

## Impact of Health Locus of Control on Breast Cancer Screening Beliefs and Psychological Flexibility among Women: Mediating Role of Cancer Stigma.

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Breast cancer is a significant global health concern, with 2.3 million women diagnosed and 670,000 deaths recorded in 2022 (Arnold et al., 2024). This disease affects women of all ages, with increasing rates observed in later life. The objective of this study is to comprehensively explore the multifaceted domain of women's health, with particular emphasis on addressing the significant challenge posed by breast cancer. Utilizing a descriptive research design and a purposive sampling method, data were collected from 239 women aged 20 to 50 in Chennai and Bangalore through validated self-report questionnaires, including the Multidimensional Health Locus of Control (MHLC), Breast Cancer Screening Beliefs Questionnaire (BCSBQ), Acceptance and Action Questionnaire II (AAQ-II), and the Cancer Stigma Scale (CASS). Statistical analyses revealed significant differences in breast cancer screening beliefs and knowledge across different Health Locus of Control (HLOC) orientations. Women with a Chance HLOC exhibited lower knowledge and greater barriers to mammography compared to those with Internal and External HLOC. The findings also highlight the mediating role of cancer stigma in the relationship between HLOC and psychological flexibility, suggesting that stigma can hinder women's adaptive responses to health-related challenges. Moreover, demographic factors, particularly age, were found to influence psychological flexibility and HLOC. While the study provides valuable insights into the dynamics of health beliefs and behaviours among women, limitations such as the sample size and reliance on self-report measures suggest the need for further research to enhance generalizability and explore additional psychological constructs.

**Keywords:** Health Locus of Control, cancer stigma, psychological flexibility, women's health, Breast cancer screening beliefs.

Women's health is a multifaceted issue influenced by a myriad of factors, including social determinants, hormonal changes, and lifestyle habits. Understanding these factors is crucial in addressing women's access to healthcare services and improving overall well-being. Social determinants, such as income, education, and age, significantly impact women's health outcomes. Access to healthcare services, preventive screenings, and treatment options are often determined by these factors. Ahlgren, Melbye, Wohlfahrt, and Sorensen (2003) highlight how high birth weight, early age at peak growth, and other

factors during childhood can independently increase the risk of breast cancer, emphasizing the importance of early intervention and healthcare access.

Hormonal changes throughout a woman's life play a pivotal role in cancer development. Oestrogen exposure, particularly during puberty, pregnancy, and menopause, has been linked to an increased risk of breast cancer (Vachon et al., 2010). These hormonal fluctuations underscore the importance of hormone-related cancer prevention strategies, such as hormone therapy and lifestyle modifications.

Cancer, a chronic disease characterized by long-term complex treatment and substantial physical and psychological burdens, stands as a life-threatening condition with a high incidence, destruction of integrity, and a notable risk of recurrence (Fitzmaurice et al., 2015). The formidable impact of cancer on individuals' lives necessitates a global focus on understanding and addressing specific types of cancer, such as breast cancer, which ranks as the second most common cancer among women worldwide (Bray et al., 2018).

In 2020 alone, breast cancer affected a staggering 2.3 million women worldwide, leading to 685,000 deaths (Bray et al., 2018). In the year 2018, breast cancer comprised 32.8% of all cancer cases in women within India for the specified age group. The incidence of breast cancer reaches its peak in the 50 to 69 age group, accounting for nearly 46.5% of all cases. Subsequently, in the age group of 70 years and above, there is a decline in reported cases. It's worth noting that this reduction may be associated with life expectancy factors rather than an actual decrease in occurrences. During this period, 21,892 women succumbed to breast cancer in the age group of 25 to 49 years. Despite significant strides in early detection and treatment, breast cancer remains a persistent health challenge, retaining its status as the leading cause of death among women. Recognized risk factors for breast cancer encompass aging, obesity, alcohol use, radiation exposure, family history, and reproductive history. The presence of gene mutations, notably BRCA1, BRCA2, and PALB-2, significantly escalates the risk of developing breast cancer (American Cancer Society, 2009).

The American Cancer Society underscores the critical role of early detection programs, emphasizing the importance of tools like mammography and clinical breast examination (CBE) in reducing death rates.

The World Health Organization (WHO) further emphasizes the need for comprehensive breast cancer early detection programs that are intricately linked with effective medical therapies to enhance survival rates on a global scale.

Despite their significance, barriers to the utilization of breast self-examination (BSE), clinical breast examination (CBE), and mammography among women are attributed to factors such as lack of knowledge, social influences, confidence issues, attitudes towards breast cancer, and perceived susceptibility to breast cancer. Screening beliefs is influenced by cultural, social, and psychological factors, are critical determinants of women's intentions and behaviors regarding screening (Sarma, 2015; Talbert, 2008).

