

# Health status of female Moldovan immigrants to Italy by health literacy level and age group: a descriptive study

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*immigrants, health literacy, Italy, health status*

## Abstract

**Background:** Migration flows from Eastern Europe to Italy have been large and continue to grow. The purpose of this study was to examine the health status of a population of Moldovan immigrant women, and their access to health care services in northern Italy, by age group and health literacy level.

**Methods:** We administered an ad-hoc questionnaire to adult Moldovan women to assess their lifestyles, self-reported health status (symptoms and diseases), access to health services, and health literacy. Then, using descriptive statistics, we compared our data with findings for a sample of Italian women of the same age living in the north-east of the country.

**Results:** Our sample included 170 Moldovan women (aged  $46.5 \pm 12.3$ ) in five occupational categories: home care workers (28.2%); cleaners (27.1%); health care workers (5.9%); other occupations (28.8%); and unemployed (10%). Active smokers were twice as prevalent among the women with a low health literacy. Health literacy level also determined access to healthcare services: women with a higher health literacy tended to use scheduled health services and screening programs, while those with a lower health literacy relied more on emergency health services. For all age groups, the Moldovan sample reported a higher prevalence of allergies, lumbar disorders and depression than the Italian controls.

**Conclusions:** The reported prevalence of some diseases was higher among Moldovan immigrant women than among Italian resident women. Health literacy was associated with the immigrant women's lifestyle and the use of health care services, as previously seen for the autochthonous population.

## Background

International migration is one of the most predominant issues of our times. The migration of workers from Eastern to Southern Europe began in the late 1980s, after the dissolution of the former communist regimes, and increased enormously in subsequent decades (1,2). In Europe as a whole, many migrants from Eastern Europe have satisfied the increasing demand for a cheap labor force in low-skill and high-strain jobs. To give an example, only 6% of the domestic workers registered with

the Italian National Social Security Institute in the early 1980s were of migrant origin, whilst the figure had reached 72% by 2006 (3,4). Moldovan migration, in particular, is highly feminized, and the flows from Ukraine and the Republic of Moldova largely consist of women who are independent migrants (5-7).

Worldwide, it has been reported that migrant workers in certain living and economic conditions may not seek health care - supposedly due to a limited knowledge of their rights or to cultural or language barriers (8). This seems to be particularly true in the case of work-related diseases or injuries (9), and even applies to migrant women with a good formal education (5,6). It has also been established internationally that, for people to use health care services appropriately, they need to be able to access and understand health-related information, as captured in the concept of "health literacy". This type of competence depends directly on a given individual's language, education and culture. It is often described as an individual's capacity both to process health-related information and actively choose a healthy behavior, and to actively and appropriately interact with health care services (10,11).

Moldova's worker migration flow is reportedly one of the highest in the world, with approximately 25% of the country's economically active population in 2010 returning from working abroad, still working abroad, or intending to work abroad, according to the "Moldovan Labor Force Survey" (12). Studies on the health status of these people and in particular of female migrants, and on their use of health care services in their destination countries, are lacking, however. Recognizing this target population's health problems and ascertaining their inclination to use public health services could be useful in order to establish an effective program of health promotion and disease prevention for this particular migrant group.

Hence this descriptive study to examine the health status of a sample of Moldovan immigrant women, and their recourse to health care services in Padova, a province in north-eastern Italy, by age group and health literacy level.

Methods

Context

The Italian National Health System (NHS) is a mainly public system financed by general taxation. All residents registered with the country's NHS (be they Italians or regular immigrants) can access all healthcare services free of charge or by paying a small fee, and they are assigned a general practitioner (GP) of their choice. Italy is one of five of the 27 EU Member States to freely provide immigrants with much the same range of services as Italian nationals (13).

### Moldovan migration to Italy

The Republic of Moldova is not a member of the European Union, so its citizens cannot move freely within the EU. They need an appropriate document to cross its borders. Nonetheless, Moldovan migration to Italy has been quite considerable, and has increased in recent times. As at January 1st, 2019, there were 128,979 Moldovan citizens legally residing in Italy, and 66% of them (85,431) were women. In the province of Padua (in north-eastern Italy), their prevalence is akin to the national one, with 63% of women out of a total of 9,866 Moldovan immigrants. These Moldovans now account for 1% of the resident population (937,908) of the province of Padua (13).

### Sample

Our study population consisted of adult Moldovan women who understood Italian, recruited from February to June 2019 by a convenience sampling. Questionnaires were administered in four different venues in Padua at different times to minimize possible biases: i) the Moldovan Consulate; ii) the two local Moldovan Orthodox Churches; iii) a parking lot usually attended by Moldovans because it is from where the vehicles of a transport service depart for Moldova; and iv) a park where Moldovan women tend to meet on Sundays and Thursday afternoons.

Verbal informed consent was obtained from all participants before their enrolment.

### Questionnaire

The tool used for this study was an *ad hoc* questionnaire administered to our sample population. It consisted of 55 multiple-choice or open-answer questions administered by a trained interviewer, covering the following domains: socio-demographic factors; lifestyles; perceived health symptoms; self-reported diagnoses of certain specific diseases; and recourse to public health services. The questionnaires were anonymized for the purposes of our analysis.

The variables measured for each domain were as follows:

1. Socio-demographic factors:

Age, expressed in years, and grouped as: "20-34", "35-44", "45-54", "55-64" and ">65" years;

Schooling, expressed in years of school attended;

Employment, classified by risks of exposure for the purposes of this study in 5 groups of occupations as follows: home care-workers (live-in and live-out paid caregivers); cleaners (live-in and live-out domestic workers or industrial cleaners); health care workers (nurses and social care operators); or other occupations (all forms of employment other than those mentioned above); and unemployed;

Health literacy, measured with the "Single Item Literacy Screener" (SILS), a single-item questionnaire used to identify any impairment in adults' understanding of health material: "How often do you need to have someone help you when you read instructions, pamphlets or other written material from your doctor or pharmacist?" with 5 possible answers (1. Never; 2. Rarely; 3. Sometimes; 4. Often, 5. Always). Scores higher than 2 indicate some difficulty in understanding the meaning of printed health-related material (14). Respondents' scores were used to divide our sample into groups with a high health literacy (SILS questionnaire scores of 1 or 2) or low health literacy (for scores of 3, 4 or 5).

2. Lifestyle factors:

Smoking habit, regardless of the number of cigarettes smoked a day. Ex-smokers were classified as non-smokers for the purposes of this study;

Drinking habit, expressed as the mean daily alcohol intake measured in units of alcohol (UA), where 1 UA = 12 g ethanol, i.e. approximately 250 ml beer, 75 ml wine or 25 ml spirits;

Sport or physical exercise in free time in the previous 12 months: rated as "Never", "Less than once a week", or "At least once a week";

Weight (kg) and height (cm), from which we calculated the respondent's Body Mass Index (BMI, kg/m<sup>2</sup>), then divided our sample into BMI categories: "Underweight" (BMI less than 18.5); "Normal weight" (BMI between 18.5 and 24.9); "Overweight" (BMI between 25 and 29.9); and "Obese" (BMI over 30).

