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RELATIONSHIP BETWEEN HEALTH LITERACY, PHYSICAL ACTIVITY, MOTIVATION AND BARRIERS OF PEOPLE AGED 30–50 YEARS

Viktorija Valatkaitytė, Vida Janina Česnaitienė
Lithuanian Sports University, Kaunas, Lithuania

ABSTRACT

Background. An international study of health literacy among European citizens has shown that 47% of Europeans lack health literacy (Sørensen et al., 2015). Participation in physical activity is associated with health literacy. According to Matsushita, Harada, and Arao (2018), people with a lack of health literacy are less engaged in physical activity.

The aim of this study was to evaluate health literacy, physical activity, motivation of people aged 30 to 50 years and barriers to be physically active, so that in the future more effective measures for improving health literacy and promotion of physical activity could be developed.

Methods. To collect data, questionnaire survey was applied.

Results. Health literacy statistically significantly differed between age and physical activity groups ($p < .05$). However, there was no statistically significant difference as far as education is concerned ($p > .05$). There was also a statistically significant ($p < .05$) relationship between health literacy and physical activity as well as health literacy and motives, namely, enjoyment, competence, appearance, and fitness. The reverse relationship was found between health literacy and internal-external barriers.

Conclusions. Forty- fifty-year-olds and physically active individuals had a higher level of health literacy. There was no statistically significant difference in education. A statistically significant relationship between health literacy and physical activity among people aged 30–50 years was identified.

Keywords: health literacy, physical activity, motivation, barriers.

INTRODUCTION

With the help of modern technology nowadays difficult physical labour has been replaced by a variety of machines, which do not require much physical effort. Most of the working-age people have sedentary jobs, which results in back pain, stiff and weak muscles, decreasing mobility, strength, productivity and deteriorating quality of life. The loss of muscle mass, accumulation of fat and slower metabolism can be noticed among people over 30 years old (English & Jones, 2010). After the age of 40 or later, progressive cognitive disorders start to emerge. They affect memory and learning. Also, 8% of muscle atrophy per decade, decreased bone mineral density, and finally sarcopenia, osteopenia and osteoporosis can be observed (Gomes et al., 2017; McPhee et al., 2016). In addition, studies have shown that chronic non-infectious diseases are most common at the age of 40 and over (Vičaitė, 2016).

Physical inactivity is one of the most concerning problems in the world. WHO reports that one in four adults (1.4 billion people worldwide) does not meet the WHO recommendations on physical activity (WHO, 2018b). Even 46% of adults in Lithuania never exercise or play a sport. The greatest decline

of physical activity is noticeable at the age of 40 and over (Special Eurobarometer 472, 2017). People are facing various personal and environmental barriers, which prevent them from regular exercising. Research shows that people lack motivation to participate in physical activity (Hoare, Stavreski, Jennings, & Kingwell, 2017; Teixeira, Carraca, Markland, Silva, & Ryan, 2012). Motivation is the main factor which affects self-determination and support to be physically active. Psychologists define motivation as the need or desire which gives energy to behave and directs it to the purpose (Mayers, 2008). Physical inactivity is associated with the risks of non-communicable diseases, obesity, hypertension, depression, cardiovascular diseases, and contributes to the aging of various metabolic systems, which in turn generally reduces average lifespan (Fullerton, Taylor, Grande, & Berry, 2014; Kwasniewsa et al., 2016).

Participation in physical activity is associated with health literacy. It is defined as a cognitive and social skill, which is conditioning motivation, knowledge, and competence to access, understand, appraise, and apply information in everyday life. It also promotes and maintains health and a better quality of life (Sørensen et al., 2012; Van den Broucke, 2014). People with low health literacy tend to understand less and do not know how to apply health information. Moreover, they are more likely to have health problems that are reducing their quality of life and increasing mortality (Crook, Stephens, Pastorek, Mackert, & Donovan, 2016; Nyman, Nillson, Dahlberg, & Jaensson, 2018). An international study of health literacy among European citizens has shown that 47% of Europeans had insufficient health literacy (Sørensen et al., 2015). A study in Lithuania showed that for most people it is difficult to understand health-related information and advice given by health professionals via television and radio programs (Javtokas, Sabaliauskas, Žagminas, & Umbrasaitė, 2013). Among European countries, Lithuanian residents (48%) search for health-related information least frequently (Flash Eurobarometer 404, 2014). Therefore, *the aim* of this study was to investigate the relationship between health literacy, physical activity, motivation and barriers to be physical active among people aged 30–50 years.

