Breast imaging is quite important and stressful for women. A significant number of the women care about obtaining information about the examination and being in direct contact with the physician as well as getting the results of the examination. However; although automated breast examination is a new technology and is not used very commonly in our country; it has been evaluated as testable for women.

**Keywords:** Automated US, hand-held US, breast imaging, ultrasonography

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## INTRODUCTION

While technological developments are advancing rapidly in our age, new breast imaging techniques are being added day by day. The fact that breast cancer (BC) is the most common cancer in women and that early diagnosis reduces BC-related deaths and changes in the course of treatment play an important role in the rapid increase in developments.

In addition to mammography, ultrasonography (US) is used in BC screening. US can detect early stage, small invasive cancers that cannot be detected on mammography in women with dense breast parenchyma (1,2). However, the hand-held breast US (HHBUS) examination, which is used as a standard today, has some disadvantages. These disadvantages shown in some studies include dependence on the physician performing the procedure, its being time consuming for radiologists, high false-positive rates, and not being cost-effective (2-5). Due to these disadvantages, the use of automated three-dimensional breast US has been increasing in breast imaging clinics recently. Automated breast US (ABUS) allows the image to be stored digitally and is not user dependent and provides technical standardization (6-8).

The aim of this prospective study was to evaluate whether women would prefer a new method for breast US examination after being informed about ABUS examination, their distance from technological developments, and whether they decide according to their mental and physical conditions.

## METHODS

Between 17.02.2023 and 17.03.2023, 118 women who were admitted to our clinic for breast US examination were evaluated. Foreign nationals were not included in the study due to problems that might arise from incomplete communication and women with a history of BC and/or implants were not included in the study due to the lack of data on ABUS application.

An anonymous questionnaire was prepared by an experienced breast radiologist who had worked with several different ABUS devices. The forms were made available only in Turkish, printed on paper. All of the women who were admitted to our clinic were asked to fill out a questionnaire consisting of personal information (age, "do you have BC or does one of your relative have BC?", "do you have any complaint about your breast?", "has an interventional procedure been applied to the breast before?") before the breast US examination and the data were recorded routinely. Information on personal characteristics used in the study was obtained from these forms. The questionnaire form prepared for this study was filled by the physician who would perform the HHBUS examination and who was also the investigator, after giving a brief verbal information about the ABUS. The physician also explained what the survey questions were about and informed

that it would take approximately 7-8 minutes to answer. Women participated in the survey voluntarily and no coercion was applied to those who could not complete the survey.

It was stated that the questions of the questionnaire were aimed at the differences between the two methods, even if the ABUS device was used instead of the HHBUS device available in the clinic. Then, about the ABUS, it was told that the radiology technician would perform the imaging similar to mammography (but the evaluation would be done by the physician on the screen and the whole breast image might be saved), that the process might take longer than HHBUS, and that there might be pain because the breast would be compressed during the procedure, but the general procedure was found to be tolerable. It was told that these devices were not widely used and that they were available in a limited number of centers in Turkey.

The questions consisted of three groups: those related to HHBUS, those related to ABUS, and those that were related to both. The questions related to HHBUS were as follows: "Does the conversation with the doctor relax you?", "Do you want to get information from the doctor during or after the US examination?", and "Does the facial expression of the doctor affect you during the procedure?". The questions related to ABUS were as follows: "Does compression of the breast and its being a painful procedure change your decision about the imaging method used?", "Do you think that ABUS gives more detailed information because the device is a new technology?" and "Which is reassuring? Widely usage of a device or its use in a limited number of centers?" The questions regarding both procedures were as follows: "Does it make any difference to you if the doctor performs the procedure or not?", "Do you have a tolerance level for the duration of the US examination?" (if possible, <10-15 minutes or I don't care about the time) and "do you act according to the preference of the doctor who referred you or according to your own preference when having an imaging examination?".

Descriptive statistics, numbers and percentage distributions were used for statistical analysis. İstanbul Medipol University Non-Interventional Clinical Research Ethics Committee approved the study (decision no: 178, date: 16.02.2023). Consent for the study was obtained from the patients.

