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Health literacy among young adults: a short survey tool for public health and health promotion research

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SUMMARY

Health literacy (HL) is context-specific. In public health and health promotion, HL in the private realm refers to individuals' knowledge and skills to prevent disease and to promote health in everyday life. However, there is a scarcity of measurement tools explicitly geared to private realm contexts. Our aim was to develop and test a short survey tool that captures different dimensions of HL in the context of family and friends. We used cross-sectional data from the Swiss Federal Surveys of Adolescents from 2010 to 2011, comprising 7983 males and 366 females between 18 and 25 years. HL was assessed through a set of eight items (self-reports). We used principal component analysis to explore the underlying factor structure among these items in the male sample and confirmatory factor analysis to verify the factor structure in the female sample. The results showed that the tested item set represented dimensions of functional, interactive and critical HL. Two sub-dimensions, understanding versus finding health-relevant information, denoted functional HL. Interactive and critical HL were each represented with two items. A sum score based on all eight items (Cronbach's α: 0.64) showed expected positive associations with own and parental education among males and females ($p < 0.05$). The short item set appears to be a feasible measurement tool to assess HL in the private realm. Its broader application in survey studies may help to improve our understanding of how this form of HL is distributed in the general population.

Key words: health literacy; measurement; youth; public health

INTRODUCTION

The notion of health literacy (HL) refers to individuals' knowledge and skills to deal successfully with matters of health and illness [e.g. (Nutbeam, 2008; Peerson and Saunders, 2009)]. There is growing consensus today that HL is context specific, i.e. its function, acquisition and application should be studied and understood in the light of distinct contextual conditions (Nutbeam, 2000; Kickbusch and Maag, 2006; Pleasant and Kuruvilla, 2008; Freedman *et al.*, 2009; Frisch *et al.*, 2012).

Consequently, it has been suggested that public health and clinical settings may each require a different research approach to HL (Nutbeam, 2000; Peerson and Saunders, 2009; Sorensen *et al.*, 2012). In public health, HL might be defined as the knowledge and skills an individual needs to prevent disease and to promote health in everyday life (Kickbusch *et al.*, 2005; Nutbeam, 2008). In clinical settings, HL might refer to the set of personal resources a patient needs to successfully navigate health services (Pleasant and Kuruvilla, 2008). After reviewing the literature, Peerson and Saunders (Peerson

and Saunders, 2009) suggested that a distinction should be drawn between 'health literacy' (applied to health management as a part of daily life) and 'medical literacy' (applied to patients in health care settings). They propose that we increase our attention to 'measuring and analyzing health literacy and its complexities' [Peerson and Saunders, 2009), p. 286]. For example, they suggest that, among contexts outside the health care system, we should consider 'families and neighborhoods'. In such outside contexts, we should take into account 'the various information opportunities and decisions that impact upon health every day' [Peerson and Saunders, 2009), p. 289].

There is also general agreement that we need reliable measurement tools in both areas of application (Abel, 2008; Sorensen *et al.*, 2012) that can be used to measure the HL of different age groups, genders or language contexts (Baker *et al.*, 2002; Wolf *et al.*, 2005; Ishikawa *et al.*, 2008; Peerson and Saunders, 2011). Though a great deal of effort has been devoted to developing and testing HL measures in the clinical realm [see e.g. (Mancuso, 2009; Frisch *et al.*, 2012)], there is a marked scarcity of tested measures explicitly geared to public health (Baur, 2010; Sorensen *et al.*, 2012).

In public health, measuring HL presents particular challenges (Abel, 2008). Public health as a field of research and practice is broad and diverse, encompassing a wide variety of topics and perspectives. This diversity makes it difficult to generate and apply a single measurement tool that could account for the broad variety of different contexts of HL. Within public health, then, systematic assessment of HL and its distribution in (sub-) populations may require us to develop a multitude of context-specific measures (Frisch *et al.*, 2012).

