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Relationship between motivation, health literacy, motivation, and leisure-time physical activity levels of adolescents

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Abstract

Health literacy refers to the understanding, drive, and ability to utilize health information for better health outcomes. This skill is linked to consistent physical activity. Yet, it's unclear if health literacy correlates with the inclination for physical activity in the broader population. This research aimed to determine the connection between readiness for recreational physical activities and health literacy. The study examined data from 300 young individuals using a cross-sectional approach. The readiness for recreational physical activities was gauged using a validated questionnaire on physical activity stages. Health literacy levels were determined using the abbreviated European Health Literacy Survey Questionnaire (HLS-EU-Q16) and segmented into low, moderate, and high categories. The study employed regression analysis for its findings. The results showed a positive relationship between health literacy, motivation and physical activity level with a significance value of 0.000 < 0.005. High health literacy was positively associated with a more advanced phase of motivational readiness for leisure-time physical activity. Therefore, considering health literacy in interventions to increase motivation for leisure-time physical activity may be a useful approach.

Keywords: *Health Literacy; Sports Motivation; Physical Activity.*

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INTRODUCTION

Physical activity has been shown to have many health benefits, including reducing the risk of overall mortality and other diseases (WHO 2018; Lee et al. 2012). Furthermore, physical activity is also beneficial in reducing the risk of cardiovascular disease and other non-communicable diseases, such as diabetes, stroke, cholesterol (Zhang et al. 2017; Aune et al. 2021). Another interesting thing is that physical activity is also related to reducing the adverse effects or risk of cancer and helping to cure it (Liu et al. 2015; McTiernan et al. 2019). Even psychologically, physical activity has benefits, one of which is that regular physical activity can reduce the risk of depression (Pearce et al. 2022).

Data from the Ministry of Health states that the level of physical activity of the population in Indonesia tends to be moderate to low (RISKESDAS, 2018; Widiyatmoko and Hadi 2018; Apriantono et al. 2020). Another thing is also seen in the prevalence of non-communicable diseases, which has increased from previous years. Although physical education has a significant impact on adolescents' active lifestyles (Widiyatmoko et al. 2020), the frequent curriculum changes in Indonesia may have caused the contribution of physical education to be less than optimal for improving active lifestyles. Health literacy has become progressively

crucial in global public health research and policy since the 1990s (Abel and Sommerhalder 2015). Initially cantered on functional health literacy, which involves the capacity to read and comprehend health-related information, including medical terminology, the contemporary understanding of this concept in current research and interventions is generally more expansive (Sørensen et al. 2012).

This involves possessing the knowledge, skills, and motivation to access, comprehend, evaluate, and apply health information for the purpose of maintaining and enhancing health and well-being in relation to healthcare, disease prevention, and health promotion (Sørensen et al. 2015). Given that higher health literacy is correlated with improved health status and positive health behaviours (Schaeffer et al. 2021; Gibney et al. 2020), it represents a promising target for interventions that promote health.

The goal of advancing health literacy is to enable individuals to champion their own health and that of others. Moreover, in both research and practical applications, health literacy is viewed as extending beyond individual capabilities, such as comprehending health risks, to encompass the complex societal prerequisites for a healthy life. This involves tackling challenges such as the absence of easily comprehensible information on health risks and restricted access to opportunities for physical activity (Kickbusch 2013). Multiple empirical studies highlight a favourable link between health literacy and engagement in physical activity (Buja et al. 2020). Yet, it's unclear if health literacy is correlated with the readiness and motivation for physical activity. Should such a connection exist, fostering health literacy might be utilized to boost readiness and motivation for physical activities.

This study is based on Buchmann's et al (2023) research which states that high health literacy is positively associated with a more advanced phase of motivational readiness for leisure-time physical activity. Hence, incorporating health literacy into strategies aimed at boosting motivation for recreational physical activity could prove beneficial. This concept of a link between health literacy and the willingness to modify physical activity habits is also supported by prior research and is rooted in theoretical frameworks (Sørensen et al. 2012; Nutbeam 2008) and initial empirical evidence (Aygun and Cerim 2021). The theoretical framework advanced by von Wagner et al. regarding health literacy and health behaviours asserts that health literacy contributes to shaping both motivational and volitional processes (Buchmann et al. 2023). Considering that health literacy includes not just knowledge (cognitive aspect) and competence (behavioural aspect) but also the drive (conative-affective aspect) to utilize information in a health-enhancing way, it is conceptually associated with the readiness and motivation for physical activity. Based on the transtheoretical model of behaviour change,

cognitive and behavioural processes, like raising awareness and assessing decisional balance (evaluating advantages and disadvantages), are integral components (Bröder et al. 2017), dictate progression through the stages of change. These processes can be compared to actively interacting with health behaviour information, aligning with the principles of health literacy.