3. Items concerning self-reported diagnoses were drawn from the Italian version of the

"European Health Interview Survey" (EHIS, Eurostat) adopted by the Italian National Institute of Statistics (ISTAT) (15,16). The assessment concerned whether any of the following diseases had been diagnosed by the respondent's doctor: asthma, allergies, bronchitis, myocardial infarction, coronary diseases, hypertension, diabetes, lumbar and cervical disorders, arthritis/arthrosis, depression and anxiety.

4. Items regarding perceived symptoms were extracted from the "Health and Work

Performance Questionnaire" (HPQ) (17). Specific symptoms were chosen because they are often associated with chronic stress (18) which is reportedly a risk to migrant care workers' mental health (19). The questions concerned whether respondents had suffered any of the following symptoms in the previous 6 months:

headache, trouble sleeping, fatigue, lack of appetite, difficulty concentrating, gastrointestinal disturbances, dizziness, shortness of breath, and difficulty relaxing.

Respondents answered on a 6-point scale ranging from “Never” (0) to “Daily”, as reported elsewhere (6) (20). Then they were pooled into three groups (“Never”, “Sometimes” and “Daily”) for our analysis.

5. To assess aspects of health care, we first inquired whether respondents were covered by free medical insurance and social security benefits, and whether they had their own, trusted doctor in Italy or in Moldova. To examine their access to health care services, our questionnaire included other elements drawn from the EHIS (15). The questions concerned whether respondents had: “seen a GP in the previous four weeks”; “been examined by a specialist in the previous four weeks”; “gone to an Emergency Department in the previous 12 months”; and/or “been hospitalized in the previous 12 months”. Women in the appropriate age groups were also asked if they had undergone mammography and PAP smear/HPV testing at least once in their life (Italian NHS prevention programs recommend mammography screening for women aged 50 to 74, and HPV screening [HPV test or PAP smear] for women aged 25-64).

### Data for comparison

The results of the “European Health Interview Survey 2015” (EHIS) (16) questionnaire administered to a sample of Italian women (n=1827) living in the country’s north-eastern region, and aged between 20 and 74 were compared with the results of the present study on Moldavan immigrants, calculating 95% confidence intervals on the percentages.

### Statistical analysis

Descriptive statistics were used for this study. We calculated means and standard deviations for quantitative variables, and relative and absolute frequencies for categorical variables. The “R: A language and environment for statistical computing” (R Foundation for Statistical Computing, Vienna, Austria) was used for the analysis (21).

### Results

Our sample included 170 Moldovan women living legally in Italy. Table 1 shows the sample's characteristics. They ranged in age from 21 to 69 years (mean 46.5; SD 12.3). They had attended school for a mean 12.7 years (SD 3.7). The sample's distribution in the different job categories revealed that 28.2% were home care workers, 27.1% were cleaners, 5.9% were health care workers, 28.8% had other occupations, and 10% were unemployed.

Table 1  
Characteristics of the sample

Variable		Overall responders	Results
Socio-demographic variables			
Age groups	n (%)	164	
20-34			32 (19.5%)
35-44			41 (25.0%)
45-54			36 (22.0%)
55-64			46 (28.0%)
>65			9 (5.5%)
Years of education	mean (SD)	166	12.7 (3.7)
Low health literacy: SILS score > 2	n (%)	161	21 (13.0%)
Occupation	n (%)	170	
Home care workers			48 (28.2%)
Cleaners			46 (27.1%)
Other			49 (28.8%)
Health care workers			10 (5.9%)
Unemployed			17 (10.0%)
Health behaviors and anthropometric variables			
BMI (kg/m <sup>2</sup> )	mean (SD)	164	25.6 (4.7)
Body Mass Index	n (%)	164	
Underweight			6 (3.7%)
Normal weight			79 (48.2%)
Overweight			50 (30.5%)
Obese			29 (17.7%)
Smoking	n (%)	170	30 (17.6%)
Daily alcohol intake (units)	mean (SD)	93	1.4 (1.0)
Sport or physical exercise in the last 12 months	n (%)	160	
Never			53 (33.1%)
Less than once a week			21 (13.1%)
Once a week or more			86 (53.8%)
Health status			
Previously diagnosed diseases		164	
Asthma	n (%)		8 (4.9%)
Bronchitis	n (%)		6 (3.7%)
Myocardial infarction	n (%)		7 (4.3%)
Coronary disease	n (%)		9 (5.5%)
Hypertension	n (%)		44 (27.0%)
Arthritis/arthrosis	n (%)		56 (34.1%)
Lumbar disorders	n (%)		71 (44.4%)
Cervical disorders	n (%)		62 (38.3%)
Diabetes	n (%)		9 (5.5%)
Allergies	n (%)		59 (36.0%)
Depression	n (%)		22 (13.7%)
Anxiety	n (%)		14 (8.6%)
Symptoms in the last 6 months			
Headache	n (%)	164	

Never			32 (19.5%)
Sometimes			58 (35.4%)
Daily			74 (45.1%)
Trouble sleeping	n (%)		
Never			71 (43.8%)
Sometimes			27 (16.7%)
Daily			64 (39.5%)
Extreme fatigue	n (%)		
Never			78 (47.6%)
Sometimes			23 (14.0%)
Daily			63 (38.4%)
Lack of appetite	n (%)		
Never			129 (78.7%)
Sometimes			10 (6.1%)
Daily			25 (15.2%)
Difficulty concentrating	n (%)		
Never			92 (56.8%)
Sometimes			37 (22.8%)
Daily			33 (20.4%)
Gastro-intestinal problems	n (%)		
Never			91 (55.5%)
Sometimes			27 (16.5%)
Daily			46 (28.0%)
Dizziness	n (%)		
Never			76 (46.3%)
Sometimes			51 (31.1%)
Daily			37 (22.6%)
Shortness of breath	n (%)		
Never			132 (80.5%)
Sometimes			15 (9.1%)
Daily			17 (10.4%)
Difficulty relaxing	n (%)		
Never			95 (58.3%)
Sometimes			23 (14.1%)
Daily			45 (27.6%)
Use of public health services			
Mammography at least once in life*	n (%)	73	
No			7 (9.6%)
Yes			66 (90.4%)
Pap smear at least once in life**	n (%)	150	
No			17 (11.3%)
Yes			133 (88.7%)
GP visit in previous 4 weeks	n (%)	164	78 (47.6%)
Specialist visit in previous 4 weeks	n (%)	164	61 (37.2%)
Emergency dept. visit in previous 12 months	n (%)	164	40 (24.4%)
Hospitalization in previous 12 months	n (%)	164	20 (12.2%)
*Only for women of screening age (50-74 years) **Only for women of screening age (25-64 years)			

Table 2 shows the bivariate analysis conducted on the variables considered in the questionnaire by age group. There was a high prevalence of allergies and lumbar disorders at all ages, and a high prevalence of depression clustered in the intermediate age groups. The prevalence of anxiety was reportedly twice as high among the 45- to 54-year-olds. Finally, older age was associated with a

higher BMI, and with an increase in the reported prevalence of some diseases, such as hypertension, arthritis/arthrosis, cervical disorders, and diabetes.

