ORIGINAL ARTICLE

Annals of Agricultural and Environmental Medicine 2025, Vol 32, No 3, 411–417
www.aaem.pl

The health locus of control and the declared health behavior concerning breast cancer prevention – comparison of Polish women living in urban and rural areas

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A – Research concept and design, B – Collection and/or assembly of data, C – Data analysis and interpretation, D – Writing the article, E – Critical revision of the article, F – Final approval of the article

Ciuba A, Kulpa M, Nitsch-Osuch A. The health locus of control and the declared health behavior concerning breast cancer prevention – comparison of Polish women living in urban and rural areas. Ann Agric Environ Med. 2025;32(3):411–417. doi:10.26444/aaem/204854

Abstract

Introduction and Objective. Health behaviour is a set of activities that affect an individual's well-being and attitude toward health. These behaviours are shaped by socio-demographic characteristics, social circumstances, cultural background, personality traits, and the mass media. The health of an individual is largely determined, among other factors, by his/her actions, decisions, and the resulting outcomes. The health locus of control affects an individual's adherence to health-related recommendations. The aim of the study is to examine the association between the health locus of control and declared health behaviours in Polish women in the setting of breast cancer prevention.

Materials and Method. The study included 407 women between the age of 45 and 69 years (mean: 54.86, SD: 6.718), selected using convenience sampling. The research was conducted at the Medical University of Warsaw between March 2021 – May 2022, using convenience sampling. The research tool was a survey consisting of an author-designed questionnaire, the Multidimensional Health Locus of Control Scale, and the Health Behaviour Inventory Correlation analysis between scales from HBI questionnaire and scales from MHLC-B questionnaire was conducted.

Results. Correlation analysis showed that the internal health locus of control was positively correlated with healthy nutrition habits, preventive behaviours, and positive adjustment. Additionally, the external health locus of control was also positively correlated with preventive behaviours, positive adjustments, and health-promoting practices. In contrast, a higher belief in the influence of chance was inversely correlated with healthy nutrition habits and positive adjustment.

Conclusions. Psychological factors influencing women's attitudes towards preventive behaviours can help in the planning of preventive measures. An increase in the internal health locus of control may translate into a higher participation rate in population-based screening programmes.

Key words

Internal-external control, public health, health behaviour, breast cancer

INTRODUCTION

The World Health Organization (WHO) defines health as 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity' [1]. Health behaviour refers to a set of activities that have both direct and indirect effects on an individual's health and well-being, and reflect a formed attitude toward health. Health behaviours are defined as 'any intentional action taken by an individual aimed at perpetuating or enhancing health potential, regardless of its effectiveness' [2]. This area also encompasses various personal attributes, including actions and habits (maintaining, improving, and recovering health), motives, expectations, beliefs, perceptions, personality characteristics (such as emotional states and traits), and patterns of overt behaviour. In addition, five classes of health-promoting behaviours have been identified in the literature: 1) traffic safety (e.g., seat belt use, sobriety, safe speed); 2) positive health practices (e.g., physical activity, tooth brushing and oral health, adequate sleep, use of sunscreen); 3) avoidance of harmful substances; 4) preventive behaviours (e.g., medical checkups, blood pressure monitoring, breast self-examination, cytological examinations, mammography, testicular self-examination), 5) eating habits (e.g., number of meals; consumption patterns of meat, fruit, salt, and animal fat) [3].

In 2011, Machteld Huber, a Dutch researcher, proposed the concept of positive health, which she defined as 'the ability to adapt and to self-manage, and to elaborate perceived indicators of health in order to make the concept measurable' [4, 5]. Huber emphasized that health is a dynamic process determined by individual and subjective factors. The positive health model includes six dimensions of health, which represent an individual's resources and potential: physical functioning, mental health and psychological resilience, a sense of meaning in life and control over health, quality of life, social functioning and openness to experiences, and the ability to cope with the challenges of daily life. This concept

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Received: 11.11.2024; accepted: 09.05.2025; first published: 04.06.2025

is consistent with the principles of personalized medicine, marking a shift from the traditional biomedical model of health toward a more holistic and positive approach. This supports a broader understanding of health as an interaction between individuals and their intrapsychic resources, as well as biological, psychological, social, and environmental factors. Factors such as psychological resilience, social support, health locus of control, and stress management skills have attracted increasing attention in the context of individual health. Their analysis is becoming essential for assessing both health status and health behaviour, which in turn influence engagement in preventive measures. Incorporating mental and social dimensions enables a comprehensive approach to health, which is particularly important in areas such as healthcare, health promotion, and public health [4, 5].

