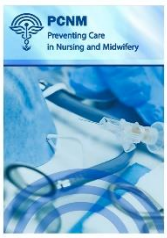
Prev Care Nurs Midwifery J (PCNM)
http://dx.doi.org/10.61882/pcnm.15.3.41

PCNM. 2025;15(3):41-49
Peer-Reviewed | Open Access

Preventive Care in Nursing and Midwifery Journal



Original Article

Maternal Health Literacy and Its Association with Breastfeeding Self-Efficacy and Nutritional Performance: A Cross-Sectional Study

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Received: 15 Apr 2025 **Accepted:** 18 Jun. 2025 **Published:** 12 Jul. 2025

Article Info

Keywords:
Health Literacy
Mothers
Complementary Feeding,
Breastfeeding Self-Efficacy

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How to Cite This Article:
Esmaili NZ, Jafari varjoshani N, Khosravani M, Hasanloo M, Sepehrinia M. Maternal Health Literacy and Its Association with Breastfeeding Self-Efficacy and Nutritional Performance: A Cross-Sectional Study. Prev Care Nurs Midwifery J. 2025;15(3): 41-49.

Abstract

Background: Health literacy (HL) lays the foundation for health-related decisions. Moreover, nutrition during infancy plays a critical role in a child's growth and development. Therefore, it is particularly important to investigate the status of maternal health literacy (MHL) and its relationship with nutritional performance (NP).

Objectives: This study aims to investigate the association of mothers' HL level with their breastfeeding self-efficacy (BSE) and NP.

Methods: This cross-sectional study was conducted on 234 mothers recruited from urban integrated healthcare service centers (UIHSCs) and their affiliated healthcare bases using a two-stage cluster sampling method. Data were collected using demographic survey questions, the Health Literacy for Iranian Adults (HELIA), the Breastfeeding Self-Efficacy Scale-Short Form (BSES-SF), and the researcher-made Mother's Complementary Feeding Performance (MCFP) Questionnaire. Descriptive statistics and the correlation coefficient test were used to analyze the data in SPSS 24.

Findings: The mean (SD) scores for Health Literacy, Breastfeeding Self-Efficacy, and Nutritional Performance were 71.47 (11.98), 42.65 (8.79), and 20.36 (4.20), respectively, indicating adequate to satisfactory levels. The mothers' HL and its components were significantly related to their BSE and NP (P<0.05).

Conclusion: Given the relationship between mothers' HL levels and their BSE and NP, the findings of this study highlight the need for greater attention to education across various areas, including mass media, and to the provision of educational courses in UIHSCs.

Implications for Nursing and Midwifery Preventive Care

- Improving MHL should be prioritized in community-based nursing education programs.
- Targeted training in IHSCs can help improve mothers' BSE and NP.
- Nurses play an effective role in empowering mothers through face-to-face training and mass media.

Introduction

Health literacy (HL) is defined by the World Health Organization as the set of cognitive and social skills that determine individuals' motivation and ability to access, understand, and use information to promote and maintain health [1]. Nutbeam emphasizes HL as a major global challenge of the 21st century and a key determinant of health equity and health outcomes [2]. Strengthening HL has been identified as an essential strategy for improving individuals' health-related decisions, preventive behaviors, and use of healthcare services [3].

Parents, especially mothers, play a central role in the care and nutrition of young children. Their HL level directly affects their ability to acquire reliable information and make informed health decisions [3]. Therefore, enhancing mothers' HL is considered a crucial priority for improving maternal and child health. Previous evidence demonstrates that mothers' decision-making regarding exclusive breastfeeding (EBF) depends on their knowledge, attitudes, and ability to interpret health information [4]. Furthermore, infants who are exclusively breastfed experience lower rates of infectious, respiratory, and digestive diseases, and prolonged breastfeeding has been shown to reduce multiple early-life complications [5, 6].

In addition to the well-demonstrated health benefits of breastfeeding, promoting breastfeeding has been described as a moral obligation and a fundamental component of children's rights [7]. Emerging evidence shows that inadequate HL among pregnant or postpartum women is associated with early cessation of breastfeeding and suboptimal infant feeding practices [8]. Studies have also reported significant associations between maternal HL and breastfeeding outcomes, including breastfeeding duration and breastfeeding self-efficacy (BSE) [9, 10]. Breastfeeding self-efficacy predicts how she will cope with breastfeeding-related problems [11].

