



ORIGINAL RESEARCH ARTICLE

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## A SYSTEMATIC REVIEW OF FUNCTIONAL HEALTH LITERACY AND HEALTH OUTCOMES AMONG DIABETES TYPE II AND HYPERTENSIVE PATIENTS

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### ARTICLE INFO

#### Article History:

Received 09<sup>th</sup> June, 2017  
Received in revised form  
21<sup>st</sup> July, 2017  
Accepted 08<sup>th</sup> August, 2017  
Published online 29<sup>th</sup> September, 2017

#### Keywords:

Functional health literacy,  
Diabetes type II,  
Hypertension,  
Barriers,  
Interventions.

### ABSTRACT

Health literacy is a rapidly growing field involving interdisciplinary audience. Understanding the contributing factors and their influence on individual health literacy can help to assess their ability to take responsibility for one's own health as well as of one's family and community. Health literacy is an important domain to be considered while management of chronic diseases including diabetes and hypertension. The aim of this review paper is to systematically identify the barriers and interventions related to functional health literacy among diabetics and hypertensive patients in developed and developing countries as well as Pakistan in order to improve health literacy. A total of 62 studies were retrieved from databases related to functional health literacy among diabetes type II and hypertensive patients and systematically analyzed. The review concluded that extensive interventions are required to improve functional health literacy among chronic disease patients. Healthcare providers should recognize barriers related to functional health literacy such as inadequate health literacy level and social support. Interventions must be devised focusing on self-efficacy, patient satisfaction, coping skills, health literacy and perceptions of social support for management of chronic disease patients.

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Citation: Madeeha Malik, Madiha Khan and Azhar Hussain, 2017. "A systematic review of functional health literacy and health outcomes among diabetes type ii and hypertensive patients", *International Journal of Development Research*, 7, (09), 15209-15213.

### INTRODUCTION

The terms literacy and health literacy terms have been refined, defined and measured in a variety of ways over years. Health literacy field is growing rapidly broadening to involve more interdisciplinary audience (Berkman *et al.*, 2011). Understanding the contributing factors and their influence on individual health literacy can help to assess their ability to take responsibility for one's own health and that of one's family and community health. (Nutbeam, 2000). Different definitions of health literacy have been evolved through gradual process. The term health literacy was introduced for the first time in 1974, followed by a definition proposed by WHO in 1998 (Sørensen *et al.*, 2012). It is defined as "the cognitive and social skills which determine the motivation and ability of individuals to

gain access to, understand and use information in ways which promote and maintain good health" (Nutbeam, 2008). The term functional health literacy is defined as "the skills and ability to successfully complete health related tasks". Individual level attributes include abilities in prose, document, quantitative literacy, ability to engage in two way communication, skills in media and computer literacy, motivation to receive health information, and communicative assistance (Schwartzberg *et al.*, 2005). Health literacy is an important domain to be considered while management of chronic diseases including diabetes and hypertension (Baker, 2006). Perceived health status and knowledge regarding diabetes are considered important factors for glycemic control (Bains *et al.*, 2011; Schoenthaler *et al.*, 2009). Similarly better control of hypertension is attributed to better education level and effective

lifestyle modification in hypertensive patients (Zafar *et al.*, 2008; Ashfaq *et al.*, 2007). English language pronunciation is a major barrier for diabetes type II and hypertensive patients with limited health literacy in order to comprehend the information as English is the second language in most of the developing countries. This leads to non-compliance of patient with therapy as well results in ineffective management of the disease. The aim of this review paper is to systematically identify the barriers and interventions related to functional health literacy among diabetics and hypertensive patients by reviewing the past and present studies conducted in developed and developing countries as well as Pakistan.

## MATERIALS AND METHODS

The electronic databases PubMed, Google Scholar, and Science Direct, were searched for articles published from 1990 to 2015. The search terms used with each database were literacy, health literacy, functional health literacy, diabetes and hypertension. Full-text papers, as well as abstracts, were retrieved and included in review. A total of 62 studies were retrieved from databases related to functional health literacy among diabetes type 2 and hypertensive patients. The inclusion criterion for the studies was (a) studies on functional health literacy of diabetes type 2 and hypertensive patients (b) interventional studies on functional health literacy (c) studies with reported intervention strategies to improve health outcomes (Table 1). Exclusion criteria were (a) Studies with non-adults (b) Review articles.

