Original paper

Health literacy levels and their sociodemographic, family, and health predictors among primary health care patients in urban and rural areas: a cross-sectional study

Poziom kompetencji zdrowotnych i ich socjodemograficzne, rodzinne i zdrowotne predyktory u pacjentów podstawowej opieki zdrowotnej z miasta i obszarów wiejskich: badanie przekrojowe

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Słowa kluczowe: kompetencje zdrowotne, podstawowa opieka zdrowotna, mieszkańcy miast, mieszkańcy rejonów wiejskich.

Abstract

Introduction: Health literacy (HL) plays a key role in accessing, understanding, appraising, and using health-related information within the healthcare, disease prevention, and health promotion areas.
Aim of the research: To determine the level of health literacy among primary health care (PHC) patients depending on their place of residence, and to evaluate the impact of individual sociodemographic, family, and health predictors on the level of health literacy within the study group.
Material and methods: The cross-sectional study included 566 primary health care (PHC) patients, and it was conducted between January and December 2020. The data was collected using the paper and pencil interview (PAPI) method. The research tools applied were the European Health Competence Questionnaire (HLS-EU-Q16), the Family APGAR Questionnaire, the General Health Questionnaire (GHQ-28), and the authors' own questionnaire.
Results: The mean age in the study group was 49.28 ±18.39 years. The respondents were mostly women (63.3%; $n = 358$) and came from rural areas (52.5%; $n = 297$). The mean HL score (HLS-EU-Q16) of urban residents was slightly higher (12.19 ±3.5) than that of the rural residents (11.91 ±4.1). Age, financial capabilities, family function (Family Apgar), and mental health condition (GHQ-28) were found to be significantly associated with HL levels in both urban and rural residents ($p < 0.05$).
Conclusions: In a multivariate analysis, HL levels in urban residents were positively related to family function but negatively associated with financial capability and mental condition. Financial situation, source of income, and family function were positively associated with HL among rural residents, while gender and mental health condition were negatively associated with HL.

Streszczenie

Wprowadzenie: Kompetencje zdrowotne (HL) odgrywają kluczową rolę w procesie uzyskiwania dostępu, rozumienia, oceniania i stosowania informacji związanych ze zdrowiem w obszarze opieki zdrowotnej, profilaktyki chorób i promocji zdrowia.
Cel pracy: Określenie poziomu kompetencji zdrowotnych wśród pacjentów podstawowej opieki zdrowotnej (POZ) w zależności od miejsca zamieszkania oraz ocena wpływu wybranych predyktorów socjodemograficznych, rodzinnych i zdrowotnych na poziom kompetencji zdrowotnych w badanej grupie.
Materiał i metody: Badania przekrojowe przeprowadzono między styczniem a grudniem 2020 roku wśród 566 pacjentów POZ. Dane zostały zebrane metodą *paper and pencil interview* (PAPI). Narzędziami badawczymi były Europejski kwestionariusz kompetencji zdrowotnych (HLS-EU-Q16), Kwestionariusz oceny sytuacji rodzinnej Family Apgar, Kwestionariusz ogólnego stanu zdrowia (GHQ-28) oraz autorski kwestionariusz ankiety.
Wyniki: Średnia wieku uczestników badania wynosiła 49,28 ±18,39 roku. Wśród respondentów przeważały kobiety (63,3%; $n = 358$) oraz mieszkańcy obszarów wiejskich (52,5%; $n = 297$). Średni wynik kompetencji zdrowotnych mieszkańców miasta (12,19 ±3,5) był nieco wyższy niż mieszkańców rejonów wiejskich (11,91 ±4,1). Wiek, możliwości finansowe, funkcjonowanie rodziny (Family Apgar) i ocena stanu zdrowia psychicznego (GHQ-28) były istotnie powiązane z poziomem HL zarówno wśród mieszkańców miasta, jak i rejonów wiejskich ($p < 0,05$).

