Analysis of health literacy measures in the elderly population Michael Brusovansky1, Katerina Bronfman2, Maria Sirotin3, Michal Hochhauser4 1Loewenstein Hospital, 2Beilinson Hospital, 3Leumit Health Services, 4Faculty of Health Sciences, Department of Health Management, Ariel University

**Abstract**

Health literacy is important for patients’ comprehension of the health and medical messages conveyed to them and their meaning for them so that they can better manage their health. This is why limited health literacy is associated with negative health outcomes. Surveys conducted in various countries around the world indicate a reality in which there is a high rate of people with limited health literacy. The level of health literacy is related, among other things, to socio-demographic variables, one of which is age.

The aim of the study was to examine the level of health literacy within the elderly population (over 65). The hypothesis of the study was that health literacy within this population would be low and expressed in the need for assistance to read or understand medical material; a low ability to understand medical explanations; and a low ability to seek and obtain medical information. The assumption was that the level of literacy in the three areas would be related to gender, education, health and reading ability in Hebrew and English. The study involved 60 men and women over the age of 65 who were selected using a convenience sample. The research tool was a 13-item questionnaire compiled by the researchers based on previous studies in the field.

The results of the study showed that the level of health literacy among the participants was low. One fifth found it difficult to read medical material in Hebrew, reported difficulty in understanding the doctor's words and required assistance. One third reported difficulties in reading medical documents, completing medical forms, understanding medical terms, and understanding the leaflet attached to medications. Two-fifths reported difficulty completing medical forms and understanding the results of the tests. Two-thirds reported difficulty reading medical information written in English. The conclusions indicate that medical teams have an obligation to be alert and attentive to the level of health literacy of elderly patients and to modify communication and information to an accommodating degree, so that they can better manage their health, which is characterized by a multitude of chronic illnesses.

Keywords: health literacy, health management, seniors

**Background**

Health literacy is a relatively recent concept in the theoretical and empirical scientific literature, although it was first described about 40 years ago (Nutbeam, 2006). The concept is mainly used to describe and explain the relationship between the literacy level of an individual and his ability to comprehend the recommended medical treatment and respond better to it. This is a concept from the general field of health promotion, and in particular, health education. The approach is that as part of their health education, patients must be able to comprehend the health messages being conveyed to them and their meaning for them so that they can have better control over their health. Such comprehension is even more crucial nowadays, since today’s patients are partners in their own treatment and have the autonomy to decide about the type of medical treatment they will receive; thus their ability to comprehend the health messages conveyed to them, to analyze their meaning and to make informed decisions about the most suitable treatment for themselves is very important (Sørensen et al, 2012; Mehudar, 2014).

There are a number of definitions of the term “health literacy” in the literature (Baker, 2006; Nutbeam, 2008; Peerson & Saunders, 2009; Sørensen et al, 2012; Mehudar, 2014); some are narrow and restrictive while others are broad and expansive. The most restrictive definition defines health literacy as the ability of a person to use reading and writing skills to convey and receive messages. The broadest definition defines health literacy as the ability of an individual to obtain, process, comprehend and assimilate medical knowledge in order to reach appropriate medical decisions and understand the treatment instructions. The accepted approach today is to relate to three levels of health literacy. The first, functional health literacy, relates to the reading and writing skills required from an individual to understand simple health messages and to implement them. The second, communicative health literacy, relates to the skills required from an individual to manage his health in partnership with professionals. The third, highest level is critical health literacy, expressed as the ability of an individual to critically analyze information, to raise his own awareness of his health problems, to take action that will enable him to achieve informed medical decisions with the aim of preventing or reducing health risks and to improve his quality of life. In recent years two additional types of health literacy were defined. The first, online health literacy, is expressed by the ability to seek, find, understand and evaluate information from the internet, to implement the obtained information in order to treat a health problem and to find a solution for it (Breinin & Netter, 2009). The second, media health literacy, is expressed by the ability to identify health-related content appearing in the media, whether revealed or hidden, to understand its impact on health behavior, to critically evaluate the presented content, and to indicate an intention to act and/or respond to the exposure to such content (Levin-Zamir, 2006). All these definitions assume that a population with a sufficient level of health literacy is able to make more appropriate decisions and improve its state of health (Levin, Baron-Appel & Elhiyani, 2013).