Delving into the individual realm, the concept of health locus of control (HLOC) elucidates individuals' beliefs regarding their influence over health outcomes, playing a pivotal role in shaping health behaviors and decision-making (Steca et al., 2020; Centers for Disease Control and Prevention, 2016). Originating from the influential study by Wallston, Wallston, Kaplan, and Maides, the development of the Health Locus of Control (HLC) Scale highlighted the connection between locus of control and health behavior (Wallston et al., 1978). However, the exploration of this construct within the context of breast cancer screening beliefs remains a crucial avenue for investigation. Internal health locus of control has been associated with positive screening beliefs, emphasizing personal responsibility and control over health decisions (Steca et al., 2020). Conversely, an external locus of control may lead individuals to rely on external factors, such as stigma, when forming decisions about breast cancer screening. Ghare Naz et al. (2019) found that different dimensions of health locus of control internal, powerful others, and chance served as significant

predictors of screening beliefs among Iranian women, with stronger internal control associated with higher screening uptake. Similarly, Gillett and Ortiz (2000) demonstrated that internal and external health locus of control influenced screening behaviours in elderly Hispanic women, reinforcing the concept's relevance across diverse populations.

These findings suggest that empowering women with a stronger internal sense of control over their health may promote greater engagement in preventive health behaviours such as breast cancer screening.

Expanding beyond the individual, cancer stigma becomes a significant deterrent to participation in cancer screening programs, influencing both cancer and non-cancer individuals (Kulesza et al., 2019). This stigma, observed across diverse settings and perpetuated by the general public, healthcare providers, media, and advertising agencies, contributes to fear, reluctance, and avoidance of necessary healthcare services (Kulesza et al., 2019). Instances of stigmatization toward cancer have been identified, emphasizing perceived severity, personal responsibility, and awkwardness (Acharya et al., 2013). Stigma, both internalized and societal, also plays a substantial role in delaying help-seeking behaviors and reducing participation in screening programs. Nyblade et al. (2017) found that stigma surrounding breast and cervical cancer was a significant barrier to early detection and treatment-seeking among women in Karnataka, India. Similarly, Pakseresht et al. (2021) revealed that perceived stigma was strongly associated with delays in seeking help among women with breast cancer in Rasht, Iran. Gershfeld-Litvin et al. (2022) further highlighted gender differences in stigma, with men scoring higher on stigma-related attitudes, which affected women's engagement with health services. These studies collectively

underscore the urgent need to address cancer-related stigma in order to improve screening rates and timely intervention.

Psychological flexibility, a new concept in psychology, represents the ability to adapt to life situations flexibly and pursue behavioural goals aligned with personal values despite distress (Kashdan et al., 2020). As a core construct of acceptance and commitment therapy (ACT), psychological flexibility becomes pivotal in navigating barriers associated with stigma and maintaining positive beliefs.

Psychological flexibility, particularly in the context of cancer-related challenges, has also been identified as a key determinant of well-being and health outcomes. Duarte et al. (2023) found strong correlations between psychological flexibility, cancer-related pain, and stigma, suggesting that enhancing psychological resilience can improve emotional and physical well-being in individuals facing cancer. Moreover, Binzaqr (2017) showed that psychological flexibility was a significant predictor of mental health, with reliance on external loci of control leading to lower flexibility and poorer outcomes. Krafft et al. (2017), through a meta-analysis of Acceptance and Commitment Therapy (ACT) interventions, demonstrated that psychological inflexibility is positively correlated with stigma and that ACT can effectively reduce stigma in cancer patients. These findings suggest that interventions targeting psychological flexibility, such as ACT, may be crucial for reducing stigma and enhancing breast cancer screening participation.

Demographic factors, including age, education, and geographical location, further influence breast cancer screening beliefs and behaviors. Ghare Naz et al. (2019) identified age and education as significant predictors, with older and more educated women showing increased knowledge and

participation in screening programs. Mba and Patience (2022) echoed these findings, emphasizing that geographical location, stigma, and cultural beliefs significantly influenced health-seeking behavior among public university students in Ghana. These studies highlight the need for tailored, culturally sensitive interventions that consider specific demographic contexts to effectively promote breast cancer screening.

Furthermore, the psychological burden associated with breast cancer, as explored by Sunitha Daniel et al. (2021), underscores the importance of integrating mental health services into cancer care. Women undergoing treatment are often battling not just the physical aspects of cancer but also profound psychological distress, influenced by societal expectations and familial responsibilities.

In India, despite a concerning rise in breast cancer cases, worryingly low numbers of women participate in screening programs. A mere 0.9% have ever undergone a breast examination for detection, and in half of the states or UTs, screening participation stands below a dismal 1% (Gopika et al., 2022). This study aims to delve into the unique cultural context of India, specifically investigating how factors like cancer stigma, perceived control over health (loci of control), influence Indian women's beliefs about breast cancer screening and ultimately, their decision to participate.