Our study takes as its goal the development of a context-specific measurement tool of HL, and we achieve the necessary focus in four steps. First, we focus on measuring HL in the field of public health, rather than in clinical contexts. Second, our definition of HL is based on the assumption that individuals are active agents in their social contexts (Kickbusch *et al.*, 2005; Abel, 2007; Mogford *et al.*, 2011). We thus take a health promotion perspective and define HL as a set of personal resources that must be available to individuals if they are to successfully handle common health matters (Rootman and Ronson, 2005; Kickbusch and Maag, 2006). Third, we assume that health literacy gives an advantage to people in all age groups (Kickbusch, 2006; Wu *et al.*, 2010; Berkman *et al.*, 2011; Levin-Zamir *et al.*, 2011; Zamora and Clingerman, 2011; Paakkari and Paakkari, 2012), but we focus in the present study on young adults. Health literacy is important in young adulthood because many health practices, including risk behaviours like smoking and drinking, are established in this stage of life (Manganello, 2008; Due *et al.*, 2011; Stone *et al.*, 2012; Dermota *et al.*, 2013). Fourth, we focus on the private realm. Young adults deal with health matters on an everyday basis, at home, in their family and among peers (Levin-Zamir *et al.*, 2011; Dermota *et al.*, 2013). We assume that this context is less formally structured than institutional settings (e.g. workplaces or schools) and thus distinct in terms of the acquisition and application of health literacy. We address this distinction by, e.g. assessing knowledge and skills relating to health conversations in the family and among peers.

Our approach to measurement takes this specific direction because it allows us to set and keep a focus on health literacy as a personal resource in private realms, with their specific individual and structural conditions. While the form of health literacy we describe can be considered an important factor for the health of a population, questions about its distribution across and within (sub-)populations can only be answered on the basis of appropriate empirical data. To date, these data are rare and the lack of appropriate measurement tools compounds the problem (Berkman *et al.*, 2010).

The aim of our study was to address this lack. In this paper, we report on the development and initial empirical testing of a survey tool for quantitative assessment of health literacy in the private realm. Our goal was to develop a short survey measure that yields a reliable health literacy score. Data for the measurement, development and testing came from a large survey conducted among Swiss young adults in 2010 and 2011.

METHODS

Sample

We used data from the Swiss Federal Surveys of Adolescents (ch-x) conducted in 2010 and 2011 in the German-speaking part of Switzerland.

Data for the male sample were collected during recruitment for compulsory military service. Participation in the survey was voluntary and anonymous, and 90% agreed to fill out a paper-and-pencil questionnaire. We also calculated the proportion of the eligible population using the data from the Swiss census. The male sample corresponded to 14% of the eligible population in Switzerland, yielding a net sample of 7983 Swiss male citizens aged 18–25 [mean (M) = 19.6, standard deviation (SD) = 1.0]. An additional female sample was obtained and the same survey was mailed to young female Swiss citizens aged 18–21 (M = 18.8, SD = 0.4). Addresses for the female survey were drawn from official registers of German-speaking Swiss communities in a two-stage randomization procedure [see (Jann, 2007)]. The response rate for the postal survey was 49%, yielding a net sample of 366 females. The survey design is described in more detail elsewhere (Hofmann *et al.*, 2013).

Measures

Health literacy was assessed with questions newly developed by the research team, drawing on reports in the literature as well as their own experiences. HL was measured by eight Likert-scale items: (i) 'How well do you understand the following information? Instruction leaflets for medication' was scored in five answer categories from 'very bad' = 1 to 'very good' = 5. (ii) 'How well do you understand the following information? Information brochures on health issues (e.g. on nutrition, addictive drugs etc.)' scored in five answer categories from 'very bad' = 1 to 'very good' = 5. (iii) 'When I have questions on diseases or complaints (e.g. headaches, back pain and sports injuries), I know where I can find information on these issues' scored in four answer categories from 'disagree strongly' = 1 to 'agree strongly' = 4. (iv) 'When I want to do something for my health—without being sick (like establish a healthy diet, exercise regularly), I know where I can find information on these issues' scored in four answer categories from 'disagree strongly' = 1 to 'agree strongly' = 4. (v) 'In the past: How often were you able to help your family members or a friend if they had questions concerning health issues (e.g. stress, minor sport injuries or nutrition)?' scored in five answer categories from 'never' = 1 to 'always' = 5. (vi) 'When you came up with questions concerning health issues, how often were you able to get information and advice from others (family and friends)?' scored in five answer categories from 'never' = 1 to 'always' = 5. (vii) 'Nowadays there is a large number of advices and offers available on how to lead a healthy life. How well are you doing in choosing the advices and offers that fit with you the most?' scored in five answer categories from 'very bad' = 1 to 'very good' = 5. (viii) 'Regarding information on health on the Internet, I'm able to determine which sources are of high and which of poor quality' was scored in four answer categories from 'disagree strongly' = 1 to 'agree strongly' = 4.