BSE—defined as a mother's confidence in her ability to breastfeed successfully—is a strong predictor of breastfeeding behaviors, persistence, and response to breastfeeding challenges [12]. Mothers with higher BSE are more likely to initiate and maintain breastfeeding. Prior research has also demonstrated that BSE is associated with sociodemographic factors, maternal experiences, support systems, and previous exposure to breastfeeding education [13].

Appropriate complementary feeding is another crucial component of infant nutrition. Evidence indicates that adequate maternal knowledge and feeding practices are essential for ensuring healthy growth and preventing nutritional deficiencies [14–16]. However, studies show substantial variability in mothers' nutritional performance (NP), with some reporting satisfactory levels and others indicating inadequate knowledge, attitudes, and practices [17–21]. The introduction of appropriate complementary foods, aligned with global recommendations, remains a key determinant of child development and health.

Given the importance of maternal HL in shaping breastfeeding behaviors, complementary feeding, and overall infant health, it is essential to assess the current status of MHL and its relationship with NP and BSE.

Objectives

This study aimed to determine the relationship between maternal health literacy, nutritional performance, and breastfeeding self-efficacy among patients admitted to Urban Integrated Healthcare Service Centers (UIHSCs) in Zanjan in 2021, given the importance of MHL, the need to identify its associated factors, and the limited research in this area.

Methods

Study Design and Participants

This research is a cross-sectional descriptive correlational study. Two-stage sampling (first, cluster sampling, then convenience sampling) was conducted among mothers of children aged 6 months to 2 years who had been admitted to UIHSCs of Zanjan University of Medical Sciences (ZUMS) from March to August 2021. Inclusion criteria were as follows: being a mother with a child between 6 months and 2 years of age, willingness to participate in the study, having minimum literacy to read and

write, full-time care of the child by the mother (rather than a nurse), not using infant formula as a complete substitute for breast milk, mother's lack of an underlying disease, and child's lack of digestive problems.

Sampling Method

The sample size was determined based on a pilot study conducted with 30 mothers, which yielded a correlation coefficient of 0.73. Using this effect size with a 95% confidence level and 84% power, the initial sample size was calculated. To account for potential sample dropout, non-response, and withdrawal, 20% was added to the calculated sample size, resulting in a final sample of 260 participants.

A two-stage cluster sampling method was employed. In the first stage, from all 18 Urban Integrated Healthcare Service Centers (UIHSCs) in Zanjan city, 4 centers were randomly selected using cluster sampling. In the second stage, 65 mothers were recruited from each selected center through convenience sampling, yielding a total of 260 participants.

Due to COVID-19 restrictions and decreased in-person visits to healthcare centers, the researcher coordinated with healthcare officials to obtain addresses of eligible mothers. After initial phone contact to explain the study objectives and obtain verbal consent, home visits were scheduled. During these visits, written informed consent was obtained before questionnaire administration.

Of the 260 distributed questionnaires, 26 were excluded due to missing data or incomplete responses, resulting in 234 completed questionnaires for final analysis (90% response rate). Data collection was conducted during morning shifts, with each questionnaire requiring approximately 30-45 minutes to complete.

Data Collection

Data were collected using demographic survey questions, the Health Literacy for Iranian Adults (HELIA) questionnaire, the Breastfeeding Self-Efficacy Scale-Short Form (BSES-SF), and a researcher-made Mother's Complementary Feeding Performance (MCFP) Questionnaire. The demographic survey questions asked about the child's gender, parents' age, education level, occupation, income level, delivery method, the child's status at birth, and health and illness.

Measurement Tools

Health Literacy for Iranian Adults (HELIA) Questionnaire: The HELIA questionnaire, designed by Montazeri et al. (2014) to assess the health of the general population aged 18 to 65 years, is tailored to Iranian socio-cultural characteristics [18]. Relevant definitions were extracted from a review of various scientific documents to develop the instrument's conceptual framework. Based on exploratory factor analysis, the final questionnaire contains 33 items across 5 dimensions: access (6 items), reading skills (4 items), understanding (7 items), appraisal (5 items), and decision-making/application of health information (12 items) [18]. This instrument has been used in various studies in Iran [22-24]. Responses are scored on a 5-point Likert scale from never (1) to always (5), with total scores ranging from 33 to 165, subsequently converted to a 0-100 scale. Health literacy levels were categorized as: inadequate (0-50), fairly adequate (50.1-66), adequate (66.1-84), and excellent (84.1-100). The instrument demonstrated good reliability with Cronbach's alpha of 0.85 in this study.

