

ORIGINAL REPORT

Health literacy among pharmacy visitors in the Netherlands

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ABSTRACT

Purpose Health literacy is defined as the ability to obtain, understand and apply information to make appropriate health decisions. Most health literacy research has been performed in the USA. Our objective was to study the prevalence of limited health literacy among adult pharmacy visitors in the Netherlands and to assess the association between health literacy and understanding of drug label information.

Methods A cross-sectional study was performed in community pharmacies belonging to the Utrecht Pharmacy Practice network for Education and Research. Adult pharmacy visitors (aged ≥ 18 years) were approached in the pharmacy waiting area and invited for a brief interview including the newest vital sign, a validated health literacy assessment measure and questions about understanding of standard drug label instructions.

Results A total of 984 pharmacy visitors were included in the study: 63% were women, mean age was 56 years and the majority was of native origin (84%). Based on newest vital sign scores, 52% had limited health literacy skills. Pharmacy visitors with limited health literacy skills had significantly lower understanding of drug label instructions ($p < 0.001$).

Conclusion Approximately half of the pharmacy visitors in this study had limited health literacy skills. These individuals experienced more difficulties understanding drug label instructions. These findings emphasize the need to identify patients with limited health literacy skills, as these patients might be at increased risk for drug-related problems caused by misunderstanding of information. Copyright © 2015 John Wiley & Sons, Ltd.

KEY WORDS—community pharmacy; drug labels; health literacy; pharmacoepidemiology

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INTRODUCTION

Previous research has shown variation in the prevalence of limited health literacy, with studies reporting a prevalence of limited skills in up to 50% of the population.^{1–6} Health literacy is defined as the ability to obtain, understand and apply information to make appropriate health decisions. Health literacy is specific and context dependent, meaning that each (medical) situation requires specific skills or generic skills at a specific level.⁷ For example, to manage their medication regimen, patients need to be able to perform numeric tasks to calculate the total amount of pills to be taken per day, and they need skills to recognize and respond to possible adverse effects. Adequate health literacy skills are essential to understand the

aim, expected (side) effects and specific instructions of drug treatment.^{1,8,9} In a previous study, we showed incorrect interpretation of commonly used drug label instructions among both immigrants and natives in the Netherlands, which might also be caused by limited health literacy skills.¹⁰

Furthermore, studies have shown that patients with limited health literacy skills have poor self-management knowledge, resulting in lower medication adherence, poor health outcomes and increased health costs for society.^{11,12} These limited health literacy skills seem to be more prevalent among elderly, ethnic minority groups and people with a lower socioeconomic status (e.g. low income or low educational level).^{7,13}

To date, most health literacy research has been performed in the USA^{14–16}; however, other countries have also made efforts to address the issue of health literacy.¹⁷ Most of these studies focused on general (health) literacy skills and did not specifically address

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understanding of drug information.¹⁸ However, health literacy is a complex concept consisting of different skills that may be necessary to ensure good medication use.¹⁹ Our objective was to study the prevalence of limited health literacy and to assess the association between health literacy skills and understanding of drug-related information in adult pharmacy visitors in the Netherlands.

METHODS

Setting and population

A cross-sectional study was performed in community pharmacies belonging to the Utrecht Pharmacy Practice network for Education and Research, a network consisting of pharmacies that regularly participate in research and internships for pharmacy students.²⁰ Approximately 1300 community pharmacies in the Utrecht Pharmacy Practice network for Education and Research network received an email invitation to participate in this study (during a specific time period of March–June 2014) and were asked to respond within 2 weeks when they were willing to participate. The study was approved and conducted according to the guidelines of the Institutional Review Board of the Division of Pharmacoepidemiology and Clinical Pharmacology, Utrecht University.

Pharmacy visitors aged 18 years and older were approached in the pharmacy waiting area. The purpose of the study was explained, and verbal consent was obtained. Exclusion criteria for the study were insufficient comprehension of Dutch or not filling a prescription for themselves. In total, we invited 2027 pharmacy visitors from 33 different community pharmacies to participate in the study, and 904 agreed. For 10 non-native Dutch patients, the interview was translated, and they were excluded from the final analysis, resulting in a 44% response rate. The most common reasons for not willing to participate were no interest in the study and being in a hurry.

