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To cite this article: Frederieke S. Diemer, Yentl C. Haan, Rani V. Nannan Panday, Gert A. van Montfrans, Glenn P. Oehlers & Lizzy M. Brewster (2017) Health literacy in Suriname, *Social Work in Health Care*, 56:4, 283-293, DOI: [10.1080/00981389.2016.1277823](https://doi.org/10.1080/00981389.2016.1277823)

To link to this article: <https://doi.org/10.1080/00981389.2016.1277823>



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Published online: 28 Feb 2017.



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Health literacy in Suriname

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ABSTRACT

Background: Low health literacy is an independent predictor of cardiovascular mortality. However, data on health literacy in low- and middle-income countries are scarce. Therefore, we assessed the level of health literacy in Suriname, a middle-income country with a high cardiovascular mortality.

Methods: We estimated health literacy in a convenience sample at an urban outpatient center in the capital and at a semirural health center, using the validated Rapid Estimate of Adult Literacy in Medicine adapted for the Dutch language (REALM-D) instrument. REALM-D scores vary from 0 to 66 (all correct). The primary outcome was the level of health literacy. Furthermore, we assessed the effect of age, sex, ethnicity, disease history, research location, and level of education on health literacy with multi-variable linear regression.

Results: We included 99 volunteers (52% men; 51% urban research location) with a mean age of 44.9 years (SD 13.4). The mean REALM-D score was moderate: 48.6 (SD 8.1). Greater health literacy was associated with male sex, an urban research location, and a higher educational level.

Conclusion: Health literacy was moderate in these Surinamese participants. Health care workers should take health literacy into account, and targeted interventions should be developed to improve health literacy in Suriname.

ARTICLE HISTORY

Received 24 March 2016

Revised 9 December 2016

Accepted 21 December 2016

KEYWORDS

Cardiovascular disease;
developing countries;
ethnicity; health literacy;
REALM; Suriname

Background

There is a rapid increase in cardiovascular disease (CVD) in low- and middle-income countries (LMIC) (Krishnamurthi et al., 2013). Currently, more than 80% of the global burden of CVD occurs in these countries, and projections on mortality attributable to CVD predict even higher death rates in 2030 (Mathers & Loncar, 2006). Therefore, drastic measures need to be taken to prevent a surge in cardiovascular death.

Previous studies showed that treatment and control levels of hypertension are often worryingly low in LMIC (Ibrahim & Damasceno, 2012). Improving these

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levels could lead to a significant reduction in CVD mortality (Angell, De Cock, & Frieden, 2015). However, effectively managing chronic diseases such as hypertension requires patients to develop a multifaceted pallet of skills in order to accurately take medications, attend frequent follow-up visits, and understand disease- and medication-related education materials. An important barrier in the acquirement of these self-management skills is health literacy. Health literacy is defined as an individual's ability to acquire, process, and understand health care information for the purpose of making appropriate decisions related to personal health (Nielsen-Bohlman, Panzer, & Kindig, 2004). Persons with low health literacy may have difficulties navigating the health care system, understanding medical instructions, and being compliant to their medication regimen (Donovan-Kicken et al., 2012; McCarthy et al., 2012; Ngoh, 2009). In line with this, low health literacy is strongly linked to a cascade of suboptimal health outcomes, including increased hospitalizations, greater use of emergency care, and eventually a higher all-cause mortality (Berkman, Sheridan, Donahue, Halpern, & Crotty, 2011). Moreover, improving health literacy of individuals appears to reduce emergency department visits and hospitalizations and disease severity (Sheridan et al., 2011).

In Suriname, an middle-income country in South America with a multi-ethnic population, CVD is the number one cause of mortality and is projected to rise dramatically in the following 15 years (Brewster, 2015; Mathers & Loncar, 2006; Punwasi, 2012). In order to design effective preventive measures to reduce CVD morbidity and mortality, the level of health literacy of the Surinamese population should be taken into account. However, local and regional data on health literacy are scant. Therefore, we aimed to assess the level of health literacy in Suriname.

Methods

Setting

Suriname is an middle-income country, located in the Northeastern part of South America, with a population of approximately 541,500 citizens (General Bureau of Statistics Suriname, 2013; The World Bank Group, 2014). The vast majority (70%) resides in urban areas, including the capital Paramaribo in northern Suriname and its surrounding suburbs. Due to past and recent migrations, Suriname has a multiethnic population of mainly Asian and African descent. Dutch is the official language.