Wnioski: W analizie wieloczynnikowej poziom HL wśród mieszkańców miast pozytywnie powiązany był z oceną funkcjonowania rodziny, natomiast możliwości finansowe oraz ocena stanu zdrowia psychicznego były powiązane negatywnie. Wśród mieszkańców obszarów wiejskich zmiennymi pozytywnie powiązanymi z poziomem HL były sytuacja materialna, źródło utrzymania oraz ocena funkcjonowania rodziny, natomiast płeć i ocena stanu zdrowia psychicznego były powiązane negatywnie.

Introduction

There are many definitions of health literacy (HL) because the concept is well known. According to the World Health Organization (WHO), it is "the cognitive and social skills that determine the motivation and ability of individuals to (access), understand, and use information in ways that promote and maintain good health" [1]. Health literacy is also known as "health consciousness", which plays a key role in the proper management of health and disease by determining health-related decisions and thus health consequences. In view of the new concept of primary health care (PHC), which emphasizes the use of preventive tools and care coordination rather than the provision of medical services, it is reasonable to indicate that shaping patients' HL is one of the basic needs and challenges in PHC. Health care providers should be aware of the widespread differences in patients' health competences, which, among other issues, cause a variety of problems in health and disease management. As a result, it is of key importance to identify HL determinants so that health interventions can be better tailored to the patient and their ability to maintain good physical and mental health and prevent disease infection and spread.

It is believed that rural residents have poorer health outcomes than urban residents [2]. Polish people living in rural areas have a poorer assessment of their physical health condition [3] and are significantly less likely to care for their mental health [4]. They are unlikely to follow medical recommendations [5] and take up physical activity [6], as compared to urban residents. In terms of stimulants, rural residents are more likely to smoke cigarettes [7], whereas urban residents are more likely to drink alcohol [8]. Rural residents have a higher mortality rate, which mainly results from cardiovascular diseases, cancers, and lung diseases [2].

A variety of factors affect the differences in health condition and health behaviour between rural and urban residents. One of these factors is thought to be HL, which is of key importance for accessing, understanding, evaluating, and using health-related information within health protection, disease prevention, and general health promotion areas [9]. Several studies [10, 11] have found that rural residents have lower levels of health literacy. However, it should be noted that this trend does not apply to Poland. According to studies conducted in Poland, rural residents have slightly higher general health literacy scores than urban residents, but these differences are not statistically significant [12]. However, no studies have been conducted in Poland to evaluate specific HL determinants or differentiated health literacy levels based on the place of residence of the respondents. In contrast, only a few studies have focused on measuring overall HL in Polish society [12–15]. Therefore, the research results presented herein fill a knowledge gap in the health literacy area.

Aim of the research

The aim of this study was to determine the HL level among PHC patients depending on their place of residence. The second goal was to determine how different sociodemographic, family, and health predictors affect the HL level in the study group depending on their place of residence.

Material and methods

Study design and participants

Between January and December 2020, a cross-sectional study involving 566 patients from 4 PHC facilities located in the Lubelskie Province of eastern Poland was carried out. Health service data from the selected PHC facilities for 2019 were used for sampling. The principle of proportionality was used to select patients based on the quantity of health services provided in the year preceding the research. Efforts were made to obtain responses from 20% of all respondents in each of the 5 age groups: 18–19 years, 20–39 years, 40–65 years, 66–75 years, and older than 75 years. With a minimum sample size of 378 people (confidence interval 0.95, maximum error 5%), the resulting sample size (n = 566) was adequate for population analyses. The inclusion criteria were as follows: (1) patient's age 18 years and above; (2) use of PHC services at one of the selected health care facilities; and (3) informed consent to participate in the study. The exclusion criteria included: (1) patient's age below 18 years; (2) mental disorder, i.e. illness significantly affecting the state of consciousness; and (3) lack of consent to participate in the study.

Ethical approval

Participation in the study was entirely voluntary and anonymous. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki and was approved by the Bioethics Committee of the Medical University of Lublin (KE-0254/83/2019).

