

## Summary

**Introduction.** Breast cancer is the most common malignant tumor among women in Poland and globally. Breast self-examination (BSE) is a key element in promoting knowledge about breast cancer, and numerous studies confirm the important role it plays in the early diagnosis of breast cancer. Insufficient knowledge and ignorance of the BSE technique turns out to be the main barrier for many women. Therefore, measures should be taken to educate in the field of breast cancer prevention and promote breast self-examination. The varied demand for health education results from intergenerational differences. The increase in the expectations and needs of patients means that mobile medical applications are increasingly focused on personalization, adapting to the individual needs of users. Many scientists point to the significant role that mobile medical applications play and can play in the future in order to increase knowledge and awareness of health behaviors, including the prevention and early detection of breast cancer.

**The aim of the thesis** is to analyze the functionality of the proprietary educational medical application in promoting breast self-examination.

**Material and methods.** The research was conducted among female residents of the Podkarpackie Province aged 18+: the study group consisted of 500 women from the Podkarpackie Province. The target group of 500 women was randomly divided into groups II: I - test group of 250 people (subjected to the intervention); II - a control group of 250 people (no intervention). The division into groups was made randomly. The software used in the application assigned alternately people to groups I and II. The first person using the application was assigned to the first group, then all persons using the application in the order as odd numbers were subjected to intervention, while the second person and all other subjects in the order as even numbers were not subjected to intervention. The research used the method of on-line diagnostic survey and on-line tactile test. The following data collection tools were used: Z. Juczyński's Health Behavior Inventory (IZZ), Z. Juczyński's Health Criteria List (LKZ), Z. Juczyński's Generalized Self-Efficiency Scale (GSES), Breast cancer risk survey questionnaire by Dr. Wiesław Różycki-Gerlach. Proprietary survey questionnaire check your knowledge about breast cancer, Proprietary survey

questionnaire 10 information about me, Proprietary interactive tactile test. The research was carried out in the period March 2018 - February 2019.

**Results.** Studies have shown that the number of points indicated on the breast, both in measurement I and II, depended solely on the knowledge of women ( $p < 0.001$ ). The higher the estimated risk of developing breast cancer, the more points in the first measurement were indicated by the women in the touch test ( $p = 0.0122$ ). The research showed that with the increase in the result of the level of knowledge about cancer (1st measurement), the frequency of marked points in the tactile test (1st measurement) significantly increases ( $\chi^2 = 103.684$ ,  $df = 12$ ,  $p < 0.001$ ). The data analysis showed a very strong statistically significant correlation, which indicates that with the increase in the result of the level of knowledge about cancer (1st measurement), the frequency of marked points in the touch test (2nd measurement) significantly increases ( $\chi^2 = 95.832$ ,  $df = 12$ ,  $p < 0.001$ ). The more points marked on the "breast" in the touch test during the 1st measurement, the higher the level of knowledge in the 2nd measurement, ( $\chi^2 = 59.651$ ,  $df = 12$ ,  $p < 0.001$ ). The lower the level of knowledge of the subjects in the second measurement, the less they mark points on the "breast" in the touch test during the second measurement ( $\chi^2 = 24.073$ ,  $df = 9$ ,  $p = 0.004$ ). The higher the level of knowledge in measurement II, the greater the number of points indicated in the tactile test in measurement II, both in total ( $p < 0.001$ ) and the study group ( $p = 0.004$ ) and the control group ( $p < 0.0001$ ). There were statistically significant differences between the measurements ( $p < 0.001$ ) in the scope of correct responses in the knowledge test about breast cancer between the studied groups. The level of knowledge increased significantly ( $p < 0.05$ ) in both groups between the measurements, but this applies to women to a greater extent from the test group. The differences between the number of points indicated in study I and the results of study II were statistically significant ( $p < 0.0001$ ) - 3 points or less - was mentioned more often in study I (27.2%) than in study II (15.8%). In study II, 7-13 points were indicated more often than in study I, or above 13 points. Based on the conducted analysis, it was also shown that the amount of the examined breast surface (number of fields) in the touch test by individual users of the application increased between the measurements in both groups, which supports the effectiveness of the intervention. It was shown that in the study group significantly more points were marked during the 2nd measurement than in the control group ( $\chi^2 = 53.448$ ;  $df = 6$ ;  $p < 0.0001$ ).

**Conclusions.** Medical application can play a vital role in promoting breast self-examination. The application of the intervention significantly increased the amount of the examined area of the breast in the touch test. The higher the level of knowledge about breast

cancer, the more often these people declare breast self-examination. People with a higher risk of developing breast cancer do better on the touch test, but not on the breast cancer knowledge test. Knowledge about breast cancer has changed significantly in women using Sam's proprietary application, I test between measurements, and the intervention applied resulted in a greater increase in the level of knowledge. The use of the intervention significantly influences the development of the ability to perform breast self-examination in the touch test, and personalization significantly increases this skill among application users. The number of points indicated on the breast in the touch test, both in measurement I and in measurement II, depended solely on the knowledge of women. The number of hours spent on the Internet per day by application users is not related to the level of their knowledge about breast cancer. Insufficient knowledge and ignorance of the BSE technique turns out to be the main barrier for many women. Mobile medical applications benefit from epidemiological threats, and the current global epidemiological situation in connection with the SARS-CoV-2 virus pandemic is the best example of this.

**Postulates.** Further research should focus on what interventions to use to improve the way women of all age groups are motivated to exercise BSE. The development of medical applications for self-examination of the breast should focus on the possibility of verifying the skill of three-stage compression of the examined breast and the amount of the examined breast surface. It is reasonable to conduct further research using this application on a national basis. Education in the field of breast cancer and BSE prevention should be regularly updated in order to maintain a consistently high level of knowledge and skills in this field.

**Keywords:** breast self-examination, mobile applications, women's health, breast cancer