Study design and population

In this cross-sectional study, we assessed the level of health literacy in Suriname using the validated Rapid Estimate of Adult Literacy in Medicine

in Dutch (REALM-D) questionnaire (Fransen, Van Schaik, Twickler, & Essink-Bot, 2011). The Ethics Committee of the Ministry of Health in Suriname approved this study (Approval nr. 1326-VG 029-2012). The study was conducted at an urban outpatient health care center in Paramaribo and a semirural primary health care center in the small village Lelydorp located 25 km from the capital (Kewalbansing, Ishwardat, & Brewster, 2013). Data were collected between July 2013 and August 2013 by a trained interviewer. Patients were conveniently approached in the waiting room. Men and women of 18 years and older were eligible for inclusion. Verbal informed consent was obtained from every participant. As the REALM-D is a Dutch medical word recognition and pronunciation test, we did not include persons with significant visual impairment or persons who stated not to master the Dutch language sufficiently.

Outcome measures

The primary outcome was to determine the average level of health literacy in Surinamese. In addition, we assessed the effect of age, sex, ethnicity, disease history, research location, and educational level on health literacy.

Sample size

To calculate the sample size, we used data from a previous study that assessed REALM scores in 200 patients attending a tertiary care hospital in Southern India (Rathnakar et al., 2013). This study reported a mean health literacy score of 48.1 (SD 14.5), resulting in a 95% confidence interval of 46–50. As this study was conducted in a tertiary care hospital and over 70% of the participants had a high educational level, we expected a wider range of scores in our participants in primary and secondary care settings. Therefore, we used a 95% confidence interval of 44–52 and calculated that at least 83 participants were needed to enter our study to assess the health literacy score with $\alpha = 0.05$ and $1 - \beta = 0.80$.

Measures

Interview

Participants were asked to provide socio-demographic information, including age, sex, ethnicity, disease history, and highest completed level of education. Disease history was defined as the presence of a chronic disease with a duration of >3 months, such as CVD, cancer, chronic respiratory disease, or diabetes (World Health Organization, 2014). Level of education was categorized into three groups, according to the International Standard Classification of Education (ISCED): Low (<8 years of education, ISCED 1), intermediate (8–12 years of education, ISCED 2), or high (>12 years of education, ISCED ≥ 3).

REALM-D

As Dutch is the official language in Suriname, we used the REALM-D for assessing health literacy (Fransen, Van Schaik, Twickler, & Essink-Bot, 2011). This is a translated version of the widely used and validated REALM test and was developed following standardized procedures for health status measures (Bass, Wilson, & Griffith, 2003; Davis et al., 1993; Fransen, Van Schaik, Twickler, & Essink-Bot, 2011). Both the translated REALM-D and the original REALM comprise a list of 66 health-related words and use correct pronunciation as a surrogate measure of understanding of medical vocabulary. Each correctly pronounced word is scored as one, and the range of the total score varies from 0 (no words pronounced correctly) to 66 (all words pronounced correctly). The words are arranged in three columns with increasing difficulty based on the number of syllables and pronunciation. The number of syllables, meaning, and level of difficulty in the words were to a large extent maintained between the REALM-D and the original REALM, which had a positive effect on the comparability (Fransen, Van Schaik, Twickler, & Essink-Bot, 2011). In addition, the REALM-D correlated with other Dutch health literacy measures and had a high reliability (Fransen, Van Schaik, Twickler, & Essink-Bot, 2011).

Scores below 18 words indicate that patients might not be able to read most low-literacy materials, scores between 19 and 44 words indicate that patients need low-literacy materials, scores between 45 and 60 words indicate that patients may have problems in reading most patient education materials, and scores above 60 words indicate that patients are probably able to read most patient education materials (Davis et al., 1993).