## Method

### Participants

The data collection process involved 239 women, aged 20 to 50, hailing from diverse educational backgrounds and residing in urban and suburban areas of Chennai, Bangalore, and Mumbai. These participants represented a broad spectrum of socio-demographic factors, providing a wide range of perspectives. Of the total, 216 participants

filled out the questionnaires through an online Google Forms platform, while 29 opted for offline, hard-copy submissions. Initially, 245 responses were collected, but after screening for 239 valid responses was taken for analysis.

### Measures

The study employed a range of validated questionnaires to explore critical dimensions which includes,

*The Multidimensional Health Locus of Control (MHLC)* instrument, developed by Wallston, Wallston, and DeVellis in 1978, consists of 18 items categorized into three subscales: Internal Health Locus of Control (IHLC), Powerful Others Health Locus of Control (PHLC), and Chance Health Locus of Control (CHLC). This instrument measures how individuals perceive the influence of internal factors, powerful others, or chance on their health outcomes. The reliability of the MHLC has been established with alpha coefficients ranging from .673 to .859, demonstrating its robust internal consistency. Validity has been confirmed through positive correlations with health status and IHLC, while negative correlations with CHLC indicate a nuanced understanding of health beliefs.

To assess attitudes towards breast cancer screening, the *Breast Cancer Screening Beliefs Questionnaire (BCSBQ)* was utilized. Developed by Cannas Kwok, Olayide Ogunsiji, and Chun Fan Lee in 2016, this questionnaire includes 13 items divided into three subscales: attitudes towards general health check-ups, knowledge and perceptions about breast cancer, and barriers to mammographic screening. High internal consistency is evidenced by Cronbach's alpha values ranging from 0.77 to 0.92.

Psychological flexibility was measured using the *Acceptance and Action*

*Questionnaire II (AAQ-II)*, created by Bond et al. in 2011. This instrument consists of seven items focusing on experiential avoidance and psychological inflexibility. It demonstrates strong reliability, with alpha coefficients between .78 and .88, and high test-retest reliability at three and twelve months, confirming its stability over time. A significant correlation with the earlier version, AAQ-I, supports its consistency.

Finally, the *Cancer Stigma Scale (CASS)*, developed by Marlow and Wardle in 2014, measures multiple dimensions of cancer-related stigma across six subscales: Awkwardness, Avoidance, Perceived Severity, Policy Opposition, Personal Responsibility, and Financial Discrimination. With internal consistency coefficients ranging from .86 to .92, the CASS shows high reliability. Test-retest and split-half reliability further validate its consistency.

The study employed a self-report questionnaire as its primary method of data collection and followed a descriptive research design, purposive sampling was utilized, considering variables such as age, education, and socioeconomic status.

Women were the focus of the study, with specific inclusion and exclusion criteria established to guide participant selection. Throughout the research process, participant confidentiality and informed consent were prioritized to maintain ethical standards.

Data analysis was conducted using various statistical techniques, including ANOVA, mediation analysis, and multiple regression. These methods allowed for a comprehensive examination of the complex relationships between psychological flexibility, health locus of control, cancer stigma, and breast cancer screening beliefs.

### Results

Data collection was conducted with a total of 245 participants. The analysis was performed on the remaining 239 valid responses.

#### Descriptive Statistics

Descriptive statistics for the study variables are presented in Table 1. The variables assessed included Breast Cancer Screening Belief, Health Locus of Control, Psychological Flexibility, and Cancer Stigma.

Table 1. Descriptive Statistics and Normality Tests for Study Variables

	N	Missing	Mean	Median	SD	Shapiro-Wilk	
						W	p
Breast Cancer Screening Belief	239	0	34.4	34.0	9.19	0.992	0.232
Health Locus of Control	239	0	59.1	58.0	8.85	0.991	0.133
Psychological Flexibility	239	0	23.8	22.0	8.54	0.983	0.006
Cancer Stigma	239	0	69.9	67.0	21.75	0.958	<.001

Note. SD = Standard Deviation; W = Shapiro-Wilk Statistic; p = p-value.

Descriptive statistics for the study variables were computed based on a sample of 239 participants, with no missing data. The mean score for Breast Cancer Screening Belief was 34.4 (SD = 9.19), with scores ranging from 13.00 to 65.0. For Health Locus of Control, the mean score was 59.1 (SD =

8.85), with values ranging from 30.00 to 88.0. Psychological Flexibility had a mean score of 23.8 (SD = 8.54), with scores spanning from 7.00 to 45.0. The mean score for Cancer Stigma was 69.9 (SD = 21.75), with scores ranging from 34.00 to 145.0.