Socio-demographic factors, social circumstances, cultural background, personality traits, and mass media play an important role in shaping health behaviour. The health of an individual is determined, among other factors, by his/her actions, decisions, and the resulting outcomes. Establishing health-promoting habits in childhood is important, as they will be reflected in adulthood. Appropriate health behaviours help maintain health, improve well-being, and cope with illness and its consequences. The health locus of control affects an individual's adherence to health-related recommendations.

The health locus of control is a concept that includes two main types: internal and external. An internal health locus of control refers to the belief that one's health is primarily determined by personal actions and behaviours. People with a dominant internal locus tend to be more assertive in physician-patient interactions, more autonomous in making health-related decisions, and show a stronger sense of personal responsibility for their health. This type of person is associated with pro-health behaviours and better self-assessment of both physical and mental health [6, 7].

An external health locus of control refers to the belief that one's health is influenced by external factors, such as chance or the actions of others. This perspective can lead individuals to delegate responsibility for their health, potentially reducing motivation to engage in preventive and health-promoting behaviours. This is more commonly observed in individuals with chronic illnesses; however, this orientation can also positively impact the treatment process and adherence to medical recommendations, particularly when trust is placed in a physician's guidance. From a therapeutic standpoint, the most favourable scenario is when a patient presents a mixed locus of control, with a strong belief in both external influences and their own ability to take effective health-related actions [6].

The incidence of breast cancer in Poland is increasing, while mortality rates have not decreased [8]. Despite the availability of population-based screening programmes and growing awareness among women, participation in preventive mammography remains low, with only a 29.32% population coverage [9]. This may be influenced by individual factors, such as health locus of control, which is shaped through social learning and the modeling of health behaviours. Identifying and addressing these factors could lead to increased participation in population-based interventions.

OBJECTIVE

The aim of the study is to examine the association between health locus of control and declared health behaviours in Polish women aged 45–69 years in the context of breast cancer prevention. Additionally, it compares selected psychological factors between participants living in urban and rural areas. The outcome variables were health locus of control and health behaviour, with place of residence (rural/urban) as a covariate.

MATERIALS AND METHOD

Study group. The study included 407 women aged between 45–69 years (mean, 54.86 ± 6.718). This survey study was conducted as part of a doctoral thesis at the Medical University of Warsaw, Poland, between March 2021 – May 2022. Participation in the survey was voluntary and anonymous.

Sample size calculation. The calculation of the minimum sample size indicated that 385 female respondents would be sufficient to achieve a representative sample. However, due to the nature and scope of the study, a convenience sampling method was used. The size of the study group was calculated using the following assumptions: an estimated proportion of 50%, a significance level (α) of 5%, a population size of 6,427,420 (women aged between 45–69 years, based on the Central Statistical Office of Poland, 2024), and a permissible margin of error of 5%.

Selection of the study group. The survey was conducted on paper using snowball selection, and electronically using computer-assisted web interviewing (CAWI).

Bioethics Committee: The study was approved by the Bioethics Committee at the Medical University of Warsaw (Approval No. KBE/47/2021).

Research tools. Research tools included an author-designed questionnaire, and standardized questionnaires of the Psychological Test Laboratory of the Polish Psychological Association: 1) the Multidimensional Health Locus of Control Scale version B (MHLC-B) by Kenneth A. Wallston, Barbara S. Wallston, and Robert DeVellis (adapted by Zygfryd Juczyński); and 2) the Health Behaviour Inventory (*Inwentarz Zachowań Zdrowotnych* – IZZ) by Zygfryd Juczyński.