Socio-cultural characteristics were measured with four categorical items: (i) parental education was based on highest educational level attained by either parent and was categorized as 'secondary' = 1 or 'tertiary' = 2. (ii) A respondent's own educational level was based on the type of school attended, i.e. 'mandatory' = 1, 'vocational' = 2, or 'grammar school and higher' = 3. (iii) Rating of the importance of a healthy lifestyle in the family was categorized as 'not important' = 1, 'rather important' = 2 or 'very important' = 3. (iv) Respondents rated the importance of a healthy lifestyle for themselves, which was categorized as 'not important' = 1, 'rather important' = 2 or 'very important' = 3.

Analyses

STATA was used for all analyses (version 12; StataCorp, 2011). Measurement development was accomplished in three steps. First, we used the male sample ($n = 7983$) to conduct a principal component analysis (PCA) that explored the eight HL items for a potentially underlying factor structure. Second, we used the data from the female sample ($n = 366$) to conduct a confirmatory factor analysis (CFA) to verify the suggested factor structure in an independent sample. Third, we constructed an HL sum score for each sample and assessed its construct validity. We examined *a priori* anticipated associations between the sum score and gender [expecting higher scores among females than males; see e.g. (Levin-Zamir *et al.*, 2011)], education [expecting it to be positively associated with HL; see e.g. (Wu *et al.*, 2010 and Levin-Zamir *et al.*, 2011)] and a value-based item measuring the importance of a healthy lifestyle [plausibility would suggest a positive association with HL; see also (Schmidt *et al.*, 2010)]. Anticipated associations were investigated using one-way analysis of variance (ANOVA) with a Bonferroni correction

as *post hoc* procedure to compare the significance of differences in mean scores according to education and health value.

RESULTS

Descriptive results

We excluded respondents who had one or more missing values among the eight HL items, which left us with two effective samples of 7097 men and 331 women who had valid answers for all items. We considered the overall number of missing values (<12%) as acceptable in both samples.

Table 1 reports item-wise basic descriptive results. Mean and standard deviation (M ± SD) ranged from 2.58 ± 1.31 to 3.59 ± 1.46 in men, and from 2.48 ± 1.38 to 4.18 ± 1.13 in women.

Principal component analysis

Correlation coefficients (r) >0.30 (Spearman's r 0.08–0.62; see Table 2), a significant Bartlett's test of Sphericity ($\chi^2 = 8944.52$ with $p < 0.001$) and a Keiser–Meyer–Olkin (KMO) measure >0.60 (KMO = 0.63) indicated that the data were suitable for factor analysis.

A PCA with varimax rotation was performed on the male sample ($n = 7097$) to explore the factor structure of the eight items. We applied three criteria to decide on the number of factors: eigenvalues >1; factor loadings >0.60; and, plausibility of the factors in terms of their substantive meaning. The above-listed criteria were met with a four-factor solution that explained 72.96% of the variance.

The four factors represented distinct facets of functional, interactive and critical HL (see Table 2). Factor loadings ranged from 0.68 to 0.72. Each factor was a set containing two items: Factor 1 was the item set that described a facet of functional HL called 'understanding health information'. Factor 2 was the item set that described a facet of functional HL called 'finding health information'. This distinction between the two facets appeared plausible in its substantive

Table 1: Item definition and descriptive results for young men ($n = 7907$) and women ($n = 331$)