Data collection

Data were collected between March and June 2014 by pharmacy master students enrolled in a course on pharmacy practice research. All students received instructions on the interview procedure, and interviews were guided by a structured interview questionnaire that only contained closed questions. The questionnaire consisted of four elements: (i) a measure of satisfaction with information received about medication, (ii) questions about understanding of drug label

instructions, (iii) health literacy assessment and (iv) sociodemographic questions.

Satisfaction with information about medication

The extent to which patients feel that they have received enough information about their medication was assessed using the satisfaction with information about medication scale (SIMS).²¹ The SIMS contains 17 questions to be rated referring to a particular aspect of medication use. Of these, one item (whether the medication will affect you sex life) was excluded because of expected difficulties for patients to rate this item in the presence of a student. Those reporting that the information was “about right/enough information received” or indicating “none needed” were classified as satisfied (score 1) with the information, and those reporting that the information was “too much,” “too little” or indicating “none received” were classified as dissatisfied (score 0). Sum scores were calculated, and higher scores indicate a high degree of overall satisfaction with the amount of medication information received. The SIMS showed good internal consistency (Cronbach’s alpha coefficient: 0.87).

Understanding of drug label instructions

To assess correct understanding of drug label information, we included six multiple choice questions about six frequently used standard drug label instructions (e.g. “complete prescribed course” and “use max 6 tablets per day”) within Dutch pharmacies, based on our previous study (see Supporting Information, Appendix 1).¹⁰ In order to study the association between health literacy and correct interpretation of instructions, we used correct interpretation of all survey questions related to the specific instruction, as outcome measure for the regression model. Scores range from 0 to 6, and correct understanding was classified as a score of 6 (all labels correctly interpreted).

Health literacy assessment—newest vital sign

The newest vital sign (NVS) consists of a nutrition label from an ice-cream container, which is presented to the participant.²² The NVS is suitable to measure individual reading and numeracy skills and can be applied in healthcare settings.¹⁸ The participant answers six questions related to the information on the label, and scores range from 0 to 6. The sum scores can be classified into high likelihood of limited health literacy skills (scores 0 to 1), possible limited skills (scores 2 to 3) and adequate skills (scores 4–6). In this study, we considered a score of 0–3 as limited health

literacy skills and a score of 4–6 as adequate skills. In this study, we used a translation of the original NVS.²² Internal consistency of the NVS in our population was good (Cronbach's alpha: 0.80).

Sociodemographic information

Sociodemographic characteristics included age, gender, ethnic origin and educational level. Ethnic origin was classified into three groups: native (Dutch), non-western immigrant (someone whose country of origin is or lies in Turkey, Africa, Latin America and Asia, with the exception of Indonesia (or the former Dutch East Indies) and Japan) or western immigrant (people from Europe, Japan (a developed high-income country) and Indonesia (a former colony)). Educational level was divided into three categories: none/low, middle or high. No or low educational level was defined as no secondary education (only primary school) or lower vocational. Middle was defined as intermediate vocational or higher secondary education, and high educational level was defined as higher vocational or university.

Data analysis

Descriptive statistics were used to calculate the prevalence of limited health literacy. Logistic regression analysis controlling for age, educational level and ethnic background was used to calculate odds ratios and their corresponding 95% confidence intervals (CI) for the association between health literacy (outcome) and patient characteristics and understanding of drug label information. All analyses show the odds ratios for limited health literacy compared with adequate health literacy. Data were analyzed using IBM SPSS version 20.0 (IBM Corporation, Armonk, NY, USA) for Windows.

RESULTS

The majority (62%) of the interviewees were women, mean age was 56 years and the majority (84%) was of native Dutch origin (Table 1.). The proportion of low, middle and highly educated participants in the study population is in line with the composition of the adult Dutch population.²³

Health literacy skills

The NVS scores ranged from 0 to 6 (mean 3.2 ± 2.2). Based on the standard NVS classification, 28.6% of the patients ($n=256$) were classified as having a high likelihood of limited literacy skills (scores 0 to 1),

Table 1. Study population characteristics

	Total population ($n=894$)
Male gender, n (%)	336 (37.6)
Age, mean (standard deviation)	56.3 (16.9)
Ethnicity, n (%)	
Native	749 (83.8)
Non-western immigrant	123 (13.8)
Western immigrant	22 (2.5)
Educational level, n (%)	
No formal education/low	347 (39.3)
Middle	279 (31.6)
High	257 (29.1)

23.7% ($n=212$) had possible limited skills (scores 2 to 3) and 47.7% ($n=426$) were classified as having adequate health literacy skills.

