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Differences in Health Literacy of Older Adults According to Sociodemographic Characteristics

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Abstract

BACKGROUND: The research is based on the concept of health literacy. This is the "sixth vital sign" to navigating the health-care system and raising self-efficacy in the field of health care. Research findings indicate a low level of health literacy in adults over 65 years of age. Morbidity and multimorbidity in older adults are often the reason for more frequent visits to health facilities.

AIM: The study aim was to present the health literacy of older adults in the Savinja Statistical Region in Slovenia.

METHODS: The study was based on a non-experimental quantitative research approach. The study included 199 older adults aged 65 and more, without the presence of dementia. The data were collected using the Health Literacy and Montreal Cognitive Assessment questionnaire. We used a non-random, convenience sampling. Basic descriptive statistics (frequency distribution, median, mode, and standard deviation) were used for data analysis, and the existence of statistically significant differences with respect to demographic variables was verified by Mann–Whitney U and Kruskal–Wallis tests.

RESULTS: We established that in the study population, 64.8% of the population was below the level of acceptable general health literacy, whereas only 3.5% of this population had an excellent level of health literacy. Statistically significant differences in the level of health literacy are shown in the field of health-care treatment in older adults living with their families ($f = 5,198$; $p < 0,001$). Respondents who engaged in activities in day care centers also had a higher level of health literacy ($t = 3.738$; $p < 0.001$). People with low health literacy, who use health services more frequently, should be given access to health education, based on individual presentation of contents, supported by andragogical knowledge.

CONCLUSION: The health literacy of older adults is the basis for their greater care for their own health and a better quality of life.

Introduction

In recent decades, education for older adults has become increasingly important, creating opportunities for successful and active aging [1]. As early as 2002 [2], the World Health Organization pointed out that lifelong learning and education opportunities are key factors that also enhance health and help people to develop the skills they need to adapt to change and independence during aging.

Aging of the world's population is a demographic trend that will continue to intensify in the coming decades [3], [4] as the number of older adults in Europe grows very rapidly [5]. The growing number of older adults brings several health challenges, such as the prevalence of chronic diseases and disabilities in older adults and, often, cognitive impairment [6]. Physical and mental decline also affects a person's ability to understand and use information related to their own health [7]. Decreased cognitive abilities can have a significant impact on the level of health literacy, even in relatively young people, and are an important barrier to health care [7]. Chesser *et al*. [8], for example, emphasized that education is an important predictor of health literacy and that older adults with low health literacy often report poor health and enter the health system when problems are very severe, thus prolonging treatment or increasing the risk of disease complications. They also participate less frequently in prevention programs [7], [9]. As the population is continuously aging, the prevalence of chronic non-communicable diseases is increasing, and with it the need for research to address the health literacy of older adults.

Health literacy is a competence in the field of health that includes a variety of information, knowledge, and skills relevant to deciding on the choice of health-related behaviors [10] and successfully managing the use of the health system [11]. Such a definition covers three topics: (1) Knowledge of health, health care, and health-care systems, (2) processing and use of

information in various forms regarding health and health care, and (3) ability to maintain health by caring for one's own health and cooperating with health-care providers [12]. Health literacy is developed at the level of the individual and the population and is a lifelong process of acquiring skills and abilities in the field of health [9], [13]. It is a key factor in politics which contributes to strengthening public health and managing the economic framework of public health finances [14]. Sørensen *et al*. [15], they have developed a complex model that combines the main dimensions of individual health literacy and demonstrates the proximal and distal social factors that can influence the health literacy of individuals. In their model, health literacy is divided into three key health domains, which were considered as individual variables in the present study: Health literacy in the field of health care, health literacy in the field of prevention, and health literacy in the field of health promotion. Within the individual domain of health literacy, the authors also distinguish the dimensions of health information management, specifically the level of access or search, level of understanding, level of judgment, and the level of use of information [9]. Among the social determinants influencing individual health literacy, they highlight environmental, social, economic, and political factors that have an impact on individual health literacy. Key social structures that can significantly affect the level of health literacy include school [16] and the health system [17]. The organization and structure of the education system are, therefore, crucial for the development of a health literate population in that it should include health education in the school curriculum [16]. The organization and structure of the health-care system are largely responsible for maintaining and raising the level of health literacy of older adults [17], [18], for which it is necessary to encourage the identification and determination of the level of health literacy in patients entering the health system. This will be the basis for creating an individualized information delivery strategy. Parnell [19] draws attention to the importance of delivering health information in an understandable manner, the acquisition of knowledge, and the development of skills relevant to the prevention or control of disease when holistically treating older adult patients. The study of Kim *et al*. [20] confirms the importance of health literacy rates of older adults when entering programs to support the change of health-related habits in patients with diabetes. The findings show a positive link between the level of health literacy and susceptibility to the given content and care for one's health. Both studies suggest that promoting accountability and a higher level of health literacy encourage people to take better care of their own health as well as collective health. To make education for the development of health literacy as successful as possible, appropriate andragogical methods [21], [22], which are involved in health education work with patients and represent a mechanism for promoting health literacy, are also relevant. Geboers *et al*. [7] link health outcomes to health literacy rates and other factors influencing the development of health literacy in older adults, such as social support (family, peers, carers, and communities); individualized approaches to empowering the individual; interaction between personality traits and health system requirements; taking measures to improve communication between the individual and health-care professionals; rapid identification of health literacy problems by health professionals; and access to the health-care system, quality of care, and patient safety within the health-care system.

