Caspian Journal of Health Research
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Research Paper

Social Determinants of Health and Health Literacy in Cancer Patients from PERSIAN Guilan Cohort Study

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Citation Bakhshi F, Naghipour M, Joukar F, Homaei Rad E, Javadi, Mansour Ghanaei F. Social Determinants of Health and Health Literacy in Cancer Patients from PERSIAN Guilan Cohort Study. Caspian Journal of Health Research. 2025; 10(3):183-192. https://doi.org/10.32598/CJHR.10.3.543.5

Running Title Social Determinants of Health and Health Literacy

https://doi.org/10.32598/CJHR.10.3.543.5

Article info:
Received: 02 Feb 2025
Accepted: 15 May 2025
Published: 01 Jul 2025

Keywords:
Social determinants of health, Health literacy, Cancer

ABSTRACT

Background: Effective health interventions rely on community-based strategies that address the social determinants of health. Health literacy plays a crucial role in individuals' ability to understand, evaluate, and act on health-related information, thereby influencing their health decisions and behaviors.

Objectives: This study aimed to determine the relationship between social determinants of health and health literacy in cancer patients.

Materials & Methods: In this cross-sectional descriptive study, 71 patients enrolled in the PERSIAN Guilan Cohort were studied in 2019. The social determinants of health and health literacy data were collected by a valid and reliable questionnaire and analyzed using STATA software, version 13.1.

Results: The mean health literacy score among participants was 81.6±2.66. Among the subdomains of health literacy, decision-making and behavior had the highest average score (95.24±1.12), while reading skills had the lowest (57.65±5.00). Among the social determinants of health, a significant relationship was reported between health literacy score and wealth index (β=7.827, P<0.001), not having diabetes (β=-3.85, P=0.022), not having hypertension (β=-10.05, P=0.045), and years of schooling (β=0.87, P<0.001).

Conclusion: Social determinants such as education, economic status, and family size are important predictors of health literacy in cancer patients. Health service programs, particularly those within the framework of the PERSIAN Cohort, should prioritize addressing these factors to enhance health literacy outcomes.

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Caspian Journal of Health Research

Introduction

Cancer remains a pressing global health concern, driven by an alarming rise in incidence rates worldwide [1]. Although the precise causes of many cancers are not fully understood, a range of factors, including individual behaviors, social characteristics, medical history, and lifestyle choices, are known to elevate cancer risk [2]. Focusing on factors that impact individuals' lives, especially environmental factors affecting health, has become an essential preventive strategy. The World Health Organization (WHO) recognized the importance of social factors and their effects on health as early as 1948, highlighting their significance in health promotion [3].

The social determinants of health—including socioeconomic status, marginalization, stress, early childhood experiences, employment status, working conditions, insurance coverage, social support, and other factors such as diet, transportation, urbanization, and globalization are now widely acknowledged to have a profound impact on health outcomes [4]. As a result, empowering individuals to actively manage their health through health-promoting behaviors has become a core principle in contemporary health policy [5]. This approach aligns with the principles of the Alma-Ata Declaration, which advocates for health promotion through individual awareness, education, and proactive engagement in behaviors that protect and enhance health [6].

One of the critical factors influencing engagement in health-promoting behaviors is health literacy. Health literacy is an individual's ability to effectively use their reading, writing, verbal, and numerical skills to participate positively in their personal health care [7]. A person's health literacy skills are crucial for making health-related decisions. Health literacy is described as "the personal knowledge and competencies that enable individuals to access, understand, evaluate, and use information and services in ways that promote and maintain good health and well-being for themselves and those around them" [8]. General literacy does not provide all the skills necessary to manage and communicate critical health information and concerns [9]. Health literacy, a topic of increasing global relevance, encompasses the cognitive and social skills needed to access, understand, and utilize health information effectively to maintain and improve health [10]. Evidence suggests that low health literacy is associated with poorer health outcomes, adverse health behaviors, lower patient satisfaction, and, in some cases, increased mortality rates. Health literacy disparities contribute to health inequities, as individuals with limited health literacy face challenges in understanding medical information, adhering to treatment, participating in preventive measures, and managing chronic conditions effectively [5].