### Statistical Analysis

When the answers regarding HHBUS were evaluated as yes/no; the rate of patients who answered "yes" was found to be very high: "Do you want to get information from the doctor during or after the procedure?" (97.8% vs. 2.1%), "Does the conversation with the doctor relax you?" (82.4% vs. 17.4%), "Does the facial expression of the doctor affect you?" (83.5% vs. 16.4%) and "Does it make a difference for you if the doctor or technician does the extraction?" (83.5% vs. 16.5%).

When both processes were evaluated jointly, the rate of those who said "I don't care about the time" in terms of tolerance level was found to be higher than those who said "I care" (85.7% vs. 14.2%). The rate of those who said "I care about the doctor's preference" when choosing for the procedure was found to be higher than those who said "I act according to my own preferences" (80.1% vs. 19.7%).

## RESULTS

Of the women not included in the study, 5 had breast cancer, 12 were foreign nationals, and 8 had silicone. Two women over 75 years old, one was not included in the study because she was non-cooperative and the other thought she could not fill out the questionnaire. A total of 91 out of 118 women were included in the study.

When the sociodemographic characteristics of the women were evaluated, the mean age was 47.8 (22-74). Twelve (13.1%) women had a family history of breast cancer. The number of those who had breast imaging before was 79 (86.8%). Five (5.4%) women had previously undergone an interventional procedure as biopsy or cyst aspiration.

While only 3 (3.2%) out of 91 women were primary school graduates, 8 (8.7%) were high school graduates, 80 (87.9%) women were university graduates. While only 2 (2.1%) women lived in the small city, 89 (97.8%) women lived in İstanbul.

Seventy six out of 91 women, 76 women (83.5%) stated that they would prefer the doctor to perform the imaging, and 89 (97.8%) stated that they would like to get information about the procedure.

While talking with the physician was comforting for 75 (82.4%) women, 76 (83.5%) women stated that the facial expression of the physician affected them.

Twenty-three women stated that they would not want a painful procedure, whether they previously had a mammogram or not. Of the women, 53 (58.2%) stated that ABUS would give better information because it was a new technology, while 61 (67%) stated that it was more reassuring to have the device in fewer centers.

While making a choice for the procedure, 73 (80.1%) women stated that they cared about the preference of the referring physician. The majority of them (61/91) stated that they only considered the preference of the physician. In terms of duration, there were 13 (14.2%) women who said that they would like the procedure to take a short time, while 78 (85.7%) women stated that they would not care about the duration (Tables 1-3).

## DISCUSSION

Breast imaging is very important and also stressful for women (9,10). Anxiety levels are usually high during the procedure, but sometimes even days before the procedure. During HHBUS examination, women are curious about what the examining physician will say, and they may sometimes look into the eyes of the physician or carefully examine the physician's facial expressions. Although there were not enough studies in the literature on this subject, it was shown in a study that while anxiety levels were high before breast US was performed, the level of anxiety decreased significantly when information about the procedure was given after the procedure (11).

**Table 1. Answers for the questions about hand-held breast ultrasonography**

	n=91 (%)
<b>Do you want to get information from the doctor during or after the procedure?</b>	
Yes	89 (97.8%)
I would like to receive information during the procedure	57
I would like to receive information when the process is completed	30
I would like both	2
No (I get information from the doctor who referred me)	2 (2.1%)
<b>Does having a conversation with a doctor during the procedure relax you?</b>	
Yes	75 (82.4%)
Absolutely	69
I do not want to interrupt the examination, otherwise it does	6
It does not matter	13 (14.2%)
No	3 (3.2%)
<b>Does the doctor's facial expression affect you?</b>	
Yes	76 (83.5%)
Always	63
Sometimes	13
No	15 (16.4%)

**Table 2. Answers for the questions about automated breast ultrasonography**

	n=91 (%)
<b>Do you think it gives better information because it is a new technology?</b>	
Yes	53 (58.2%)
No	10 (10.9%)
I can't decide/I don't know	28 (30.7%)
<b>Does compression of the breast and pain affect your decision?</b>	
Yes, it affects	23 (25.2%)
No, it does not affect	68 (74.7%)
<b>Does the widespread use of a device or the fact that it is used in a limited number of centers give confidence?</b>	
Its widespread use	7 (7.6%)
Its use in a limited number of centers	61 (67.0%)
I can't decide/I don't know	23 (25.2%)