Data collection

The data were collected through personal interviews using the paper and pencil interview (PAPI) method. Each respondent could only complete one survey questionnaire. Patients with health issues who found it difficult to complete the questionnaire on their own were allowed to be assisted by a caregiver. The survey questionnaires were collected by trained nurses during patient visits to the primary health care facilities and home visits. In each of the selected primary healthcare facilities, 2 research study notices were posted on the facility's front door and at the registration desk. In addition, nurses informed patients about the study and distributed pre-prepared information leaflets. Survey questionnaires were distributed to patients seeking health advice at the PHC facilities on 3 pre-determined days of the week: Tuesday, Thursday, and Friday. All patients who had a nursing home visit were invited to participate in the study and were accepted if they met the inclusion criteria. As soon as the intended number of questionnaires was gathered, the collection of questionnaires at each PHC facility was completed. A total of 640 questionnaires were distributed, but 74 were rejected due to missing responses. As a result, 566 correctly completed questionnaires were analysed. The return rate was 88.4%.

Measurements

Health literacy was measured using the European Health Competence Questionnaire (HLS-EU-Q16) [16]. This survey tool contains 16 items addressing self-reported difficulties in accessing, understanding, and appraising health information related to health care, disease prevention, and health promotion). Each item was rated on a 4-point Likert scale. The total score reflects general health literacy, categorised as follows: 13–16 points – sufficient health literacy level, 9–12 points – problematic health literacy level, 0–8 points – inadequate health literacy level. The questionnaire shows evidence of adequate internal reliability and accuracy. Cronbach's α coefficient for the entire questionnaire was 0.98 and for the individual subscales it was 0.94–0.95.

The Family APGAR Questionnaire [17] was applied for the measurement of family function. The questions in the Family APGAR Questionnaire are designed to permit qualitative measurement of a family member's satisfaction with 5 components of family function identified as adaptation, partnership, growth, affection, and resolve. Each of the items is scored on the following scale: "always", "almost always", "sometimes", "hardly ever", and "never". The total score reflects general family status, categorised as follows: 8–10 points as "no significant disturbances in the family system", 4–7 points as "existence of irregularities in the family system", and 0–3 points as "serious dysfunction in the family system". The overall Cronbach's α coefficient in the Polish version was 0.81.

The General Health Questionnaire (GHQ-28) [18] was used for the detection of mental disorders. The questionnaire consists of 28 items that relate to the respondent's medical complaints over the past few weeks. This tool assesses somatic symptoms, anxiety and insomnia, social dysfunction, and severe depression. The general health condition was determined by adding points from the entire questionnaire and converting the total score (range between 0 and 84 points) into the so-called "standard ten" score, which was developed on the basis of Polish population studies [17]. Cronbach's α coefficient for the Polish version of the questionnaire was 0.9 and 0.8–0.9 for the individual subscales.

Standard questions were employed to collect variables, such as place of residence, age, gender, marital status, education, source of income, financial situation, financial capability, number of children, and co-morbidities. In addition, the respondents were asked about their body weight and height. Based on the above data, the body mass index (BMI) was calculated as body weight (kg) divided by height squared in metres (kg/m^2), and subjects were classified as normal weight when BMI = 18.5–24.9 kg/m^2, overweight when BMI = 25–29.99 kg/m^2, and obese when BMI ≥ 30 kg/m^2 [19].

Statistical analysis

Categorical variables were reported as absolute numbers and percentages, and continuous variables were presented as means (M) with standard deviation (SD). The Shapiro-Wilk test was applied to assess conformity with a normal distribution. Differences between groups were assessed by *t*-test, Pearson's χ^2 test, or analysis of variance (ANOVA). Simple and multiple linear regression models were performed to assess the significant predictors of HL. The IBM SPSS Statistics for Windows, Version 28.0. (Armonk, NY: IBM Corp) software was used for statistical analysis. A *p*-value less than 0.05 was considered significant for all tests.