Breastfeeding Self-Efficacy Scale-Short Form (BSES-SF): The BSES-SF is a 14-item instrument derived from the original Breastfeeding Self-Efficacy Scale developed by Dennis (2003) [25]. A validation study in Iran with 220 low-risk pregnant women confirmed its discriminant validity and reliability with Cronbach's alpha of 0.91 [26]. All items feature positive loading and are scored on a 5-point Likert scale (1: never or I am not sure to 5: I am completely sure), with total scores ranging from 14 to 70. Higher scores indicate greater breastfeeding self-efficacy. In this study, the instrument showed acceptable reliability with Cronbach's alpha of 0.76.

Mother's Complementary Feeding Performance (MCFP) Questionnaire: This researcher-developed instrument was constructed based on a comprehensive review of scientific literature, including guidelines and foundational studies such

as that by Salarkia et al. [19]. The content validity was established through review by an expert panel, which confirmed satisfactory content validity indices (CVI = 0.95, CVR = 0.9). In the present study, the reliability of the MCFP was evaluated. The test-retest method was administered to a sub-sample of 20 participants over a two-week interval, demonstrating excellent stability (ICC = 0.92). Furthermore, the instrument showed high internal consistency (Cronbach's alpha = 0.88).

Procedure

This study employs a two-stage sampling method. In the first stage, 4 of the 18 IHSCs in Zanjan city were selected using cluster sampling. In the second stage, the researcher visited the selected centers during morning shifts to identify and select eligible mothers using convenience sampling.

Due to the restrictions caused by the COVID-19 pandemic and the decreased rate of mothers' in-person visits during the peak period of the disease, the data collection protocol was developed as follows:

After coordinating with the healthcare center officials and receiving the home addresses of the eligible mothers, the researcher made phone calls to explain the study objectives and methods, invite them to participate in the study, and offer a home visit. If they agreed to participate in the study, a time was set for the visit.

During the in-person home visit, the mothers were provided with additional explanations, given written consent, and then the questionnaires were distributed to them. They completed the questionnaires for an average of 30 to 45 minutes, and the researcher was available to answer any questions that were unclear. Finally, the completed questionnaires were collected in the same session.

Statistical Methods

The collected data were analyzed using SPSS version 24. The normality of the data distribution was confirmed using the Kolmogorov-Smirnov test. Subsequently, descriptive statistics (mean, standard deviation, frequencies, and percentages) and inferential statistics (Pearson's correlation test) were employed, with a significance level set at .05.

Results

The analysis of demographic characteristics is presented in Table 1. The study included 234 mother-child dyads. The majority of children were female (59.8%). Most mothers (42.70%) held a diploma or associate's degree, and over half (55.55%) identified as homemakers. Regarding paternal characteristics, 43.16% of fathers had a diploma or associate's degree, and 44.87% were employed. Economically, 15.28% of families reported insufficient income. Most children were born via vaginal delivery (63.70%) and were full-term (89.30%). The primary sources of health information were healthcare providers (29.05%) and the internet (28.63%).

As shown in Table 2, the mean score of maternal health literacy was 71.47 (SD = 11.98) on a 0-100 scale, indicating an adequate level. Among health literacy dimensions, decision-making/application obtained the highest mean score (M = 42.50, SD = 7.43), while appraisal showed the lowest mean score (M = 9.59, SD = 2.36). The mean score for breastfeeding self-efficacy was 42.65 (SD = 8.79), and nutritional performance averaged 20.36 (SD = 4.20), both indicating satisfactory levels.

The correlation analyses revealed significant relationships between study variables, as detailed in Table 3. Health literacy demonstrated a strong positive correlation with breastfeeding self-efficacy (r = .905, $p < .001$). All health literacy components showed significant correlations with breastfeeding self-efficacy, with access exhibiting the strongest relationship (r = .905, $p < .001$) and understanding showing the lowest, though still substantial, correlation (r = .812, $p < .001$).

Similarly, health literacy significantly correlated with nutritional performance (r = .749, $p < .001$). Among its components, access showed the strongest correlation with nutritional performance (r = .749, $p < .001$), while appraisal demonstrated the weakest correlation (r = .687, $p < .001$). All correlations were statistically significant at $p < .001$.