Surveys conducted in different countries around the world show that in developed countries, and more so in developing countries, a large proportion of the population has limited health literacy (Sørensen et al, 2013; Mehudar, 2014). In 2011, a comprehensive survey was conducted on the level of health literacy in developed European countries. The survey included 1,000 respondents from the eight countries participating in a project initiated by the World Health Organization (WHO) to promote worldwide health literacy (HLS-EU Consortium, 2012). The survey examined the ability of people to access information and to understand, analyze and use it to make informed decisions that will enable them to stay healthy, prevent diseases and seek treatment in the event of disease. The survey revealed that about half of the respondents (46.3%) had a limited literacy level. The researchers claim that the survey strengthens the findings of many other surveys among different populations, demonstrating that a large proportion of people around the world, even when they are able to understand most of the health information, still find it difficult to understand and analyze medical information that is written in complex, sophisticated language. Limitations to health literacy lead to a situation where individuals are often unable to be active partners in their treatment plan or to independently manage their diseases efficiently and effectively. As far as Israel is concerned, data collected in 2006 by the UNESCO Institute for Statistics indicate that 97.1% of the population can read and write (Levin-Zamir, 2006); however, there is still a relatively large proportion of people with limited health literacy. There are two reasons that can explain this limitation: first, the language in which health and medical information is written is highly sophisticated and complex, making it difficult to understand, and second, as in many countries with immigrants, for a relatively large proportion of the population Hebrew is not the mother tongue (Levin-Zamir, 2006; Levin, Baron-Appel & Elhiyani, 2013).

Limited health literacy has been shown to be linked to negative health outcomes. The first negative outcome is low accessibility to health communication and medical information. Due to the complicated nature of Israel’s heavily burdened healthcare system, it is difficult to convey the vast and complex information required for patients to better manage their health. Today, patients are required to obtain medication and health information independently in order to better manage their medical treatment or exercise their healthcare rights. Patients with limited health literacy find it difficult to independently obtain information from written sources, thus their ability to better manage their health is affected (Breinin & Netter, 2009, Shalom & Farber, 2012). The second negative outcome is a lack of information about individually adapted, available and accessible health and medical services, leading to a lack of use of such services, particularly those dealing with primary prevention (Weiss, 2007; Kanj & Mitic, 2009). The third negative outcome is higher illness and mortality rates among populations with limited health literacy due to a lack of knowledge about treatment options, the importance of responding to treatment, and the most effective way to use medications (Berkman, Sherida, Donahue, Halpern & Crotty, 2011; Peerson & Saunders, 2009). The fourth outcome is economic. The assumption is that health expenses among patients with low health literacy are much higher than those of patients with intermediate or high health literacy. The reasons for this are mainly: many more visits to the family doctor; many more, longer hospitalizations due to medical complications arising from not following treatment instructions properly; many more visits to hospital emergency wards due to complications arising from a lack of communication about how to effectively manage common, non-complex health situations; and a deteriorating state of health due to errors in taking medications (Levin, Baron-Appel & Elhiyani, 2013; Mehudar, 2014).

Studies have found that the level of health literacy is related, among other things, to socio-demographic variables, such as age, gender and education (Sørensen et al, 2012, 2013; Protheroe et al, 2016). Limited health literacy is common mainly among the elderly population (above 65) and within this population it is much more common among women than among men, and among the poorly-educated than the highly-educated. Such limited health literacy has a particular impact on this population, which is characterized by a multitude of chronic illnesses. A limited comprehension of medical knowledge and health information makes it difficult to independently monitor risk factors for this population’s health and to effectively manage the treatment of its illnesses, and thus may further amplify its illness and mortality rates (Baker et al, 2007; Tiller, Herzog, Kluttig & Haerting, 2015; Kobayashi, Wardle, Wolf & von Wagner, 2016).