Studies indicate that individuals with low health literacy tend to rely more on emergency services, experience higher rates of hospital admission, and engage less frequently in preventive healthcare behaviors, all of which contribute to elevated healthcare costs and strain on health systems [11]. Additionally, limited health literacy is linked to reduced participation in cancer screening programs and a diminished capacity to make informed health decisions, potentially impacting cancer outcomes [5, 12], For example, a study in Isfahan reported that approximately 80% of individuals had low health literacy, leading to increased hospitalization rates and more frequent doctor visits [12]. The implications of these findings are critical for policymakers and healthcare planners worldwide, underscoring the need for targeted interventions to improve health literacy and reduce associated costs [13]. Investigating the relationship between health literacy and social determinants of health in cancer patients may offer valuable insights for enhancing patient care and reducing disparities. Health literacy enables cancer patients to better understand their condition and use healthcare information effectively, potentially improving their overall well-being. This study, as part of the PERSIAN Guilan cohort, aims to examine the link between social determinants of health and health literacy in cancer patients in Guilan province to identifying strategies to enhance health literacy and support cancer prevention efforts.

Methods

Study design and participants

This cross-sectional descriptive study was conducted in 2019 as part of the PERSIAN Guilan cohort, using data from all known cancer patients within this cohort. The Guilan cohort study was conducted on 10520 men and women between 35-70 years of age in Guilan province and Some'e Sara county, northern Iran, from October 8, 2014 to January 20, 2017 as part of the prospective epidemiological research studies in Iran (PERSIAN) [14].

Eligibility criteria included patients who diagnosed with any type of cancer who provided informed consent, had a medical record in the PERSIAN Guilan cohort, and were able to complete the questionnaire. Patients who declined to participate in the study, were unwilling or unable to respond were excluded from the study.

From 102 identified cancer patients in the cohort, data were gathered on all available individuals. During follow-up calls, 10 patients were found to be deceased, and 21 individuals either could not be reached or declined participation. A total of 69 patients consented to participate via telephone interviews, conducted with confidentiality assurances. For two additional patients with speech difficulties due to laryngeal cancer, interviews were completed with assistance from their spouses. Before the telephone interview began, the study objectives were explained to the individuals, the text of the approved informed consent form was read to them, and their verbal consent was obtained. Data collection spanned 35 days, from December 11, 2020, following approval from the Guilan University of Medical Sciences' Research and Technology Deputy and Ethics Committee.

Data collection instruments

Data were collected through a structured questionnaire comprising two parts.

Social determinants of health

This section included 15 items on demographic and socioeconomic factors: Age, sex, height, weight, marital status, employment, education level, monthly income, number of children and household members, housing status, socioeconomic status, insurance, supplementary insurance, and primary health information sources. These data were obtained from participants' cohort records. The economic status was assessed using the wealth index, a reliable measure for household welfare in low- to middle-income settings. PCA was employed to create an index based on household access to assets including having television, computer, washing machine, dishwasher, microwave, smart phone, internet and car with higher scores indicating greater wealth.

Health literacy assessment

Health literacy was measured using the health literacy for iranian adults (HELIA) tool, validated by Montazeri et al. [15] for use in Iranian populations with Cronbach's α coefficients ranging from 0.72 to 0.89. This self-administered questionnaire includes demographic data and 33 items assessing health literacy across five domains: reading comprehension (4 items), information access (6 items), understanding (7 items), appraisal (4 items), and decision-making/behavior (12 items). Responses were scored on a 5-point Likert scale: For reading items, scores ranged from 1 (very difficult) to 5 (very easy), while for other items, scores ranged from 1 (never) to 5 (always). Each domain's score was calculated by summing item scores and rescaling to a 0–100 range. A total health literacy score was obtained by averaging across the five domains, categorized as follows: insufficient (0–50), marginal (51–66), sufficient (67–84), and excellent (85–100) [15].