Statistical analysis

Differences between mean REALM-D scores were calculated using the Student's *t*-test. Demographic statistics were compared between different REALM-D score tertiles using the Chi-square test. Subsequently, we assessed the effect of age, sex, ethnicity, disease history, research location, and level of education on health literacy with multivariable linear regression (forced entry model). Covariates known to influence health literacy and predictors with a correlation of $p < 0.05$ were included in the analysis. We verified whether the assumptions of linear regression model were met, including normality, linearity, homoscedasticity, and no collinearity. The presence of a ceiling effect, in which scores are clustered at the upper end of the scale, may influence the reliability, validity, and responsiveness of an instrument. Since there is no consensus on how to define ceiling effects mathematically, we used the definition of Terwee and colleagues and considered ceiling effects present when more than 15% of the participants had a REALM-D score above 60 (Terwee et al., 2007). Statistical analyses were performed with the SPSS statistical software package for Windows, version 20.0 (SPSS Inc., Chicago).

Results

We approached 112 men and women to participate in the study. Of these, 99 were included in the study. One person declined because he did not speak Dutch. Main reasons for the other 12 persons not to participate were time constraints and fatigue.

Table 1 shows the socio-demographic characteristics for the total study population and by REALM-D score tertile. Fifty-one participants were men (52%), and 50 participants were included at the urban health care center (51%). Participants of Asian ethnicity were the largest ethnic group ($n = 52$; 53%), followed by participants of African ethnicity ($n = 40$; 40%). The overall mean health literacy score was 48.6 (SD 8.1) out of 66. Compared to the lowest health literacy tertile, subjects in the highest tertile were more often men (respectively 38 in the lowest tertile vs 69% in the highest tertile, $p = 0.03$), were more often included at the urban health care center (respectively 21 vs 69%, $p < 0.01$), and were more often highly educated (respectively 12 vs 54%, $p < 0.01$). Crude REALM-D scores did not vary across age categories, ethnic groups, and between persons with or without a chronic disease (Figure 1). None of the participants scored the lowest health literacy level (0–18 correct). On the other hand, only 5% of the participants scored the highest health

Table 1. Socio-demographic characteristics and health literacy scores of the total study population and by REALM-D score tertile.

	Total ($n = 99$)	Tertile 1 (REALM-D 0–45) ($n = 34$)	Tertile 2 (REALM-D 46–52) ($n = 30$)	Tertile 3 (REALM-D 53–66) ($n = 35$)
Male (%)	51.5	38.2	46.7	68.6
Age, years*	44.9 (13.4)	41.5 (13.2)	45.7 (13.8)	47.4 (12.8)
Urban (%)	50.5	20.6	63.3	68.6
Level of education (%)				
Low (<8 years)	32.3	58.8	33.3	5.7
Intermediate (8–12 years)	35.4	29.4	36.7	40.0
High (>12 years)	32.3	11.8	30.0	54.3
Ethnicity (%)				
African	40.4	38.2	36.7	45.7
Asian	52.5	50.0	63.3	45.7
Other	7.1	11.8	0	8.6
Chronic disease (%)	58.6	50.0	66.7	60.0
Health literacy				
REALM-D score*	48.6 (8.1)	39.4 (4.0)	48.7 (2.0)	57.3 (3.0)
0–18	0 (0)	0 (0)	0 (0)	0 (0)
19–44	29 (29.3)	29 (85.3)	0 (0)	0 (0)
45–60	65 (65.7)	5 (14.7)	30 (100)	30 (85.7)
61–66	5 (5.1)	0 (0)	0 (0)	5 (14.3)

Note. *Values are mean with standard deviation. Level of education was defined as the highest completed level of education. Ethnicity was self-reported. Other ethnicities were Amerindian (6.1%) and Lebanese (1.0%). Chronic disease was defined as the self-reported presence of cardiovascular disease, cancer, chronic respiratory disease, and/or diabetes. REALM-D: Rapid Estimate of Adult Literacy in Medicine adapted for the Dutch language.