Despite the conceptual link, there is currently sparse empirical data confirming a connection between health literacy and the readiness to engage in physical activity. To our knowledge, a focused investigation into the correlation between health literacy and stages of change for physical activity has been conducted in just one study, which involved a sample of adults from a specific region in Turkey (n=826) (Aygun and Cerim 2021). Aygun and Cerim found that individuals with elevated health literacy scores were more inclined to be in advanced stages of change regarding overall health behaviours, including exercise (Aygun and Cerim 2021). Another study focusing on young men (Hirvonen et al. 2015), found that low health literacy was linked to avoiding thoughts about exercise, while actively seeking information was associated with more advanced stages of change for physical activity. Some studies examining other health behaviours also point in the same direction, suggesting a positive connection between health literacy and stages of change, such as in healthy behaviour (Aula and Nurhayati 2020), smoking cessation (Atri et al. 2018) and glycaemic control in diabetes (Tseng et al. 2017). In conclusion, both theoretical models and empirical studies offer backing for the idea that there is an association between health literacy and the readiness and motivation for physical activity. The purpose of this study is to develop the results of previous studies related to the relationship between motivation and health literacy, and in this study there is a variable physical activity level that is tested whether it is related to other variables.

METHOD

This study utilized cross-sectional data. The population in this study were Semarang city teenagers. The researcher used convenience sampling techniques, distributed the questionnaire through the PJOK teacher community or MGMP PJOK senior high school level in the city of Semarang, so the researcher could not ensure that all teachers distributed the questionnaire to students and asked the students to fill it out. There were around 313 students who filled out the questionnaire, but after we checked the validity of the data, we could only use 300. Some extreme patterns of physical activity (e.g. very long durations of vigorous activity totaling ≥1500 MET-min, over <3 days per week) may yield incorrect scores for physical activity category. Firstly, leisure-time physical activity was evaluated using the IPAQ-SF (Kurth and Klenosky 2021). Health literacy was measured using the validated short version of the

European Health Literacy Survey Questionnaire (HLS-EU-Q16), comprising 16 items (Pelikan and Ganahl 2017) employed in numerous studies across various countries and settings (Heuser et al. 2019). Student motivation was measured using a sports motivation questionnaire referring to Pelletier et al. (2013). Data analysis using multiple regression tests.

RESULTS

Participants who had valid data for all the variables under consideration were included in the analysis (comprising n=300 for complete case analysis). The results of multiple linear regression analysis show that exercise motivation and health literacy have a positive effect on physical activity. The discussion of the research results is as follows:

Table 1. Multiple Regression Test of variables of health literacy, exercise motivation and physical activity

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	T	Sig.	Tolerance	VIF
(Constant)	2014,708	106,673		18,887	,000		
X1	15,769	1,724	,464	9,145	,000	,945	1,058
X2	6,887	2,120	,165	3,249	,001	,945	1,058

Based on the results of the data analysis above, the significant value of sports motivation is 0.000 <0.05, which means that the sports motivation variable is related to the level of physical activity. Likewise, health literacy is 0.001 <0.05, which means that the Health Literacy variable affects Physical Activity.

Tabel 2. Anova Test of the three variables

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	4633015,453	2	2316507,726	57,222	,000[b]
	Residual	11982813,163	296	40482,477		
	Total	16615828,615	298			

Based on the results of the analysis above, the significant value <0.05 means that sports motivation and health literacy have a significant effect on physical activity with a significance value of 0.000.

DISCUSSION

The noted positive correlation between health literacy and the readiness and motivation for physical activity aligns with findings from another research. Aygun and Cerim (2021) found that individuals with higher health literacy levels (measured using the HLS-EU-Q47) were

more likely to be in the maintenance stage of regular exercise. Yet, it's crucial to note that the standards used to define activity in their study varied from those in another research. The outcomes of this study align with previous research on different health behaviours. Specifically, there's a positive link between heightened health literacy and progression to advanced stages of change in quitting smoking (Atri et al. 2018) and additionally, health literacy is associated with better glycaemic control among diabetic individuals, influenced by dietary knowledge and the stage of change for healthier eating habits (Tseng et al. 2017). Our results align with a recent systematic review that synthesized empirical findings, consistently indicating that increased health literacy correlates with greater levels of physical activity (Buja et al. 2020). As the authors discuss, interventions promoting physical activity could mitigate the adverse effects of low initial health literacy. This could enhance awareness, motivation, and the capacity to overcome obstacles in altering physical activity behaviours (Buja et al. 2020).

Given this perspective, it becomes intriguing to delve into the explanation of how health literacy correlates with the motivation to modify health behaviours. It's also essential to identify which facets of health literacy are pertinent to the adoption of new routines. Such insights would be invaluable when crafting interventions aimed at promoting physical activity. According Buchmann et al. (2023), there exist three categories of health literacy: functional, interactive, and critical. The conceptual framework of the health literacy tool employed in this study encompasses these three types (Sørensen et al. 2012; Pelikan et al. 2019).

Functional health literacy pertains to fundamental abilities in managing health information, such as reading proficiency and being acquainted with pertinent medical terminology. This type emphasizes the cognitive aspect of comprehension, like understanding instructions provided by healthcare providers about treatments. Interactive health literacy goes beyond basic cognitive skills to encompass social competencies. It enables individuals to engage with health topics alongside healthcare providers, family, or peers, adapting and applying this knowledge in diverse situations to seek guidance and make informed health choices. On the other hand, critical health literacy is the pinnacle, requiring individuals to scrutinize health information discerningly. It empowers them to proactively act in ways that foster both their own health and that of others.