Data analysis

Data described using frequency and percent or Mean±SD. PCA of the households' assets was used to define wealth index as socioeconomic status. To determine the predictors of health literacy, ordinary least squares regression model was used with health literacy as the dependent variable and social determinants of health as independent variables. The collinearity between the explanatory variables was assessed using variance inflation factor (VIF). Variables associated with high VIF scores were eliminated from the regression model. χ^2 Breusch-Pagan test was used for assessing heteroscedasticity. The model coefficients and statistical significance were evaluated at a 95% confidence level ($P<0.05$), using STATA software, version 13.1.

Results

Out of the 71 participants, 73.2% were women, with a Mean±SD age of 54.45±9.13. Approximately 36.6% resided in urban areas, and 95.8% were married. The majority (59.2%) were housewives, with the most common comorbidities being hypertension and diabetes, affecting 50.7% of the sample (Table 1). Breast cancer was the most prevalent type, affecting 38% of participants. Totally, 77.4% having at least one chronic disease.

Sources of health information

When asked about preferred sources for information about health and illness, 61.97% of participants reported obtaining information from physicians and healthcare staff, followed by other patients, friends, and acquaintances (19.72%). Internet sources were used by 16.90% of participants, while only one respondent (1.4%) indicated uncertainty about where to obtain health-related information.

Health literacy scores

The Mean±SD total health literacy score among participants was 81.6±2.26. Scores were highest in the decision-making and behavior domain, averaging 24.95±1.12, and lowest in reading skills, with a

Table 1. Demographic characteristics of participants (n=71)

Social Determinants of Health		No. (%)
Gender	Men	19(26.8)
	Female	52(73.2)
Residence	City	26(36.6)
	Village	45(63.4)
Marital status	Married	68(95.8)
	Widowed	3(4.2)
No. of children	Without children	1(1.5)
	<3	29(40.8)
	3-6	36(50.7)
	>6	5(7)
Educational level	Less than primary school	18(17.5)
	Diploma or less	46(75.7)
	University level	7(6.8)
Job	Unemployed	3(4.2)
	Housewife	42(59.2)
	Employed	3(4.2)
	Worker	3(4.2)
	Farmer	6(8.4)
	Retired	7(9.9)
	Self-employed	7(9.9)
Having insurance	Basic insurance	65(91.4)
	Full insurance	26(36.6)
comorbidity	Hypertension	36(50.7)
	Pre-diabetes & diabetes	36(50.7)
	Cardiac ischemia	8(11.3)
	Heart attack	2(2.8)
	Kidney stone	12(16.9)
	Gallstone	1(1.4)
	Psychological illness	19(26.8)
	Chronic lung disease	3(4.2)
	Thyroid disease	9(12.7)
	Rheumatic disease	4(5.6)
	epilepsy	2(2.8)
	Chronic headache	4(5.6)

Table 2. The Level of health literacy of participants in different dimensions and the total score

Health Literacy Dimensions	Mean±SD	95% CI	
		Lower Limit	Upper Limit
Reading skill	57.6±5.01	47.67	67.65
Access	82.6±3.48	75.75	89.63
Comprehension	74.9±3.31	68.34	81.56
Evaluation	75.1±2.23	70.72	79.63
Decision making and Behavior	95.2±1.12	93.01	97.49
Total score	81.6±2.66	77.1	86.18

Mean±SD of 57.65±5.00. Regarding health literacy levels, 49.3% of participants demonstrated excellent health literacy, while 19.72% had sufficient literacy. Meanwhile, 30.99% of patients exhibited inadequate or marginal health literacy (Table 2). Table 3 shows the results of principal component analysis (PCA) and its eigenvalues. In the table, each of the variables added for the PCA and their proportion for the total wealth score is shown.