Normality was assessed using the Shapiro-Wilk test. The results indicated that the distribution of Breast Cancer Screening Belief scores did not significantly differ from normal ( $W = 0.992$ ,  $p = 0.232$ ), suggesting that this variable meets the assumption of normality. Similarly, Health Locus of Control scores were normally distributed ( $W = 0.991$ ,  $p = 0.133$ ). In contrast, Psychological Flexibility scores deviated significantly from normality ( $W = 0.983$ ,  $p = 0.006$ ). Likewise, the distribution of Cancer Stigma scores showed a significant deviation from normality ( $W = 0.958$ ,  $p < 0.001$ ). These findings indicate that while Breast Cancer Screening Belief and Health Locus of Control conform to normality, Psychological Flexibility and Cancer Stigma do not so analysis was conducted accordingly.

The demographic analysis of the participants revealed diverse characteristics

across several dimensions. Age distribution indicated a majority of young adults (59.0%), followed by older adults (26.4%) and middle adults (14.6%). Employment status showed that 59.8% of participants were unemployed, while 40.2% were employed. Most participants came from nuclear families (73.6%), with a smaller representation from joint (23.0%) and extended families (3.3%). In terms of residence, 75.3% of participants lived in urban areas, while 24.7% resided in rural areas. Geographically, 48.5% were from Chennai, and 51.5% hailed from other cities. Socioeconomic status analysis revealed a predominant middle-class representation (92.5%), with only 5.9% classified as higher class and 1.7% as lower class. Overall, the sample reflected a significant representation of young, unemployed, middle-class women predominantly from urban nuclear families.

Table 2. One-Way ANOVA Results for Attitude Towards General Health Checkup, Knowledge and Perception of Breast Cancer, Mammogram Barrier, and Breast Cancer Screening Belief

	F	df1	df2	p
ATTITUDE TOWARDS GENERAL HEALTH CHECKUP	1.63	2	236	0.197
KNOWLEDGE AND PERCEPTION OF BC	7.12	2	236	< .001
MAMMOGRAM BARRIER	9.96	2	236	< .001
Breast Cancer Screening Belief	8.56	2	236	< .001

Table 3. Tukey Post-Hoc Test Results for Attitude Towards General Health Checkup

	Chance	Internal	External
Chance Mean difference	—	0.923	1.295
p-value	—	0.285	0.195
Internal Mean difference		—	0.372
p-value		—	0.797
External Mean difference			—
p-value			—

A one-way ANOVA was performed to examine the effect of Health Locus of Control (with three levels: Internal, External, and Chance) on various dimensions of Breast Cancer Screening Belief.

The one-way ANOVA revealed that there was no statistically significant difference in Attitude Towards General Health Checkup between the groups ( $F(2, 236) = 1.63$ ,  $p = 0.197$ ). However, there was a statistically significant difference in Knowledge and Perception of Breast Cancer ( $F(2, 236) = 7.12$ ,  $p < .001$ ), Mammogram Barrier ( $F(2, 236) = 9.96$ ,  $p < .001$ ), and overall Breast

Cancer Screening Belief ( $F(2, 236) = 8.56$ ,  $p < .001$ ) between at least two of the groups.

Table 4. Tukey Post-Hoc Test Results for Knowledge and Perception of Breast Cancer

		Chance	Internal	External
Chance	Mean difference	—	2.32	1.03
	p-value	—	0.001	0.412
Internal	Mean difference		—	-1.29
	p-value		—	0.101
External	Mean difference			—
	p-value			—

Table 5. Tukey Post-Hoc Test Results for Mammogram Barrier

		Chance	Internal	External
Chance	Mean difference	—	3.36	2.893
	p-value	—	< .001	0.006
Internal	Mean difference	—	-0.466	
	p-value		—	0.794
External	Mean difference			—
	p-value			—

Tukey's HSD Test for multiple comparisons found that the mean value of Knowledge and Perception of Breast Cancer was significantly different between the Chance and Internal groups ( $p = 0.001$ ), with the Chance group having a higher mean score. No significant difference was found between the Chance and External groups ( $p = 0.412$ ) or between the Internal and External groups ( $p = 0.101$ ).

Table 6. Tukey Post-Hoc Test Results for Breast Cancer Screening Belief

		Chance	Internal	External
Chance	Mean difference	—	6.60	5.22
	p-value	—	< .001	0.023
Internal	Mean difference		—	-1.38
	p-value		—	0.635
External	Mean difference			—
	p-value			—

For Mammogram Barrier, the mean difference was statistically significant between the Chance and Internal groups ( $p < .001$ ) and between the Chance and External groups ( $p = 0.006$ ), with the Chance group again showing higher mean values. However, the comparison between the Internal and External groups did not show a statistically significant difference ( $p = 0.794$ ).

Regarding the overall Breast Cancer Screening Belief, Tukey's HSD test revealed that the mean value was significantly different between the Chance and Internal groups ( $p < .001$ ) and between the Chance and External groups ( $p = 0.023$ ), with higher mean scores in the Chance group. There was no statistically significant difference between the Internal and External groups ( $p = 0.635$ ).