Hypothesis. On the basis of the data from previous studies, we believe that individuals with better health literacy will be more physically active, have more motivation and fewer obstacles to be physically active (Geboers, Reijneveld, Jansen, & Winter, 2016; Jayasinghe et al., 2016; Reisi et al., 2014).

METHODS

Research participants were 190 respondents from 30 to 50 years of age who completed the questionnaire; the average age was 39.47 ± 7.03. Most of them were women (140, 73.7%) while the others were men (50, 26.3%). Also, the majority of those who completed the questionnaire had higher university education (48.9%), were working (90.5%) and living in towns or cities (Table 1).

Table 1. **Characteristics of research participants**

Characteristic		Number of participants	Percent (%)
Age	30–39 years	96	50.5
	40–50 years	94	49.5
Education	secondary/vocational	51	26.8
	a college	46	24.2
	higher university	93	48.9
Residence	village	49	25.8
	town	55	28.9
	city	86	45.3

Instruments. A questionnaire survey method was used to achieve the aim. The *European Health Literacy Questionnaire* (HLS-EU-Q47) was translated into the Lithuanian language and was used to evaluate health literacy. The HLS-EU-Q measured health literacy across three health domains: healthcare, disease prevention and health promotion. Within each domain, questions were focused on the competence of accessing, understanding, appraising and applying health-related information. However, in this study we used the third part of the questionnaire – health promotion (where knowledge is used for health promotion, 16 questions). Likert scale was used to answer each question: 1 – very difficult; 4 – very easy. Also, there was option 5 – I do not know, but the answer to this question was not included in the calculation. Health literacy index was calculated as: (average – 1) * (50/3) 0–25 – inadequate; 25–33 – problematic; 33–42 – sufficient; 42–50 – excellent (Pelikan, Rothlin, & Ganahl, 2009–2012).

Godin Leisure-Time Exercise Questionnaire (GLTEQ) was chosen to evaluate physical activity. Activity scores are calculated using the formula: (9 * intensive workout) + (5 * moderate intensity physical activity) + (3 * light exercises). If the index was less than 24, the respondent was attributed to a physically inactive group (Godin & Shephard, 1997).

Motives for Physical Activities Measure–Revised (MPAM–R) motive scale was chosen to evaluate motivation of physical activity. It consisted of 30 propositions that needed to be answered using the semantic differential scale: 1 – I totally disagree; 7 – I totally agree. The scale was divided into 5 motives to participate in physical activity: interest/enjoyment; competence; appearance; fitness; and social (Frederick & Ryan, 1993; Ryan, Frederick, Lapes, Rubio, & Sheldon, 1997).

The questionnaire of *Barriers to Physical Activity* was used to find out the causes that limited physical activity (15 items). The possible answers were: 1 – I fully agree; 5 – I totally disagree (*Physical Activity Monitor,* CFLRI, 1995).

Data analysis. Data from the study was analysed using the IBM SPSS 21 statistical analysis program. The following statistical parameters were calculated: averages, standard deviations and percentage distribution. Parametric statistics of criteria was used to analyse the results. Student *t* test and One-Way ANOVA software was used to compare the results. Chi-squared test was applied for percentage statistics. Pearson's correlation coefficient was used to identify the relationship. The criterion of significant difference in results was set at $p < .05$.

RESULTS

Comparison of health literacy indicators with regard to age, education and physical activity. Comparing health literacy in two age groups (Figure 1), the study showed that older people aged from 40 to 50 years had a better level of health literacy; 42.6% of older people had sufficient health literacy, while that of 22.9% individuals aged 30–39 years. The difference in results was statistically significant ($p < .05$).

Comparing health literacy of adults in different education groups, no statistically significant difference was found ($p > .05$) (Figure 2). However, there was a tendency that people with higher university education had sufficient, i.e. 37.6%, and excellent, i.e. 16.1%, health literacy compared to those with a college and secondary/vocational education.

A statistically significant difference ($p < .05$) was found in the assessment of health literacy in the domain of physical activity (Figure 3). The results showed that the majority of physically active people had an excellent level of health literacy, which constituted 18.8%, whereas the least inadequate – 16.8%, as compared to physically inactive people – 4.5%, 27%.