The author-designed questionnaires was created to identify demographic and sociological factors influencing women's enrollment in preventive mammography screening in Poland. The survey consisted of 40 questions, divided into 12 thematic areas including: socio-demographic data, (e.g., age, place of residence, educational level, marital status, occupational situation, mode of work, gynaecological-reproductive history, lifestyle and subjective assessment of health, knowledge of breast cancer, family history and reactions to illness of loved ones, participation in screening, breast self-examination practices, opinions on the recommended frequency of examinations, opinions on barriers to preventive measures, presented health behaviours and experience of breast cancer. All the above areas allowed the calculation of two main variables: 'Pro-health behaviour' and 'Awareness of prevention possibilities'.

The Health Behaviour Inventory (HBI) consists of 25 statements about health-related behaviour. Responses are rated on a 5-point Likert scale, where 1 indicates 'almost never' and 5 indicates 'almost always'. Based on the reported frequency of these behaviours, the intensity of 4 health behaviour subscales is determined: 1) Healthy Habits Nutrition (HHN); 2) Preventive Behaviours (PB); 3) Positive Adjustments (PA); and 4) Health Practices (HP). The HHN subscale refers to the type of food consumed. Preventive Behaviours involve adherence to health recommendations and seeking information related to health and disease. Health Practices encompass daily routines related to sleep, recreation, and physical activity. The PA subscale includes psychological factors that support coping with stress and maintaining emotional balance. Each dimension is scored from 1–30 points, with higher scores indicating greater severity of health behaviour. According to the authors of the questionnaire, its application—along with other tools—can support the development of preventive measures by identifying areas for improvement and tracking changes in health practices. The results of the study were compared to the results of the standardization group of the Polish population of adults aged 20–65 included in the test manual. Normative data is presented separately for men and women which allows for a comparison of results by gender of the respondents [10].

The Multidimensional Health Locus of Control (MHLC-B) contains 18 statements that reflect generalized expectations across 3 dimensions: 1) Internal – the belief that an individual has control over their own health; 2) Powerful Others – the belief that one's health is determined by the influence of others, especially medical personnel; and 3) Chance – the belief that health is determined by chance. Responses are rated on a 6-point Likert scale (1 – strongly disagree; 6 – strongly agree). The score within each dimension ranges from 6–36 points, with higher scores indicating a stronger belief. The MHLC-B scale is used in health promotion and disease prevention programs. Its premise is based on the belief that an internal health locus of control strengthens health-promoting behaviour. People with this orientation are generally more likely to engage in physical activity, reduce smoking, limit the intake of alcohol and other harmful substances, control their body weight, prevent HIV infection, and avoid other health risks.

The results of the study were compared to the results of the standardization group of the Polish population of adults aged 20–65 included in the test manual. Normative data is presented separately for men and women which allows for a comparison of results by gender of the respondents [10].

Statistical analysis: The 'Pro-health behaviour' and 'Awareness of prevention possibilities' variables were calculated from the survey responses based on the key provided by the authors. Outcome variables from the standardized questionnaires were computed according to their respective instructions and diagnostic keys. Statistical analysis was conducted using the R software (version R-4.1.2). Categorical variables were described using absolute and relative frequencies. Numerical variables were summarized using basic descriptive statistics: mean ± standard deviation or median with interquartile range, depending on the normality of distribution. Normality was assessed using the Shapiro-Wilk test and further verified through skewness and kurtosis. Homogeneity of variance was tested with the Levene's test. Participants from urban and rural areas were compared using the Student-t test, Welch-t test, or Mann-Whitney U test, as appropriate. Correlation analysis between the HBI and MHLC-B scales was conducted using the Pearson method, based on the normal distribution of variables. Statistical significance was set at $\alpha = 0.05$.

The characteristics of the study group are presented in Table 1.