Chesser *et al*. [8] found that various research demographic data may or may not be statistically significant [8]. With recent literature review, we determined that health literacy in older adults' population is an important factor of taking care of own health during a disease [23], and that many sociodemographic data may be used as indicators for health-care literacy level [24]. The aim of the research was to examine the level of health literacy of older adults and to determine whether it is related to demographic characteristics such as gender, education, and self-assessment of health status. Throughout the research, we attempted to answer the research question of how the level of health literacy of older adults is reflected in relation to sociodemographic data. The key hypothesis was set in the field of social determinants of older adults. We were interested in whether health literacy is statistically significantly linked to living in an urban or a rural environment, with support from relatives, and use of health-social institutions that are available in the country.

Methods

A non-experimental quantitative study was conducted in which data were collected using a structured questionnaire. A non-random sample involved 199 older adults, aged 65 and over, living in a home environment. We used Creative Research Systems, Sample Size Calculator – available at: https://www.surveysystem.com/sscalc.htm to calculate the sample, where we entered data to calculate the sample according to the region in which the study was conducted. The population includes 49,945 older adults aged 65 and over. A sample size of at least 196 individuals is required for a confidence level of 95% and a confidence interval of +/- 7%. The research lasted 30 days. During this period, we included older adults who have responded to the information about the research and have applied to the survey. All have previously passed the MoCA test – The Montreal Cognitive Assessment [25], a screening test to assess cognitive ability. Only respondents who scored more than 26 points in the test participated in the study, which

is the minimum score at which we can say that they did not show signs of reduced memory abilities [26], [27].

More women (n = 122) than men (n = 77) participated in the study. The participants were divided into two groups of approximately equal size in accordance with age, and they were also fairly evenly distributed in regard to their living environments (Table 1). Most had completed high school or vocational education. They mostly assessed their health condition as good or satisfactory, and most of them state that they do not use the social protection services available to them in the region. Most of them live with a partner, and a third of them live alone. Sample data are presented in more detail in Table 1.

Table 1: Description of the sample

	f	%
Sex		
Male	77	38.7
Female	122	61.3
Age		
65–69 years	104	52.3
70 years and older	95	47.7
Education		
Elementary school	56	28.1
High school or vocational	123	61.8
Short cycle or higher	20	10.1
Living environment		
Rural	98	49.2
Urban	101	50.8
Living conditions [n = 198]		
Alone	66	33.3
With a partner	96	48.5
With extended family	34	17.2
With a partner and extended family	2	1
Uses services provided by day care centers for older adults or other organizations/institutions		
Yes	47	23.6
No	152	76.4
Assessment of health status		
Very good	16	8
Good	90	45.2
Satisfactory	85	42.7
Poor	8	4

f=number, %=Percentage.

The questionnaire Health Literacy Survey HLS-EU-Q47 [4], [28] was used to measure health literacy. It was translated into Slovenian and used in the first survey in Slovenia in 2013 [29]. All relevant consents have been obtained for its use.

The health literacy survey consists of 47 statements and is based on the model developed on the basis of the literature review by Sørensen *et al*. [9]. The first set contains statements intended to aid in measuring health literacy in health care (16 statements), the second set of statements is intended for measuring health literacy in the prevention of chronic infectious diseases (15 statements), and the third set of statements is intended for measuring health literacy in health promotion (16 statements). Respondents responded to the statements using a 4-point Likert scale (from 1 – Very difficult to 4 – Very easy, 5 – I don't know).

The internal reliability of the questionnaire was checked by calculating Cronbach's alpha coefficient. Table 2 shows the values of Cronbach's alpha coefficient for the whole questionnaire and for each set. All calculated coefficients are satisfactory; the coefficient for general health literacy is good; and all others are higher than 0.9, which shows the adequate internal consistency of the questionnaire [30].