Table 1. Frequency and Percentage Distribution of Participants' Demographic Characteristics (N=234)

Variable	Category	n (%)
Age of Mother		
	20-30 years	119
	31-39 years	97
	40-49 years	16
	50-59 years	2 (0.85)
Age of Father		
	20-30 years	62
	31-39 years	122
	40-49 years	45
	50-59 years	5 (2.13)
Education Level:		
	Below Diploma	48
	Diploma / Associate's Degree	100
	Bachelor's Degree and Higher	86
Education Level:		
	Below Diploma	34
	Diploma / Associate's Degree	101
	Bachelor's Degree and Higher	99
Occupation:		
	Homemaker	130
	Employed	97
Occupation:		
	Employee	105
	Laborer	31
	Self-employed	89
	Unemployed and Other	9 (3.83)
Income Level		
	Sufficient	81
	Relatively Sufficient	116
	Insufficient	37
Child's Gender		
	Boy	94
	Girl	140
Delivery Method		
	Vaginal Birth	149
	Cesarean Section	85
Child's Status at		
	Full-term	209
	Preterm	25
Sources of Health		
	Asking Doctors/Healthcare	68
	Internet	67
	Recorded Phone Information	5 (2.13)
	Radio and Television	31
	Newspapers and Magazines	3 (1.28)
	Asking	44
	Booklets, Pamphlets,	10
	Satellite Networks	6 (2.56)
	Do not know where to get	0

Discussion

This study investigated the relationships between maternal health literacy (MHL), breastfeeding self-efficacy (BSE), and nutritional performance (NP) among mothers of young children. The results demonstrated that participants generally had adequate MHL, moderate BSE, and satisfactory NP. Importantly, the strong positive correlations found in this study show that higher MHL is closely associated with improved BSE and better NP, emphasizing MHL as a key leverage point in interventions aiming to enhance maternal and child health. The strength of these associations, particularly the role of information access and appraisal, suggests that MHL functions not merely as a background characteristic but as an influential determinant shaping behavioral and nutritional decisions.

Consistent with our findings, several studies have reported adequate or acceptable levels of MHL among Iranian mothers and adult populations [27–29]. Ebrahimpour et al. [19] similarly observed adequate HL among mothers in a pediatric healthcare setting, and other studies among breastfeeding mothers have reported comparable findings [30–31]. However, not all evidence aligns with these results. Studies in other populations have identified insufficient MHL [22–23], highlighting the importance of contextual factors such as socioeconomic status, availability and quality of information sources, cultural norms, communication skills, and insurance coverage. Variation in these determinants across different communities may explain discrepancies in MHL levels reported in the literature.

The mean BSE score in this study was moderate, which aligns with mixed findings in prior research. Some studies have reported relatively high levels of BSE, whereas others found lower or moderate levels [25, 26]. Maafi et al. [27] also reported moderate-to-high BSE levels among mothers, and Karbandi et al. [28] found BSE scores comparable to those observed in the present study. Evidence suggests that BSE is shaped by a combination of sociodemographic and psychological factors, including income, education, maternal attitude, type of delivery, emotional

connectedness with the infant, social support, and positive pregnancy experiences [29]. Mothers' satisfaction with the breastfeeding process has also been linked to greater BSE [32–33], and numerous intervention studies demonstrate that educational packages, structured training sessions, and peer support can significantly enhance BSE and promote continued exclusive breastfeeding (EBF) [34].

Table 2. Mean and Standard Deviation of Health Literacy, Its Dimensions, Breastfeeding Self-Efficacy, and Mothers' Nutritional Performance

Variable	Mean (SD)	Median	Minimum	Maximum
Health Literacy (Raw Score)	117.93 (19.78)	121.00	45.00	161.00
Health Literacy (0-100 Scale)	71.47 (11.98)	73.33	27.27	97.57
Dimension 1: Access	21.64 (3.76)	22.00	11.00	30.00
Dimension 2: Reading Skills	14.30 (2.82)	14.00	4.00	20.00
Dimension 3: Understanding	25.05 (4.62)	25.00	7.00	34.00
Dimension 4: Appraisal	9.59 (2.36)	9.00	4.00	19.00
Dimension 5: Decision Making/Application	42.50 (7.43)	44.00	17.00	59.00
Breastfeeding Self-Efficacy	42.65 (8.79)	44.00	19.00	63.00
Nutritional Performance	20.36 (4.20)	21.00	8.00	29.00