Table 2  
Results of bivariate analysis: distribution of different questionnaire variables by age group

		Overall responders	AGE				
			20-34 (N = 32)	35-44 (N = 41)	45-54 (N = 36)	55-64 (N = 46)	> 65 (N = 9)
Socio-demographic variables							
Occupation	n (%)	170					
Home care workers			2 (6.2%)	3 (7.3%)	8 (22.2%)	24 (52.2%)	6 (66.7%)
Cleaners			6 (18.8%)	16 (39.0%)	12 (33.3%)	10 (21.7%)	2 (22.2%)
Other			20 (62.5%)	17 (41.5%)	2 (5.6%)	9 (19.6%)	0 (0.0%)
Health care workers			2 (6.2%)	2 (4.9%)	5 (13.9%)	1 (2.2%)	0 (0.0%)
Unemployed			2 (6.2%)	3 (7.3%)	9 (25.0%)	2 (4.3%)	1 (11.1%)
Formal education (years)	mean (SD)	166	13.2 (3.0)	13.3 (3.6)	13.2 (2.8)	12.2 (3.1)	14.4 (4.7)
Health literacy: SILS score > 2	n (%)	161	3 (9.4%)	7 (17.1%)	3 (9.1%)	4 (9.1%)	3 (33.3%)
Health behavior variables							
BMI (kg/m <sup>2</sup> )	mean (SD)	164	22.2 (3.2)	24.6 (3.8)	27.0 (5.5)	27.5 (4.1)	27.6 (4.2)
Body Mass Index	n (%)	164					
Underweight			2 (6.5%)	2 (4.9%)	0 (0.0%)	1 (2.3%)	0 (0.0%)
Normal weight			25 (80.6%)	22 (53.7%)	17 (47.2%)	12 (27.9%)	2 (22.2%)
Overweight			3 (9.7%)	13 (31.7%)	13 (36.1%)	16 (37.2%)	4 (44.4%)
Obese			1 (3.2%)	4 (9.8%)	6 (16.7%)	14 (32.6%)	3 (33.3%)
Smoking	n (%)	170	8 (25.0%)	11 (26.8%)	3 (8.3%)	4 (8.7%)	1 (11.1%)
Daily alcohol intake (units)	mean (SD)	93	1.8 (1.6)	1.3 (0.7)	1.1 (0.4)	1.4 (0.7)	1.1 (0.6)
Sport or physical exercise in previous 12 months	n (%)	160					
Never			8 (25.0%)	15 (36.6%)	17 (51.5%)	12 (26.7%)	1 (11.1%)
Less than once a week			3 (9.4%)	6 (14.6%)	2 (6.1%)	8 (17.8%)	2 (22.2%)
Once a week or more			21 (65.6%)	20 (48.8%)	14 (42.4%)	25 (55.6%)	6 (66.7%)
Health status							
Previously diagnosed diseases	n (%)	164					
Asthma			0 (0.0%)	2 (5.0%)	0 (0.0%)	5 (10.9%)	1 (11.1%)
Bronchitis			0 (0.0%)	2 (5.0%)	2 (5.9%)	1 (2.2%)	1 (11.1%)
Myocardial infarction			1 (3.1%)	1 (2.5%)	1 (2.9%)	4 (8.7%)	0 (0.0%)
Coronary disease			1 (3.1%)	0 (0.0%)	4 (11.8%)	4 (8.9%)	0 (0.0%)
Hypertension			3 (9.4%)	6 (15.0%)	8 (23.5%)	19 (42.2%)	5 (55.6%)
Arthritis/arthrosis			4 (12.5%)	6 (15.0%)	11 (32.4%)	28 (60.9%)	7 (77.8%)
Lumbar disorders			10 (31.2%)	14 (35.9%)	18 (52.9%)	24 (54.5%)	4 (50.0%)
Cervical			6 (18.8%)	13 (32.5%)	15 (44.1%)	24 (53.3%)	4 (50.0%)

disorders							
Diabetes			0 (0.0%)	0 (0.0%)	2 (5.9%)	6 (13.3%)	1 (11.1%)
Allergies			10 (31.2%)	17 (42.5%)	14 (41.2%)	14 (30.4%)	4 (44.4%)
Depression			2 (6.5%)	6 (15.0%)	8 (24.2%)	5 (11.1%)	1 (11.1%)
Anxiety			1 (3.1%)	2 (5.0%)	6 (17.6%)	4 (8.9%)	1 (11.1%)
Symptoms in previous 6 months	n (%)	164					
Headache							
Never			6 (18.8%)	6 (14.6%)	4 (11.4%)	12 (26.7%)	4 (44.4%)
Sometimes			13 (40.6%)	14 (34.1%)	13 (37.1%)	15 (33.3%)	3 (33.3%)
Daily			13 (40.6%)	21 (51.2%)	18 (51.4%)	18 (40.0%)	2 (22.2%)
Trouble sleeping							
Never			16 (51.6%)	21 (51.2%)	14 (40.0%)	15 (34.1%)	3 (33.3%)
Sometimes			6 (19.4%)	7 (17.1%)	5 (14.3%)	5 (11.4%)	4 (44.4%)
Daily			9 (29.0%)	13 (31.7%)	16 (45.7%)	24 (54.5%)	2 (22.2%)
Extreme fatigue							
Never			20 (62.5%)	20 (48.8%)	16 (45.7%)	17 (37.8%)	3 (33.3%)
Sometimes			6 (18.8%)	8 (19.5%)	3 (8.6%)	4 (8.9%)	2 (22.2%)
Daily			6 (18.8%)	13 (31.7%)	16 (45.7%)	24 (53.3%)	4 (44.4%)
Lack of appetite							
Never			27 (84.4%)	31 (75.6%)	27 (77.1%)	36 (80.0%)	6 (66.7%)
Sometimes			1 (3.1%)	4 (9.8%)	1 (2.9%)	4 (8.9%)	0 (0.0%)
Daily			4 (12.5%)	6 (14.6%)	7 (20.0%)	5 (11.1%)	3 (33.3%)
Difficulty concentrating							
Never			15 (46.9%)	21 (52.5%)	19 (54.3%)	29 (65.9%)	7 (77.8%)
Sometimes			9 (28.1%)	10 (25.0%)	9 (25.7%)	6 (13.6%)	2 (22.2%)
Daily			8 (25.0%)	9 (22.5%)	7 (20.0%)	9 (20.5%)	0 (0.0%)
Gastro-intestinal problems							
Never			18 (56.2%)	26 (63.4%)	18 (51.4%)	23 (51.1%)	5 (55.6%)
Sometimes			9 (28.1%)	5 (12.2%)	7 (20.0%)	4 (8.9%)	2 (22.2%)
Daily			5 (15.6%)	10 (24.4%)	10 (28.6%)	18 (40.0%)	2 (22.2%)
Dizziness							
Never			15 (46.9%)	20 (48.8%)	15 (42.9%)	20 (44.4%)	5 (55.6%)
Sometimes			14 (43.8%)	10 (24.4%)	11 (31.4%)	14 (31.1%)	2 (22.2%)
Daily			3 (9.4%)	11 (26.8%)	9 (25.7%)	11 (24.4%)	2 (22.2%)
Shortness of breath							
Never			29 (90.6%)	33 (80.5%)	29 (82.9%)	32 (71.1%)	7 (77.8%)
Sometimes			2 (6.2%)	3 (7.3%)	4 (11.4%)	5 (11.1%)	1 (11.1%)
Daily			1 (3.1%)	5 (12.2%)	2 (5.7%)	8 (17.8%)	1 (11.1%)
Difficulty relaxing							
Never			18 (56.2%)	27 (65.9%)	24 (68.6%)	21 (47.7%)	4 (44.4%)
Sometimes			9 (28.1%)	2 (4.9%)	3 (8.6%)	7 (15.9%)	2 (22.2%)
Daily			5 (15.6%)	12 (29.3%)	8 (22.9%)	16 (36.4%)	3 (33.3%)
Use of public health services							
Mammography at least once in life*		73					
No			-	-	2 (11.1%)	5 (8.9%)	0 (0.0%)
Yes			-	-	16 (88.9%)	41 (91.1%)	9 (100.0%)
Pap smear at least once in life**		150					
No			2 (6.9%)	5 (12.2%)	6 (17.6%)	4 (8.7%)	-
Yes			27 (93.1%)	36 (87.8%)	28 (82.4%)	42 (91.3%)	-
GP visits in previous 4 weeks	n (%)	164	11 (34.4%)	15 (36.6%)	17 (50.0%)	29 (63.0%)	5 (55.6%)