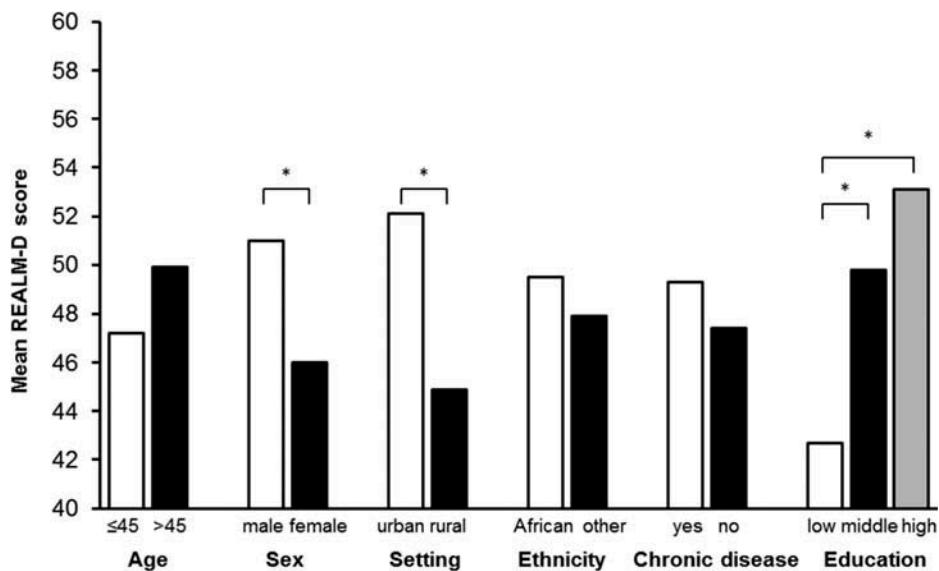


Figure 1. Mean REALM-D score by different socio-demographic characteristics. Health literacy scores were significantly higher in men, in participants included at the urban research location, and in those with a higher education. * $p < 0.05$, Student's t -test.

literacy level (61–66). Thus, a ceiling effect could not be detected. **Table 2** shows the 10 most well and mispronounced items (in Dutch with English translation between brackets).

In multivariable linear regression analysis, greater health literacy was associated with male sex, inclusion at the urban health care center, and a higher level of education (**Table 3**). However, there was a significant interaction effect between health care center and educational level ($p < 0.01$). Further exploration of the data demonstrated a more pronounced increase in mean REALM-D scores from a medium to a high educational level in participants included at the semirural health care center compared to participants included at the

Table 2. Items from the REALM-D test pronounced incorrectly (left) vs correctly (right) by the majority of the participants.

Items pronounced incorrectly, %		Items pronounced correctly, %	
Artritis (arthritis)	97.0	Vet (fat)	100.0
Gonorrroe (gonorrhea)	81.8	Griep (fever)	100.0
Anesthesioloog (anesthesiologist)	79.8	Pil (pill)	100.0
Aambeien (hemorrhoids)	79.8	Oog (eye)	100.0
Osteoporose (osteoporosis)	77.8	Maaltijd (meal)	100.0
Hepatitis (hepatitis)	69.7	Bekken (pelvis)	99.0
Anemie (anemia)	67.7	Voeding (nutrition)	99.0
Testikel (testicle)	62.6	Gedrag (behavior)	99.0
Obesitas (obesity)	56.6	Oefening (exercise)	99.0
Syfilis (syphilis)	50.5	Ziekte (disease)	98.0

Note. Values are percentages. The English translation is given in brackets. REALM-D, Rapid Estimate of Adult Literacy in Medicine adapted for the Dutch language.

Table 3. Multivariable linear regression analysis of determinants influencing health literacy.

Variables	Coefficient	(95% CI)
Age	0.10	(−0.01–0.21)
Male sex	3.00	(0.42–5.58)
African ethnicity [†]	−0.29	(−2.94–2.35)
Disease history [§]	−0.22	(−3.11–2.68)
Urban research site	6.44	(3.49–9.40)
Highest educational level	7.68	(4.75–10.60)

Note. Data are based on 99 participants and represent the increase in health literacy score, assessed by the Rapid Estimate of Adult Literacy in Medicine adapted for the Dutch language (REALM-D) questionnaire. With significant higher scores in men, urban participants, and higher educated participants.

[†]African vs non-African. [§]Chronic disease vs no chronic disease.

urban health care center (41.5 [5.6] to 53.1 [5.1], $p < 0.01$ at the semirural health care center vs 53.1 [6.3] to 53.0 [6.0], $p = 0.97$ at the urban health care center). Subsequently, we analyzed the unadjusted effect of educational level on health literacy by health care center and found that a high educational level might be an important factor for the level of health literacy at the semirural health care center (a rise of 13.0 words [95% CI 9.9 to 16.0] from low to high educational level). In contrast, at the urban health care center, educational level was not significantly associated with health literacy levels, 1.3 words [95% CI −2.9 to 5.4] from low to high educational level.