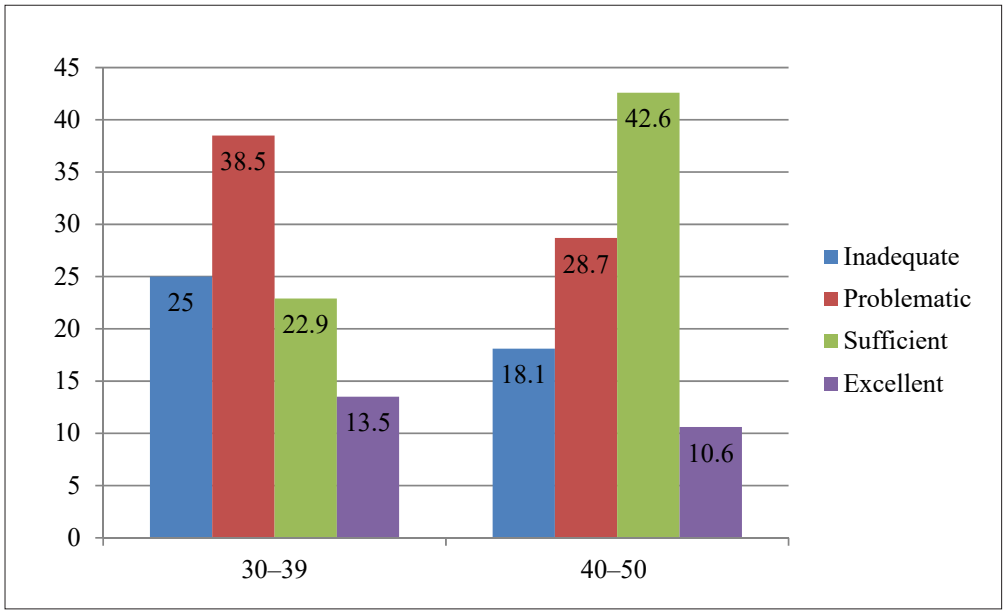

Figure 1. **Comparison of health literacy in different age groups**

Notes. %, $\chi^2 = 8.355$, $df = 3$, $p = .039$).

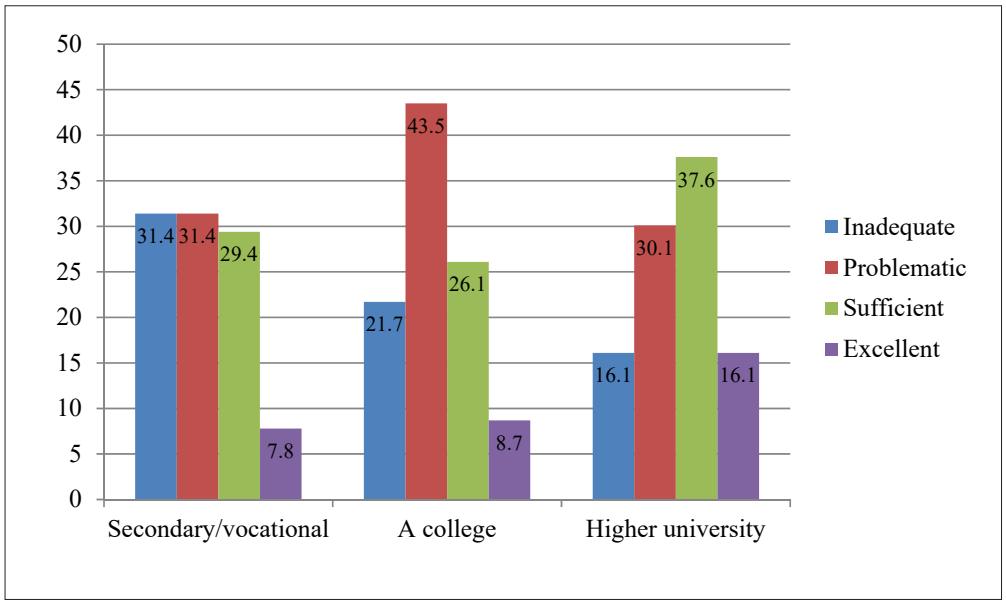

Figure 2. **Comparison of health literacy in different education groups**

Note. %, χ^2 = 9.222, df = 6, p = .161.