## RESULTS AND DISCUSSION

### Functional Health Literacy and its Domains

Functional health literacy is divided into three main domains. The first domain is social support. Association with social support in diabetes self-care and glycemic control has been reported with an indirect effect on health literacy. A study from USA reported that by enhancing social support in patients with limited health literacy can improve glycemic control and diabetes self-care (Osborn *et al.*, 2010). The second domain is medication knowledge and adherence. Patients who possess basic understanding of socio-demographic factors and diseases knowledge usually adhere more to their medication. A study conducted in Palestine reported that health care costs can be minimized and better clinical outcomes can be achieved by improving medication adherence (Najjar *et al.*, 2015). The third domain of functional health literacy is reading, oral communication, pronunciation and word recognition skills. REALM (Rapid estimate of adult literacy in medicine) is a tool most widely used to measure functional health literacy for assessment of individual reading and oral communication skills to understand and use of health related material. A study reported reading fluency as more important variable than education while examining the association between socioeconomic status and health. Furthermore, inadequate health literacy measured by reading fluency was reported as important factor contributing to death and mortality among elderly cardiovascular patients in USA (Baker, 2006).

### Barriers to Functional Health Literacy

One of the major barriers to functional health literacy is inadequate health literacy. Mostly patients who have limited health literacy cannot adhere to standardize instructions as

given with the universal medication schedule and task centered strategies. The instructions on prescription medication labels are not understood properly due to low literacy and greater number of prescription medication (Walker *et al.*, 2010). A study conducted in United States reported that patient do not have comprehensive understanding of elevated systolic blood pressure as well their current status of blood pressure control (Oliveria *et al.*, 2005). Similarly another study conducted in USA reported functional health literacy as major barrier towards appropriate medication adherence among chronic disease patients (Williams *et al.*, 1998). Another study reported inadequate health literacy leading towards high rate of retinopathy due to worse glycemic control (Wolf *et al.*, 2011). Similarly various studies identified that patients do not have comprehensive understanding of their condition although their general knowledge and awareness regarding disease was adequate. This highlighted the need of assessment of general health literacy among community prior to formal testing of their disease knowledge (Oliveria *et al.*, 2005; Davis *et al.*, 2006, Ishikawa *et al.*, 2008; Jones *et al.*, 2011). Low health literacy can be improved by effective educational interventions. Use of information and communication technology can help to intervene the effect of limited health literacy (Paasche-Orlow *et al.*, 2006; Wolf *et al.*, 2011). The second major barrier contributing to low functional health literacy is poor refill adherence. Lack of appropriate communication was reported to be associated with inadequate cardio metabolic medication refill adherence. However, this could be improved by enhancing the communication skills of clinicians with their patients (Gazmararian *et al.*, 2003). Another important barrier towards functional health literacy is poor self-efficacy and management skills. Self-efficacy and disease management skills play an important role along with adequate health literacy in achieving better disease outcomes. A study conducted in USA highlighted that disease management skills, health literacy and general numeracy skills helped to improve glycemic control among diabetes patients (Osborn *et al.*, 2003). Beside this self-empowerment is also important element in managing chronic disease like diabetes. A study conducted in Iran highlighted that better patient counseling and involvement in their treatment plans improved their psychology which influenced their current health status (Tol *et al.*, 2012).

### Tools used for Functional Health Literacy Screening

A cross-sectional study reported that S-TOFHLA measured literacy is not associated with self-reported diabetes complication glycated hemoglobin, blood pressure and lipid levels in elderly diabetes patients with good glycemic control (Kirk *et al.*, 2012). Another study highlighted low ability of elder population to complete and understand S-TOFHLA indicating the use of other instruments in measurement of health literacy among elder patients (Morris *et al.*, 2006). However, a study conducted in USA reported S. Tofhla appropriate for measuring health literacy for all literacy levels (Kirk *et al.*, 2012; Morris *et al.*, 2006). Inadequate reading skills among patients can be identified through a screening instrument known as REALM. REALM is a quick screening tools used by the physicians to identify limited reading skills. It has been reported as a practical instrument with standardized reading tests and proven validity in United States. REALM is a 66 item tool including pronunciation, word recognition and vocabulary domains. It predicts knowledge, behavior and outcomes (Davis *et al.*, 1993).