Regression analysis

Table 4 shows the results of ordinary least square regression analysis to show the relationship between different variables and scores of health literacy. The results of regression analysis showed a significant relationship between health literacy score and wealth index (β=7.827, P<0.001), not having diabetes (β=-3.85, P=0.022), not having hypertension (β=-10.05, P=0.045), and years of schooling (β=0.87, P<0.001).

Discussion

This study explored the relationship between social determinants of health and health literacy among cancer patients participating in the PERSIAN Guilan Cohort Study in 2020. We found that most patients obtained health information primarily through healthcare professionals, consistent with findings from similar studies using the HELIA questionnaire [16-19]. Improving health literacy is likely to lead to improved use of preventive services, adherence to treatment, and participation in health decision-making [20]; therefore, policymakers' interventions in promoting the provision of health information through experts can improve healthcare performance [21].

Health literacy domains

Our results indicated that patients scored highest in the decision-making and behavior domain, followed by access, evaluation, comprehension, and reading skills. These findings are consistent with studies conducted in Iran [22-24] and internationally, such as those by Dai Minh in Vietnam [25] and Hosking et al. in Australia [26], which similarly reported higher scores in decision-making and behavior. This domain, which involves using health information for self-care and daily health-related decisions, is crucial for chronic disease management, as also suggested in qualitative research by Karim Saberi et al. [27].

Health literacy levels

Approximately 70% of participants demonstrated adequate health literacy, with nearly half scoring in the excellent range. These results align with studies by Mirsamiyazdi [28], Javadzade [29], Bánfai-Csonka [30], Liu [31], and Moon [32]. However, Tehrani et al. found that only 21% of women in their study exhibited excellent health literacy [16]. Meta-analyses, such as one summarizing 19 studies in the U.S., indicated that 23% of adults had insufficient or borderline health literacy [33]. In contrast, studies from Hormuz Island and Kerman reported high levels of inadequate or marginal health literacy among adults, suggesting regional disparities in health literacy in Iran [28]. Intervention programs associated with the PERSIAN Guilan Cohort may have contributed to higher health literacy levels in this population, highlighting the potential impact of structured health interventions.

Table 3. The results of PCA for calculation of wealth index using household asset ownership

Component	Eigenvalue	Proportion
Television	3.75735	0.4697
Computer	1.78778	0.2235
Washing machine	1.11621	0.1395
Dishwasher	0.5737	0.0717
Microwave	0.444102	0.0555
Smart phone	0.193554	0.0242
Internet	0.113981	0.0142
car	0.0133255	0.0017

Health literacy levels

Approximately 70% of participants in the PGCS demonstrated adequate health literacy, with nearly half scoring in the excellent range. These findings are consistent with those of Mirsamiyazdi et al. [28], who evaluated health literacy among patients with chronic diseases in urban health centers and found generally adequate literacy levels. Similarly, Javadzade et al. [29] assessed adult patients with type 2 diabetes and reported moderate to high health literacy among the majority of participants.

In a hospital-based study in Hungary, Bánfai-Csonka et al. [30] investigated health literacy in cancer patients and found that a substantial proportion had sufficient literacy, supporting our findings in a cancer population. Liu et al. [31], studying health literacy among Chinese patients undergoing chemotherapy, also reported moderate to high levels of literacy, suggesting that patients actively engaged in care may achieve higher literacy. Moon et al. [32] examined Korean cancer patients and similarly found acceptable levels of health literacy, reinforcing the relevance of these results in oncology settings.

However, Tehrani et al. [16], in a study of women attending public health clinics in Iran, found that only 21% exhibited excellent health literacy, suggesting disparities across gender or healthcare settings. Additionally, a U.S. meta-analysis summarizing data from 19 general population studies indicated that 23% of adults had insufficient or borderline health literacy [33], pointing to a wider global challenge.

In contrast, studies from Hormuz Island and Kerman, which assessed health literacy among general adult populations, reported high levels of inadequate or marginal health literacy [34]. These regional differences highlight variability across geographic and sociodemographic contexts in Iran.