Item		Min—max	Men	Women
			M (SD)	M (SD)
HL1	How well do you understand instruction leaflets for medication	Very bad = 1; bad = 2; moderate = 3; good = 4; very good = 5; I do not make use of this kind of information = 0[a]	3.54 (1.28)	4.08 (0.96)
HL2	How well do you understand information brochures on health issues	Very bad = 1; bad = 2; moderate = 3; good = 4; very good = 5; I do not make use of this kind of information = 0[a]	3.59 (1.46)	4.18 (1.13)
HL3	When I have questions on diseases or complaints, I know where I can find information on these issues	Disagree strongly = 1; disagree = 2; agree = 3; agree strongly = 4; I do not have experience with these issues = 0[a]	3.54 (0.71)	3.66 (0.58)
HL4	When I want to do something for my health without being sick, I know where I can find information on these issues	Disagree strongly = 1; disagree = 2; agree = 3; agree strongly = 4; I have not been interested in these issues = 0[a]	3.48 (0.80)	3.60 (0.62)
HL5	How often were you able to help your family members or a friend if they had questions concerning health issues	Never = 1; seldom = 2; sometimes = 3; often = 4; always = 5; there have never been any questions = 0[a]	2.59 (1.32)	2.80 (1.27)
HL6	When you came up with questions concerning health issues, how often were you able to get information and advice from others (family and friends)	Never = 1; seldom = 2; sometimes = 3; often = 4; always = 5; there have never been any questions = 0[a]	3.20 (1.36)	3.58 (1.08)
HL7	How well are you doing in choosing the advices and offers that fit with you the most	Very bad = 1; bad = 2; moderate = 3; good = 4; very good = 5; I have not been interested in these issues = 0[a]	3.02 (1.62)	3.20 (1.65)
HL8	Regarding information on health on the Internet, I'm able to determine which sources are of high and which of poor quality	Disagree strongly = 1; disagree = 2; agree = 3; agree strongly = 4; I do not have experience with these issues = 0[a]	2.58 (1.31)	2.48 (1.38)

Note: SD = Standard deviation; M = Mean; HL = Health literacy.
[a]Answers external to the ordinal scales were seen as difficult to interpret due to ambiguity. Such responses were scored 0 points.

Table 2: Spearman correlation matrix and results from PCA for young men ($n = 7097$)

	HL1	HL2	HL3	HL4	HL5	HL6	HL7	Factor 1 functional HL	Factor 2 functional HL	Factor 3 critical HL	Factor 4 interactive HL
How well do you understand instruction leaflets for medication (HL1)	n.a.							0.71			
How well do you understand information brochures on health issues (HL2)	0.62							0.70			
When I have questions on diseases or complaints, I know where I can find information on these issues (HL3)	0.16	0.15							0.72		
When I want to do something for my health without being sick, I know where I can find information on these issues (HL4)	0.18	0.18	0.50						0.69		
How often were you able to help your family members or a friend if they had questions concerning health issues (HL5)	0.11	0.13	0.11	0.13							0.69
When you came up with questions concerning health issues, how often were you able to get information and advice from others (family and friends) (HL6)	0.11	0.15	0.12	0.13	0.35						0.72
How well are you doing in choosing the advices and offers that fit with you the most (HL7)	0.11	0.15	0.08	0.16	0.17	0.15				0.72	
Regarding information on health on the Internet, I'm able to determine which sources are of high and which of poor quality (HL8)	0.18	0.21	0.08	0.18	0.19	0.14	0.34			0.68	

Note: All correlations are significant at $p < 0.001$. Only factor loadings >0.60 and eigenvalues >1 are displayed. HL = Health literacy; n.a. = not applicable.

meaning: 'finding' health information is distinct from 'understanding' health information. Factor 3 was the item set that described critical HL, and Factor 4 was the item set that described interactive HL.

Confirmatory factor analysis

We conducted a CFA to test whether the factor structure identified in our male sample could be replicated in our female sample ($n = 331$). We considered statistical fit indices of Tucker and Lewis index (TLI) and comparative fix index (CFI) >0.95 and root mean square error of approximation (RMSEA) and standardized root mean square residual (SRMR) <0.05 as indicative of good model fit for the factor structure described above (Hu and Bentler, 1999).

The four-factor solution fit the data well for female respondents (CFI = 0.99; TLI = 0.97; RMSEA = 0.03; SRMR = 0.03). It was superior to a one-factor solution that (like other solutions tested) failed to fit the data (CFI = 0.78; TLI = 0.70; RMSEA = 0.11; SRMR = 0.07). Thus, the CFA with the female sample supported the four dimensions identified in the male sample.