**Table 3. Answers for the questions about both methods**

	n=91 (%)
<b>Do you have a tolerance level related to the duration of the US examination?</b>	
I prefer it to last a short time (less than 10-15 minutes)	13 (14.2%)
I don't care about the time	78 (85.7%)
<b>Does it matter if a doctor or a technician is performing the imaging?</b>	
Yes, I want the doctor to perform the imaging	76 (83.5%)
Absolutely, the doctor should perform the imaging	72
It is better if the doctor performs the imaging	4
No, it does not matter	14 (16.4%)
Technician can perform the imaging	1 (1.0%)
<b>Is the preference of the referring physician or your own preference important when conducting a US examination?</b>	
Doctor's preference	61 (67.0%)
My own preference	18 (19.7%)
Both of my and the doctor's preference	12 (13.1%)
US: ultrasonography	

It is reassuring for women to be in direct contact with the physician and to receive information about their breasts during or after the procedure in countries where the physician performs the US procedure, as in our country (6,12). In this study, 83.5% (76/91) of the women stated that they would prefer the doctor to perform the imaging, and 97.8% (89/91) of them would like to get information about the procedure. Conversation with the physician was found to be relaxing for 82.4% (75/91) of the women. One of the important results of this study was that the facial expression of the physician affected 83.5% (76/91) of the women. When the answers about HHBUS were evaluated, the rate of those who gave 'Yes' answer was very high.

The use of ABUS for both screening and diagnostic purposes is increasing (13-15). A method must be accepted by the female population, especially when it will be used for screening purposes (12). There are few studies evaluating the perspective of the procedure and the tolerance of the patients after having the ABUS procedure (6,12,16,17). The most important disadvantage of ABUS is the feeling of discomfort due to pressure and pain. However, it was shown to be less painful in one study compared to mammography (18). Considering all these studies, the procedure was generally found to be tolerable. In this study, it was told to the patients that the procedure could be painful and could take a long time, but it was emphasized that it was tolerable in these respects. In terms of breast compression and a painful procedure,

23 women (25.2%) stated that they would not want a painful procedure, whether they previously had a mammogram or not. Although the ability to save the whole breast image is an important advantage of ABUS, it may be viewed with suspicion in women because it is a new technology. However, it was seen in this study that more than half of the women (53/91) with a rate of 58.2% stated that ABUS would give better information because it was a new technology and that they would prefer a new technology instead of the traditional method and would like to try it. It was emphasized that while the widespread use of a device was not important for most women in terms of trust, it was more important to trust the center where the device was located and the physician who referred them. In such a situation, having the device in fewer centers was more reassuring for 67% (61/91) of women.

Patients are admitted to imaging clinics, usually by referral from different clinics. And if they trust the referring physician, they also trust the center where they will undergo the imaging. It was also seen in this study that while making a choice for the procedure, 80.1% (73/91) of the women stated that they cared about the preference of the physician who referred them. The majority of them (67%) stated that they only considered the preference of the physician. In terms of the duration of the procedure, the rate of those who said "I don't care about the duration" was very high (85.7% vs. 14.2%).

### Study Limitations

Some of the limitations of this study could be listed as follows: The number of participants was relatively small and the questionnaire was administered in the light of the verbal information given, taking into account the advantages and disadvantages of the ABUS device, which was not routinely used in daily practice. However, the aim of the study was to assess how well the device would be accepted before placing it in the clinic. On the other hand, the reason why a new technology was viewed so positively might be that while patients were informed that the ABUS device was a new technology, they were not informed about the results in breast cancer detection.

### CONCLUSION

It may be helpful to survey patients before placing a new device in imaging clinics. Especially in terms of breast imaging, a significant portion of women care about getting information about the examination and being in direct contact with the physician as much as they care about the result of the examination.

**Ethics Committee Approval:** İstanbul Medipol University Non-Interventional Clinical Research Ethics Committee approved the study (decision no: 178, date: 16.02.2023).

**Informed Consent:** Consent for the study was obtained from the patients.

**Peer-review:** Externally peer-reviewed.

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