Specialist visits in previous 4 weeks	n (%)	164	11 (34.4%)	11 (26.8%)	12 (35.3%)	23 (50.0%)	2 (22.2%)
Emergency dept. visits in previous 12 months	n (%)	164	8 (25.0%)	8 (19.5%)	6 (17.6%)	14 (30.4%)	3 (33.3%)
Hospitalizations in previous 12 months	n (%)	164	4 (12.5%)	3 (7.3%)	3 (8.8%)	8 (17.4%)	1 (11.1%)
*Only for women of screening age (50-74 years)							
**Only for women of screening age (25-64 years)							

Table 3 shows the distribution of respondents' lifestyles and usage of health care services by their health literacy level. The prevalence of active smokers in the low health literacy group was more than twice as high as in the high health literacy group. There was also evidence of the group with a high health literacy making more use of GPs and specialist visits, while the low health literacy group showed a lower adherence to screening programs (mammographies and PAP smears/HPV tests).

Table 3

Results of bivariate analysis: distribution of different questionnaire variables by level of health literacy

		Overall responders	Low health literacy (N = 21)	High health literacy (N = 140)
Socio-demographic variables				
Age group	n (%)	159		
20-34			3 (15.0%)	29 (20.9%)
35-44			7 (35.0%)	34 (24.5%)
45-54			3 (15.0%)	30 (21.6%)
55-64			4 (20.0%)	40 (28.8%)
>65			3 (15.0%)	6 (4.3%)
Formal education (years)	mean (SD)		12.3 (3.8)	13.2 (3.1)
Health behavior variables				
BMI (kg/m <sup>2</sup> )	mean (SD)	157	25.6 (4.8)	25.6 (4.6)
Body Mass Index	n (%)	157		
Underweight			0 (0.0%)	5 (3.7%)
Normal weight			12 (57.1%)	65 (47.8%)
Overweight			5 (23.8%)	42 (30.9%)
Obese			4 (19.0%)	24 (17.6%)
Smoking	n (%)	161	7 (33.3%)	20 (14.3%)
Daily alcohol intake (units)	mean (SD)	93	1.5 (1.1)	1.4 (1.0)
Sport or physical exercise in previous 12 months				
Never	n (%)	159	8 (40.0%)	45 (32.4%)
Less than once a week			4 (20.0%)	17 (12.2%)
Once a week or more			8 (40.0%)	77 (55.4%)
Health status				
Previously diagnosed diseases	n (%)	164		
Asthma			4 (19.0%)	3 (2.2%)
Bronchitis			2 (9.5%)	4 (2.9%)
Myocardial infarction			0 (0.0%)	6 (4.4%)

Coronary disease			2 (9.5%)	6 (4.4%)
Hypertension			9 (42.9%)	31 (22.8%)
Arthritis/arthrosis			8 (38.1%)	46 (33.6%)
Lumbar disorders			10 (50.0%)	58 (43.3%)
Cervical disorders			10 (47.6%)	50 (37.0%)
Diabetes			1 (4.8%)	6 (4.4%)
Allergies			9 (42.9%)	48 (35.0%)
Depression			5 (23.8%)	15 (11.2%)
Anxiety			3 (14.3%)	9 (6.6%)
Symptoms in previous 6 months	n (%)	164		
Headache				
Never			5 (23.8%)	24 (17.3%)
Sometimes			8 (38.1%)	50 (36.0%)
Daily			8 (38.1%)	65 (46.8%)
Trouble sleeping				
Never			5 (23.8%)	65 (47.1%)
Sometimes			8 (38.1%)	19 (13.8%)
Daily			8 (38.1%)	54 (39.1%)
Extreme fatigue				
Never			9 (42.9%)	67 (48.2%)
Sometimes			5 (23.8%)	18 (12.9%)
Daily			7 (33.3%)	54 (38.8%)
Lack of appetite				
Never			16 (76.2%)	110 (79.1%)
Sometimes			0 (0.0%)	10 (7.2%)
Daily			5 (23.8%)	19 (13.7%)
Difficulty concentrating				
Never			10 (47.6%)	81 (58.7%)
Sometimes			7 (33.3%)	29 (21.0%)
Daily			4 (19.0%)	28 (20.3%)
Gastro-intestinal problems				
Never			13 (61.9%)	76 (54.7%)
Sometimes			4 (19.0%)	23 (16.5%)
Daily			4 (19.0%)	40 (28.8%)
Dizziness				
Never			11 (52.4%)	62 (44.6%)
Sometimes			6 (28.6%)	44 (31.7%)
Daily			4 (19.0%)	33 (23.7%)
Shortness of breath				
Never			16 (76.2%)	113 (81.3%)
Sometimes			2 (9.5%)	13 (9.4%)
Daily			3 (14.3%)	13 (9.4%)
Difficulty relaxing				
Never			11 (52.4%)	82 (59.4%)
Sometimes			4 (19.0%)	18 (13.0%)
Daily			6 (28.6%)	38 (27.5%)

Table 4 shows the figures for the prevalence of various diseases in the sample of 20- to 74-year-old Italian women living in the north-east of the country. When compared with the self-reported prevalence of diseases in the sample of Moldovan women (Table 2), there emerged a higher prevalence of all the diseases considered in the Moldovan women. This was true for all age groups, except in the case of diabetes, for which the Moldovan women reported a higher prevalence only among the 45-54, 55-64 and over 65-year-olds.