Table 3. Correlations Between Maternal Health Literacy, Its Dimensions, Breastfeeding Self-Efficacy, and Nutritional Performance

Variable	Health Literacy	Access	Reading	Understanding	Appraisal	Decision Making
Breastfeeding Self-Efficacy	**r**	0.905	0.847	0.812	0.813	0.843
	p	<0.001	<0.001	<0.001	<0.001	<0.001
Nutritional Performance	**r**	0.749	0.698	0.694	0.687	0.688
	p	<0.001	<0.001	<0.001	<0.001	<0.001

The mothers' NP in this study was satisfactory overall; however, the literature presents a wide spectrum. Fathi et al. [35] reported satisfactory feeding performance, while Akbari et al. identified low levels of knowledge, attitude, and performance related to child nutrition [36]. Another study found mothers' NP to be moderate [14]. These inconsistencies mirror broader challenges in complementary feeding practices, which are strongly influenced by mothers' informational resources, cultural practices, and exposure to evidence-based guidance.

A noteworthy finding of this study is the significant direct association between MHL and both BSE and NP. This relationship is well supported by previous research. Studies have shown that higher HL is associated with adherence to EBF up to six months [8, 20, 23, 37]. Khodabandeh et al. [38] documented a strong association between HL and both self-efficacy and self-care behaviors in older adults, while Shieh et al. [39] concluded that HL exerts a direct effect on women's self-efficacy. Hosseini et al. [31] also reported a positive association between HL and breastfeeding duration, and Aghababaei et al. [40] demonstrated that HL-enhancing educational interventions can effectively improve maternal BSE and breastfeeding practices. Moreover, Hossain et al. [41] found a significant link between HL and EBF-related self-efficacy. Taken together, the findings indicate that HL strengthens mothers' confidence and decision-making abilities, enabling them to navigate health information, engage in appropriate feeding behaviors, and sustain breastfeeding.

HL has been recognized globally as an essential component of public health. It encompasses cognitive and social abilities that enable individuals to understand and use health information effectively [32]. Low HL is associated with a range of adverse outcomes, including increased health inequalities, poorer health indicators, and higher healthcare costs

[32, 33]. Thus, improving MHL is a strategic priority in maternal and child health promotion and should be systematically integrated into healthcare policies and educational programs.

This study has some limitations. As with all cross-sectional studies, the design prevents causal inference regarding the relationships among HL, BSE, and NP. Additionally, contextual factors, such as cultural norms, access to healthcare services, and local health policies, may limit the generalizability of the findings to populations in different regions or settings. Future research should consider qualitative or mixed-methods designs across diverse communities to deepen understanding of the mechanisms linking MHL with maternal and child health outcomes.

Conclusion

The findings of this study demonstrate that higher maternal health literacy is associated with greater breastfeeding self-efficacy and more satisfactory nutritional performance. These relationships highlight the importance of strengthening mothers' competencies in accessing, understanding, and applying health information. Integrating structured educational programs into Integrated Healthcare Service Centers, enhancing communication between healthcare providers and mothers, and developing supportive environments for health information exchange may empower mothers in making informed decisions about breastfeeding and complementary feeding. Improving MHL is therefore a critical strategy for promoting maternal and child health and should be prioritized in future health interventions and community-based programs.

Ethical Consideration

Adapted from a master's thesis in community health nursing with the code A-11-984-10, this study was approved by the Vice Chancellor for Research and Technology of ZUMS with the ethics code (IR.ZUMS.REC.2021.107).

Before data collection, participants were briefed on the study's objectives. They were also assured that the information they provided would remain confidential. All participants also completed an informed consent form.

Acknowledgments

The authors would like to express their deepest gratitude to all participants and the esteemed Vice Chancellor for Research and Technology of ZUMS.

Conflict of Interest

Authors have no conflicts of interest to declare.

Funding

This study was sponsored by the Vice Chancellor for Research and Technology of ZUMS with the code A-11-984-10.

Authors' Contributions

All authors participated in different aspects of the study.

Esmaili N.Z. contributed to data collection, design planning, design management, and participation.

Jafari Varjoshani N. was responsible for research compilation.

Hasanlo M. performed statistical analysis and participated in study design. Sepehrinia M. conducted article review and supervised the study as corresponding author.

Artificial Intelligence Utilization for Article Writing

No artificial intelligence was used in the preparation of this article.

Data Availability Statement

The data are available from the corresponding author

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