Table 7. One-Way ANOVA Results for Psychological Flexibility Across Health Locus of Control Levels

	F	df1	df2	p
Psychological Flexibility	6.11	2	236	0.003

Table 8. Tukey Post-Hoc Test Results for Psychological Flexibility Across Health Locus of Control Levels

		Chance	Internal	External
Chance	Mean difference	—	5.13	5.0571
	p-value	—	0.002	0.018
Internal	Mean difference		—	-0.0775
	p-value		—	0.998
External	Mean difference			—
	p-value			—

A one-way ANOVA was performed to compare the effect of different levels of Health Locus of Control (internal, external, chance) on Psychological Flexibility.

The one-way ANOVA revealed a statistically significant difference in Psychological Flexibility between the groups,  $F(2, 236) = 6.11$ ,  $p = 0.003$ .

Tukey's HSD Test for multiple comparisons found that the mean Psychological Flexibility score was significantly different between the Chance and Internal groups (mean difference = 5.13,  $p = 0.002$ , 95% C.I. = [2.58, 7.68]) and between the Chance and External groups (mean difference = 5.06,  $p = 0.018$ , 95% C.I. = [0.91, 9.22]). There was no statistically significant difference in Psychological Flexibility between the Internal and External groups (mean difference = -0.08,  $p = 0.998$ ).

Table 9. Mediation Analysis of Health Locus of Control (HLOC) on Breast Cancer Screening Belief (BCSB) with Cancer Stigma as a Mediator

Effect	Estimate	SE	Z	p
Indirect	0.105	0.0362	2.89	0.004
Direct	0.230	0.0544	4.22	<.001
Total	0.334	0.0636	5.25	<.001

A mediation analysis was conducted to examine the relationship between Health Locus of Control (HLOC) and Breast Cancer Screening Belief (BCSB) with Cancer Stigma as a mediator. The results revealed a significant indirect effect of HLOC on BCSB through Cancer Stigma ( $b = 0.105$ ,  $SE = 0.0362$ ,  $Z = 2.89$ ,  $p = 0.004$ ), indicating that Cancer Stigma significantly mediates this relationship. This means that the impact of HLOC on BCSB is significantly influenced by its effect on Cancer Stigma. Additionally, the direct effect of HLOC on BCSB was significant ( $b = 0.230$ ,  $SE = 0.0544$ ,  $Z = 4.22$ ,  $p < 0.001$ ), suggesting that HLOC also has a direct influence on BCSB independent of the mediator. The total effect of HLOC on BCSB, combining both direct and indirect pathways, was significant ( $b = 0.334$ ,  $SE = 0.0636$ ,  $Z = 5.25$ ,  $p < 0.001$ ). This overall effect demonstrates that HLOC affects BCSB through both direct and mediated pathways via Cancer Stigma.

Mediation Analysis of Health Locus of Control (HLOC) on Psychological flexibility with Cancer Stigma as a Mediator

Effect	Estimate	SE	Z	p
Indirect	0.0457	0.0192	2.379	0.017
Direct	-0.0318	0.0617	-0.516	0.606
Total	0.0139	0.0624	0.223	0.824

A mediation analysis was conducted to explore the relationship between Health Locus of Control (HLOC) and psychological flexibility, with cancer stigma acting as a mediator. The results indicated a significant indirect effect of HLOC on psychological flexibility through cancer stigma ( $b = 0.0457$ ,  $SE = 0.0192$ ,  $Z = 2.379$ ,  $p = 0.017$ ). This suggests that cancer stigma significantly mediates the relationship between HLOC and psychological flexibility, implying that the influence of HLOC on psychological flexibility is substantially impacted by its effect on cancer stigma.

Conversely, the direct effect of HLOC on psychological flexibility was not significant ( $b = -0.0318$ ,  $SE = 0.0617$ ,  $Z = -0.516$ ,  $p = 0.606$ ). This finding indicates that HLOC does not exert a direct influence on psychological flexibility when controlling for the mediator, highlighting that other factors, such as stigma, play a more critical role in shaping psychological adaptability.

The total effect of HLOC on psychological flexibility, which encompasses both direct and indirect pathways, was also non-significant ( $b = 0.0139$ ,  $SE = 0.0624$ ,  $Z = 0.223$ ,  $p = 0.824$ ). This result underscores that the relationship between HLOC and psychological flexibility is primarily mediated by cancer stigma, rather than being directly influenced by HLOC itself. Overall, these findings emphasize the importance of addressing cancer stigma in enhancing psychological flexibility among women with varying health locus orientations.