Advancing age was significantly associated with limited health literacy ($p < 0.001$). Educational level was also associated with health literacy: participants with higher educational level were less likely to have limited health literacy skills ($p < 0.001$) (Table 2). Furthermore, participants with a non-western background were more likely to have limited skills ($p < 0.001$).

Health literacy and understanding of drug labels

Patients with limited literacy skills had significant lower understanding of drug label instructions compared with the participants with adequate literacy skills (4.7 vs 5.6 labels with correct interpretation, $p < 0.001$) (Table 3). In both groups, more than half of the participants were unsatisfied with the information provided about medication (58% vs 54%).

DISCUSSION

More than 50% of the pharmacy visitors in our study were classified as having limited health literacy skills according to their NVS score. These participants also experienced problems with understanding of drug label information. Furthermore, patient characteristics—age, ethnic background and educational level—were associated with limited health literacy.

The relatively high prevalence of limited health literacy found in our study among Dutch pharmacy visitors is in line with other studies reporting rates of limited health literacy in up to 50% of the population.^{1,3,25–27} However, lower prevalence has also been reported.^{28–30} Differences in the reported prevalence of limited literacy may be explained by the use of different instruments or differences between the study populations. Sham *et al.*²⁶ showed in their study that there was variation in the prevalence of limited health literacy depending on the type of instrument used to

Table 2. Patient characteristics associated with limited health literacy skills (newest vital sign score < 4)

	Adequate literacy	Limited literacy	Crude OR (95%CI)	Adjusted* OR (95%CI)	<i>p</i>
Age, mean (SD)	50.2 (16.3)	61.8 (15.6)	1.04 (1.03–1.06)	1.04 (1.03–1.05)	<0.001
Male gender	35.2	39.7	0.82 (0.62–1.08)	1.11 (0.77–1.59)	0.63
Educational level					
No/low	15.1	61.8	REF	REF	
Middle	38.1	25.5	0.16 (0.11–0.23)	0.30 (0.20–0.45)	<0.001
High	46.8	12.7	0.07 (0.04–0.10)	0.10 (0.07–0.16)	<0.001
Non-western background	5.4	21.2	5.76 (3.31–10.02)	4.70 (2.48–8.89)	<0.001

CI, confidence interval; OR, odds ratio; SD, standard deviation; REF, reference category.

*Adjusted for age, educational level and background.

Table 3. Understanding of medical information and health literacy

	Adequate literacy (%)	Limited literacy (%)	Crude OR (95%CI)	Adjusted* OR (95%CI)	<i>p</i>
Satisfaction with information received SIMS score, mean (SD)	12.0 (3.6)	11.8 (4.1)	0.98 (0.95–1.02)	1.00 (0.95–1.04)	0.83
Correct understanding of drug label instructions, mean (SD)	5.6 (0.6)	4.7 (1.3)	0.35 (0.29–0.43)	0.47 (0.37–0.60)	<0.001

CI, confidence interval; OR, odds ratio; SD, standard deviation; SIMS, satisfaction with information about medication scale.

*Adjusted for age, educational level and background.

measure health literacy. The NVS might be relatively difficult for patients and therefore, classifying a larger proportion of patients as health illiterate.

Our study demonstrated associations between limited health literacy and demographic factors. In line with findings reported in literature, older patients were more likely to have limited health literacy skills.^{8,26} Aging is related to a decreasing ability to perform cognitive tasks that require information processing, and older adults seem to have more difficulties and need more time to complete tasks that require reasoning, reading or information processing.³¹ This could contribute to poorer health literacy in older adults. Also, educational level was associated with health literacy in accordance with the literature.^{8,13,26,32} Those with low educational level more often had limited literacy skills, and this can be explained by the fact that these participants might experience more difficulties with understanding and interpretation of health information caused by reading, numeracy and information processing difficulties. Also, participants with a non-western background more often had limited literacy skills. This may be caused by difficulties in understanding information (language barriers).⁸

In this study, we did not show an association between health literacy skills and patients satisfaction with information about medication. In line with previous research of van Geffen *et al.*,³³ more than half of the participants in our study (both patients with adequate and limited health literacy skills) were unsatisfied with the information received. It is plausible that

satisfaction with information is primarily driven by the counseling given by the healthcare provider and not by patients' understanding of this information.