Results

General characteristics of the study participants

Table 1 shows the characteristics of the study group depending on the participants' place of residence. The mean age in the study group was 49.28 ±18.39 years. Moreover, most respondents were women (63.3%; *n* = 358) who lived in rural areas, (52.5%; *n* = 297), had secondary education (38%; *n* = 215), and were in a relationship (60.8%; *n* = 344). When compared to rural residents, urban residents were more

Table 1. Characteristics of the study group depending on the participants' place of residence

Variables	Urban areas (*n* = 297)	Rural areas (*n* = 268)	Total (*n* = 566)	*P*-value
Sociodemographic variables:				
Age [years][b]	48.04 ±18.7	50.64 ±18	49 28 ±18.4	0.092
Gender[a]:				
Female	196 (54.7)	162 (45.3)	358 (63.3)	0.182
Male	101 (48.6)	107 (51.4)	208 (36.7)	
Marital status[a]:				
In a relationship	201 (50.5)	197 (49.5)	398 (70.3)	0.176
Single	96 (57.1)	72 (42.9)	168 (29.7)	
Education[a]:				
Primary/vocational	52 (33.5)	103 (66.5)	155 (27.4)	< 0.001
Secondary	110 (51.2)	105 (48.8)	215 (38)	
Higher	135 (68.9)	61 (31.1)	196 (34.6)	
Source of income[a]:				
Employed	181 (56.2)	141 (43.8)	322 (56.9)	0.121
Student/unemployed	35 (48.6)	37 (51.4)	72 (12.7)	
Retirement/disability pensionbeneficiary	81 (47.1)	91(52.9)	172 (30.4)	
Financial situation[a]:				
Average/poor	122 (48.2)	131 (51.8)	253 (44.7)	0.082
Good/Very good	175 (55.9)	138 (44.1)	313 (55.3)	
Financial capabilities, e.g. ability to purchase medicines or make a doctor's appointment[a]:				
Strong	61 (58.7)	43 (41.3)	104 (18.4)	0.056
Moderate	195 (53.4)	170 (46.6)	365 (64.5)	
Poor	41 (42.3)	56 (57.7)	97 (17.1)	
Family variables:				
Children[a]:				
Yes, under the age of 15 years	56 (44.1)	71 (55.9)	127 (22.4)	0.001
Yes, aged 15 years and older	117 (48.1)	126 (51.9)	243 (42.9)	
I do not have children	124 (63.3)	72 (36.7)	196 (34.6)	
Family Apgar[a]:				
Serious dysfunction in the family system	17 (54.8)	14 (45.2)	31 (5.5)	0.594
Existence of irregularities in the family system	94 (49.5)	96 (50.5)	190 (33.6)	
No significant disturbances in the family system	186 (53.9)	159 (46.1)	345 (61)	
Health variables:				
BMI – Underweighta	13 (86.7)	2 (13.3)	15 (2.7)	0.037
BMI – Normal weighta	130 (53.7)	112 (46.3)	242 (42.8)	
BMI – Overweighta	105 (51.2)	100 (48.8)	205 (36.2)	
BMI – Obesea	49 (47.1)	55 (52.9)	104 (18.4)	

Table 1. Cont.

Variables	Urban areas (*n* = 297)	Rural areas (*n* = 268)	Total (*n* = 566)	*P*-value
Co-morbidities[a]:				
No	125 (50)	125 (50)	250 (44.2)	0.335
Yes	172 (54.4)	144 (45.6)	316 (55.8)	
GHQ-28 – Total score[b]	26.37 ±12.1	23.99 ±10.09	25.24 ±12.1	0.0014
GHQ-28 – Low scores[a]	75 (48.1)	81 (51.9)	156 (27.6)	0.411
GHQ-28 – Average scores[a]	118 (53.4)	103 (46.6)	221(39)	
GHQ-28 – High scores[a]	104 (55)	85 (45)	189 (33.4)	
Health literacy:				
HLS-EU-Q16 – Total score[b]	12.19 ±3.5	11.91 ±4.1	12.05 ±3.8	0.382
HLS-EU-Q16 – Inadequate HL[a]	44 (48.9)	46 (51.1)	90 (15.9)	0.703
HLS-EU-Q16 – Limited HL[a]	94 (54.3)	79 (45.7)	173 (30.6)	
HLS-EU-Q16 – Sufficient HL[a]	159 (52.5)	144 (47.5)	303 (53.5)	

Data is presented as: a (%) or b ean (M) ± standard deviation (SD).

likely to have higher education, no children, and a healthy weight according to their BMI.