The level of health literacy among those aged 65 and over has not been adequately studied in Israel. Therefore, the aim of this study is to examine the level of health literacy within this population. The research hypothesis claims that the level of health literacy in the 65-and-over population will be low and will be characterized by a need to receive assistance from others to read or understand medical material; a low ability to comprehend medical explanations; and a low ability to seek and obtain medical information. The study also assumes that the level of health literacy in these three areas will be linked to the following demographic variables: gender, education, state of health, ability to read in Hebrew and English and type of residence.

**Methods**

Sixty men and women aged 65 and over (M±SD = 74.13±7.33) participated in the study, selected by convenience sampling, where 36.7% were men, and 63% were women. 8.3% of them had primary education, 31.7% had secondary education and 60% had tertiary education. 75% of them live with a partner, children or caregiver and 25% live alone. After receiving ethical approval from the Ethics Committee of Ariel University, the researchers approached the participants in two senior citizens’ clubs. The researchers explained the aims of the research and promised to maintain anonymity and confidentiality of the obtained information. The response rate was very high. Among 65 people approached by the researchers, 60 responded to the interview – the target number determined for this study. Surveys were conducted individually for about 15 minutes on average.

The research tools included a 13-item questionnaire formulated by the researchers, based on previous studies in this field (Appendix A). The 13 items examined the subjects’ level of health literacy from three perspectives. First, we examined the degree to which the subject requires assistance to read and understand medical information (items 1, 2, 5, 6, 9). For example: “I need assistance to understand the doctor’s words”. Cronbach’s alpha test revealed a correlation of 0.673 among these five items. Second, the degree to which the subject reads and understands medical information related to his medical condition (items 3, 4, 7, 8, 13). For example: “I understand the medical terms related to my medical condition”. Cronbach’s alpha test revealed a correlation of 0.642 among these five items. Third, the degree to which the subject is able to obtain medical information, obtain health information from the internet, compare sources of information and make an informed medical decision (items 10, 11, 12). For example: “I know how to obtain all of the information I need to understand my state of health”. Cronbach’s alpha test revealed a correlation of 0.742 among these three items. All 13 items were examined on a 5-point Likert scale, where1 = to a very high degree and 5 = not at all. In addition, the questionnaire included two items that examined the subject’s ability to read in Hebrew and in English, as well as six demographic items: age, gender, education, state of health, type of residence and mother tongue.

**Results**

The results are presented according to the three levels of health literacy: low, intermediate/adequate and high (Table 1). To this end, the scales were combined as described below. The first finding relates to the degree to which the subject requires assistance to read and understand medical material (items 1, 2, 5, 6, 9). In this context, it was determined that “to a very high degree” and “to a high degree” reflect a low level of literacy, the level, “to a moderate degree”, reflects intermediate/adequate literacy and the levels, “to a low degree”, or, “not at all”, reflect a high level of literacy. Similarly, an average above 2.5 reflects a low level of literacy.

Table 1: Frequency of three levels of health literacy with respect to assistance in reading and understanding medical material

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Mean±SD | Low literacy | Intermediate/ adequate literacy | High literacy |
| I need assistance to read the hospital release letter or summary of doctor’s appointment | 3.45±1.478 | 30% | 15% | 15% |
| I need assistance to understand the doctor’s words | 3.85±1.273 | 18.3% | 18.3% | 63.4% |
| I need assistance to complete medical forms | 2.62±1.574 | 35% | 6.7% | 58.3% |
| I feel confident completing medical forms\*\*\* | 2.85±1.624 | 41.7% | 8.3% | 50% |
| I need assistance from others to understand my test results | 3.02±1.432 | 40% | 18.3% | 41.7% |

\*\*\*Scale was reversed to calculate frequencies.

