

Education Level as a Predictor for Health Literacy Levels in a Rural Community Health Centre

A Cross-Sectional Study

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ABSTRACT

Health literacy is an important determinant in individual health and public health. However, evidence suggests that there are still disparities in health literacy levels between different socio-economic and education backgrounds. This study aims to look at level of education as a predictor for achieving a certain health literacy level. This study used a cross-sectional design. The study was conducted in Ngempit Village, in the district of Pasuruan, East Java. The participants were registered patients at the Ngempit Community Health Centre (PUSKESMAS). Data were collected through interviews and surveys utilising a translated and adapted version of Health Literacy Survey Europe with ten short questions (HLS-EU-SQ10-IDN). Spearman's correlation was used to see the correlation between variables and a causal model logistic regression was built to estimate the association of education on health literacy after controlling for confounders. A total of 60 participants were included in the study. Having only achieved primary education is associated with 5 times the odds (95% CI: 0.31 - 92.2, p:0.253) of problematic or inadequate health literacy levels compared to participants achieving at least high-school education.

Keywords: Health Literacy, Community, Health Centre, Indonesia.

1. INTRODUCTION

Health literacy (HL) plays a pivotal role in determining health status, as well as one of the main determinants in public health [1]. However, the gap in HL between rural and urban populations remains an issue [2]. The definition of HL is the cognitive and social skills that determine the motivation and ability of individuals to gain access to health, understand, and use information in ways that promote and maintain good health [1].

Initially, HL focused on access to health care and was in no way related to the patient's ability to understand medical words or terms. However, this concept is developing increasingly complex and interrelated between one concept with another concept. At present, HL includes knowledge about medical information, the ability to communicate with health workers, and understanding medical instructions. Poor HL decreases medication compliance, limits the understanding of the

disease, and lacks independence in the treatment of the disease [3,4].

Although an important determinant in public health, low level of community HL remains apparent. In the United States, nearly half of the adult population has difficulty acting on health information [5], and in Canada, the desired HL level is estimated at 48%, Australia with 30% [6][7].

For the Southeast Asian region, HL is still a challenge. Southeast Asia, a region consisting of several developing countries, with high population densities and with a very diverse cultural and ethnic mix, still has many problems with health and economic development indices. Difficulties that are often encountered by countries in Southeast Asia are providing optimal standardised health services, even more so in this population still found low literacy rates [8].

On average, HL levels in the countries belonging to the Southeast Asia region remain low, while national

scale data on HL in Indonesia is yet to be available [8]. However, Rohmah in 2015, found that 84% of the subjects in the Sleman regency had low HL [9]. With the increasing burden of disease in the Southeast Asian region, patient participation in the health care process for disease management is very important, nonetheless, this is still limited by low HL. Subsequently, an understanding of a disease becomes inappropriate and has implications for improper personal management. In recent years, the exponential growth of technology has provided ease of access to information, including health related information. The ease and myriad of access to information could lead to early intervention in disease within the mild category; however, could lead to delays in more severe diseases. Thus, adequate skill in processing the vastness of health-related information is essential. Moreover, it is of paramount importance for health practitioners to build a bridge with communities to connect the gaps between health information and the ability to process health information through health promotion initiatives [10].

Given the importance of HL as a public health determinant, and disparities of HL levels among the Urban population and Rural population in Indonesia, supporting data on the topic must be completed immediately. This study intends to (1) describe at the health literacy levels and (2) analyse factors contributing towards the level of health literacy of the rural population in the Ngempit Health Centre, Pasuruan

2. METHOD

2.1 Study design and participants

This cross-sectional study was conducted in Ngempit Village, in the district of Pasuruan. Between October 2019 and November 2019, residents aged 18 above holding an active national insurance coverage (Jaminan Kesehatan Nasional) under the coverage of the Ngempit health centre (Puskesmas) were recruited at the outpatient facility. Participants with prior psychiatric disorders or a history of psychiatric treatment were excluded from the study.