Sum score (eight-items)

The results from the factor analytical models (PCA and CFA) indicated that the tested items were useful measures of meaningfully distinct facets of HL. The substantive content of the items fits within our broad definition of HL. In bi-variate correlation analyses, those eight items were consistently and positively associated with each other (see Table 2 for males and Table A1 in the appendix for females). To develop a short survey measure, we merged the eight items into a sum score that included the facets of functional, interactive and critical HL. The internal consistency of the sum score was acceptable (Cronbach's α: 0.64 in men; 0.65 in women). The sum score showed a normal distribution (see Figure A1 in the appendix), and mean scores were higher for females than for males (M $\pm$ SD: 25.54 $\pm$ 5.38 in men; 27.57 $\pm$ 4.87 in women).

Next, we investigated the construct validity of our tool by examining its associations with gender as well as two socio-cultural characteristics, i.e. education and health value. Because our respondents were young adults, many of whom still lived with their parents, we used two education items (own and parental education) and two health value questions asked separately (importance of a healthy lifestyle 'for one's own' and 'within the family'). Results presented in Table 3 show the *a priori* anticipated positive associations: Among both genders, respondents with higher own and parental education generally had a higher HL sum score (both $p < 0.05$). Positive associations were also found for both value-based indicators of the importance of a healthy lifestyle (both genders $p < 0.05$). In all categories, females reported consistently higher HL scores than males.

SUMMARY AND DISCUSSION

The shortage of empirically tested HL measurement tools in public health motivated us to develop a survey tool to assess HL in a health promotion context. Our goal was to empirically test a set of questions, and thus to produce a short measurement tool that captures different dimensions of HL in the private realm.

We focused our study on young adults and specifically on HL in the private realm. We can compare our findings with two other studies that also reported on the development and assessment of an HL survey instrument for a similar age group. The measurement approach introduced by Levin-Zamir *et al.* (Levin-Zamir *et al.*, 2011) is focused on media HL. As such it adds a particular perspective, which, however, does not cover HL in the broader form that we have addressed in the present study. The Wu *et al.* (Wu *et al.*, 2010) study is closer to our focus. The authors developed a broader HL measurement tool for high school students and found it feasible for classroom use. Their measure is based on 47 items and is more detailed, but does not include the domains of accessing and communicating health-relevant information. The time-consuming long list of items and its methodological characteristics of a classroom survey may also render the tool less feasible for inclusion in population health surveys. Thus, we still observe a considerable need for new measurement tools, and we hope that the short survey tool introduced in our study contributes to fill this gap.

We used exploratory factor analysis on data from a large sample of Swiss young men and found that our eight items represented a meaningful factor structure. This structure described two sub-factors of functional HL, one factor for

Table 3: The mean value of the sum score by socio-cultural characteristics for young men ($n = 7097$) and women ($n = 331$)

	Men			Women		
	M	SD	%	M	SD	%
Parents: Education						
Secondary	**25.16**	**5.27**	**52.78**	**27.12**	**5.13**	**52.37**
Tertiary	**26.31**	**5.18**	**47.22**	**28.32**	**4.15**	**47.63**
Total			100.00			100.00
Missing			7.98			4.23
Parents: Importance of a healthy lifestyle						
Not important	**23.07**	**5.89**	**9.69**	**24.25**	**5.66**	**3.64**
Rather important	**25.20**	**5.17**	**44.20**	27.18	4.60	39.70
Very important	**26.42**	**5.23**	**46.11**	**28.04**	**4.93**	**56.66**
Total			100.00			100.00
Missing			0.76			0.30
Own: Education						
Mandatory	**23.81**	**5.82**	**7.41**	27.05	3.78	6.12
Vocational	**25.16**	**5.37**	**62.80**	**26.66**	**5.41**	**54.74**
Grammar school and higher	**26.85**	**4.99**	**29.79**	**28.95**	**3.85**	**39.14**
Total			100.00			100.00
Missing			1.47			1.21
Own: Importance of a healthy lifestyle						
Not important	**23.29**	**5.96**	**9.98**	27.22	3.96	2.75
Rather important	**24.78**	**5.31**	**41.16**	**26.56**	**4.89**	**32.72**
Very important	**26.66**	**5.05**	**48.86**	**28.06**	**4.86**	**64.53**
Total			100.00			100.00
Missing			1.35			1.21