Table 2: Cronbach's alpha coefficient values for the whole questionnaire and each questionnaire set

Variables	Cronbach's alpha coefficient
General HL	0.858
HL in the field of health care	0.921
HL in prevention	0.917
HL in health promotion	0.933

HL: Health literacy.

Data collection through field surveys took place in the home environment of the respondents with the presence and assistance of interviewers. These were pre-trained to perform the MoCA test and survey.

Self-assessments of health literacy were categorized into groups in accordance with the methodology recommended by Sørensen *et al*. [4]: Inadequate health literacy – from 0 to 2.55 points; problematic health literacy – from 2.56 to 3.05 points; sufficient health literacy – from 3.06 to 3.62 points; and excellent health literacy – from 3.63 to 4 points.

The data were processed with the SPSS 25 program for Windows environment. The results of data analysis are presented with basic descriptive statistics (frequency distribution, median, mode, and standard deviation). The comparison of selected variables with respect to demographic data was verified by Mann–Whitney U and Kruskal–Wallis tests [30].

Results

Based on calculations and categorization into groups in accordance with the methodology of Sørensen *et al*. [4], we found that 18.6% of respondents have inadequate general health literacy and 64.8% have problematic general health literacy. The best level of health literacy was shown in health care (sufficient = 36.2%; excellent = 8%). The most inadequate was

Table 3: Classification of respondents into groups for the assessment of health literacy in specific areas

Health literacy	Naming	Inadequate	Problematic	Sufficient	Excellent
	Group range	0–2.55	2.56–3.05	3.06–3.62	3.63–4
Health care	Percentage of responses in the group	16.1	39.7	36.2	8.0
	Cumulative percentage	16.1	55.8	92.0	100
Prevention and health care	Percentage of responses in the group	25.1	40.7	29.2	5
	Cumulative percentage	25.1	65.8	95	100
Health promotion	Percentage of responses in the group	24.1	40.2	30.2	5.5
	Cumulative percentage	24.1	64.3	94.5	100
General	Percentage of responses in the group	18.6	46.2	31.7	3.5
	Cumulative percentage	18.6	64.8	96.5	100

health literacy in prevention and health care (25.1%). More than half of the participants reported inadequate or problematic health literacy in all areas (Table 3).

Table 4: Basic descriptive statistics of composite variables

Variables	M	Standard deviation
General HL	2.90	0.41
HL in the field of health care	2.98	0.43
HL in prevention	2.84	0.47
HL in health promotion	2.86	0.49

HL: Health literacy, M: Arithmetic mean.

Table 4 shows the average estimate and standard deviation for each composite variable. By analyzing the variance for repeated measurements, we confirmed statistically significant differences between the average values in individual areas of health literacy ($f (2, 197) = 15.59$; $p < 0.001$). Participants reported the best health literacy in health care and the worst health literacy in prevention.

Table 5: The results of the t-test of differences in health literacy according to gender

Variables	Men		Female		Statistics		
	M	SD	M	SD	M_{diff}	t (197)	p
General HL	2.86	0.43	2.91	0.39	–0.05	–0.840	0.402
HL in the field of health care	2.96	0.46	2.99	0.42	–0.03	–0.557	0.578
HL in prevention	2.79	0.51	2.87	0.45	–0.08	–1.141	0.255
HL in health promotion	2.83	0.43	2.91	0.39	–0.04	–0.623	0.534

HL: Health literacy, M: Arithmetic mean, SD: Standard deviation, M_{diff}=Difference between arithmetic means, t=Statistics of t-test, p=Level of statistical significance.

According to the results of the t-test (Tables 5 and 6), gender and place of residence (in an urban or rural environment; Table 7) of older adults do not affect their self-assessment of health literacy. Gender differences and differences between older adults living in urban areas and those living in rural areas regarding general health literacy, health literacy in health care, prevention, and health promotion were not statistically significant. Moreover, the analysis of variance did not support statistically significant differences in health literacy according to the level of education (Table 6).

Table 6: Results of analysis of variance (ANOVA) of differences in health literacy according to the level of education

Variables	Elementary school		High school or vocational		Short cycle or higher		Statistics	
	M	SD	M	SD	M	SD	F (2, 196)	p
General HL	2.85	0.48	2.91	0.37	2.94	0.38	0.503	0.606
HL in the field of health care	2.97	0.48	2.98	0.40	2.99	0.46	0.016	0.984
HL in prevention	2.80	0.59	2.86	0.42	2.84	0.40	0.384	0.681
HL in health promotion	2.77	0.57	2.88	0.46	2.97	0.38	1.555	0.214

HL: Health literacy, M: Arithmetic mean, SD: Standard deviation, F, p: Degree of statistical significance.