The mean GHQ-28 scale score was significantly higher among urban residents (26.37 ±12.1) than among rural residents (23.99 ±10.09) (p = 0.0014). The mean HL score (HLS-EU-Q16) of urban residents was also slightly higher (12.19 ±3.5) than that of rural residents (11.91 ±4.1). After converting the data into 2 groups, 159 (52.5%) urban residents and 144 (47.5%) rural residents had sufficient level of health literacy.

The relationship between sociodemographic, family, and health literacy variables in the study group

Table 2 presents the relationship between sociodemographic, family and health variables, and health literacy levels (HLS-EU-Q16). Age, financial capabilities, family function (Family Apgar), and mental health condition (GHQ-28) were found to be significantly associated with health literacy levels in both urban and rural residents. Young respondents and study participants with stronger financial capabilities and no significant disturbances in the family system, as well as with good mental health condition, were more likely to score a sufficient level of health literacy. Additionally, among rural residents, the level of health literacy was significantly related to gender, education, source of income, financial situation, and co-morbidities. Women, people with higher education, students, or the unemployed, who consider their financial situation as good or very good and who do not have any co-morbidities, are more likely to score a sufficient level of health literacy.

The relationship between the health literacy level and sociodemographic, family, and health variables depending on the respondents' place of residence in a multidimensional model

Table 3 reveals the relationship between the analysed sociodemographic, family, and health variables and the health literacy level depending on the place of residence of respondents in the study group. Model 1 was statistically significant (F = 5.096, $p < 0.001$). With regard to urban residents, the health literacy level was positively associated with family function (Family Apgar), while financial capabilities and mental health condition (GHQ-28) were negatively associated with HL. The model's variables explained 17% of the variation in health literacy (R^2 = 0.177).

Model 2 was statistically significant (F = 7.953, $p < 0.001$). Financial situation, source of income, and family function (Family Apgar) were variables positively associated with health literacy among rural residents, while gender and mental health condition (GHQ-28) were negatively associated with HL. The model's variables explained 27% of the variation in health literacy (R^2 = 0.272).

Discussion

In this study, we assessed the health literacy level and its selected determinants among patients using primary health care services based on their place of residence. According to the study results, inadequate or problematic health literacy levels are found in approximately 46.5% of the study sample. This indicates that almost one in two people might have difficulties

Table 2. Relationship between selected sociodemographic, family, and health literacy variables in the study group