Note: Bold values indicate that differences in mean values are significant at $p < 0.05$ in an ANOVA with a Bonferroni test. Analyses were computed separately for males and females.
SD = Standard deviation.

interactive and one factor for critical HL. The emerging two additional factors, one for interactive and one for critical HL, appeared straightforward because the content of their items clearly indicated aspects of interactive and critical HL. For functional HL, we did not expect to find two sub-factors (ability to 'find' health information and 'understanding' health information). Theoretically plausible, the fact that they emerged from the data indicates that a distinction could be applied in such studies that seek to provide more differentiated analyses of distinct facets of functional HL.

The findings from our CFA verified the distinct factor structure in our female sample. Considering the substantively appropriate meaning of the dimensions as well as the positive internal associations of the items, we concluded that the set of eight items measures HL in its three basic dimensions. After we tested for internal consistency, we constructed a sum score, which showed a normal distribution in both samples.

Testing the construct validity of our sum score, we expected—based on previous findings by Manganello (Manganello, 2008), Wu *et al.* (Wu *et al.*, 2010) and Levin-Zamir *et al.* (Levin-Zamir *et al.*, 2011)—female gender and higher educational status to be associated with higher HL scores. We also expected a positive association between the importance of a healthy lifestyle and HL. Construct validity of our measure was supported as the sum score achieved the *a priori* anticipated associations. Both female gender and higher education were associated with higher HL scores. HL scores were also higher for respondents who had a stronger health valuation, which further supported the construct validity of the new measure.

Overall, the findings showed that the new measurement tool captured different dimensions of HL in the private realm. Our findings also

provide empirical evidence for its construct validity, indicating that the HL sum score can detect meaningful social variations in this form of HL in the general population.

Limitations

We studied self-perceived HL. We are aware of criticism that self-reports may limit validity. For example, it is possible that respondents may overestimate their own HL (e.g. Frisch *et al.*, 2012). The focus of the present study was, however, not on objectively assessing specific health knowledge of respondents. Consequently, the questionnaire was not presented as a test of knowledge, but instead asked individuals about their abilities to deal with health issues in everyday life. We believe that this focus makes our study less prone to self-report bias.

The study included young German-speaking adults in Switzerland. We do not yet know whether our results are generalizable to other age groups, other national contexts or languages.

The lower response rate in our female sample may bias our results for females as, e.g. young women with less interest in health issues might be under-represented. While this could have produced some selection effects in the descriptive results, we do not think this effect would substantially limit our main findings with regard to the properties of the new measurement tool among young women.

Future tasks

Our health promotion perspective allowed us to focus on the private realm of home, family and peers. This perspective guided the development and selection of relevant items for the measurement tool. However, the issues addressed by these items may be sufficiently general so that due adjustment and future testing could allow the tool's extension or application in other age groups and in other health promotion contexts like social and recreational settings, or neighbourhoods (Kickbusch and Maag, 2006; Peerson and Saunders, 2009).

With only eight short questions, this new tool can provide a time- and cost-effective measure to be included in broader health surveys. For more specifically focused HL surveys, the tool may also be considered and linked to an expanded set of more detailed items (e.g. to examine specific forms of interactive HL within families).

Empirical assessment of HL in non-clinical settings remains challenging for researchers in public health and health promotion. This new tool for measuring HL in the private realm, families and among peers may help to improve our understanding of the way HL is distributed in the general population.