For the purposes of analyzing the results in Table 8, the categories of the independent variables "living with family" and "living with family and partner" were combined into one category. By analyzing variance, we then supported the existence of statistically significant differences in the level of general health literacy and levels of health literacy in health care, prevention, and health promotion that reflect the cohabitation arrangements of the older adults surveyed. On average, the best health literacy (in general and in the areas of health care, prevention, and health promotion) was shown by those older people who lived with their families. Older adults who lived alone or with a partner, however, showed slightly lower and mutually comparable health literacy.

Table 7: Results of the t-test of differences in health literacy according to the living environment

Variables	Rural		Urban		Statistics		
	M	SD	M	SD	M_{diff}	t (197)	p
General HL	2.87	0.42	2.92	0.39	–0.06	–0.959	0.339
HL in the field of health care	2.94	0.44	3.01	0.42	–0.06	–0.928	0.355
HL in prevention	2.82	0.52	2.86	0.42	–0.04	–0.528	0.598
HL in health promotion	2.81	0.48	2.90	0.49	–0.08	–1.210	0.228

HL: Health literacy, M: Arithmetic mean, SD: Standard deviation, t-test, p: Level of statistical significance.

Table 8: Results of the analysis of variance in differences in health literacy according to the cohabitation arrangements of older adults

Variables	Alone		With a partner		With family/with partner and family		Statistics	
	M	SD	M	SD	M	SD	F (2, 195)	p
General HL	2.84	0.42	2.86	0.39	3.09	0.38	5.198	0.006
HL in the field of health care	2.92	0.46	2.94	0.41	3.18	0.41	5.009	0.008
HL in prevention	2.77	0.47	2.81	0.44	3.08	0.50	6.080	0.003
HL in health promotion	2.81	0.50	2.84	0.46	3.02	0.50	2.452	0.089

HL: Health literacy, M: Arithmetic mean, SD: Standard deviation, p: Level of statistical significance.

Table 9 shows that statistically significantly higher levels of health literacy in all areas are achieved by those older adults who participate in day care centers for older adults or other similar organizations/institutions, compared to older adults who do not participate in such activities. Older adults participating in activities report higher levels of general health literacy, health literacy in health care, health literacy in health promotion, and health literacy in prevention.

Table 9: Results of the t-test of differences in health literacy according to participation in activities organized by day centers for older adults or other similar organizations/institutions

Variables	Yes		No		Statistics		
	M	SD	M	SD	M_{diff}	t (197)	p
General HL	3.09	0.41	2.84	0.39	0.25	3.738	<0.001
HL in the field of health care	3.13	0.43	2.93	0.42	0.20	2.790	0.006
HL in prevention	3.03	0.46	2.78	0.46	0.25	3.250	0.001
HL in health promotion	3.09	0.51	2.78	0.46	0.31	3.922	<0.001

HL: Health literacy, M: Arithmetic mean, SD: Standard deviation, M_{diff}: Difference in mean values of compared groups, t: t-test statistics, p: Degree of statistical significance.

For the purpose of the analysis, the self-assessment of the health status of older adults was changed to a bivariate variable (Table 10). The first group included participants who rated their health as very good or good, and the second group included those who rated their health as satisfactory or poor. We did not find statistically significant differences in health literacy between such groups; therefore, we conclude that placement in a group according to the self-assessment of health status does not have a significant impact on health literacy.

Table 10: Results of the t-test of differences in health literacy according to the self-assessment of the health condition

Variables	Very good/good		Satisfactory/poor		Statistics		
	M	SD	M	SD	M_{diff}	t (197)	p
General HL	2.91	0.38	2.87	0.43	0.04	0.663	0.508
HL in the field of health care	3.01	0.39	2.94	0.47	0.07	1.117	0.265
HL in prevention	2.83	0.48	2.86	0.46	–0.03	–0.452	0.652
HL in health promotion	2.89	0.46	2.81	0.51	0.08	1.156	0.249

HL: Health literacy, M: Arithmetic mean, SD: Standard deviation, M_{diff}: Difference in mean values of compared groups, t: t-test statistics, p: Degree of statistical significance.