We showed limited health literacy skills to be associated with poor understanding of drug labels: pharmacy visitors with limited skills more often experienced difficulties with understanding standard drug labels. Before, this was shown by Marvanova and colleagues who assessed understanding of medication regimens in relation to health literacy skills.³⁴ Poor understanding of information can lead to errors in medication use. Yin *et al.*³⁵ showed, for example, medication dosing errors due to misunderstanding. Furthermore, studies have shown an association with low medication adherence.¹⁴

Healthcare providers are expected to inform patients about the proposed treatment. By identifying patients with limited skills, healthcare professionals are able to recognize patients in need for additional support as these patients have increased risk of drug-related problems.³⁶ For patients with limited (health) literacy skills, there is a variety of intervention options, such as verbal presentation of information, videos, comprehensible written information (adjusted to their health literacy level) and extra reviews or additional consults to explain medication use.³⁷ However, to date, there is limited use of these interventions in daily practice. Praska *et al.*³⁸ performed a telephone survey among community pharmacists in the USA and showed that only 7% of the pharmacies actively attempted to identify patients with low literacy skills in order to provide

tailored care. In this study, we showed limited health literacy skills in a large proportion of the general population attending the community pharmacy. It is therefore important to address this issue. Focus could be first on patients with highest risk of limited literacy, such as elderly and individuals with a (non-western) foreign background.

One of the strengths of this study was the relatively high response rate (45%) and large study population. We attribute this to the face-to-face nature of the recruitment in the pharmacies, and this also facilitated the inclusion of adults with limited reading abilities. There may be some selection bias, as those who declined may possess lower literacy levels, and thus, the prevalence found in our study might even underestimate the actual prevalence of limited health literacy. On the other hand, highly educated people with demanding jobs may have declined participation (due to time constraints). Furthermore, older people might be overrepresented in the sample as this is the population who usually uses more medication and might therefore visit the pharmacy more often. Overall, we believe that the study population is a good representation of people in the Netherlands who fill prescriptions (pharmacy visitors) in the community pharmacy, also as the composition of educational level and ethnicity are in line with the general population.²³ Furthermore, data were collected in different pharmacies spread throughout the country.

A potential limitation of the study might be that different students were involved in the data collection. Although the interview questionnaire was structured (with only closed questions) and students followed a training session before the start of the data collection period, there may have been some variation in interview skills. However, we assume that this limitation only had minimal effect and therefore does not influence our results.

We used the NVS to assess health literacy skills. The NVS is suitable to assess reading and numeracy skills, but this instrument does not measure skills specifically necessary for medication use. The NVS measures basic functional health literacy and uses questions that investigate both comprehension and numeracy skills. We showed that limited health literacy based on the NVS was associated with lower comprehension of drug labels, indicating that functional literacy is important for correct medication use. Other skills, such as communicative skills,¹⁹ which might also be important, were not assessed. We showed good NVS internal consistency, and previous research within the Dutch care setting also showed good performance of the NVS.³⁸ Therefore, we think that the NVS was suitable to assess basic health

literacy skills in pharmacy visitors; however, to gain insight in all necessary skills, another instrument might be necessary.

In this study, we used a simple translation of the original NVS. Recently, Fransen and colleagues developed a culturally adapted version of the NVS for the Dutch situation with a different food label.¹⁸ In future research, it might be better to use (maybe combined with other measures or questions to assess other skills necessary for correct medication use) this version as cultural differences might influence understanding. However, we showed good internal consistency and were able to differentiate between groups.

Several conclusions can be drawn from the results presented in this paper. First, a high percentage of the Dutch adult pharmacy visitors in our study were found to have limited health literacy skills, which may affect their ability to obtain and maintain an adequate health status as we have also shown poorer understanding of drug label instructions in patients with limited health literacy skills. Second, certain patient characteristics seem to be associated with an increased risk for limited literacy, and these factors may be used to identify high-risk populations. Therefore, there is a need to identify patients with limited health literacy skills in order to prevent (medication related) problems and provide tailored care. The community pharmacist could play an active role in this process by supporting their patients with tailored education and counseling adjusted to individual health literacy levels.

CONFLICT OF INTEREST

The authors report no conflict of interest related to this study.

KEY POINTS

- Most previous health literacy research has been performed in the US. In this study carried out in the Netherlands, half of the pharmacy visitors had limited health literacy skills.
- Limited literacy was associated with difficulties in understanding drug label information.

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