Discussion

Health literacy in Suriname

The average health literacy score in these Surinamese participants was 49, as assessed with the REALM-D test. Although none of the participants scored the lowest level of health literacy, only 5% had a score over 60, representing adequate health literacy. Furthermore, we measured higher health literacy scores in men, in persons included at the urban health care center, and in those with higher educational levels. The effect of a higher educational level on health literacy was especially seen in participants included at the semirural health care center.

An overall health literacy score of 49 indicates that health literacy levels in Suriname are moderate (Davis et al., 1993). These persons are likely to struggle with patient education material and may experience problems navigating the health care system. In our study, women with low educational levels living in semirural areas might be particularly at risk for poor health literacy levels, and, therefore, for adverse (cardiovascular) health outcomes. Health care workers should take this into account.

Comparison of our findings with other studies on health literacy

The level of health literacy that we found was comparable to the level reported in the few other studies in middle-income countries (Dowse,

Lecoko, & Ehlers, 2010; Rathnakar et al., 2013). Rathnakar and colleagues found an average REALM score of 48 in patients of a tertiary care hospital in India, whereas Dowse et al. measured a slightly lower health literacy of 46 in a primary care center in South Africa (Dowse et al., 2010; Rathnakar et al., 2013). Both studies found greater health literacy in higher educated subjects, which is comparable to our study.

We found lower health literacy scores in women than men. This is in line with a recent study conducted in Zambia where high levels of health literacy were less often found in women than in men (adjusted OR 0.34 [95% CI 0.29 to 0.39]) (Schrauben & Wiebe, 2015). However, data from other papers show less consistent results regarding sex differences in health literacy. Two large studies in developed countries found higher health literacy levels in women than in men (Kutner, Greenberg, Jin, & Paulsen, 2006; Sørensen et al., 2015), while others reported no difference between women and men (Paasche-Orlow, Parker, Gazmararian, Nielsen-Bohlman, & Rudd, 2005; Rathnakar et al., 2013). We hypothesized that the lower health literacy levels of women in our study might be a result of a lower socioeconomic status of women in LMIC, thereby diminishing their educational opportunities. In the current study, a low educational level was more often reported in women (41.7% *vs* 23.5% in men), but this difference did not reach statistical significance.

In contrast with previous studies that reported poorer health literacy in people of African ethnicity (Kutner et al., 2006; Paasche-Orlow et al., 2005), we found no association between ethnicity and health literacy. This is probably due to the fact that these studies were conducted in countries where African ethnicity groups are a socially challenged minority group while this is not the case in Suriname.

Strengths and limitations

To the best of our knowledge, we are the first reporting health literacy levels in Suriname. In addition, we included an urban as well as a rural health care center, since living in urban areas is significantly related to health literacy (Halverson et al., 2013). Furthermore, all questionnaires were administered by one trained interviewer, eliminating inter-interviewer variability.

A limitation of the study was the use of convenience sampling, which potentially carries selection bias. Also, the effect of predictors on health literacy must be considered hypothesis-generating as the study was not powered for this analysis. Furthermore, although the REALM is one of the most widely used tests, it comprises only a small area of health literacy (Bass et al., 2003; Dodson, Good, & Osborne, 2015). It focuses on reading skills, thereby omitting other important aspects of health literacy, such as understanding and the ability to use information (Dodson et al., 2015). People might pronounce words correctly without comprehending the

meaning, or the other way around (Dowse et al., 2010). Finally, the REALM-D measures health literacy of an individual, without capturing different ways of functioning in a health care environment, for example, through families or communities. In LMIC, people often use social networks to get access to health information (Dodson et al., 2015). Therefore, measuring health literacy only might underestimate the actual ability to navigate the health care system.

Implications of the study and directions for future research

The results of the study imply that health care providers should be aware of the moderate health literacy levels of their patients, in particular those with lower levels of education. Future studies should include other health literacy indicators, such as comprehension and the ability to use health information, to give further insight in health literacy in Suriname.

Conclusions

Health literacy is a vital prerequisite to adequately implement preventive strategies. However, in Suriname, a multiethnic, middle-income country with high cardiovascular risk in the main population groups of Asian and African descent (Diemer et al., 2014), we found moderate health literacy levels. Improvement of health literacy might be a practical approach to better implement preventive strategies, and this deserves further exploration in resource-limited countries.

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