Discussion

As the world's population ages, many societies face many challenges regarding the health problems of older adults [31]. Due to the high prevalence of chronic and cancerous diseases and the increasing trend toward a significant presence of age-related fragility and multimorbidity, an adequate level of health literacy is crucial. Panagioti *et al*. [32] noted that "lower health literacy is a key independent predictor of poorer quality of life in older adults with chronic health problems." Understanding and focusing on health literacy factors, organizing education aimed at reducing disease problems, and promoting health and active life in older adults contribute to better socialization and a better quality of life [31]. Therefore, the study examined the importance of sociodemographic characteristics in relation to the level of health literacy of older adults. A study examining health literacy as a predictor of quality of life in a sample of older adults. Geboers *et al*. [7] found that this perfectly predicts a decline in the physical, environmental, psychological, and social fields. A statistically significant difference between older adults living alone or with a partner and those living with a family is likely to indicate better health literacy due to more frequent and diverse social contacts. In the event of a chronic illness or any change in health status, health professionals try to promote the need to involve the patient and their relatives in self-care, leading to competent behavior, enhancing self-perception, and improving health-related behaviors [33]. Sentell *et al*. [34] studied the impact of health condition on health literacy rate and found that there is a strong link between the two factors. The impact of self-assessment of health condition in our research proved to be statistically insignificant, as did the level of education of participants in the research.

We further found that older people who visit day care centers where they receive information on disease management and have contacts with "peers" who experience similar health problems have better health literacy. Sentell *et al*. [34] also confirmed the impact of population health literacy on an individual's health condition. Individuals living in a higher health literacy community have a better health condition, which is explained by the availability of quality health information that individuals in such communities can access. However, increasing health literacy rates could allow people to use information and guidance about their health. Health literacy would, thus, over time, have a direct impact on a better quality of life and consequently give rise to a more health literate community [35]. In the present study, we confirmed a statistically significant difference between persons attending day care centers for older adults and persons not attending these centers in the level of health literacy in general health literacy, health literacy in health care, in prevention, and in health promotion. This confirms that the participants in the activities in day care centers for older adults are better in general health literacy as well as in all three categories of health literacy. The benefits of improving health literacy include choosing the best health-related decisions, communicating, following treatment instructions, and improving health, resulting in cost savings in health care, greater patient satisfaction, and a more active old age [8]. Ma *et al*. [36] said that health literacy has a positive effect on productive ageing and promoting health in older adults. Older adults with a higher level of health literacy have more health information and are likely to be actively ageing, which will boost their physical and mental health in urban communities. Education is an important means of promoting active aging, which can be influenced by lifelong learning aimed at healthy living habits and encouraging self-efficacy in managing one's own health [36], [37]. This suggests that people with a low level of education may not understand and use the information obtained in the health system in their daily lives [36]. Although some authors emphasize the importance of formal education for health literacy [19], in some studies, education proves to be a factor that is not very important, especially in specific health literacy [38].

There were no statistically significant differences between the sexes of the respondents in our study. Lee *et al*. [39], however, detected gender differences in certain areas. Thus, older women had better health literacy in understanding written instructions that are received through the health system and provided with medicines, and they were also more familiar with the health system than men. Lee *et al*. [39] have also been associated with a correlation between the level of education and continuity of treatment in the same medical institution for women and women with the level of education and continuity of treatment in the same medical institution, and among men in unmarried men with a higher level of education. We did not confirm statistically significant differences in the level of health literacy between respondents living in rural areas and those from urban areas. Chen *et al*. [40] confirmed that people in rural areas showed lower levels of health literacy, which they associated with poorer access to specialist doctors and health services in general, indicating the individual's ability to obtain credible information from the system. We also did not confirm statistically significant differences in the level of health literacy of respondents who rate their health as very good/good and those who rate it as bad/very poor. Even though respondents with a higher level of education also have a higher level of health literacy, we did not confirm statistically significant differences according to education. From the point of view of older adults, it makes sense to point out the frequency of decline in cognitive abilities that affect the level of health literacy [41]. Findings of the research conducted by Geboers *et al*. [7] show that low levels of health literacy are particularly prevalent in older adults with impaired cognitive performance and stronger cognitive

decline, which may affect their ability to promote health and control disease. Decreased cognitive abilities in relatively young older adults may also be the cause of low health literacy [7] which is not age-related and is present regardless of education level.

Health-care professionals should identify and tailor such patients' health information in a manner that will be comprehensible to the patient with reduced cognitive abilities [7], and act "transformatively" – with a holistic approach used in the process of changing life habits [42].

To facilitate the understanding of health-related information and thus improve health literacy in older adults, a health education and promotion strategy are used that involve didactic approaches tailored to this population, such as live lectures with live content or improved accessibility and readability of health information [43]. Regarding the effective provision of health information, the authors [4], [42] emphasize in particular the necessity of encouraging patients to clearly and fully express any concerns and report symptoms, ask, and answer questions to help health professionals understand the information received, to be able to explain to them and improve their understanding and remembering. Nurses have an important role to play in providing information, and their role in health promotion [44] needs to become more visible, especially through work in family medicine clinics, community health care, and health or health promotion centers. When treating older adults, it is crucial for health care workers to be familiar with their level of health literacy, which is also affected by sociodemographic determinants. The authors believe that the above statements present the only possibility for adapting health instructions and guidelines to empower patients to take care of their own health.