2.2 Data collection

Data were collected through interviews and surveys utilising a translated version of Health Literacy Survey Europe with ten short questions (HLS-EU-SQ10-IDN). This questionnaire consists of seven dimensions of health literacy, with four dimensions focusing on seeking health information. Furthermore, placing information-seeking features on health as the most significant proportion in the HLS-EU-SQ10-IDN construct is appropriate because health information-seeking behaviour is still challenging in developing countries such as Indonesia, even for

healthcare professionals. Thus, using HLS-EU-SQ10-IDN could be adapted as the measurement tool of health literacy in Indonesia [15]. According to the manual HLS-EU adaptation in Indonesia, levels of health literacy levels are differentiated into four categories which are Excellent (>42-50 points or top 20%), Sufficient (33-42 points or 80%), Problematic (>25-33 points or 66%), and Inadequate (0-25 points or 50%). Each answer categories include values of (very easy = 4, fairly easy = 3, fairly difficult = 2, very difficult = 1), and indices were constructed for participants answering 80% of the items.

The response was obtained through in-person interviews. Informed consent was obtained prior to the interview, and all procedures performed in this study have obtained ethical clearance from the Ethics Commission of Health Research, Faculty of Medicine, Universitas Mataram (Register Number: 65/UN18.F7/ETIK/2020).

2.3 Statistical analysis

Data obtained in this study will be statistically analysed to provide understanding on its associations to the health literacy levels. Spearman correlation was used to determine the correlation of HL levels and Education Levels. For the age variable, a Pearson’s correlation was computed to examine the correlation with health literacy. Moreover, the Kruskal-Wallis non-parametric test was used for categorical variables without normal distribution. A causal logistic regression was conducted to measure the association between education levels and HL levels. Regrouping of the categories was conducted if the outcome of each category were below the desired minimum (n = 10). All statistical analyses were undertaken with Stata (16.1, StataCorp LLC, College Station, TX) using a significance level of 5%.

3. RESULT AND DISCUSSION

3.1 Result

Table 1. Baseline characteristics of participants

Participant Characteristics	Category	n	%
Gender	Male	19	32%
	Female	41	68%
Age	18 – 30	20	33.3%
	31 – 40	17	28.3%
	41- 50	10	16.6%
	>51	13	21.6%
Ethnicity	Javanese	58	96%
	other	2	4%
Religion	Islam	60	100%
	other	0	
Level of Education	No school	0	0%
	Did not complete primary school	0	0%

Participant Characteristics	Category	n	%
	Graduated primary school	27	45%
	Graduated junior high	11	18.3%
	Graduated high school	20	33.3%
	Graduated from university	2	3.3%
Occupation	Housewife	23	38.3%
	Student	5	8.3%
	Civil servant	2	3.3%
	Private sector	17	28.3%
	Peasant	5	8.3%
	Teacher	2	3.3%
	Merchant	6	10%
	Community participation (as a local health volunteer)	Active	3
	Non-active	57	95%

In this study, there were 60 participants who met the criteria as research subjects. Of the 60 respondents, 68% (n = 41) were female, and 19 were male, with 96% or of the respondents are of the Javanese ethnicity. Primary school level education is the most frequent level of education of all participants with 45% (n=27), followed by high school graduates with 33.3% (n=20), with university graduates with a bachelor's degree being the very least with 3.3% of all participants (n=2). For respondents' occupations, most or 38.3% were housewives (n = 23) and were followed by private employees with 28.3% (n = 17), which consisted of factory employees.

The HLS-EU-SQ10-IDN contains ten questions with four answer choices, which includes answers such as, "very difficult", "fairly difficult", "fairly easy", and "very easy". The results of the 10 questions will show a tendency for the selection of answers so that the HLS-10-IDN questionnaire can determine a person's level of health literacy validly. The results of the 10 questions will show a tendency for the selection of answers so that the HLS-10-IDN questionnaire can determine a person's level of health literacy validly. The level of health literacy is divided into four categories, moreover, the results of the questionnaire showed the majority of respondents were at the level of "problematic" with 75% (n = 45), then "sufficient" 11.7% (n = 7), "inadequate" 10% (n = 6), and "excellent" 3.3% (n = 2)

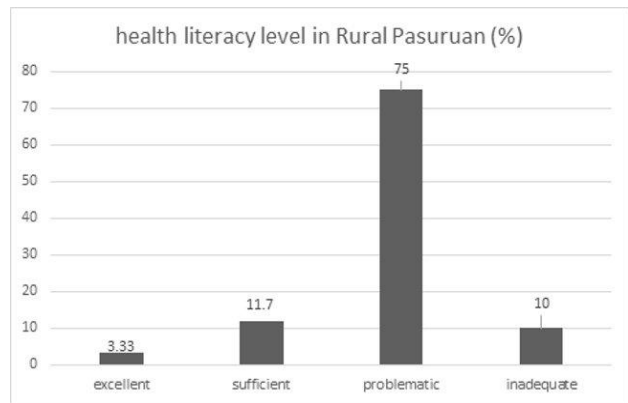


Figure 1 Histogram showing percentage of participants' health literacy levels after answering HLS-EU-SQ10-IDN questionnaire