Table 1 shows that 30-40% of subjects have low literacy with respect to reading and understanding medical material. The highest percentage of low medical literacy was expressed with respect to feeling confident when completing medical forms (41.7%); followed by the need for assistance from others to understand test results (40%); the need for assistance to complete medical forms (35%); the need for assistance to read hospital release letters or summaries of doctor’s appointments (30%); and the lowest percentage related to the need for assistance to understand the doctor’s words (18.3%). In other words, with respect to the ability to read or understand medical material independently, between one fifth and one third of subjects demonstrated a low level of medical literacy. A low level of literacy for all five items is also expressed in the mean score, which is above 2.5 for every item.

The second finding relates to the degree to which subjects understand medical information about their state of health (Table 2). In this context it was determined that “to a very high degree” and “to a high degree” reflect a high level of literacy, the level, “to a moderate degree”, reflects intermediate/adequate literacy and the levels, “to a low degree”, or, “not at all”, reflect a low level of literacy. Similarly, an average above 2.5 for these items reflects a low level of literacy.

Table 2: Frequency of three levels of health literacy with respect to understanding medical information about the subject’s health

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Mean±SD | Low literacy | Intermediate / adequate literacy | High literacy |
| I understand everything the doctor says during my appointment | 2.25±1.284 | 61.7% | 11.7% | 21.4% |
| I understand all the instructions printed on the leaflet attached to my medication | 2.55+1.478 | 61.7% | 10% | 28.3% |
| I understand the medical terms related to my state of health | 2.92±1.279 | 41.7% | 28.3% | 30% |

Table 2 shows that a marked percentage of subjects have low literacy with respect to understanding medical information related to their state of health. Respectively, the highest percentage of low medical literacy was expressed in relation to understanding the medical terms related to their state of health (30%), followed by understanding instructions printed in the leaflet attached to their medication (28.3%); the lowest percentage related to understanding the doctor’s words (21.4%). In other words, with respect to medical information, between one fifth and one third of subjects demonstrated low health literacy. These findings are also reflected in the average of the first two items being close to 2.5 and only the third item having an average above 2.5.

The third finding relates to the degree to which the subject is able to seek and obtain information and compare sources of information in order to make an informed decision (items 10, 11, 12) (Table 3). In this context it was determined that “to a very high degree” and “to a high degree” reflect a high level of literacy, the level, “to a moderate degree”, reflects intermediate/adequate literacy and the levels, “to a low degree”, or, “not at all”, reflect a low level of literacy. Similarly, an average above 2.5 for these items reflects a low level of literacy.

Table 3: Frequency of the ability to seek and obtain information and compare sources of information

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Mean±SD | Low literacy | Intermediate / adequate literacy | High literacy |
| I know how to obtain all the information I require and to understand my state of health | 2.83±1.330 | 35% | 18.3% | 46.7% |
| In know how to seek information about my state of health on the internet | 3.42±1.544 | 53.3% | 8.3% | 38.4% |
| I am accustomed to comparing the information I obtain from different sources in order to reach an informed medical decision that is the most appropriate for me | 3.52±1.513 | 30% | 13.3% | 56.7% |

Table 3 shows that a marked percentage of subjects have low literacy related to their ability to seek information, obtain it and compare sources of information. In this respect, the highest percentage of low health literacy was expressed in relation to the ability of the subject to search the internet for information on their state of health (53.3%), followed by the ability to obtain all of the information required to understand their state of health (35%); the lowest percentage was in relation to the ability to compare sources of information in order to reach an informed medical decision (30%). In other words, with respect to the ability to seek information, obtain it, and compare sources of information, one third to one half of the subjects had a low level of health literacy. This finding is also expressed by the means of all items being above 2.5.