In this context, elevated levels of both interactive and critical health literacy encompass behavioural aspects. These dimensions empower individuals not only to modify their own lifestyles but also to promote the adoption of healthy habits among others (Buchmann et al. 2023; Nutbeam 2000; Nutbeam 2008). Consistent with this notion, it's not just the cognitive

aspect (aligned with functional health literacy) but also the behavioural dimensions of health literacy that play a pivotal role in fostering motivation for health behaviour change. This leads to the development and execution of intentions to participate in physical activity.

This indicates that elevated health literacy levels are associated with a deeper, more critical form of health literacy, empowering individuals to transform health-conscious decisions into tangible actions. Such insights resonate with Nutbeam's proposal that health promotion initiatives, including those cantered on physical activity, should strive to enhance individuals' ability to autonomously act upon health information. This approach would bolster both motivation and self-assurance in making and maintaining healthy choices (Nutbeam 2000).

It's crucial to emphasize that, as per the conceptual model of the health literacy tool in use and Nutbeam's framework, promoting health literacy extends beyond individual skill development. It also entails reshaping political, societal, and environmental contexts to encourage the effective utilization of health information and the adoption of healthier lifestyles. Furthermore, the findings of this study hint at the potential value of health literacy promotion in the realm of physical activity. To gain a deeper understanding of the key facets of health literacy pertinent to physical activity promotion, it would be beneficial to explore a specialized conceptual model of health literacy tailored for physical activity, along with relevant assessment tools. The concept of "physical literacy" (Edwards et al. 2017; IPLA 2017), and in particular "physical activity-related health competence physical activity-related health competence" should be mentioned here (Sudeck and Pfeifer 2016). The latter, being more encompassing, integrates movement competencies, control competencies, and self-regulation competencies tailored to specific activities. Consequently, it presents a perspective that encompasses the emotional aspect of health literacy. This framework offers a deeper understanding of the distinct facets of health literacy associated with physical activity.

This study is based on Buchmann's (2023) research which states that high health literacy is positively associated with a more advanced phase of motivational readiness for leisure-time physical activity. Therefore, considering health literacy in interventions to increase motivation for leisure-time physical activity could be a useful approach. This study focused on adding the variable of exercise motivation and found that the results also had a positive relationship. As previous researchers have proven that a person's exercise motivation will affect his/her physical activity, this study focused on adding the variable of exercise motivation and found that the results also had a positive relationship (Wallhead, Garn, and Vidoni 2014; Vallerand 2007; Knisel et al. 2009).

Our findings indicated a correlation between health and the probability of engagement in activity as opposed to mere planning. However, contrary to our anticipations, being health-aware did not correlate with a reduced likelihood of lacking intent. This contradicts the transtheoretical model's premise, which suggests that processes aimed at raising awareness are especially pertinent in the initial phases of behaviour modification. Possibly, health awareness represents a continual proactive stance on health, gaining prominence as motivational readiness progresses (Rudolf et al. 2019). Furthermore, as per Buchmann (2023) enhanced self-efficacy diminishes the likelihood of lacking intent to participate in physical activity. However, it doesn't emerge as a dominant predictor of actual activity engagement The research focused on general self-efficacy, which, it seems, is primarily relevant during the initial motivation phase of behaviour modification. To progress from mere intent to actual action, individuals might require not just a belief in their overarching problem-solving skills but also the specific confidence and capability to navigate obstacles, thereby initiating the behaviour change (pertaining to the volitional process). This perspective resonates with the notion of physical literacy as outlined earlier (IPLA 2017) and also aligns with the concept of physical activity-related health competencies (Sudeck and Pfeifer 2016), In these frameworks, motivation and self-assurance emerge as pivotal factors, enabling individuals to transform their exercise aspirations into consistent physical activity throughout their lives

Contrary to findings in other research (Garber et al. 2008), in our comprehensive model, individuals reporting 'good' or 'very good' health weren't just more motivated towards activity but also more inclined towards having no intention for change. This suggests that a favourable self-assessment of health might not necessarily catalyse behaviour modification. Furthermore, once health status was factored in, the link between elevated health literacy and activity diminished. This highlights the pivotal role of one's perceived health status in influencing physical activity levels.

CONCLUSION

Despite the constraints, our findings suggest a relationship between Health literacy, motivation, and physical activity levels of people, especially adolescents. That is, people's readiness to make changes varies based on their level of health literacy. Specifically, those with limited health knowledge and low exercise motivation were less likely to show a tendency to increase leisure-time physical activity than those with moderate or high health knowledge. Therefore, when crafting interventions tailored to specific levels of readiness for physical activity, it is crucial to consider and improve health literacy. Additional studies are needed to

better understand which aspects of health literacy are most important and how they can be effectively incorporated into interventions that increase motivation for physical activity.

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