Research limitations

The limitations of our research are the use of only quantitative research methods and not methodological pluralism, that is, a combination of quantitative and qualitative methodology. A qualitative approach would demonstrate an in-depth perspective on knowing, understanding, and using health-related information. Another limitation of our research is that we had an unrepresentative sample of the entire group of older adults living in Slovenia (although it was representative of older adults from the Savinja Statistical Region). This could have a significant impact on our findings, especially in relation to the place of residence, as in Slovenia, which is relatively small, health care workers are less accessible in certain areas. We also included a relatively homogeneous age group in the study (very old individuals were not included in the study). The conclusions of the research are valid only for the studied sample, but the results definitely indicate a starting point for further research. It would be sensible to continue the research on a larger representative sample. For the results to be applicable in the clinical environment of the health-care system, it would be sensible to conduct the research among health care workers as well, as they tend not to pay much attention to the level of health literacy of the patients.

Conclusion

Interdisciplinary action at a systemic national level with the involvement of both the educational and health systems is crucial for improving the health literacy of older adults. Hand in hand, the health and education system can prepare the contents of andragogical education to enable health promotion and support those living with a chronic illness and in rehabilitation after acute illnesses or conditions. Uniform communication of information with health content, both in the framework of andragogical educational programs, health education counseling in the health system, and national promotion, is the only way to achieve public trust in scientific findings. All messages must be targeted at a particular vulnerable group or people with the same chronic diseases or conditions. As we have found, the health literacy of older adults is influenced by social factors such as participation in day care centers for senior citizens and interaction with those with whom older adults cohabit. It would be instructive to examine how health literacy is affected by the inclusion of older adults in lifelong learning and the continuation of health education in the health system or local community.

Uniform approaches are important not only for the older adult population, but for the entire population. Individual-oriented approaches to health education and systemic health education are the basis for health promotion, which should be focused on content that in any given situation contributes the most to raising the level of health literacy and thus maintaining the health of the entire population.

References

1. Kump S. The influence of older adults' education and skills on individual and social well-being. Andrag. Spoznan. 2015;21(2):9-27. https://doi.org/10.4312/as.21.2.9-27
2. World Health Organization. Active Ageing: A Policy Framework. Geneva: World Health Organization; 2002. Available from: https://apps.who.int/iris/bitstream/handle/10665/67215/WHO_NMH_NPH_02.8.pdf?sequence=1&isAllowed=y [Last accessed on 2021 Dec 05].
3. Pais R, Ruano L, Moreira C, Carvalho OP, Barros H. Prevalence and incidence of cognitive impairment in an elder Portuguese population (65-85 years old). BMC Geriatr. 2020;20(1):470.

https://doi.org/10.1186/s12877-020-01863-7

PMid:33198643

4. Sørensen K, Pelikan JM, Röthlin F, Ganahl K, Slonska Z, Doyle G, *et al*. Health literacy in Europe: Comparative results of the European health literacy survey (HLS-EU). Eur J Public Health. 2015;25(6):1053-1058. https://doi.org/10.1093/eurpub/ckv043

PMid:25843827

5. Komisyonu A. The 2018 Ageing Report: Economic and Budgetary Projections for the 28 EU Member States (2016-2070). Luxembourg: Publications Office of the European Union; 2018.

6. Crimmins EM, Kim JK, Langa KM, Weir DR. Assessment of cognition using surveys and neuropsychological assessment: The health and retirement study and the aging, demographics, and memory study. J Gerontol B Psychol Sci Soc Sci. 2011;66(Suppl 1):i162-71. https://doi.org/10.1093/geronb/gbr048

7. Geboers B, Reijneveld SA, Koot JA, De Winter AF. Moving towards a comprehensive approach for health literacy interventions: The development of a health literacy intervention model. Int J Environ Res Public Health 2018;15(6):1268. https://doi.org/10.3390/ijerph15061268

PMid:29914065

8. Chesser AK, Woods NK, Smothers K, Rogers N. Health literacy and older adults: A systematic review. Gerontol Geriatr Med. 2016;2:2333721416630492. https://doi.org/10.1177/2333721416630492

PMid:28138488

9. Sorensen K. Health Literacy: A Neglected European Public Health Disparity. Maastricht: Universitaire Pers Maastricht; 2013.