Variable	Urban areas (*n* = 297)			*P*-value	Rural areas (*n* = 268)			*P*-value
	Inadequate HL	Limited HL	Sufficient HL		Inadequate HL	Limited HL	Sufficient HL	
Sociodemographic variables:								
Age [years][b]	48.11 ±19.49	51.85 ±18.96	45.76 ±18.02	0.043	59.02 ±15.47	51.59 ±19.96	47.44 ±16.78	< 0.001
Gender[a]:								
Female	28 (14.3)	64 (32.7)	104 (53.1)	0.854	20 (12.3)	45 (27.8)	97 (59.9)	0.012
Male	16 (15.8)	30 (29.7)	55 (54.5)		26 (24.3)	34 (31.8)	47 (43.9)	
Marital status[a]:								
In a relationship	26 (12.9)	62 (30.8)	113 (56.2)	0.294	35 (17.8)	56 (28.4)	106 (53.8)	0.809
Single	18 (18.8)	32 (33.3)	46 (47.9)		11 (15.3)	23 (31.9)	38 (52.8)	
Education[a]:								
Primary/vocational	19 (17.3)	32 (29.1)	59 (53.6)	0.053	16 (15.2)	36 (34.3)	53 (50.5)	0.002
Secondary	12 (23.1)	20 (38.5)	20 (38.5)		26 (25.2)	31 (30.1)	46 (44.7)	
Higher	13 (9.6)	42 (31.1)	80 (59.3)		4 (6.6)	12 (19.7)	45 (73.8)	
Source of income[a]:								
Employed	23 (12.7)	55 (30.4)	103 (56.9)	0.496	44 (14.8)	94 (31.6)	159 (53.5)	< 0.001
Student/unemployed	6 (17.1)	10 (28.6)	19 (54.3)		10 (7.1)	41 (29.1)	90 (63.8)	
Retirement/disability pension beneficiary	15 (18.5)	29 (35.8)	37 (45.7)		9 (24.3)	10 (27)	18 (48.6)	
Financial situation[a]:								
Average/poor	23 (18.9)	43 (35.2)	56 (45.9)	0.068	31 (23.7)	42 (32.1)	58 (44.3)	0.004
Good/Very good	21 (12)	51 (29.1)	103 (58.9)		15 (10.9)	37 (26.8)	86 (62.3)	
Financial capabilities, for instance the ability to purchase medicines or make a doctor's appointment[a]:								
Strong	7 (11.5)	16 (26.2)	38 (62.3)	0.001	3 (7)	14 (32.6)	26 (60.5)	< 0.001
Moderate	24 (12.3)	59 (30.3)	112 (57.4)		23 (13.5)	48 (28.2)	99 (58.2)	
Poor	13 (31.7)	19 (46.3)	9 (22)		20 (35.7)	17 (30.4)	19 (33.9)	

Table 2. Cont.

Variable	Urban areas (*n* = 297)			*P*-value	Rural areas (*n* = 268)			*P*-value
	Inadequate HL	Limited HL	Sufficient HL		Inadequate HL	Limited HL	Sufficient HL	
Family variables:								
Children[a]:								
Yes, under the age of 15 years	7 (12.5)	16 (28.6)	33 (58.9)	0.340	12 (16.9)	14 (19.7%)	45 (63.4)	0.064
Yes, aged 15 years and older	19 (16.2)	44 (37.6)	54 (46.2)		26 (20.6)	43 (34.1%)	57 (45.2)	
I do not have children	18 (14.5)	34 (27.4)	72 (58.1)		8 (11.1)	22 (30.6%)	42 (58.3)	
Family Apgar[a]:								
Serious dysfunction in the family system	3 (17.6)	6 (35.3)	8 (47.1)	< 0.001	6 (42.9)	4 (28.6)	4 (28.6)	0.005
Existence of irregularities in the family system	19 (20.2)	43 (45.7)	32 (34)		23 (24)	25 (26)	48 (50)	
No significant disturbances in the family system	22 (11.8)	45 (24.2)	119 (64)		17 (10.7)	50 (31.4)	92 (57.9)	
Health variables:								
BMI – Underweight[a]	1 (7.7)	6 (46.2)	6 (46.2)	0.364	0 (0)	1 (50)	1 (50)	0.543
BMI – Normal weight[a]	24 (18.5)	37 (28.5)	69 (53.1)		16 (14.3)	28 (25)	68 (60.7)	
BMI – Overweight[a]	11 (10.5)	32 (30.5)	62 (59)		18 (18)	33 (33)	49 (49)	
BMI – Obese[a]	8 (16.3)	19 (38.8)	22 (44.9)		12 (21.8)	17 (30.9)	26 (47.3)	
Co-morbidities[a]:								
No	20 (16)	35 (28)	70 (56)	0.507	13 (10.4)	33 (26.4)	79 (63.2)	0.004
Yes	24 (14)	59 (34.3)	89 (51.7)		33 (22.9)	46 (31.9)	65 (45.1)	
GHQ-28 –Total score[b]	30.45 ±13.35	29.87 ±13.38	23.16 ±9.99	< 0.001	28.70 ±10.91	25.33 ±10.78)	21.75 ±10.38	< 0.001
GHQ-28 – Low scores[a]	7 (9.3)	19 (25.3)	49 (65.3)	< 0.001	6 (7.4)	20 (24.7)	55 (67.9)	< 0.001
GHQ-28 – Average scores[a]	13 (11)	31 (26.3)	74 (62.7)		15 (14.6)	32 (31.1)	56 (54.4)	
GHQ-28 – High scores[a]	24 (23.1)	44 (42.3)	36 (34.6)		25 (29.4)	27 (31.8)	33 (38.8)	

Data is presented as: an (%) or bmean (M) ± standard deviation (SD).