The relatively high health literacy levels observed in the PGCS sample may be partially attributable to structured educational and health promotion programs associated with the PERSIAN Cohort infrastructure. These results underscore the potential benefits of targeted, long-term health interventions in improving literacy outcomes among patients with cancer.

Associations with social determinants

Our findings showed that education level was positively associated with health literacy, consistent with the results of Barikani et al. [23] and Cabellos-García et al. [35]. Wealth index also correlated positively with health literacy, aligning with Saatchi et al. [34], Saberipour et al. [36], findings, which found socioeconomic status to be an important predictor of health literacy. The study also found that higher health literacy was associated with lower rates of chronic diseases such as hypertension and diabetes. This observation is consistent with the results of various studies that show that adequate health literacy is associated with better quality of life and is a protective factor against chronic diseases [37-40]. In fact, individuals with higher health literacy tend to engage in healthier behaviors, manage chronic diseases more effectively, and navigate the health care system successfully, which leads to improved quality of life. Adequate health literacy helps individuals understand the risk factors and preventive measures associated with chronic diseases, which can reduce their incidence and severity.

Table 4. The relationship between health literacy and social determinants of health using regression model

Variables	B Coefficient	SD	P
Wealth	7.827	0.423	0.001
Age (y)	-0.009	0.070	0.896
Years of schooling	0.872	0.199	0.000
Habitat (village)	-0.513	1.282	0.691
Gender (Female)	1.247	1.636	0.449
Married	-1.230	2.921	0.675
Number of children	0.252	0.379	0.510
Lack of Basic insurance	-0.720	2.140	0.738
Lack of supplementary insurance	6.925	5.939	0.249
BMI	0.048	0.140	0.735
Lack of diabetes	-2.636	1.438	0.072
Lack of hypertension	-2.002	1.348	0.143
Constant	75.476	5.949	0.001
VIF test		1.620	
R squared		0.270	

These results indicate that individuals with higher education and socioeconomic status tend to have better health literacy, potentially enhancing their ability to engage in informed decision-making about health.

Conclusions

Our findings underscore the significant relationship between health literacy and social determinants such as education level. Recognizing and addressing these determinants is essential for policymakers and healthcare providers to design effective interventions that improve health literacy, particularly in chronic disease contexts where health literacy can impact patient outcomes. As chronic disease prevalence increases, so does the need for strategies that address the underlying social factors influencing health literacy. Enhancing health literacy through tailored interventions can help mitigate the social and economic burden of chronic disease on individuals and society, supporting a more health-literate and resilient population.

Limitations and future directions

This study has several limitations. First, reliance on self-reported data may introduce response and recall biases, potentially affecting the accuracy of reported health literacy levels. Second, the study population consisted of participants enrolled in the PERSIAN Guilan Cohort Study—a structured, long-term health initiative—which may not fully represent the general population or other patient groups outside this cohort. Therefore, the findings may not be generalizable to broader or less-engaged populations. Additionally, some participants were excluded based on study-specific criteria, which may limit the diversity of the sample and the applicability of findings to populations not meeting those criteria.

Future research should aim to include more heterogeneous samples, encompassing diverse geographic regions, socioeconomic backgrounds, and patient populations beyond cancer cohorts. It is also important to examine a broader range of social determinants of health, such as digital access, social capital, and healthcare system navigation, to better understand cultural and contextual variations in health literacy. Longitudinal studies

that assess the impact of targeted interventions on health literacy outcomes across different patient populations would further enhance the field.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the Ethics Committee of Guilan University of Medical Sciences, Rasht, Iran (Code: IR.GUMS.REC.1399.404).

Funding

This study is the result of a research project of Guilan University of Medical Sciences, Rasht, Iran (Code:2495-583).