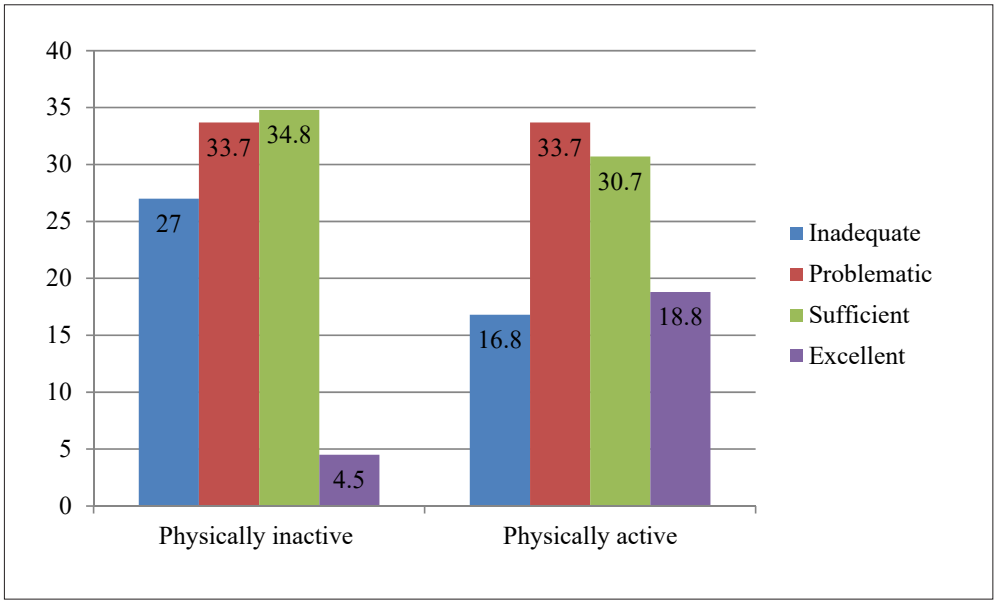

Figure 3. **Comparison of health literacy in different physical activity groups Analysis of the relationship between physical activity, health literacy, motivation and barriers to be physical active**

Note. %, χ^2 = 10.513; df = 3; p = .015.

The analysis of the relationship between 30 – 50-year-olds' health literacy and physical activity (Table 2) showed that there was a statistically significant relationship between health literacy and physical activity (r = .222, p = .002). Improving health literacy increases physical activity.

Table 2. **Relationship between health literacy and physical activity**

		Physical activity
Health literacy	r	.222
	p	.002

Note. r – relationship, p – correlation coefficient.

Analysing the relationship between health literacy and physical activity motives, all except one factor had a statistically significant relation (p < .05) (Table 3). Improving health literacy increased motivation to engage in physical activity for enjoyment, competence, appearance and fitness. However, the desire to communicate as a motive for physical activity was not related to health literacy (p > .05). There was a statistically significant relationship between physical literacy and internal - external barriers to physical activity found (p < .05). The higher the level of health literacy, the fewer the internal and external barriers to be physically active.

Table 3. **Relationship between health literacy, motives and barriers to be physically active**

		Enjoyment	Competence	Appearance	Fitness	Social	Internal barriers	External barriers
Health literacy	*r*	.214	.174	.149	.151	.109	–.164	–.236
	p	.003	.016	.040	.038	.135	.024	.001

Note. *r* – relationship, *p* – correlation coefficient.

Analysing the relationship between motives of physical activity and physical activity (Table 4), a statistically significant relationship was found between physical activity and enjoyment, competence and social motives ($p < .05$). The more people are physically active, the more they engage in physical activity for pleasure, new skills, and communication. However, there was no statistically significant relationship between physical activity and appearance and improvement of physical capacity ($p > .05$). The evaluation of relationship between physical activity and internal and external barriers showed a statistically significant relationship ($p < .05$). The more people are physically active, the less they have external and internal barriers that may affect their physical activity.

Comparing the average of the indicators of middle-aged individuals in the health literacy groups in the aspect of physical activity, results showed that the difference between the inadequate and excellent health literacy averages was statistically significant ($p < .05$) (Table 5). More active were those who had excellent health literacy – 44.65 ± 28.03, compared to those who had inadequate health literacy – 22.78 ± 18.17.