Table 3. Significant predictors of the health literacy level among urban and rural residents

HLS-EU-Q16	*b*	SE	*P*-value
Model 1 – Urban areas:			
Financial capabilities, for instance the ability to purchase medicines or make a doctor's appointment	–1.234	0.31	< 0.001
Family Apgar	0.305	0.083	< 0.001
GHQ-28 – Total score	–0.053	0.016	0.001
Model 2 – Rural areas:			
Gender	–1.746	0.453	< 0.001
Financial situation	0.866	0.329	0.009
Source of income	1.448	0.458	0.002
Family Apgar	0.397	0.104	< 0.001
GHQ-28 – Total score	–0.056	0.022	0.011

b – standardized βcoefficient, SE – standard error.

with accessing, understanding, appraising, and using health-related information. Our study results are consistent with those of the European Health Literacy Survey (HLS-EU) [14] and other Polish studies [12, 15]. We discovered that the place of residence of respondents has no significant impact on their health literacy level. According to our study, 52.5% of urban residents and 47.5% of rural residents had a sufficient level of health literacy. More than half of those with inadequate level of health literacy (51.1%) lived in rural areas, while a problematic level of health literacy mainly concerned urban residents (52.5%).

These findings contradict the Aljassim and Ostini review of health literacy in rural and urban populations [20]. According to the above research, significantly higher levels of health literacy were found in urban residents [21–23]. It should be noted, however, that the aforementioned studies did not include European countries. Instead, they were mainly carried out in developing countries and the United States of America (USA). The disproportion in the health literacy levels in these countries may result from urban-rural differences in infrastructure, education, access to health care, or residents' financial situation, which may lead to huge disparities in health outcomes. In contrast, the analysis of health disparities among European Union (EU) countries revealed that there are no significant differences between rural and urban areas in a global perspective [24]. Our study results support the hypothesis that stereotypes about lower health literacy among rural residents are fading because of better access to medical care in cities and a small number of medical facilities in rural areas, as shown by the "Polish countryside 2020" report [25]. As a result, the differences in the health literacy level between rural and urban residents can be attributed to other factors.

The respondents who took part in this study came from the Lubelskie Province of eastern Poland. Based on the data from the Statistical Office in Lublin for 2022, most of the population in this region live in rural areas. Lubelskie Province has a total urban population of 46.2%, compared to a total rural population of 59.7% [26]. According to the Central Statistical Office (GUS) data from 2021, Lubelskie Province has the highest percentage of relatively poor people (22.9%). This region is also characterised by one of the lowest annual average earnings per person and a high level of income inequality [27]. The number of professionally active population in Lubelskie Province in the fourth quarter of 2022 was 947,000, or 5.5% of all professionally active people in the country, according to data from the Labour Force Survey (LFS). Most professionally active people were men (54.5%), with rural residents accounting for 55.5% [28].

The above data may help to explain the strong correlation between the health literacy level and respondents' financial and livelihood conditions in rural areas. According to our research results, the participants who considered their financial situation as average/poor and those who assessed their financial status negatively had the lowest health literacy levels.

Financial situation has an impact on general health condition and disease prevention. The results of the National Health Test of Poles of 2020 indicate that one in every 5 Poles has avoided seeing a doctor at least once in their lives for financial reasons, and one in every 4 has avoided visiting the dentist for the same reason, while 15% of all Poles have decided not to buy a prescription drug and 9% have refrained from purchasing medical equipment [29]. Poor financial capabilities to purchase medicines or make a doctor's appointment were also a significant predictor of low health literacy levels among urban residents. In our study, employed urban residents had higher levels of health literacy than did students/unemployed or pension beneficiaries. Higher levels of health literacy among employed

persons may be attributed to the fact that employment provides good opportunities for general literacy learning, which improves reading comprehension ability and may affect health literacy outcomes [30].