The statistical analysis showed weak evidence for correlation (p -value = 0.076), between the level of health literacy and the participant's last education level. Age is found to have a significant correlation with health literacy levels (p -value: 0.019); however, with a negative coefficient value; therefore, younger ages tended to have higher health literacy levels. Moreover, the Kruskal-Wallis analysis shows a p -value of 0.002 for participants in extra-community participation, thus, showing evidence for correlation.

Table 2. Adjusted estimate of the association between education levels and health literacy levels

	Adjusted odds ratio*	95% CI	p-value*
Beyond primary education	1	-	-
Only until primary Education	4.9	0.31-92.2	0.253
* Adjusted for age, sex, occupation ** obtained from a Likelihood ratio test			

The final logistic model consisted of age of participants as a force variable and together with important confounders, namely: sex and occupation. After controlling for all confounders, participants who only achieved primary education and below were associated with 4.9 odds (95% CI: 0.31 – 92.2) of having problematic levels of health literacy.

3.2 Discussion

This study aims to look at the level of HL and understanding of health information in rural Pasuruan, with participants being the local population under the Puskesmas Ngempit, and find out the factors that can contribute to such a level of health literacy. The results of this study indicate that the majority of respondents have "problematic" HL (75%, n = 45), where this criterion

explains a person's tendency not to be able to understand and carry out basic health information such as knowledge of symptoms, prevention of diseases such as immunisation or vaccination. As explained in a study conducted by Ratzan and Parker in 2000, HL is the extent to which an individual has the capacity to obtain, process, and understand basic health information and services needed to make the right health decisions [11].

In this study, there are specific questions of disease prevention behaviour such as "... judge which vaccinations you need?" this question can also see a person's capacity in understanding his health, as well as the ability to access and use health services appropriately and can have positive direct physiological health effects [9].

From the calculation of statistical correlations, no significant correlation was found with the level of education last, the level of health literacy increases (p -value = 0.076). Moreover, there was low evidence of association between education level and HL levels, as shown by the large 95% confidence interval (table 2.). Despite re-categorisation of the education variable to account for outcome scarcity, our results may suggest that there is still an issue with the number of participants taking place in the study and this serves as one of the reasons for the large confidence interval. Moreover, in this study most participants had an elementary school education background ($n = 27$), and a bachelor's degree graduate was the educational background with the smallest number ($n = 2$). This can underlie an imbalance between the distribution of respondents, so the correlation between educational background and the level of HL cannot be confirmed significantly.

In contrast to our findings, a previous study found that HL was associated with the level of education and trained or employed in healthcare [12]. However, our findings suggest that there is a significant correlation between being an active local health volunteer with HL levels. In 2016 Nurjanah and Sri Soenaryati, studied HL levels and its factors on students, subsequently found factors that had a positive correlation include participation in extracurricular activities, and health training conducted by families [15].

Important to note that our findings found an inverse association between age and HL, where younger participants showed higher HL levels. Moreover, it is shown that the age group of < 30 , went through a minimum of 9 years of formal education. HL itself is influenced by several factors, including education, culture, and participation in social activities, where Rudd in 2003 stated that HL is mediated by education, and its adequacy is influenced by culture, language, and regulations related to health.

3.2.1 Study Limitation

Despite using a validated and translated version of the HL questionnaire, the questions were not context specific towards the condition of the study location, where many of the examples were mostly prevalent in the more urban settings or the translation was not fully understood by the participants. Therefore, answers in this study may not fully reflect health related understandings of the participants.

Secondly, the design of this study was an observational cross-sectional design, where it only captures a "snapshot" in time of the study. Therefore, it was difficult to understand the direction of association between participants' HL and factors affecting HL in this study.

3.2.2 Implication for Policy and Future Research

Our findings suggest that active social participation in the field of health provides significant implications for HL levels. One of the strategies to improve health literacy in communities that have poor health literacy is to establish collaboration between universities and the community in the form of research activities. Researchers will offer concepts according to community needs, regional conditions, demographics, local languages, and culture. Furthermore, the community will hold meetings, discuss sustainable implementation [14].