Table 1. Characteristic of the study group

Variable		Frequency (N)	Percentage of valid responses (%)		
City size	Inhabitants	64	15.8		
	City up to 50,000 inhabitants	76	18.8		
	City 50,000–150,000 inhabitants	56	13.8		
	City 150,000–500,000 inhabitants	30	7.4		
	City above 500,000 inhabitants	179	44.2		
	Total	405	100		
	Variable	Frequency (N)	Percentage of valid responses (%)	Rural residents (N)	Urban residents (N)
Education	Vocational	25	6.1	7	18
	Secodary	108	26.5	17	90
	Higher	274	67.3	40	233
	Total	407	100	64	341
Marital status	Single/ unmarried	30	7.4	2	28
	Informal relationship	22	5.4	2	20
	Married	245	60.2	46	197
	Divorced	73	17.9	12	61
	Widow	37	9.1	2	35
	Total	407	100	64	341
Employment status	Active	334	82.1	52	280
	Unemployed	4	1.0	0	4
	Retired	55	13.5	10	45
	Pensioner	14	3.4	2	12
	Total	407	100	64	341

RESULTS

The majority of women reported that they lead a healthy lifestyle (289 [72.1%] vs 112 [27.9%]). In response to a self-assessment of health on a scale of 1–10 (with 1 being the lowest and 10 the highest), the average rating was 7.12.

The results of the HBI and the MHLC-B scale for the study group are presented in Table 2.

A weak positive correlation was observed between the MHLC-B Internal subscale score and the HHN ($r = 0.17$, $p < 0.01$), PB ($r = 0.20$, $p < 0.001$), and PA ($r = 0.23$, $p < 0.001$) subscale scores of the HBI. In addition, a weak-to-moderate

Table 2. Descriptive statistics based on the Health Behaviour Inventory and MHLC-B scale

Variable	N	Min.	Max.	M	SD	Me
Health Behaviour Inventory						
HHN [1–30]	361	9.00	30.00	22.15	4.41	22.00
PB [1–30]	359	10.00	30.00	22.33	4.38	23.00
PA [1–30]	361	8.00	30.00	21.77	4.16	22.00
HP [1–30]	361	6.00	30.00	20.62	3.97	21.00
MHLC						
Internal [6–36]	366	10.00	36.00	24.96	5.37	25.00
Powerful others [6–36]	366	6.00	36.00	19.84	5.97	20.00
Chance [6–36]	367	6.00	36.00	17.83	6.32	17.00

HHN – Healthy Habits Nutrition; PB – Preventive Behaviours; PA – Positive Adjustments; HP – Health Practices

positive correlation was observed between the MHLC-B Powerful Others score and the PB ($r = 0.38$, $p < 0.001$), PA ($r = 0.18$, $p < 0.01$), and HP ($r = 0.15$, $p < 0.01$) scores. On the other hand, a weak inverse correlation was noted between the MHLC-B Chance and HHN ($r = -0.17$, $p < 0.01$) and PA ($r = -0.11$, $p < 0.05$) scores (Tab. 3).

Table 3. Correlation analysis between Health Behaviour Inventory and MHLC-B scale outcomes

Variable	MHLC-B Internal [6–36]		MHLC-B Powerful others [6–36]		MHLC-B Chance [6–36]	
	r	p	r	p	r	p
Health Behaviour Inventory						
HHN [1–30]	**0.17**	**0.002**	0.05	0.365	**-0.17**	**0.002**
PB [1–30]	**0.20**	**< 0.001**	**0.38**	**< 0.001**	0.01	0.891
PA [1–30]	**0.23**	**< 0.001**	**0.18**	**0.001**	**-0.11**	**0.047**
HP [1–30]	0.07	0.202	**0.15**	**0.005**	-0.01	0.913

HHN – Healthy Habits Nutrition; PB – Preventive Behaviours; PA – Positive Adjustments; HP – Health Practices.
r – Pearson correlation coefficient

Comparison of respondents from cities and respondents from villages. The PB score was significantly lower among women from cities compared to those from villages (MD (mean or median difference (patients from cities vs patients from villages) = -1.74, 95% CI [-2.98;-0.50], $p < 0.01$). No significant differences were noted for other HBI subscales (HHN: $p = 0.516$, PA: $p = 0.055$, HP: $p = 0.220$). A difference in MHLC-B scores was identified only for the Internal dimension, which was significantly lower among women from cities (MD = -2.09, 95% CI [-3.60;-0.57], $p < 0.01$. No significant differences were found for the other MHLC-B dimensions (Powerful Others: $p = 0.086$, Chance: $p = 0.486$). A significant difference was also observed for the 'Pro-health behaviour' scale, with lower scores among women from cities (MD = -0.50, 95% CI [-1.50;-0.50], $p < 0.01$). The 'Awareness of prevention possibilities' score did not differ significantly between participants from urban and those from rural areas ($p = 0.879$) (Tab. 4).