Findings concerning the level of health literacy among rural residents were more surprising. Here, sufficient levels of HL were noticeably more prevalent among unemployed persons or students. This group also had the lowest percentage of people with inadequate levels of health literacy. These findings may be explained by the fact that a greater percentage of the unemployed or students from rural areas had already encountered health-related issues during their time of education. According to our study results, education has a significant impact on the health literacy level among rural residents, which has been confirmed by other studies [31–33]. Additionally, rural residents with higher education are more likely to have a sufficient level of health literacy than are urban residents with higher education (73.8% versus 59.3%). This may be due to the strong belief among rural residents that obtaining a university degree leads to better social and living conditions through the acquisition of a well-paid job. As a result, it can be assumed that rural residents who pursue higher education are more committed to acquiring and expanding their knowledge, including health awareness.

Multivariate analysis was used to identify predictors of health literacy levels in the study group based on the respondents' place of residence. The Family Apgar scale, which measures self-assessment of family function, is one such factor. Rural and urban residents with higher Family Apgar scores were characterised by higher levels of health literacy. This result is consistent with other authors' findings [34–36]. A person's capacity to obtain and understand medical information and to use the health care system can be enhanced with the help of family and loved ones. This is especially important for people with a low health literacy level, because it encourages the development of health-seeking attitudes and behaviours, increases the frequency of preventive medical visits, improves health, and lowers medical costs [37]. Additionally, there is a strong correlation between self-management of chronic disease and family support [36]. Family members support the patient's disease management and self-monitoring behaviours, which improve health outcomes and raise health literacy levels.

Mental health condition (GHQ-28) was discovered to be a further predictor of health literacy, regardless of the respondents' place of residence. Our research found that as people's mental health condition deteriorated, their health literacy levels decreased. These results contradict the findings of other authors who found no correlation between mental health condition and health literacy. It should be noted, however, that in other authors' studies [32, 38], people with low health literacy levels were more likely to report severe somatic symptoms. This leads to the conclusion that the perception of chronic disorders and physical limitations in daily activities increases the likelihood of a problematic health literacy level.

It should also be noted that gender was a significant predictor of health literacy among rural residents. Women living in rural areas had significantly higher levels of health literacy. Due to the fact that women interact with healthcare providers more frequently as compared to men because they usually take care of their family members, they tend to have higher health awareness. This is especially noticeable in rural areas, where women are more likely to stay at home and take care of the family and household. This is frequently caused by the lack of suitable childcare facilities in rural areas, such as day care centres and kindergartens. On the other hand, it might be a result of the mindset of women living in rural areas. This study was conducted in primary health care facilities. It should be noted that according to the analysis of the use of health care services in 2009 by the National Health Fund (NFZ), the number of women from reproductive age to advanced old age who used outpatient specialist services was higher than men in comparable age brackets [39].

Conclusions

According to the results of the study conducted among PHC patients in rural and urban areas, urban residents were found to have higher levels of HL, but the relationship was not statistically significant. Most respondents, regardless of their place of residence, were characterised by a sufficient level of HL. Age, financial capabilities, family function, and mental health condition were found to be significantly associated with health literacy levels in both urban and rural residents. Additionally, among rural residents, the level of health literacy was significantly related to gender, education, source of income, financial situation, and co-morbidities. In a multivariate analysis, it was found that health literacy levels among urban residents were positively associated with family function, but negatively associated with financial capability and mental health condition. Financial situation, source of income, and family function were positively associated with HL among rural residents, while gender and mental health condition were negatively associated with HL. Our study results emphasize the importance of improving health literacy levels across society. Primary health care facilities are an excellent location for introducing health programs increasing health literacy. Such health programs are currently unavailable in Poland.

Conflict of interest

The authors declare no conflict of interest.

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