Table 11. Multiple Linear Regression Analysis of Breast Cancer Screening Belief

Model	R	R <sup>2</sup>
1	0.345	0.119

Model Coefficients - Breast Cancer Screening Belief

Predictor	Estimate	SE	t	p
Intercept	21.4695	3.9064	5.496	<.001
Age	0.0175	0.0577	0.304	0.761
Employment status	1.8641	1.1689	1.595	0.112
Family type	0.1904	1.0690	0.178	0.859
Area of residence	6.8635	1.2816	5.355	<.001
Socioeconomic status	0.5845	1.8647	0.313	0.754

A multiple linear regression analysis was conducted to assess the impact of various demographic variables on Breast Cancer Screening Belief. The model exhibited an R<sup>2</sup> of 0.119, indicating that the predictors accounted for 11.9% of the variance in Breast Cancer Screening Belief.

The intercept was significantly different from zero (M = 21.4695, SE = 3.9064, t(64) = 5.496, p < .001), suggesting a baseline level of Breast Cancer Screening Belief when all predictors are at their reference levels.

The variable Area of Residence emerged as a significant predictor ( $\beta = 6.8635$ , SE = 1.2816, t(64) = 5.355, p < .001), with individuals residing in rural areas showing higher Breast Cancer Screening Beliefs compared to those in urban areas.

In Age ( $\beta = 0.0175$ , SE = 0.0577, t(64) = 0.304, p = 0.761), Employment Status ( $\beta = 1.8641$ , SE = 1.1689, t(64) = 1.595, p = 0.112), Family Type ( $\beta = 0.1904$ , SE = 1.0690, t(64) = 0.178, p = 0.859), and Socioeconomic Status ( $\beta = 0.5845$ , SE = 1.8647, t(64) = 0.313, p = 0.754) did not significantly influence Breast Cancer Screening Belief.

Table 12. Multiple Linear Regression Analysis of Psychological Flexibility

Model	R	R <sup>2</sup>
1	0.245	0.0599

Model Coefficients - Psychological Flexibility

Predictor	Estimate	SE	t	p
Intercept	26.415	3.7577	7.029	<.001
Age	-0.121	0.0555	-2.178	0.030
Employment status	1.502	1.1244	1.335	0.183
Family type	0.206	1.0283	0.200	0.841
Area of residence	1.754	1.2328	1.423	0.156
Socioeconomic status	-3.507	1.7938	-1.955	0.052

A multiple linear regression analysis was performed to explore the influence of various demographic factors on Psychological Flexibility. The model had an R<sup>2</sup> of 0.0599, indicating that the predictors accounted for approximately 6.0% of the variance in Psychological Flexibility.

The analysis revealed that the intercept was significantly different from zero (M = 26.415, SE = 3.7577, t(64) = 7.029, p < .001), suggesting a baseline level of Psychological Flexibility when all predictors are at their reference levels.

Age had a significant negative effect on Psychological Flexibility ( $\beta = -0.121$ , SE = 0.0555, t(64) = -2.178, p = 0.030), indicating that as age increases, Psychological Flexibility decreases.

Employment Status (B = 1.502, SE = 1.1244, t(64) = 1.335, p = 0.183), Family Type ( $\beta = 0.206$ , SE = 1.0283, t(64) = 0.200, p = 0.841), and Area of Residence ( $\beta = 1.754$ , SE = 1.2328, t(64) = 1.423, p = 0.156) did not show significant effects on Psychological Flexibility.

Socioeconomic Status approached significance ( $\beta = -3.507$ , SE = 1.7938, t(64)

= -1.955,  $p = 0.052$ ), suggesting that lower socioeconomic status may be associated with lower Psychological Flexibility, though the result was not statistically significant at the conventional alpha level of 0.05.

Table 13. Multiple Linear Regression Analysis of Health Locus of Control

Model	R	R <sup>2</sup>
1	0.283	0.0799

Model Coefficients - Health Locus of Control

Predictor	Estimate	SE	t	p
Intercept	46.407	3.8195	12.15	< .001
Age	0.193	0.0564	3.43	< .001
Employment status	2.119	1.1429	1.85	0.065
Family type	-1.413	1.0452	-1.35	0.178
Area of residence	2.266	1.2531	1.81	0.072
Socioeconomic status	2.408	1.8232	1.32	0.188

A multiple linear regression analysis was conducted to examine the impact of various demographic factors on Health Locus of Control. The model's R<sup>2</sup> value was 0.0799, indicating that the predictors explained approximately 8.0% of the variance in Health Locus of Control.

The intercept was significantly different from zero ( $M = 46.407$ ,  $SE = 3.8195$ ,  $t(64) = 12.15$ ,  $p < .001$ ), suggesting a baseline level of Health Locus of Control when all predictors are at their reference levels.

Age had a significant positive effect on Health Locus of Control ( $\beta = 0.193$ ,  $SE = 0.0564$ ,  $t(64) = 3.43$ ,  $p < .001$ ), indicating that older age is associated with a higher Health Locus of Control.

Employment Status approached significance ( $\beta = 2.119$ ,  $SE = 1.1429$ ,  $t(64) = 1.85$ ,  $p = 0.065$ ), suggesting a potential positive association with Health Locus of Control, although the result was not

statistically significant at the conventional alpha level of 0.05.