DISCUSSION

Health is a fundamental societal value, irrespective of gender, occupation, or social role. Health control highlights the importance of health-promoting habits and caring for one's overall well-being.

The internal locus of control suggests that health is largely determined by an individual's own efforts. In this study, the mean level of internal health locus of control was 24.9, which was similar to the population norm of healthy women described in the questionnaire manual. However, it was lower than population norm of menopausal and post-mastectomy women. Women after mastectomy often have higher health behaviour indices (associated with diet, physical activity, etc.) related to stronger internal health locus of control, and post-menopausal women who prioritize symptom management through hormone therapy or lifestyle changes [11]. Thus, these women are more likely to believe their health outcomes are determined by their own actions and behaviours.

Individuals with the external locus of control largely believe that health is influenced by others, particularly physicians and the healthcare system. In contrast, those who believe that health depends on chance, attribute responsibility for their health to random external factors. In this study, the mean score for the Powerful Others dimension was 19.8, and for Chance – 17.8, with both scores being significantly lower compared to the reference groups of healthy controls and postmenopausal women after mastectomy.

Table 4. Comparison of selected variables between participants from cities and participants from villages

Variable	Participants from cities (n = 341)	Participants from villages (n = 64)	MD (95% CI)	P
Health Behaviour Inventory				
HHN [1–30], M ± SD	22.08 ± 4.50	22.50 ± 3.93	-0.42 (-1.68;0.85)	0.516
PB [1–30], M ± SD	22.06 ± 4.42	23.80 ± 3.88	-1.74 (-2.98;-0.50)	**0.006**
PA [1–30], M ± SD	21.60 ± 4.29	22.57 ± 3.25	-0.97 (-1.96;0.02)	0.055[1]
HP [1–30], M ± SD	20.52 ± 4.04	21.23 ± 3.52	-0.71 (-1.84;0.43)	0.220
MHLC-B				
Internal [6–36], M ± SD	24.63 ± 5.43	26.72 ± 4.75	-2.09 (-3.60;-0.57)	**0.007**
Powerful others [6–36], M ± SD	19.63 ± 5.86	21.11 ± 6.50	-1.48 (-3.17;0.21)	0.086
Chance [6–36], M ± SD	17.94 ± 6.46	17.30 ± 5.58	0.64 (-1.16;2.43)	0.486
Pro-health behaviour scale, Me (IQR)	4.00 (2.50;5.25)	4.50 (3.50;5.71)	-0.50 (-1.50;-0.50)	**0.001**[2]
Awareness of prevention possibilities scale, M ± SD	11.06 ± 3.95	11.14 ± 3.87	-0.08 (-1.14;0.97)	0.879

HHN – Healthy Habits Nutrition; PB – Preventive Behaviours; PA – Positive Adjustments; HP – Health Practices; M – mean; SD – standard deviation; Me – median; IQR – interquartile range; MD – mean or median difference (patients from cities vs patients from villages), CI – confidence interval. Comparisons conducted with Student's t test, Welch's t test[1], or Mann-Whitney U test[2], as appropriate.

The majority of healthy mid-life women exhibit a moderate external health locus of control, reflecting a balanced trust in the medical system without excessive reliance on it. The lower average level of perceived influence of chance in the study group suggests a stronger rejection of fatalistic views regarding health. As a result, these women may be at a lower risk of engaging in harmful behaviours, such as smoking or non-compliance with medical recommendations. The above findings are in line with the results of research by Gibek & Sacha (2019) [12].