Table 4

Results of bivariate analysis: 95% confidence intervals (CI) for different “European Health Interview Survey 2015” questionnaire variables in north-eastern Italian women aged 20-74, by age group

	20-34 (N = 343)	35-44 (N = 352)	45-54 (N = 399)	55-64 (N = 386)	> 65 (N = 347)	Total (N = 1827)
Health status	% (95% CI)	n (%)				
BMI						
Underweight	13.9% (14%, 18.1%)	4.6% (2.7%, 7.4%)	3.3% (1.8%, 5.5%)	5.7% (3.6%, 8.6%)	3.5% (1.8%, 6.0%)	110 (6.1%)
Normal weight	76.6% (65.4%, 75.4%)	69.6% (64.4%, 74.4%)	66.5% (61.6%, 71.1%)	56.4% (51.3%, 61.4%)	45.5% (40.2%, 50.9%)	1116 (61.7%)
Overweight	12.2% (8.9%, 16.1%)	19.4% (15.4%, 24.0%)	21.2% (17.2%, 25.5%)	23.2% (19.1%, 27.8%)	34.3% (29.3%, 39.6%)	400 (22.1%)
Obese	3.3% (1.6%, 5.8%)	6.4% (4.0%, 9.5%)	9.1% (6.4%, 12.3%)	14.6% (11.2%, 18.6%)	16.7% (12.9%, 21.1%)	183 (10.1%)
Smoking	28.4% (23.7%, 33.5%)	18.9% (14.9%, 23.4%)	22.5% (18.5%, 26.9%)	21.8% (17.7%, 26.3%)	15.0% (11.4%, 19.2%)	385 (21.3%)
Health status						
Previously diagnosed diseases						
Asthma	3.2% (1.6%, 5.7%)	3.4% (1.8%, 5.9%)	4.0% (2.3%, 6.5%)	3.1% (1.6%, 5.4%)	2.6% (1.2%, 4.9%)	60 (3.3%)
Bronchitis	0% (0%, 1.1%)	0.6% (0.1%, 2.0%)	3.0% (1.6%, 5.2%)	3.1% (1.6%, 5.4%)	5.5% (3.3%, 8.4%)	45 (2.5%)
Myocardial infarction	0% (0%, 1.1%)	0% (0%, 1.0%)	0% (0%, 0.9%)	0.8% (0.2%, 2.3%)	2.6% (1.2%, 4.9%)	12 (0.7%)
Coronary disease	0% (0%, 1.1%)	0% (0%, 1.0%)	0.8% (0.2%, 2.2%)	1.8% (0.7%, 3.7%)	3.2% (1.6%, 5.6%)	21 (1.2%)
Hypertension	0% (0%, 1.1%)	2.0% (0.8%, 4.1%)	10.1% (7.3%, 13.4%)	22.8% (18.7%, 27.3%)	40.8% (35.6%, 46.2%)	275 (15.1%)
Arthritis/arthritis	0.6% (0.1%, 2.1%)	1.1% (0.3%, 2.9%)	8.0% (5.6%, 11.1%)	20.5% (16.6%, 24.8%)	39.4% (34.2%, 44.7%)	252 (13.8%)
Lumbar disorders	5.0% (2.9%, 7.8%)	8.3% (5.6%, 11.7%)	17.0% (13.5%, 21.1%)	22.3% (18.3%, 26.8%)	27.8% (23.2%, 32.9%)	296 (16.3%)
Cervical disorders	4.7% (2.7%, 7.5%)	10.5% (7.5%, 14.2%)	19.3% (15.6%, 23.6%)	18.7% (14.9%, 23.0%)	22.3% (18.0%, 27.0%)	279 (15.3%)
Diabetes	0.6% (0.1%, 2.1%)	0.3% (0%, 1.6%)	0% (0%, 0.9%)	4.4% (2.6%, 7.0%)	9.0% (6.2%, 12.5%)	51 (2.8%)
Allergies	15.8% (12.1%, 20.1%)	17.0% (13.2%, 21.3%)	17.4% (13.8%, 21.5%)	13.5% (10.3%, 17.3%)	10.2% (7.2%, 13.9%)	269 (14.8%)
Depression	0.9% (0.2%, 2.5%)	2.6% (1.2%, 4.8%)	4.5% (2.7%, 7.0%)	4.4% (2.6%, 7.0%)	9.0% (6.2%, 12.5%)	78 (4.3%)
Anxiety	1.2% (0.3%, 3.0%)	2.0% (0.8%, 4.1%)	3.3% (1.7%, 5.5%)	1.8% (0.7%, 3.7%)	4.6% (2.7%, 7.4%)	47 (2.6%)
Use of public health services						
Mammography at least once in life*	-	-	88.7% (85.2%, 91.7%)	92.5% (89.4%, 94.9%)	93.1% (89.9%, 95.5%)	1034 (91.3%)
Pap smear at least once in life**	66.8% (61.5%, 71.7%)	93.2% (90.0%, 95.6%)	95.2% (92.7%, 97.1%)	93.8% (90.9%, 96.0%)	66.8% (61.5%, 71.7%)	1299 (87.8%)
GP visits in previous 4 weeks	25.9% (21.3%, 31.0%)	26.3% (21.7%, 31.3%)	35.6% (30.8%, 40.6%)	39.1% (34.2%, 44.3%)	50.6% (45.1%, 56.1%)	628 (35.6%)
Specialist visits in previous 4 weeks	20.2% (16.0%, 24.9%)	21.0% (16.8%, 25.7%)	18.1% (14.4%, 22.3%)	24.7% (20.4%, 29.3%)	27.4 (22.7, 32.4)	393 (22.2%)
Hospitalizations in previous 12 months	4.4% (2.5%, 7.2%)	6.1% (3.8%, 9.1%)	4.8% (2.9%, 7.4%)	7.9% (5.4, 11.1)	10.4 (7.4, 14.1)	121 (6.7%)

\*Only for women in screening age (50-74 years) \*\*Only for women in screening age (25-64 years)

## Discussion

As expected, this study showed a higher prevalence of several diseases, such as hypertension and diabetes in older age groups. More interestingly, almost all the illnesses considered showed a higher overall prevalence among the Moldovan immigrant women than among the Italian controls. The former made more use of health care services than the latter too. An association also emerged between health literacy level and both lifestyle and recourse to health care services.

Our sample of Moldovan immigrant women included a sizable proportion who were overweight (30.5%), or obese (17.7%). These figures are higher than the 22.1% for overweight and 10.1% for obesity among Italian women, but only half the percentages for Moldovan women in their home country, where 60.1% are overweight and 31% are obese (22). Another finding concerns the clustering of higher BMIs in the older age groups, while the younger immigrant women had lower BMIs. This may be a sign of an adaptive effect, with the immigrants' lifestyles, such as their dietary habits, approaching those of their adopted country. Another possible interpretation of this phenomenon, however, is that women lose weight after migrating because of the hard living and working conditions they find in their adopted country.