Family Type ( $\beta = -1.413$ ,  $SE = 1.0452$ ,  $t(64) = -1.35$ ,  $p = 0.178$ ), Area of Residence ( $\beta = 2.266$ ,  $SE = 1.2531$ ,  $t(64) = 1.81$ ,  $p = 0.072$ ), and Socioeconomic Status ( $\beta = 2.408$ ,  $SE = 1.8232$ ,  $t(64) = 1.32$ ,  $p = 0.188$ ) did not have statistically significant effects on Health Locus of Control, with p-values greater than the alpha level of 0.05.

## Discussion

The results of this study reveal that women's Health Locus of Control (HLOC) orientations whether Internal, External, or Chance are significantly associated with key variables related to breast cancer screening. Specifically, significant differences were found in women's knowledge and perception of breast cancer, mammogram barriers, and breast cancer screening beliefs across the three HLOC groups, whereas no significant differences emerged in their attitudes towards general health checkups.

The Chance HLOC group consistently exhibited more negative outcomes across these variables when compared to both the Internal and External HLOC groups. Women with a Chance HLOC, who attribute health outcomes to luck or chance, demonstrated significantly lower knowledge and perception of breast cancer, perceived more barriers to getting mammograms, and held weaker beliefs about the importance of breast cancer screening. Women with a Chance HLOC showed markedly lower knowledge and awareness regarding breast cancer risks, aligning with literature that suggests individuals who believe in luck as a determinant of health often exhibit lower motivation to seek out health information (Mozafari, Yang, and Talaei-Khoei, 2024). This perceived lack of control may contribute to a disconnect from preventive behaviors, as these individuals might feel their actions hold minimal influence over health outcomes.

Additionally, the findings reveal that women in this group perceive more barriers to obtaining mammograms, including cost and physical discomfort. This aligns with studies showing that individuals with a Chance HLOC experience heightened feelings of powerlessness, which can amplify perceived obstacles (Fletcher & Scaffa, 2018). Such perceived barriers likely deter health-promoting actions, as they may be viewed as insurmountable or beyond the individual's control. When individuals doubt their ability to influence health outcomes, they may deem preventive actions like mammograms as irrelevant or unnecessary (Brincks et al., 2010). This diminished sense of agency likely accounts for the lower screening engagement among women with a Chance HLOC, aligning with evidence linking this orientation to reduced participation in preventive healthcare (Mozafari, and Talaei Khoei, 2024).

In contrast, women with an Internal HLOC, who believe that their health is primarily under their control, showed significantly higher knowledge and perception of breast cancer, perceived fewer barriers to mammograms, and expressed stronger beliefs in the importance of breast cancer screening.

The lack of significant differences in attitudes toward general health checkups suggests that general health care practices may not be strongly influenced by one's health locus of control, potentially because routine checkups are less perceived as requiring personal control.

Additionally, the findings suggest that women with a Chance HLOC those who believe that outcomes are primarily determined by luck or fate tend to have lower psychological flexibility compared to those with Internal or External HLOC. Psychological flexibility involves adapting to changing situations and balancing thoughts and

emotions, but for women who feel they lack control over their health, this adaptability may be hindered. When individuals believe they cannot influence their outcomes, they might be more prone to rigid thinking patterns, avoidance behaviors, and difficulty coping with uncertainty. This sense of unpredictability might limit their ability to engage with challenging situations in a balanced and flexible way, making it harder for them to adjust to new health information or changing circumstances. This contrasts with women having Internal or External HLOC orientations, who showed higher psychological flexibility, potentially reflecting greater adaptability and a more balanced approach to health challenges (Oliveira, and Martins, 2024).

### **The Role of Cancer Stigma**

The analysis reveals a significant indirect effect of HLOC on psychological flexibility through cancer stigma. Women experiencing elevated levels of stigma may feel marginalized and isolated, leading to heightened anxiety and a diminished capacity to adapt to health challenges. This is consistent with existing literature that highlights how stigma can exacerbate feelings of helplessness and anxiety, particularly among those with a high Chance HLOC, who may already struggle with a sense of agency in managing their health (Rusch et al., 2009). The interplay between stigma and psychological flexibility suggests that interventions aimed at improving mental health outcomes should address the stigma surrounding cancer, as it plays a critical role in shaping how women navigate their health experiences.

The results indicate a non-significant direct effect of HLOC on psychological flexibility. This challenges the traditional view that an Internal HLOC inherently leads to better psychological resilience. Rather, the findings suggest that while beliefs about

health control are important, they may not suffice in fostering psychological adaptability. This perspective aligns with the work of Duarte et al. (2023), who note that the psychological landscape of individuals living with cancer is influenced by various external factors, including societal perceptions and stigma. As noted, stigma can create barriers to psychological resilience, further undermining these women's ability to cope with health-related challenges.