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APPENDIX

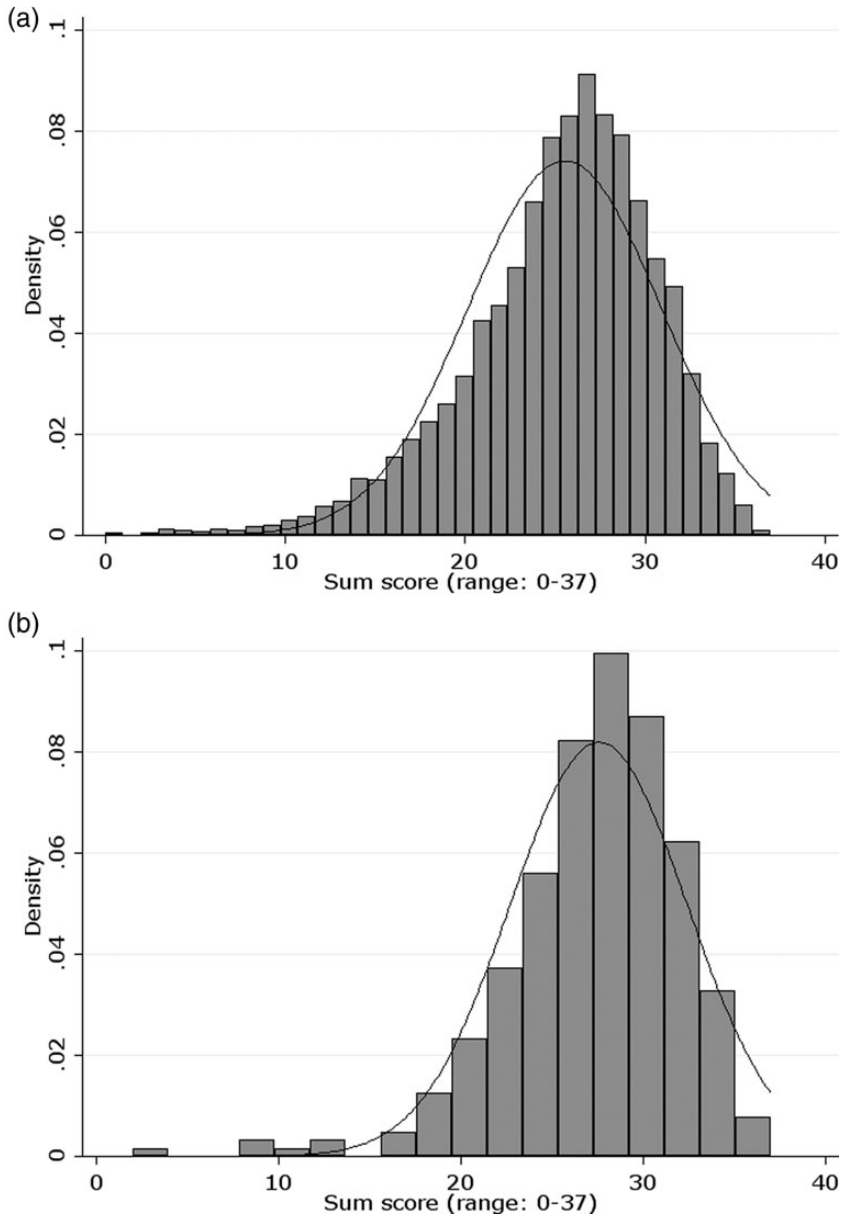

Fig. A1: Sum score (eight-items) of (a) young men ($n = 7097$) and (b) young women ($n = 331$).

Table A1: Spearman correlation matrix for young women ($n = 331$)

	HL1	HL2	HL3	HL4	HL5	HL6	HL7
How well do you understand instruction leaflets for medication (HL1)	n.a.						
How well do you understand information brochures on health issues (HL2)	0.61***						
When I have questions on diseases or complaints, I know where I can find information on these issues (HL3)	0.35***	0.21***					
When I want to do something for my health without being sick, I know where I can find information on these issues (HL4)	0.25***	0.13*	0.46***				
How often were you able to help your family members or a friend if they had questions concerning health issues (HL5)	0.27***	0.28***	0.16**	0.15**			
When you came up with questions concerning health issues, how often were you able to get information and advice from others (family and friends) (HL6)	0.18**	0.19***	0.17**	0.14*	0.13*		
How well are you doing in choosing the advices and offers that fit with you the most (HL7)	0.15**	0.19***	0.14*	0.17**	0.18**	0.07	
Regarding information on health on the Internet, I'm able to determine which sources are of high and which of poor quality (HL8)	0.22***	0.26***	0.17**	0.18**	0.18***	0.08	0.32***

Note: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; HL = Health literacy; n.a. = not applicable.

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