Authors' contributions

Conceptualization and supervision: Fataneh Bakhshi and Enayatollah Homaei Rad; Methodology: Farahnaz Joukar and Mohammadreza Naghipour; Data collection: Amirhossein Javadi; Data analysis: Amirhossein Javadi and Enayatollah Homaei Rad; Funding acquisition and resources: Fataneh Bakhshi and Fariborz Mansour Ghanaei; Investigation, Writing the original draft, review & editing: All authors.

Conflict of interest

The authors declared no conflict of interest.

Acknowledgements

The authors of this article express their gratitude and thank all the loved ones as well as the PERSIAN Guilan cohort team of the Guilan University of Medical Sciences who helped them in this study. They also appreciate the Research Vice-Chancellor of Guilan University of Medical Sciences for approving this project.

References

[1] Klein WM, Bloch M, Hesse BW, McDonald PG, Nebeling L, O'Connell ME, et al. Behavioral research in cancer prevention and control: A look to the future. Am J Prev Med. 2014; 46(3):303-11. [DOI:10.1016/j.amepre.2013.10.004] [PMID]

[2] Allahverdi N, Yassin M, Ibrahim M. Environmental factors, lifestyle risk factors, and host characteristics associated with philadelphia negative myeloproliferative neoplasm: A systematic review. Cancer Control. 2021; 28:10732748211046802. [DOI:10.1177/10732748211046802] [PMID]

[3] Ilbawi AM. WHO report on cancer: Setting priorities, investing wisely and providing care for all. Lyon: International Agency for Research on Cancer; 2020. [Link]

[4] Donkin A, Goldblatt P, Allen J, Nathanson V, Marmot M. Global action on the social determinants of health. BMJ Glob Health. 2017; 3(Suppl 1):e000603. [DOI:10.1136/bmjgh-2017-000603] [PMID]

[5] Berkman ND, Sheridan SL, Donahue KE, Halpern DJ, Crotty K. Low health literacy and health outcomes: An updated systematic review. Ann Intern Med. 2011; 155(2):97-107. [DOI:10.7326/0003-4819-155-2-201107190-00005] [PMID]

[6] Kuehne F, Kalkman L, Joshi S, Tun W, Azeem N, Buowari DY, et al. Healthcare provider advocacy for primary health care strengthening: A call for action. J Prim Care Community Health. 2022; 13:21501319221078379. [DOI:10.1177/21501319221078379] [PMID]

[7] Nutbeam D. The evolving concept of health literacy. Soc Sci Med. 2008; 67(12):2072-8. [DOI:10.1016/j.socscimed.2008.09.050] [PMID]

[8] Nutbeam D, Muscat DM. Health promotion glossary 2021. Health Promot Int. 2021; 36(6):1578-98. [DOI:10.1093/heapro/daaa157] [PMID]

[9] Rudd RE, Anderson JE, Oppenheimer S, Nath C. Health literacy: An update of medical and public health literature. In: Comings J, Garner B, Smith C, editors. Review of adult learning and literacy, volume 7. New York: Routledge; 2023. [DOI:10.4324/9781003417996-6]

[10] Scott AJ, Wilson RF. Social determinants of health among African Americans in a rural community in the deep South: An ecological exploration. Rural Remote Health. 2011; 11(1):1634. [DOI:10.22605/RRH1634] [PMID]

[11] Shahid R, Shoker M, Chu LM, Frehlick R, Ward H, Pahwa P. Impact of low health literacy on patients' health outcomes: A multicenter cohort study. BMC Health Serv Res. 2022; 22(1):1148. [DOI:10.1186/s12913-022-08527-9] [PMID]

[12] Reisi M, Javadzade SH, Heydarabadi AB, Mostafavi F, Tavassoli E, Sharifirad G. The relationship between functional health literacy and health promoting behaviors among older adults. J Educ Health Promot. 2014; 3(1):119. [DOI:10.4103/2277-9531.145925]

[13] Yaghoubi M, Javadi M, Karimi S, Pirasteh V. Costs of normal and caesarian section delivery before and after implementation of the national health sector evolution plan in Iran from the perspectives of patients, health service providers and hospitals. J Sch Public Health Inst Public Health Res. 2018; 16(2):114-25. [Link]