The fourth finding relates to the degree to which the subject has difficulty reading medical information about their state of health, written in Hebrew or English (Table 4). In this context it was determined that “to a very high degree” and “to a high degree” reflect a low level of literacy, the level, “to a moderate degree”, reflects intermediate/adequate literacy and the levels, “to a low degree”, or, “not at all”, reflect a high level of literacy. Similarly, an average above 2.5 reflects a low level of literacy.

Table 4: Frequency of three levels of health literacy with respect to reading medical information in Hebrew and in English

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Mean±SD |  | Low literacy | Intermediate/ adequate literacy | High literacy |
| I have difficulty reading medical information about my state of health written in English | 3.53±1.503 |  | 63.3% | 13.3% | 23.4% |
| I have difficulty reading medical information about my state of health written in Hebrew | 2.58±1.510 |  | 23.3% | 16.7% | 60% |

Table 4 shows that there is a very high percentage of people with a low level of literacy reflected in the difficulty they experience reading medical information about their state of health in English (63.3%). Conversely, a much lower, but still notable, percentage of subjects have a low level of literacy as reflected in the difficulty they experience reading medical information about their state of health in Hebrew (23.3%). A low level of literacy in English and a low, but improved level of literacy in Hebrew is reflected in averages above 2.5 for both items.

This study also examined the relationships between demographic variables and different aspects of health literacy. In order to identify the relationships, we defined three new variables that express the overall average of each of the three variables that were examined in the study. In a Pearson correlation test to identify relationships with demographic variables it was found that only the items examining the ability to seek information, obtain it and compare sources of information (10, 11, 12) were related to knowledge of Hebrew and English and education (r=0.649). No significant relationships were found for the other two health literacy variables and the other demographic variables. In other words, it was found that a better ability to seek information, obtain information and compare sources of information was directly related to a higher level of education, better knowledge of Hebrew and better knowledge of English.

**Discussion and conclusions**

The aim of the research presented in this paper was to examine the level of health literacy among seniors (aged 65 and over) in Israel. The research hypothesis was that the level of literacy within this population would be low and would be characterized by a need for assistance from others to read or understand medical material, a low ability to understand medical explanations, and a low ability to seek and obtain medical information. The study also tested the hypothesis that every aspect of literacy in this population would be related to gender, education, state of health, ability to read in Hebrew and in English and the type of residence.

The study was conducted on a convenience sample of 60 men and women aged 65 and over who were sampled in two senior citizens’ clubs in the center of the country. The data were collected via a questionnaire that was formulated by the authors and based on other studies in this field.

The findings of this study provide evidence that indeed, the level of literacy among one fifth to one half of the subjects, respective of the aspects of literacy, is low. The subjects need assistance from others to read or understand medical material, have difficulty understanding medical explanations, and have difficulty seeking and obtaining medical information. Specifically, one fifth of the subjects reported difficulty understanding everything the doctor tells them, require assistance from others to understand, and have difficulty reading medical material in Hebrew. One third of the subjects report difficulty reading medical documents, completing medical forms, understanding medical terms related to their state of health and understanding the instructions printed on the leaflets attached to their medications. Two fifths of the subjects reported that they have difficulty completing medical forms and understanding their test results. Approximately two thirds reported difficulty reading medical information written in English.

Below we put our results into context in order to understand their significance. In the introduction to this paper we presented findings from a number of studies showing that many people have low health literacy (Levin-Zamir, 2006; Levin, HLS-EU Consortium, 2012; Baron-Appel & Elhiyani, 2013; Sørensen et al, 2013; Mehudar, 2014). Moreover, a number of studies showed that this percentage is particularly high within the elderly population (Sørensen et al, 2012, 2013; Protheroe et al, 2016). The findings of the present study also show that a significant proportion of subjects above the age of 65 have low health literacy. This level of literacy does not allow them to independently and intelligently comprehend and analyze written medical knowledge or knowledge conveyed to them by word of mouth.