10. Mårtensson L, Hensing G. Health literacy a heterogeneous phenomenon: A literature review. Scand J Caring Sci. 2012;26(1):151-60. https://doi.org/10.1111/j.1471-6712.2011.00900.x

PMid:21627673

11. Hersh L, Salzman B, Snyderman D. Health literacy in primary care practice. Am Fam Physician. 2015;92(2):118-24.

PMid:26176370

12. Liu C, Wang D, Liu C, Jiang J, Wang X, Chen H, *et al*. What is the meaning of health literacy? A systematic review and qualitative synthesis. Fam Med Community Health. 2020;8(2):e000351. https://doi.org/10.1136/fmch-2020-000351

PMid:32414834

13. Kickbusch I, Pelican JM, Apfel F, Tsouros A. Health Literacy the Solid Facts. Copenhagen: World Health Organization, Regional Office for Europe; 2013.

14. Bitzer EM, Sørensen K. Health literacy. Gesundheitswesen. 2018;80(8/9):754-66. https://doi.org/10.1055/a-0664-0395

PMid:30176683

15. Sørensen K, Van den Broucke S, Fullam J, Doyle G, Pelikan J, Slonska Z, *et al*. Health literacy and public health: A systematic review and integration of definitions and models. BMC Public Health. 2012;12(1):80. https://doi.org/10.1186/1471-2458-12-80

PMid:22276600

16. Paakkari L, Paakkari O. Health literacy as a learning outcome in schools. Health Educ. 2012;112:133-52.

17. Baur C. Calling the nation to act: Implementing the national action plan to improve health literacy. Nurs Outlook. 2011;59(2):63-9. https://doi.org/10.1016/j.outlook.2010.12.003

PMid:21402201

18. Koh HK, Brach C, Harris LM, Parchman ML. A proposed "health literate care model" would constitute a systems approach to improving patients' engagement in care. Health Aff (Millwood). 2013;32(2):357-67. https://doi.org/10.1377/hlthaff.2012.1205.

PMid:23381529

19. Parnell TA. Health Literacy in Nursing: Providing Person-centered Care. New York: Springer Publishing Company; 2014.

20. Kim S, Song Y, Park J, Utz S. Patients' experiences of diabetes self-management education according to health-literacy levels. Clin Nurs Res. 2020;29(5):285-92. https://doi.org/10.1177/1054773819865879

PMid:31394916

21. Kanj M, Mitic W. Consultants to the Eastern Mediterranean Region. p. 1-46. Available from: https://www.who.int/healthpromotion/conferences/7gchp/Track1_Inner.pdf [Last accessed on 2021 Nov 21].

22. Schiavo R. Health communication: From Theory to Practice. 217. Hoboken, New Jersey: John Wiley and Sons; 2013.

23. Aminuddin HB, Jiao N, Jiang Y, Hong J, Wang W. Effectiveness of smartphone-based self-management interventions on self-efficacy, self-care activities, health-related quality of life and clinical outcomes in patients with Type 2 diabetes: A systematic review and meta-analysis. Int J Nurs Stud. 2021;116:103286. https://doi.org/10.1016/j.ijnurstu.2019.02.003

PMid:30827741

24. Azlan AA, Hamzah MR, Tham JS, Ayub SH, Ahmad AL, Mohamad E. Associations between health literacy and sociodemographic factors: A cross-sectional study in malaysia utilising the HLS-M-Q18. Int J Environ Res Publ Healthx. 2021;18(9):4860-4871. https://doi.org/10.3390/ijerph18094860

PMid:34063294

25. Nasreddine ZS, Phillips NA, Bédirian V, Charbonneau S, Whitehead V, Collin I, *et al*. The montreal cognitive assessment, MoCA: A brief screening tool for mild cognitive impairment. J Am Geriatr Soc. 2005;53(4):695-9. https://doi.org/10.1111/j.1532-5415.2005.53221.x

PMid:15817019

26. Hobson J. The montreal cognitive assessment (MoCA). Occup Med (Lond). 2015;65(9):764-5. https://doi.org/10.1093/occmed/kqv078

PMid:26644445

27. Sammer G, Lenz E. The montreal cognitive assessment (MoCA) and brain structure. GeroPsych 2020;33:101-14.

28. Sørensen K, Van den Broucke S, Pelikan JM, Fullam J, Doyle G, Slonska Z, *et al*. Measuring health literacy in populations: Illuminating the design and development process of the European health literacy survey questionnaire (HLS-EU-Q). BMC Public Health. 2013;13:948. https://doi.org/10.1186/1471-2458-13-948

PMid:24112855

29. Kozar I. Poročilo o Raziskavi Zdravstveno Opismenjevanje, Interno Gradivo. Ljubljana: VIVA, Zavod za Boljše Življenje; 2013.