### **Impact on Breast Cancer Screening Beliefs**

The study's findings regarding the significant indirect effect of HLOC on beliefs about breast cancer screening (BCSB) through cancer stigma are noted. Women who perceive lower control over their health also experience greater stigma, which can discourage proactive health behaviors such as regular screenings. This relationship emphasizes the detrimental impact of stigma on health-seeking behaviors, highlighting the importance of fostering positive beliefs about health control and screening.

Despite the overarching influence of stigma, the direct effect of HLOC on BCSB remains significant. Women who believe they can control their health are more likely to view breast cancer screenings as essential. This finding underscores the empowering nature of an Internal HLOC, suggesting that enhancing women's beliefs in their ability to influence health outcomes could improve their attitudes toward preventive measures like screening. Encouraging women to develop a sense of agency in their health could thus be a critical component of interventions aimed at increasing screening rates and promoting overall health.

The results of the multiple linear regression analyses reveal several significant findings that contribute to the understanding of demographic factors influencing Psychological Flexibility and

Health Locus of Control. The findings highlight that age negatively correlates with psychological flexibility, suggesting that older women may face challenges with adaptability, perhaps due to ingrained beliefs or a lack of exposure to new coping skills. Paradoxically, older women in this study reported a stronger sense of control over their health, which could foster proactive health behaviors such as regular screening (Kaiser, 2024). Employment and socioeconomic status, however, did not show a straightforward effect on psychological flexibility, which indicates that these demographic factors may play an indirect role in shaping health attitudes and behaviors (Venkatachary & A., 2024).

On the other hand, age was found to have a positive association with Health Locus of Control, indicating that older women feel a stronger sense of personal control over their health outcomes. This is consistent with previous studies that suggest older individuals tend to become more health-conscious and take greater responsibility for managing their health, potentially due to an increasing awareness of vulnerability as they age. The finding reinforces the idea that interventions for breast cancer screening may be more effective if they tap into this sense of personal control, particularly in older women.

The findings for socioeconomic status and its near-significant relationship with Psychological Flexibility add some nuance to the overall understanding. Although not reaching conventional significance, the trend suggests that women from lower socioeconomic backgrounds may experience reduced flexibility, in line with existing research that points to the psychological toll of financial hardship. This calls for further investigation, possibly with a larger sample size, to better understand the complex relationship between socioeconomic conditions and psychological health.

### **Limitation**

The study's sample size of 239 women may limit the generalizability of the findings, as a larger and more diverse sample could provide a more comprehensive understanding of the relationships examined. Additionally, the reliance on self-report measures introduces potential response biases, such as social desirability or recall bias, which could affect the accuracy of the data collected. Participants may not fully disclose their beliefs or experiences due to stigma or fear of judgment. Furthermore, the cross-sectional design of the research captures data at a single point in time, limiting the ability to draw causal conclusions about the relationships between variables since changes over time cannot be assessed. While the study identified key demographic factors, it did not explore other potentially influential factors, such as personal experiences with healthcare, cultural attitudes, or regional differences in health beliefs and practices. The exclusive focus on women may also overlook the experiences and beliefs of other genders, which could provide a more rounded understanding of health locus of control and screening behaviours in the broader population. Finally, although validated questionnaires were employed, the study primarily centered on psychological flexibility and health locus of control without exploring other relevant psychological constructs, such as anxiety or coping strategies, which could further illuminate the relationships between stigma, flexibility, and health behaviors.

### **Conclusion**

This study examined the interplay between women's Health Locus of Control (HLOC), psychological flexibility, cancer stigma, and breast cancer screening beliefs among a sample of 239 women aged 20 to 50 from urban and suburban areas. The findings revealed significant differences in knowledge

and beliefs about breast cancer screening among women with different HLOC orientations, with those holding a Chance HLOC exhibiting lower knowledge and stronger perceived barriers compared to their Internal and External counterparts.

Psychological flexibility was found to mediate the relationship between HLOC and breast cancer screening beliefs, emphasizing the role of psychological factors in health behaviors. Cancer stigma emerged as a significant mediator, indicating that negative societal perceptions can hinder women's ability to engage in health-promoting behaviors and adapt psychologically to health challenges.

Demographic analyses indicated a negative relationship between age and psychological flexibility, suggesting that older women may struggle more with adaptability, while age was positively associated with HLOC. Employment status showed a potential positive trend regarding HLOC and psychological flexibility, though it lacked statistical significance. The study also noted non-significant findings related to family type, area of residence, and socioeconomic status, contrasting with existing literature.

The research highlights the importance of addressing psychological and social factors in public health initiatives aimed at improving breast cancer screening uptake among women, particularly by targeting those with a Chance HLOC who may feel less empowered to take control of their health. The findings contribute to the broader understanding of how health beliefs are shaped by psychological constructs and societal stigma, paving the way for future research and interventions.

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