The answers to our questionnaire indicate that less than one in five Moldovan immigrant women are smokers - a proportion almost in line with the Italian reference figure (21.3%) - and the prevalence of smokers was similar in all age groups. The Moldovan women's reported alcohol consumption was moderate-to-high (nearly 1.5 UA a day), and one in three of our respondents exceeded the recommended limit for women (1 UA a day). In its "Global Alcohol Report" for the Republic of Moldova, the WHO indicated that alcohol consumption by women over 15 years old averaged 2 units/day (23). Our results suggest that our Moldovan immigrant women drink less than their counterparts at home, and slightly more than Italian women in the same age range, whose average alcohol consumption is 1 UA a day (24).

Concerning physical exercise, half of our sample reported engaging in some form of physical exercise in their free time, but one in three said they never did so. This level of sedentariness is higher than reported by Moldovans in their own country, which is 24.5% for adults generally.

As for the overall health status of our sample, there was a noticeably higher prevalence of several

diseases compared with the Italian reference values. We identified a more than twofold self-reported prevalence of hypertension, arthritis/arthrosis, cervical disorders, diabetes, and allergies, and a threefold prevalence of lumbar disorders, depression and anxiety. If we look at the reported prevalence of allergies (36% for the Moldovan group versus 14.8% for the Italian controls), this may reflect the numerous studies in the literature indicating that migration to a highly-industrialized country favors the development of respiratory allergies in immigrants (25,26). As regards lumbar and cervical disorders, back pain has been found directly related to mental health disorders and stress in fact stress could contribute to the onset or the persistence of chronic pain (27). Another plausible explanation for these conditions is work-related, given the large proportion of our respondents who were home care workers and cleaners (jobs that involve the manual lifting of sometimes heavy loads). Analyzing our women by age group, the ratio for the prevalence of Moldovan and Italian women with lumbar disorders declines linearly from 6.3 for the younger women to 1.7 for the older age groups. The same trend could be seen for hypertension, for which the ratio went from 10 for the younger women to 1.3 for the older age groups.

Depression was reported by more than 10% of our Moldovan sample, with a slightly higher prevalence in the intermediate age groups. This is three times higher than the prevalence of 4.3% reported by a sample of 1827 Italian women living in the north-east of the country (16). This difference is more evident among the younger age groups, the prevalence ratio being 7.2 in the youngest age group and dropping gradually to 1.2 for the older women. When we investigated the issue of anxiety, the prevalence of this condition was a remarkable five times higher in the Moldovan women aged 45-54 and 55-64 than in their Italian counterparts, as opposed to a twofold prevalence in the other age groups. Analyzing symptoms usually associated with anxiety, depression and burnout (18) we found quite a high overall prevalence of daily headache, trouble sleeping, and extreme fatigue, possibly as a direct consequence of underlying stress. These symptoms were distributed throughout our Moldovan sample, with no significant differences between the various age groups considered. This could be also explained by high prevalence of chronic pain as described above, in fact chronic pain could be emotionally stressful (27). Chronic pain in fact is known to change the levels of stress hormones and

these can affect your mood, thinking and behavior. Moreover, chronic pain can affect ability to function at home or work making also difficult to participate in social activities and hobbies, which could lead to decreased self-esteem. In addition, chronic pain could provide sleep disturbances, fatigue, trouble concentrating, decreased appetite. These negative changes can dampen overall mood; and this can result in depression and anxiety. In addition vulnerability to stress has already been described in migratory groups, especially for Eastern European citizens migrating westwards (28). The stress of migration per se can lead to depression and anxiety (29) or somatization (30) which are frequently underestimated. Such conditions of malaise can also be carried to the migrants' home countries when they return. In fact, increasing attention is being paid to what has been called the "Italy syndrome", which is a sort of psycho-social distress suffered by Eastern European migrant women (31,32).

When questioned about their recourse to health care services, our sample of Moldovan women of all ages reported a large number of visits to GPs and specialists. This can be interpreted as a sign of their integration, and proof of the good functioning of the Italian NHS. The proportions of women reportedly seeing a GP or a specialist in the previous month, or being hospitalized in the previous year were 47.6%, 37.2% and 12.2%, respectively. These figures are much higher than those of our Italian controls, which were 35.6%, 22.2% and 6.7%, respectively.

The proportion of Moldovan immigrant women of suitable screening age who reporting having undergone HPV testing or a PAP smear at least once in their life was much the same as for their Italian counterpart (88.8 vs 87.8%). The cumulative proportions of Moldovan and Italian women who had undergone a mammography at least once in their lives was also very similar (90.1% vs 91.3%) (16).

Our Moldovan immigrant women's health literacy was judged to be good, bearing in mind the potential language barriers imposed by migration, as discussed in the literature (33,34). This reflects our sample's generally high level of formal education, consistently with the reportedly well-functioning school systems of Eastern Europe (35). On the other hand, our study findings show that the Moldovan immigrant women's health literacy only partly influenced their lifestyles, mainly as

regards smoking (which was twice as prevalent among women with a lower health literacy level). An association between a lower health literacy level and a greater nicotine dependence has already been amply documented in the literature (11,36-38). Our study found no correlation between health literacy and BMI, alcohol consumption or physical exercise. Health literacy was a determinant of primary health care service use, however: respondents with a higher health literacy level visited GPs and specialists twice as often as those whose health literacy was limited, and made considerably greater use of screening programs (mammography and PAP smears or HPV tests), while recourse to Emergency Departments and hospitalizations was similar for the two sub-groups. There have been reports of a different, sub-optimal use of health care services by less health-literate individuals, especially in the case of immigrants (39,40). The impact of our results can be summarized in two points. First, Moldovan immigrants in Italy have a good health literacy level overall, comparable with that of Italy's autochthonous population(41); and individuals' health literacy was confirmed as a determinant of their attitude to smoking and to the use of some health care services (34). Bearing these findings in mind, adequate programs to improve health literacy in the general population - with a view to promoting healthy lifestyles - would be useful but need not target Moldovan immigrants specifically (42-44). Second, Moldovan immigrant women seem to have more health issues than their Italian counterparts, so this immigrant population should be a target of prevention programs - focusing on promoting a healthy amount of physical exercise, for instance, and providing appropriate (biopsychosocial) education on how to prevent lumbar pain.

## Conclusion

The prevalence of some diseases was higher in our sample of Moldovan immigrant women than in Italian controls of all ages, but especially among the younger women. Health literacy was associated with immigrants' lifestyles and health care service usage, as seen previously for the autochthonous population. Tailored prevention programs and interventions should be designed to address the high prevalence of some diseases among Moldovan immigrant women.

## Declarations

Ethics approval and consent to participate

The study is cross-sectional observational study; Italy legislation exempts these studies from compulsory ethical review. The data collected and analysed anonymously, to maintain anonymity only verbal consent was required.