[14] Mansour-Ghanaei F, Joukar F, Naghipour MR, Sepanlou SG, Poustchi H, Mojtahedi K, et al. The PERSIAN Guilan cohort study (PGCS). Arch Iran Med. 2019; 22(1):39-45. [Link]

[15] Montazeri A, Tavousi M, Rakhshani F, Azin SA, Jahangiri K, Ebadi M, et al. [Health literacy for Iranian adults (HELIA): Development and psychometric properties (Persian)]. Payesh. 2014; 13(5):589-99. [Link]

[16] Tehrani H, Rahmani M, Jafari A. [Health literacy and Its relationship with general health of women referring to health care centers (Persian)]. J Health Lit. 2018; 3(3):191-8. [DOI:10.22038/jhl.2018.36901.1021]

[17] Ebrahimpour F, Hasandoost F, Namazi S. [Health literacy of mothers in ghods children's hospital, Qazvin (Persian)]. J Health. 2020; 11(4):574-83. [DOI:10.29252/j.health.11.4.574]

[18] Ghanbari S, Majlessi F, Ghaffari M, Mahmoodi Majdabadi M. [Evaluation of health literacy of pregnant women in urban health centers of Shahid Beheshti Medical University (Persian)]. Daneshvar Med. 2020; 19(6):1-12. [Link]

[19] khosravi A, Ahmadzadeh k, Arastoopoor S, Tahmasbi R. [Health literacy levels of diabetic patients referred to Shiraz health centers and its effective factors (Persian)]. Health Inf Manage. 2015; 12(2):194-205. [Link]

[20] Coughlin SS, Vernon M, Hatzigeorgiou C, George V. Health literacy, social determinants of health, and disease prevention and control. J Environ Health Sci. 2020; 6(1):3061. [PMID]

[21] Tucker-Seeley R, Abu-Khalaf M, Bona K, Shastri S, Johnson W, Phillips J, et al. Social determinants of health and cancer care: An ASCO policy statement. JCO Oncol Pract. 2024; 20(5):621-30. [DOI:10.1200/OP.23.00810] [PMID]

[22] Danaei M, Asadsangabi Motlagh K, Momeni M. [Investigating the status of health literacy and its predictive factors in women with breast cancer referring to teaching hospitals of Javad Al-Aemeh university and clinic in Kerman, 2021 (Persian)]. Tolooebehdasht. 2023; 21(5):21-33. [DOI:10.18502/tbj.v21i5.11747]

[23] Barikani A, Samani Kia M, Khoshkchali A, Mirzadeh M. Relationship between health literacy level and sexual function in women in the Northwest of Iran in 2020- A cross sectional study. BMC Women Health. 2023; 23(1):176. [DOI:10.1186/s12905-023-02322-2] [PMID]

[24] Tavakoli Hafshejani T, Bahramnezhad F, Sharifi F, KH S. [Associations between health literacy with dialysis adherence and health resource utilization in patients receiving maintenance hemodialysis (Persian)]. Iran J Nurs Res. 2022; 17(4):77-87. [Link]

[25] Dai Minh L, Quang BV, Ngoc Le Mai D, Quyen LL, Gia NH, et al. Health literacy of newly-admitted cancer patients in vietnam: Difficulties understanding treatment options and processing health-related information. Health Serv Insights. 2022; 15:11786329211067325. [DOI:10.1177/11786329211067325] [PMID]

[26] Hosking SM, Brennan-Olsen SL, Beauchamp A, Buchbinder R, Williams LJ, Pasco JA. Health literacy in a population-based sample of Australian women: A cross-sectional profile of the Geelong Osteoporosis Study. BMC Public Health. 2018; 18(1):876. [DOI:10.1186/s12889-018-5751-8] [PMID]