Another finding of this study was that a better ability to seek information, find information and compare sources of information is directly linked to a higher level of education, better knowledge of Hebrew and better knowledge of English. In other words, an adequate level of health literacy that enables the patient not only to read and understand the medical material given to him, but also the ability to seek it independently and analyze it, is related to education and to a good understanding of Hebrew and English. These findings are consistent with the research literature (Sørensen et al, 2012, 2013; Protheroe et al, 2016).

A low level of health literacy among senior citizens may have negative consequences for their health, since limited health literacy prevents independent and high-quality management of their treatment of the disease, prevents use of medical services adapted to their disease, prevents use of preventative services and prevents access to knowledge about their rights as patients. Thus, limited literacy may cause deterioration in the state of health of senior citizens (Breinin & Netter, 2009; Peerson & Saunders, 2009, Kanj & Mitic, 2009; Berkman et al, 2011; Shalom & Farber, 2012; Weiss, 2012; Levin, Baron-Appel & Elhiyani, 2013), which may place an economic burden on the healthcare system.

Before stating the conclusions arising from this study we must note its limitations. The study was conducted on a relatively small sample of adults aged 65 and over. In order to obtain a more comprehensive and accurate picture of the level of health literacy of this population and of the potential consequences for this level of literacy on its health, a more comprehensive study must be conducted.

Nevertheless, even from this study we can conclude that among senior citizens aged 65 and over, a significant proportion of patients are characterized by inadequate health literacy. Therefore, all medical staff today should be alert and attentive to patients’ levels of health literacy and adapt the knowledge and information they convey to them in a way they can understand and be more able to manage the treatment of their health. For the short-term, medical staff should be taught how to determine a patient’s real level of medical comprehension. The long-term aim is to raise the level of health education in all health professions and in staff training in all medical organizations.

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**Appendix A**

Research questionnaire

Please rank your level of agreement with the following statements

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Very high | High | Moderate | Low | Very low |
| 1. I need assistance to read the hospital release letter or summary of the doctor’s appointment | 1 | 2 | 3 | 4 | 5 |
| 1. I need assistance to understand the doctor’s words | 1 | 2 | 3 | 4 | 5 |
| 1. I find it difficult to read medical information about my condition in English | 1 | 2 | 3 | 4 | 5 |
| 1. I find it difficult to read medical information about my condition in Hebrew | 1 | 2 | 3 | 4 | 5 |
| 1. I need assistance to complete medical forms | 1 | 2 | 3 | 4 | 5 |
| 1. I feel confident completing medical forms | 1 | 2 | 3 | 4 | 5 |
| 1. I understand everything the doctor tells me during an appointment | 1 | 2 | 3 | 4 | 5 |
| 1. I understand all the instructions printed on the leaflet attached to my medications | 1 | 2 | 3 | 4 | 5 |
| 1. I need others to assist me in understanding my test results | 1 | 2 | 3 | 4 | 5 |
| 1. I know how to obtain all the information I need to understand my state of health | 1 | 2 | 3 | 4 | 5 |
| 1. I know how to seek information about my state of health on the internet | 1 | 2 | 3 | 4 | 5 |
| 1. I am used to comparing information that I obtain from different sources in order to reach the most suitable medical decision for myself | 1 | 2 | 3 | 4 | 5 |
| 1. I understand the medical terms related to my state of health | 1 | 2 | 3 | 4 | 5 |



1. How would you define your ability to read in Hebrew?

1. Very good 2. Good 3. Fairly good 4. Not so good 5. Not good at all

15. How would you define your ability to read in English?

1. Very good 2. Good 3. Fairly good 4. Not so good 5. Not good at all

16. Age\_\_\_\_\_\_\_\_

17. Gender: 1. Male 2. Female

18. Education: 1. Below secondary 2. Secondary 3. Tertiary

19. State of health: 1. Very good 2. Good 3. Not good 4. Bad

20. Mother tongue

21. Do you live: 1. Alone 2. With a family member