#### Competing interests

"The authors declare that they have no competing interests"

#### Consent for publication

"Not applicable"

#### Availability of data and materials

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

#### Authors' contributions

FAV conceptualized the study, planning and supervising the work, interpreted the data and approved the final manuscript as submitted

FZ was involved in planning and migrant interview, and approved the final manuscript as submitted.

CP: carried out the database management, and approved the final manuscript as submitted.

PM carried out the statistical analyses, drafted the manuscript

AB planned the study, interpreted the data and drafted the manuscript.

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#### References

1. King R, DeBono D. Irregular Migration and the "Southern European Model" of Migration. *Journal of Mediterranean Studies*. 2013;22(1):1-31.
2. Pastore F. The Governance of Migrant Labour Supply in Europe, Before and During the Crisis: An Introduction. *Comparative Migration Studies*. 2014 Dec 1;2(4):385-415.
3. INPS. Osservatorio sui lavoratori domestici [Internet]. 2006. Available from:

<http://www.inps.it>

4. Näre L. The moral economy of domestic and care labour: Migrant workers in Naples, Italy. *Sociology*. 2011;45(3):396–412.
5. Cela E, Fokkema T, Ambrosetti E. Variation in transnationalism among Eastern European migrants in Italy: The role of duration of residence and integration. *Journal of Southeast European and Black Sea*. 2013;13(2):195–209. Available from: <https://www.tandfonline.com/action/journalInformation?journalCode=fbss20>
6. King R, Lazaridis G, Tsardanidis C. *Eldorado or Fortress? Migration in Southern Europe*. Eldorado or Fortress? Migration in Southern Europe. Palgrave Macmillan UK; 2000.
7. Cvajner M. *Soviet signoras : personal and collective transformations in Eastern European migration*. University of Chicago Press; 2019.
8. Hansen E, Donohoe M. Health issues of migrant and seasonal farmworkers. Vol. 14, *Journal of Health Care for the Poor and Underserved*. 2003. p. 153–64. Available from: <https://www.researchgate.net/publication/10767354>
9. Azaroff LS, Levenstein C, Wegman DH. Occupational Injury and Illness Surveillance: Conceptual Filters Explain Underreporting |. Vol. 92, *Am J Public Health*. 2002.
10. Nielsen-Bohlman Lynn, Panzer AM, Kindig DA, Institute of Medicine (U.S.). Committee on Health Literacy. *Health literacy : a prescription to end confusion*. National Academies Press; 2004. 345.
11. Berkman ND, Dewalt DA, Pignone MP, Sheridan SL, Lohr KN, Lux L, et al. Literacy and health outcomes. Evidence report/technology assessment (Summary). Agency for Healthcare Research and Quality (US); 2004. p. 1–8.
12. Čajka P, Jaroszewicz M, Strielkowski W. Migration Incentives and Flows between

- Belarus, Moldova, Ukraine and the European Union: a Forecasting Model. *Economics and Sociology*. 2014;7(4):11-25.
13. Mladovsky P, Rechel B, Ingleby D, McKee M. Responding to diversity: An exploratory study of migrant health policies in Europe. Vol. 105, *Health Policy*. Elsevier; 2012. p. 1-9.
  14. Morris NS, MacLean CD, Chew LD, Littenberg B. The Single Item Literacy Screener: Evaluation of a brief instrument to identify limited reading ability. Vol. 7, *BMC Family Practice*. 2006. Available from: <http://www.biomedcentral.com/1471-2296/7/21>
  15. Eurostat. European Health Interview Survey (EHIS wave 2) - methodological manual. 2013. 1-202. Available from: <http://europa.eu>
  16. ISTAT. "European Health Interview Survey 2015" [Internet]. 2015. Available from: <https://www.istat.it/it/archivio/212383>
  17. Kessler RC, Ames M, Hymel PA, Loeppke R, McKenas DK, Richling DE, et al. Using the World Health Organization Health and Work Performance Questionnaire (HPQ) to evaluate the indirect workplace costs of illness. Vol. 46, *Journal of Occupational and Environmental Medicine*. 2004. p. S23-37. Available from: <https://insights.ovid.com/crossref?an=00043764-200406001-00004>
  18. Honkonen T, Ahola K, Pertovaara M, Isometsä E, Kalimo R, Nykyri E, et al. The association between burnout and physical illness in the general population-results from the Finnish Health 2000 Study. *Journal of Psychosomatic Research*. 2006;61(1):59-66.
  19. Vahabi M, Wong JPH, Lofters A. Migrant Live-in Caregivers Mental Health in Canada. *Community Mental Health Journal*. 2018 Jul 12;54(5):590-9. Available from: <http://link.springer.com/10.1007/s10597-017-0225-5>

20. Consiglio C. Interpersonal strain at work: A new burnout facet relevant for the health of hospital staff. *Burnout Research*. 2014 Sep 1;1(2):69-75.
21. R Core Team. R: A Language and Environment for Statistical Computing [Internet]. Vienna, Austria: R Foundation for Statistical Computing; 2019. Available from: <https://www.r-project.org/>
22. World Health Organization. WHO Global Health Observatory Data Repository [Internet]. World Health Organization. 2013. Available from: <http://apps.who.int/gho/data/view.main>
23. WHO. Global Alcohol Report: Republic of Moldova [Internet]. Geneva; 2018. Available from: [https://www.who.int/substance\\_abuse/publications/global\\_alcohol\\_report/profiles/mda.pdf?ua=1](https://www.who.int/substance_abuse/publications/global_alcohol_report/profiles/mda.pdf?ua=1)
24. WHO. Global Alcohol Report: Italy [Internet]. 2018. Available from: [https://www.who.int/substance\\_abuse/publications/global\\_alcohol\\_report/profiles/ita.pdf?ua=1](https://www.who.int/substance_abuse/publications/global_alcohol_report/profiles/ita.pdf?ua=1)
25. Minetti S, Raffetti E, Lodi-Rizzini F, Facchetti S, Schlanser E, Colombo E, et al. Respiratory allergy in immigrants to a highly industrialised area in Italy according to area of origin and time period. *Allergologia et Immunopathologia*. 2015 Sep 1;43(5):461-8.
26. Tedeschi A, Barcella M, Dal Bo GA, Miadonna A. Onset of allergy and asthma symptoms in extra-European immigrants to Milan, Italy: Possible role of environmental factors. *Clinical and Experimental Allergy*. 2003 Apr 1;33(4):449-54. Available from: <http://doi.wiley.com/10.1046/j.1365-2222.2003.01628.x>
27. Stubbs B, Koyanagi A, Thompson T, Veronese N, Carvalho AF, Solomi M, et al. The epidemiology of back pain and its relationship with depression, psychosis, anxiety,