The average HHN score in the study group was 22.1, which is comparable to the results observed in the reference group of healthy women and healthy adults. Similar results were found for the PB and PA dimensions, with average scores of 22.3 and 21.77, respectively. The average HP score was the lowest among all dimensions, averaging 20.6 in the study group. This HP score was lower compared to those reported in healthy adults and menopausal women. Interestingly, Khademi et al. (2024) found that perceived limitations in behavioural control hinder the adoption of healthy habits and the pursuit of a healthy lifestyle [13]. This aligns with a study by Botha and Dahmann (2024), who reported that the internal health locus of control impacts both physical and mental well-being, and thereby influences overall health outcomes [14].

The correlation analysis of health behaviours and health locus of control showed that:

1) the internal health locus of control was positively correlated with HHN, PB, and PA scores. This is in line with a study of Kulpa et al. (2022), who found that the higher levels of internal health locus of control correlated with higher engagement in PB, and positive PA in oncology patients [15];
2) the external health locus of control was positively correlated with PB, PA, and HP scores. When it comes to participation in preventive screening, the external health locus of control is not always a poor predictor. Women who exhibit this orientation are more likely to believe that external factors, rather than their own actions, determine their current health status. This can be leveraged by involving them in educational initiatives, distributing informational campaigns about preventive screenings, and ensuring easy access to such services. They are more inclined to trust experts who, during the educational process, identify appropriate preventive measures rather than relying on their own actions or opinions. Given their reasonable belief that good health depends on medical intervention, they may be less likely to question the value of preventive examinations and more willing to participate. For this group, key requirements include the organization of accessible screening programmes, effective health promotion, and high-quality health education delivered through primary healthcare centres [16–18];
3) a higher intensity of belief in the influence of chance was negatively correlated with HHN and PA scores. This is in line with a systematic review by Dogonchi et al. (2022), which indicated that the external health locus of control often correlates with negative health behaviours and poorer psychological status [19].

The current study found that women from urban areas had significantly lower PB scores, internal locus of control, and pro-health behaviour scores compared to those from rural areas. Higher PB scores among women from villages may be associated with increased engagement in preventive health actions. These higher scores reflect greater adherence to medical recommendations and a more active search for information on health and disease prevention. One possible explanation for these findings is that the medical care provided in villages is based on local health centres where healthcare professionals often known their patients for many years, providing care from birth to old age. This long-standing, close relationship between physician and patient may increase patient confidence in medical recommendations and preventive measures. Women in rural areas also showed a higher intensity of internal health locus of control compared to those in urban areas. This may be related to the greater diffusion of responsibility for health in urban areas, where wider access to medical care and a broader choice of facilities can lead to more frequent changes in providers. Such changes may result in greater anonymity for the patient and make long-term health monitoring more difficult. In smaller communities, environmental influence on behaviour, including health-promoting behaviour, is more readily observed. High awareness of health-promoting activities in rural areas may encourage regular self-assessment and health-promoting behaviours. Psychological mechanisms associated with social conformity and respect for authority figures may also support the maintenance of positive health behaviours. The power of example, group actions, and community affiliation can serve as strong predictors of sustained health behaviours, particularly when such behaviours are promoted within the community [20, 21].

The authors of the HBI define PB as adhering to health recommendations and obtaining information about health and illness [10]. Gacek (2011) reported that certain behaviours among peri-menopausal women (aged 45–55 years) differ depending on the place of residence. Women living in urban areas demonstrated higher levels of recreational physical activity, a greater preference for frequent consumption of wholemeal bread, a higher prevalence of smoking and alcohol consumption, and a stronger tendency to use constructive coping strategies in difficult situations compared to women in rural areas [22].

Kuprewicz et al. (2016) investigated preferred health behaviours and knowledge about colorectal cancer among residents from urban and rural areas. Urban residents showed higher levels of knowledge about cancer and its prevention. Additionally, the majority of urban participants exhibited a high level of health behaviour, while most people living in rural areas showed a low level of health behaviour [23]. Seń et al. (2019) found that both women living in rural and urban areas demonstrated high levels of general health behaviours, including the HHN, PB, PA, and HP dimensions. Women living in rural areas scored significantly higher than those living in urban areas in all dimensions. In addition, women living in rural areas had significantly higher PA scores related to health behaviours and quality of life, especially in somatic and social areas [24].