In the evaluation of motives to be physically active, statistically significant average difference in enjoyment domain ($p < .05$) was found between problematic and sufficient, and excellent health literacy (Table 5). Those who had the excellent level of health literacy were physically active due to enjoyment – 5.56 ± 1.11, in comparison to those who had sufficient and problematic health literacy. Analysing the motive of competence, a statistically significant difference ($p < .05$) was found between inadequate, problematic and excellent health literacy groups. It was noticed that those who had excellent level of health literacy were physical active due to developing new skills – 5.55 ± 1.07, if compared to people with inadequate (4.62 ± 1.38) and problematic (4.58 ± 1.44) health literacy. Most of individuals who chose the improvement of their appearance as a motive, had excellent health literacy – 5.75 ± 1.09, in comparison to individuals who had the problematic – 4.67 ± 1.50 and sufficient – 4.83 ± 1.23 health literacy levels ($p < .05$). There was no statistically significant difference between different levels of health literacy for fitness and social motives ($p > .05$). However, there was a tendency that people with excellent health literacy did sports not only for the improvement of physical capacity – 6.43 ± 1.21, but also because of communication – 4.48 ± 1.46, compared to those who had inadequate, problematic and sufficient level of health literacy.

In comparison of the averages between internal, external barriers to physical activity and health literacy, no statistically significant difference between internal barriers was found ($p > .05$) (Table 5). However, there was a tendency that most internal barriers, such as lack of motivation, fatigue, pain,

Table 4. **The relationship between physical activity, motives and barriers to be physically active**

		Enjoyment	Competence	Appearance	Fitness	Social	Internal barriers	External barriers
Physical activity	*r*	.344	.350	.088	.095	.169	–.173	–.191
	p	.001	.001	.225	.192	.020	.017	.008

Note. *r* – relationship, *p* – correlation coefficient.

	Health literacy	*N*	Mean ± *SD*	*p*
Physical activity	inadequate *	41	22.78 ± 18.17*	.010
	problematic	64	30.89 ± 26.46	
	sufficient	62	31.36 ± 25.31	
	excellent	23	44.65 ± 28.03	
Enjoyment	inadequate	41	4.78 ± 1.33	.004
	problematic ✚°	64	4.72 ± 1.37✚°	
	sufficient	62	5.32 ± 0.99	
	excellent	23	5.56 ± 1.11	
Competence	inadequate *	41	4.62 ± 1.38*	.008
	problematic °	64	4.58 ± 1.44°	
	sufficient	62	5.00 ± 1.04	
	excellent	23	5.55 ± 1.07	
Appearance	inadequate	41	4.84 ± 1.32	.011
	problematic °	64	4.67 ± 1.50°	
	sufficient ×	62	4.83 ± 1.23×	
	excellent	23	5.75 ± 1.09	
Fitness	inadequate	41	5.89 ± 1.04	.051
	problematic	64	5.66 ± 1.50	
	sufficient	62	6.12 ± 1.01	
	excellent	23	6.43 ± 1.21	
Social	inadequate	41	3.80 ± 1.58	.056
	problematic	64	3.73 ± 1.44	
	sufficient	62	4.26 ± 1.27	
	excellent	23	4.48 ± 1.46	
Internal barriers	inadequate	41	2.41 ± 0.84	.287
	problematic	64	2.24 ± 0.78	
	sufficient	62	2.14 ± 0.65	
	excellent	23	2.14 ± 0.79	
External barriers	inadequate ✦❖*	41	2.75 ± 0.87✦❖*	.009
	problematic	64	2.31 ± 0.80	
	sufficient	62	2.25 ± 0.80	
	excellent	23	2.17 ± 0.79	

Table 5. **Averages of physical activity, motives and barriers to be physically active in health literacy groups**

Notes. *N* – number of participants; *SD* – standard deviation; **p* < .05 compared to excellent health literacy; ✚*p* < .05 compared to sufficient health literacy; °*p* < .05 compared to excellent health literacy; ×*p* < .05 compared to excellent health literacy; ✦*p* < .05 compared to sufficient health literacy; ❖*p* < .05 compared to problematic health literacy.

fear of injury, were basically found in those with inadequate health literacy – 2.41 ± 0.84, and the least with excellent health literacy – 2.14 ± 0.79. A statistically significant difference in mean ($p < .05$) was found after investigating external barriers such as lack of time for family responsibilities, employment at work, housework, and unsafe environment. External barriers of physical activities were linked to people, who had inadequate health literacy – 2.75 ± 0.87, compared to those with problematic, sufficient and excellent levels of health literacy.