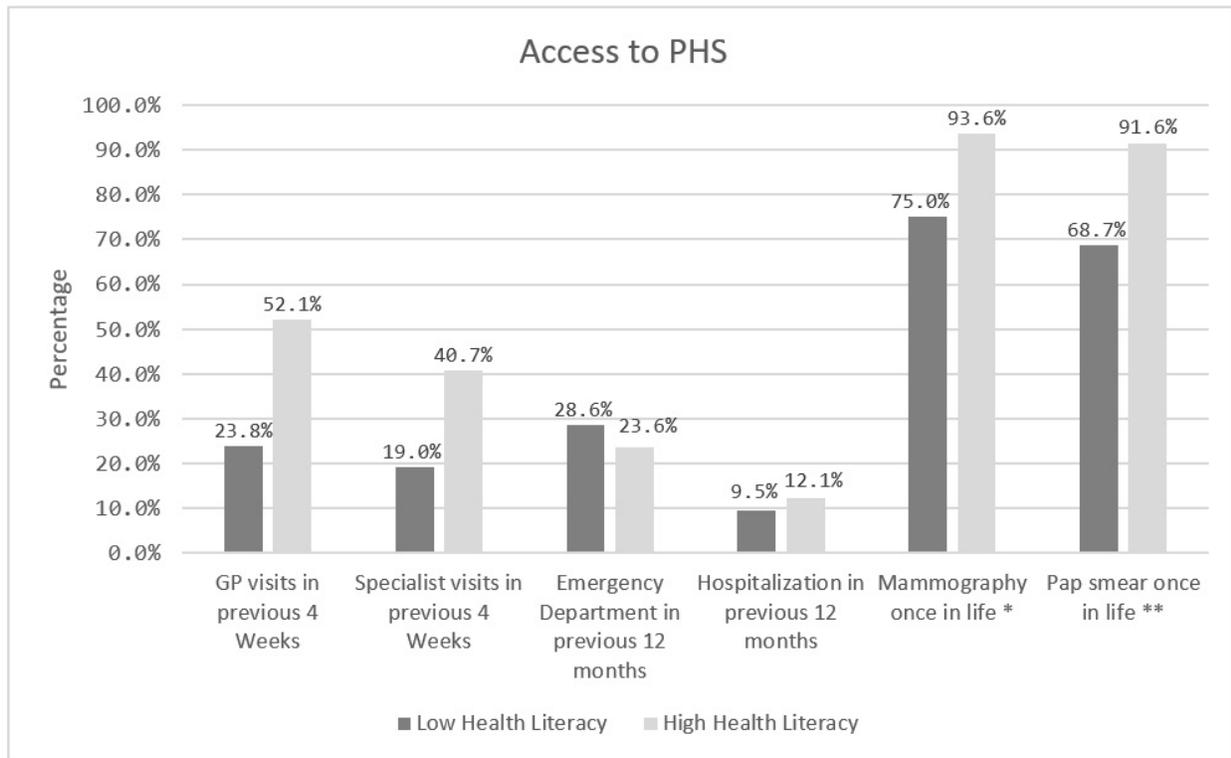
- sleep disturbances, and stress sensitivity: Data from 43 low- and middle-income countries. *General Hospital Psychiatry*. 2016 Nov 1;43:63-70.
28. de Almeida Vieira Monteiro APT, Serra AV. Vulnerability to stress in migratory contexts: A study with Eastern European immigrants residing in Portugal. *Journal of Immigrant and Minority Health*. 2011 Aug;13(4):690-6.
29. Lindert J, Ehrenstein OS von, Priebe S, Mielck A, Brähler E. Depression and anxiety in labor migrants and refugees - A systematic review and meta-analysis. *Social Science and Medicine*. 2009 Jul;69(2):246-57.
30. Aragona M, Tarsitani L, Colosimo F, Martinelli B, Raad H, Maisano B, et al. Somatization in primary care: A comparative survey of immigrants from various ethnic groups in Rome, Italy. *International Journal of Psychiatry in Medicine*. 2005;35(3):241-8. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/16480239>
31. Sarli A. The psycho-social malaise of migrant private carers in Italy: A rampant, but hidden health demand. *Acta Biomedica*. 2014;85(3):62-73. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/25265445>
32. Cozzi D. Legami in diaspora : madri , figli e genere nelle famiglie transnazionali. *EtnoAntropologia*. 2019;7(1):37-62.
33. Kreps GL, Sparks L. Meeting the health literacy needs of immigrant populations. Vol. 71, *Patient Education and Counseling*. 2008. p. 328-32.
34. Kimbrough JB. Health Literacy as a Contributor to Immigrant Health Disparities. *Journal of Health Disparities Research and Practice*. 2007;1(2):93106. Available from: <http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.685.2460>
35. Ammermüller A, Heijke H, Wößmann L. Schooling quality in Eastern Europe: Educational production during transition. *Economics of Education Review*. 2005;24(5):579-99. Available from: [www.iza.org](http://www.iza.org)

36. Safeer RS, Cooke CE, Keenan J. The impact of health literacy on cardiovascular disease. Vol. 2, Vascular Health and Risk Management. 2006. p. 457-64.
37. Stewart DW, Cano MÁ, Correa-Fernández V, Spears CA, Li Y, Waters AJ, et al. Lower health literacy predicts smoking relapse among racially/ethnically diverse smokers with low socioeconomic status. BMC Public Health. 2014 Dec 14;14(1):716. Available from: <http://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-14-716>
38. Stewart DW, Adams CE, Cano MA, Correa-Fernández V, Li Y, Waters AJ, et al. Associations between health literacy and established predictors of smoking cessation. American Journal of Public Health. 2013 Jul;103(7).
39. Mantwill S, Schulz PJ. Low health literacy and healthcare utilization among immigrants and non-immigrants in Switzerland. Patient Education and Counseling. 2017 Nov 1;100(11):2020-7.
40. Zanchetta MS, Poureslami IM. Health literacy within the reality of immigrants' culture and language. Vol. 97, Canadian Journal of Public Health. Canadian Public Health Association; 2006. Available from: <https://www.jstor.org/stable/41995824>
41. Palumbo R. Examining the impacts of health literacy on healthcare costs. An evidence synthesis. Health Services Management Research. 2017 Nov 16;30(4):197-212. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/29034727>
42. Netto G, Bhopal R, Lederle N, Khatoon J, Jackson A. How can health promotion interventions be adapted for minority ethnic communities? Five principles for guiding the development of behavioural interventions. Health Promotion International. 2010;25(2):248-57.
43. Fernández-Gutiérrez M, Bas-Sarmiento P, Albar-Marín MJ, Paloma-Castro O, Romero-Sánchez JM. Health literacy interventions for immigrant populations: a

systematic review. Vol. 65, International Nursing Review. 2018. p. 54-64.

44. Simich L. Health literacy and immigrant populations. Public Health Agency of Canada and Metroplis Canada [Internet]. 2009;(March):1-14. Available from: [http://canada.metropolis.net/pdfs/health\\_literacy\\_policy\\_brief\\_jun15\\_e.pdf](http://canada.metropolis.net/pdfs/health_literacy_policy_brief_jun15_e.pdf)

## Figures



*\*Only for women of screening age (50-74 years)*

*\*\*Only for women of screening age (25-64 years)*

Figure 1

Recourse to public health care services by health literacy level