[27] Karim Saberi M, Paknahad S, Jowkar A. [Health literacy of patients with breast cancer: A qualitative study (Persian)]. J Qual Res Health Sci. 2019; 8(2):131-42. [Link]

[28] Mirsamiyazdi N, Jafaripour F, Taqvaeinasab H, Masoudiyekta L, Amiri R, Komeilifar Z. The relationship between health literacy and health promoting behaviors in patients with type2 diabetes. J Health Lity. 2021; 6(3):24-31. [Link]

[29] Javadzade H, Mahmoodi M, Hajivandi A, Ghaedi S, Reisi M. The relationship between health literacy and health promoting behaviors among adults in Bushehr. J Health Lit. 2019; 4(2):49-60. [DOI: 10.22038/jhl.2019.41670.1065]

[30] Bánfai-Csonka H, Bánfai B, Jeges S, Gyebnár B, Betlehem J. Health literacy among participants from neighbourhoods with different socio-economic statuses in the southern region of Hungary: A pilot study. BMC Public Health. 2020; 20(Suppl 1):1060. [DOI:10.1186/s12889-020-08959-0] [PMID]

[31] Liu L, Qian X, Chen Z, He T. Health literacy and its effect on chronic disease prevention: Evidence from China's data. BMC Public Health. 2020; 20(1):690. [DOI:10.1186/s12889-020-08804-4] [PMID]

[32] Moon Z, Zuchowski M, Moss-Morris R, Hunter MS, Norton S, Hughes LD. Disparities in access to mobile devices and e-health literacy among breast cancer survivors. Support Care Cancer. 2022; 30(1):117-26. [DOI:10.1007/s00520-021-06407-2] [PMID]

[33] Fan ZY, Yang Y, Zhang F. Association between health literacy and mortality: A systematic review and meta-analysis. Arch Public Health. 2021; 79(1):119. [DOI:10.1186/s13690-021-00648-7] [PMID]

[34] Saatchi M, Panahi M, Mozafari AA, Sahebkar M, Azarpakan A, Baigi V, et al. Health literacy and its associated factors: A population-based study, Hormuz Island. Iran J Epidemiol. 2017; 13(2):136-44. [Link]

[35] Cabellos-García AC, Castro-Sánchez E, Martínez-Sabater A, Díaz-Herrera MÁ, Ocaña-Ortiz A, Juárez-Vela R, et al. Relationship between determinants of health, equity, and dimensions of health literacy in patients with cardiovascular disease. Int J Environ Res Public Health. 2020; 17(6):2082. [DOI:10.3390/ijerph17062082] [PMID]

[36] Saberipour B, Elahi N, Rouholamini S, Zamani M. [Investigating health literacy level and its effective factors of patients referred to Shoushtar hospitals in 20181 (Persian)]. Iran J Nurs Res. 2019; 14(3):33-9. [Link]

[37] Hemmatipour A, Honarmandpour A, Asadi Chenareh S, Jahangirimehr A, Abdolahi Shahvali E, Mehri Z. [The relationship of health literacy with general health in Iranian patients with heart disease using the structural equation modeling (Persian)]. J Prevent Med 2024; 10(4):388-99. [DOI:10.32598/JPM.10.4.699.2]

[38] Lovrić B, Placento H, Farčić N, Lipič Baligač M, Mikšić Š, Mamić M, et al. Association between health literacy and prevalence of obesity, arterial hypertension, and diabetes mellitus. Int J Environ Res Public Health. 2022; 19(15):9002. [DOI:10.3390/ijerph19159002] [PMID]

[39] Esen K, Kolcu M. The relationship between health literacy and self-care management in patients with hypertension attending primary healthcare centers. J Public Health. 2024; 32(2):175-83. [DOI:10.1007/s10389-022-01801-4]

[40] Song I. Relationship between health literacy and health-related quality of life in Korean adults with chronic diseases. Plos One. 2024; 19(4):e0301894. [DOI:10.1371/journal.pone.0301894] [PMID]

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