DISCUSSION

Physical activity and health literacy are components that can improve the quality of life. There have been numbers of studies done that show the benefits of physical activity and the importance of health

literacy for health. Research shows that physical activity and health literacy can change significantly depending on gender, age, education, place of residence, marital status, etc. The aim of this study is to investigate the relationship between health literacy, physical activity, motivation and barriers to be physical active among people who are 30–50 years old.

The results of the study showed that older people aged 40–50 had better health literacy compared to younger individuals ($p < .05$). The results of a study conducted by Nakayma and other co-authors (2015) showed that health literacy was increasing with age. However, other studies have shown that people aged 25 to 39 have higher levels of health literacy compared to older and younger people (Van der Heide et al., 2016). Most articles show that health literacy is beginning to decrease from the age of 50, which can be attributed to age-related cognitive decline (Morrow et al., 2006; Ownby, Acevedo, Valverde, & Jacobs, 2014; Sørensen et al., 2015).

Comparing health literacy by education, no statistically significant difference was found ($p > .05$). However, there has been a tendency in the study by Essink-Bot, Dekker, Timmermans, Uiters, and Fransen (2016) that individuals with high education have sufficient health literacy compared to those with low education. Also, the research by other scientists has found that people with lower education have lower levels of health literacy, poorer general, physical and mental health if compared to people with higher education (Van der Heide et al., 2013; Yost, Dewalt, Lindquist, Hahn, 2013). Smith, Simpson, and Travena (2014) suggest that processing information is more complicated for people with lower education.

The study has shown that those who have better health literacy are more physically active compared to lower health literacy of 30–50-year-old people ($p < .05$). Many studies confirm these results and show that inadequate health literacy in health is associated with rarer participation in physical activity (Bannett, Boyle, James, & Bannett, 2012; Geboers, de Winter, Luten, Jansen, & Reijneveld, 2014; Yoshida, Iwasa, Kumagai, Suzuki, & Yoshida, 2014; Zamir, Epel, Cohen, & Elhayany 2016). A study conducted by Jayasinghe and colleagues (2016) shows that 40–50-year olds are more physically inactive (63%) with low health literacy than those with higher health literacy (47%). Also, literature shows that respondents with sufficient health literacy engage in physical activity 2 to 3 times a week, compared to people with inadequate health literacy (Fernandez, Larson, & Fisher, 2016). It has been noticed that people do not participate in physical activities because of their poor knowledge of exercising, types of physical activity, benefits, and health in general (Pereira, Padoan, Garcia, Patusco, & Magalhaes, 2019).

The relationship between health literacy and physical activity is statistically significant ($p < .05$). This is confirmed by other authors' research that health literacy is related to physical activity. Increasing health literacy also increases physical activity (Geboers et al., 2016; Reisi et al., 2014). According to Suka and co-authors (2015), health literacy is generally related to health behaviour. People with low health literacy understand less how important it is to behave correctly in health field.

A statistically significant relationship ($p < .05$) was found after investigating the relationship between physical activity and motives that stimulate physical activity in the areas of enjoyment, competence, appearance and fitness. Research shows that physical activity is more intense due to fitness, but there was no statistically significant relationship between appearance and social motives (Kamal, Radzani, & Jannah, 2018). Also, with increasing health literacy, there is a growing consciousness of why it is necessary and useful to engage in physical activity by eliminating all possible barriers which may limit physical activity.

Thus, the hypothesis has been confirmed, as our findings show that people with greater health literacy are more physically active, more motivated, and have fewer barriers to be physically active.

CONCLUSIONS

1. People who are 40–50 years old and who are more physically active have higher levels of health literacy than 30–39 year-olds and physically inactive people. The level of health literacy is no different according to education.
2. A direct statistically significant relationship was identified between health literacy and physical activity of people aged 30–50 years. A statistically significant relationship has been established between health literacy and motives of enjoyment, competence, appearance, and fitness as well as between physical activity and motives of enjoyment, competence and social motives. Increasing health literacy and physical activity help to decrease internal and external barriers to be physically active.

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