Individuals with an internal locus of control tend to take greater responsibility for their own health, are more likely to participate in preventive examinations, and are more inclined to adopt health-promoting behaviours. This is because they place a high value on health in their personal hierarchy of values. In contrast, an external locus of control, characterized

by the belief that health is determined by others or by chance, is generally not conducive to health and can lead to lower personal responsibility for health. Individuals with this orientation are often passive and dependent on healthcare providers to manage their health. Research shows that people who do not engage in health behaviours tend to believe that they have no personal impact on their health [25]. On the other hand, a strong sense of internal locus of control fosters health-promoting behaviours and healthy eating habits [7, 14, 19, 26]. Among individuals who place a high value on health, health locus of control has been shown to correlate with health-promoting behaviours [27].

In Poland, preventive programmes aimed at education as well as disease detection and prevention have been accessible for years. However, the percentage of women presenting for mammography screening is lower than expected. This may indicate that the high level of knowledge about the importance of prevention does not translate into pro-health behaviours and habits. While access to health knowledge may be sufficient, certain psychological and sociological conditions must be met to translate this knowledge into behaviour. Factors such as health beliefs, opinions, attitudes, trust in medical care, the quality of physician-patient relationships, and individual health competence must be considered to increase participation in preventive interventions [20].

Strengths of the study

1. The use of the CAWI as a research tool made it possible to reach a large number of female respondents, despite the limitations imposed by the COVID-19 pandemic. It also reduced the time and costs of the project.
2. The study addresses an important topic and explores the psychological factors contributing to low participation rates in preventive mammography. The findings may support the development of tailored health promotion strategies.
3. The results may help identify weak points in the organization of breast cancer prevention measures in Poland, suggesting that educational and preventive activities should be adapted to different groups of women, based on their psychological profile. Such an approach might significantly improve the effectiveness of prevention programmes.

Limitations of the study

1. The main limitation of the study was the COVID-19 pandemic, which forced the researchers to include an electronic survey, despite the original plan to use only the paper-pencil method, and reach respondents directly. With self-administered surveys, there is a risk that participants may not understand the questions, which can lead to invalid responses and the need to reduce the final sample size.
2. The sample included a disproportionately high number of individuals with certain characteristics (e.g., respondents with higher education), resulting in limited representativeness of the study group.
3. Another limitation is the use of the author-designed questionnaire, because the lack of a validated diagnostic key, psychometric validation, and literature references hinders a reliable interpretation and comparison of results.
4. Finally, the study used the snowball sampling method for participant recruitment. Although this approach facilitated access to a hard-to-reach population, it may have introduced selection bias and thus limited the generalizability of the findings.

CONCLUSIONS

Health locus of control is an important psychological variable that influences health behaviours and motivation to maintain health. Considering psychological factors that affect women's attitudes towards preventive behaviours – such as participation in mammography screening – may support the effective planning of preventive measures. Strengthening the internal health locus of control in women may translate into a higher participation rate in population-based screening programmes.

The health locus of control in women in the context of breast cancer prevention is an important issue that requires attention from both the healthcare system and the women themselves. The use of tools such as the MHLC-B questionnaire can help identify barriers to and motivations for health-oriented measures. It is also crucial to increase public awareness about the importance of regular examinations and health education, which can lead to a reduction in breast cancer morbidity and an improvement in women's quality of life. The MHLC-B questionnaire can be useful in assessing women's attitudes toward health and their tendency to engage in preventive measures. Research shows that women with higher levels of knowledge about risk factors and preventive methods are more likely to participate in regular screening.

Acknowledgment

The study was conducted thanks to a grant (Grant Agreement No. 1/2021) awarded through the Oncogrants IV competition organized by the Polish Cancer League – Polska Liga Walki z Rakiem in Warsaw, Poland.

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