30. Hair FJ, Black WC, Babin BJ, Anderson RE. Multivariate Data Analysis. 7th ed. London, United Kingdom: Pearson; 2019. Available from: https://www.textileebook.com/2020/11/multivariate-data-analysis-8th-edition-pdf-by-joseph-f-hair-jr-william-c-black-barr-y-j-babin-rolph-e-anderson.html [Last accessed on 2021 Nov 21].

31. Anstey KJ, Eramudugolla R, Ross LA, Lautenschlager NT, Wood J. Road safety in an aging population: Risk factors, assessment, interventions, and future directions. Int Psychogeriatr. 2016;28(3):349-56. https://doi.org/10.1017/S1041610216000053

PMid:26888735

32. Panagioti M, Skevington SM, Hann M, Howells K, Blakemore A, Reeves D, *et al*. Effect of health literacy on the quality of life of older patients with long-term conditions: A large cohort study in

UK general practice. Qual Life Res. 2018;27(5):1257-68. https://doi.org/10.1007/s11136-017-1775-2

PMid:29322478

33. Buckworth J. Promoting self-efficacy for healthy behaviors. ACSMs Health Fit J. 2017;21(5):40-2. https://doi.org/10.1249/FIT.0000000000000318
34. Sentell T, Zhang W, Davis J, Baker KK, Braun KL. The influence of community and individual health literacy on self-reported health status. J Gen Intern Med. 2014;29(2):298-304. https://doi.org/10.1007/s11606-013-2638-3

PMid:24096723

35. Lifshitz-Vahav H, Shrira A, Bodner E. The reciprocal relationship between participation in leisure activities and cognitive functioning: The moderating effect of self-rated literacy level. Aging Ment Health. 2017;21(5):524-31. https://doi.org/10.1080/13607863.2015.1124838

PMid:26745357

36. Ma T, Meng H, Ye Z, Jia C, Sun M, Liu D. Health literacy mediates the association between socioeconomic status and productive aging among elderly Chinese adults in a newly urbanized community. Front Public Health. 2021;9:647230. https://doi.org/10.3389/fpubh.2021.647230

PMid:33898380

37. Horowitz BP, Wong SD, Dechello K. Intergenerational service learning: To promote active aging, and occupational therapy gerontology practice. Gerontol Geriatr Educ. 2010;31(1):75-91. https://doi.org/10.1080/02701960903578345

PMid:20390628

38. Babnik K, Štemberger Kolnik T, Bratuž A. Health literacy concept: integration of definitions and the role of nursing in further development of the concept. Obzor Zdrav N*eg.* 2013;47(1):62-73.
39. Lee HY, Lee J, Kim NK. Gender differences in health literacy among Korean adults: Do women have a higher level of health literacy than men? Am J Mens Health. 2015;9(5):370-9. https://doi.org/10.1177/1557988314545485

PMid:25122719

40. Chen X, Orom H, Hay JL, Waters EA, Schofield E, Li Y, *et al*. Differences in rural and urban health information access and use. J Rural Health. 2019;35(3):405-17. https://doi.org/10.1111/jrh.12335.

PMid:30444935

41. Boyle PA, Yu L, Wilson RS, Segawa E, Buchman AS, Bennett DA. Cognitive decline impairs financial and health literacy among community-based older persons without dementia. Psychol Aging. 2013;28(3):614. https://doi.org/10.1037/a0033103

PMid:23957225

42. Vaz de Almeida C. Health Skills: Beyond the Biomedical How Knowledge, Skills and Attributes Improve the Effectiveness of Results Defining Health Competence. Lisbon: Technical University of Lisbon; 2020. Available from: Available from: https://www.researchgate.net/publication/340608128 [Last accessed on 2021 Nov 21].
43. Andrade I, Silva C, Martins AC. Application of the health literacy index on the development of a manual for prevention of falls for older adults. Patient Educ Couns. 2017;100(1):154-9. https://doi.org/10.1016/j.pec.2016.07.036

PMid:27516436

44. Štemberger Kolnik T, Babnik K, Žvanut B, Pucer P, Majda Š. V domačem okolju je staranje bolj Kakovostno in lepše: European Project CoNSENSo and Majcen Dvoršak S, Štemberger Kolni T, Kvas A. Medicinske Sestre in Babice Ključne za Zdravstveni Sistem: Zbornik Prispevkov z Recenzijo. Ljubljana: Zbornica Zdravstvene in Babiške Nege Zveza Strokovnih Društev Medicinskih Sester, Babic in Zdravstvenih Tehnikov Slovenije; 2017. p. 49-55.