As this study focuses solely on how well participants answered the HLS questionnaire quantitatively, future research should also include qualitative aspects of HL. This will capture a deeper understanding on what health related knowledge is already known and implemented by the participants. Moreover, in terms of health promotion and disease prevention, this could also provide more understanding on what is working and not.

4. CONCLUSION

The majority of participants in the Ngempit Community Health Centre, Pasuruan, had a "problematic" level of health literacy, and no positive relationship was found between the latest education and the level of health literacy in rural Pasuruan.

AUTHORS' CONTRIBUTIONS

FRA – for conceptualising the study, conducting the study, and statistical analysis

HK – refining final manuscript, and expert contribution towards analysis

AS – refining final manuscript

ACKNOWLEDGMENTS

The authors would like to sincerely thank Puskesmas Ngempit, Pasuruan, for their cooperation through this study.

REFERENCES

- [1] WHO. Health Literacy. *WHO Publ* 2008;22:519–25. doi:10.1002/rcm.3390
- [2] Wang C, Li H, Li L, et al. Health literacy and ethnic disparities in health-related quality of life among rural women: Results from a Chinese poor minority area. *Health Qual Life Outcomes* 2013;11:1. doi:10.1186/1477-7525-11-153
- [3] Van den Broucke S. Health literacy: a critical concept for public health. *Arch Public Heal* 2014;72:10–1. doi:10.1186/2049-3258-72-10
- [4] Duplaga M. Determinants and consequences of limited health literacy in Polish society. *Int J Environ Res Public Health* 2020;17. doi:10.3390/ijerph17020642
- [5] IOM (Institute of Medicine). Health Literacy. *IMPROVING HEALTH, HEALTH SYSTEMS, AND HEALTH POLICY AROUND THE WORLD. WORKSHOP SUMMARY.* 2013. doi:10.17226/18325
- [6] Rootman I, Gordon-El-Bihbety D. *A Vision for a Health Literate Canada: Report of the Expert Panel on Health Literacy.* 2008.
- [7] Barber MN, Staples M, Osborne RH, et al. Up to a quarter of the Australian population may have suboptimal health literacy depending upon the measurement tool: Results from a population-based survey. *Health Promot Int* 2009;24:252–61. doi:10.1093/heapro/dap022
- [8] Levin-Zamir D, Wills J. In: Begoray D, Gillis DE, Rowlands G, editors. *Health literacy, culture and community, in Health literacy in context: International perspectives.* New York: Nova Science Publishers, Inc; 2012
- [9] Nutbeam D. Health promotion glossary. *Health Promot Int.* 1998;13:349–364. doi: 10.1093/heapro/13.4.349.
- [10] Rudd RE, Comings JP, Hyde J. 2003. Leave no one behind: Improving health and risk communication through attention to literacy. *Journal of Health Communication, Special Supplement on Bioterrorism* . 8(Supplement 1): 104–115.
- [11] Ratzan SC, Parker RM. 2000. *Introduction. In: National Library of Medicine Current Bibliographies in Medicine: Health Literacy.* Selden CR, editor; , Zorn M, editor; , Ratzan SC, editor; , Parker RM, editor. , Editors. NLM Pub. No. CBM 2000-1. Bethesda, MD: National Institutes of Health, U.S. Department of Health and Human Services.
- [12] Rohmah, A. L., Guardian, Y. S., Fahmy, A. T., 2015, *Hubungan antara Tingkat Literasi Kesehatan dengan Citra Tubuh dan Aktivitas Fisik pada Remaja di Kabupaten Sleman,* Skripsi, Universitas Gadjah Mada, Yogyakarta.
- [13] Charan, Jaykaran, and Tamoghna Biswas. “How to Calculate Sample Size for Different Study Designs in Medical Research?” *Indian Journal of Psychological Medicine*, vol. 35, no. 2, 2013, p. 121., doi:10.4103/0253-7176.116232.
- [14] Pignone, Michael, et al. “Interventions to Improve Health Outcomes for Patients with Low Literacy.” *Journal of General Internal Medicine*, vol. 20, no. 2, 2005, pp. 185–192., doi:10.1111/j.1525-1497.2005.40208.x.
- [15] Nurjanah, Nurjanah & Soenaryati, S. & Rachmani, Enny. (2017). Media use behavior and health literacy on high school students in Semarang. *Advanced Science Letters.* 23. 3493-3496. 10.1166/asl.2017.9145.