Table 1. Characteristics of included studies

Characteristics	Number of papers	Countries
Assessment of health literacy	41	USA, Australia, UK, Japan, Germany, Belgium, Switzerland, Sweden, Canada, Denmark, Greece, Spain, Italy, South Korea, Finland, Ireland, Netherlands, Turkey, China, South Africa, Cyprus, Croatia, Ghana, Ethiopia, Malaysia, India, Taiwan, Brazil, Iran, Saudi Arabia, Qatar, Austria, Eritrea, Jordan, Israel Pakistan
Interventional studies	10	USA, Australia, UK, Japan, Germany, Belgium, Switzerland, Sweden, Canada, Denmark
Reported intervention strategies	11	USA, Australia, UK, Japan, Germany, Belgium, Switzerland, Sweden, Canada, Malaysia, India, Saudi Arabia

### Relationship between Functional Health Literacy and Chronic Diseases

Disease knowledge is associated with low health literacy. Many chronic disease patients with low health literacy face problems in managing their illnesses. Majority of them believe they are controlling disease very well or they may less likely to improve control due to limited health literacy. Health care providers must consider health literacy level while setting treatment goals for the patient (Woodard *et al.*, 2014). A study reported low health literacy significantly associated with inadequate disease knowledge and poor glycemic control (Powell *et al.*, 2007). A study conducted in Nepal reported that counseling regarding preventive strategies and life style modification can improve functional health literacy and better disease outcome among cardiovascular patients (Oli *et al.*, 2014). A study conducted in Kenya reported poor knowledge, attitude and practice of diabetes patients due to inadequate health literacy (Maina *et al.*, 2010). Similarly a study from Nepal reported that although the community was aware regarding diabetes and hypertension but lack in-depth regarding control and self-efficacy of the disease. The need of health literacy program was highlighted to change the behavior and correct status of health among the community (Gautam *et al.*, 2015). A study reported that patients with marginal health literacy achieved good glycemic control (Al Sayah *et al.*, 2013). A study reported correlation among health education and adequate health literacy. Patient with adequate health literacy showed better in self-management behaviors (Macek *et al.*, 2010). A study conducted in Pennsylvania highlighted the need of improving literacy level for improvement of health literacy among out reached patients (Chen *et al.*, 2014).

### Role of Healthcare Professionals in Improving Functional Health Literacy

Patient recall and comprehension of new concepts are rarely assessed among patients having chronic diseases and low functional health literacy by the primary care physician. Beside this effective prescriber-patient interaction is the neglected part. Patient self-management can be improved through patient center approach focusing on better patient counseling resulting in better patient understanding and self-efficacy skills (Schillinger *et al.*, 2003). Similarly a study conducted in Israel highlighted the need of assessment of reliability of information sources used by the patients during self-management (Levin-Zamir *et al.*, 2001). A study conducted in Mexico highlighted the involvement of primary care providers with individual patient to self-manage diabetes type II and hypertension presenting different factors and barriers translating into effective self-management of disease (Fort *et al.*, 2013).

### Impact of Educational Intervention on Functional Health Literacy

Effective patient education can enhance patient self-care skills and health literacy to avoid complications and improve disease

control among diabetes patients. There is need to identify health issue among community to create culturally, language and literacy sensitive health education material ensuring their acceptability among community. Inadequate literacy level was reported as major barriers towards functional health literacy in China. Moreover families with lower income frequently seek more health knowledge than rich families. Thus, different educational interventions focusing families with different qualification and income level were adopted which showed improved health literacy and health seeking behavior (Yuan *et al.*, 2015). An effective educational model comprising of counseling and routing individual teaching in majority of diabetes patients might not be adequate to improve disease knowledge and health literacy (Rafique *et al.*, 2006). Use of information technology can be an effective tool if used along education strategies. A study reported use of diabetes education computer multimedia application significantly increased diabetes knowledge among patient with low literacy level but having high computer skills (Gerber *et al.*, 2015). Another study from USA also reported multimedia diabetes education programs in improving the overall knowledge of patients with low health literacy regarding disease and its complications (Kandula *et al.*, 2009).

### Overview of Functional Health Literacy among Chronic Disease Patients in Pakistan

The prevalence of chronic diseases has been increasing at an alarming rate in Pakistan. According to Pakistan National Health Survey (PNHS) prevalence of hypertension and diabetes has been increased 10 fold during the last decade with more dominance among females and urban population. Pakistan ranks at 160th in terms of literacy among the total countries of the world. The literacy rate of the country is 55 percent with the inclusion of those who can just read or write their names as literate; thus having the lowest literacy rate in the world. Approximately 3.8 million people residing in Punjab being the biggest province in terms of population are illiterate. Literacy has been reported to have significant association with knowledge and practice of patients having chronic diseases. Few studies have been conducted in Pakistan which reported poor health literacy and disease knowledge. A study conducted in Pakistan reported poor knowledge regarding hypertension patient due to limited health literacy (Zafar *et al.*, 2008). Similarly better qualification level was attributed with better hypertension control in middle class community residing in Karachi. However, increased awareness regarding life style modification can help to improve functional health literacy (Ashfaq *et al.*, 2007). Another study conducted in Karachi reported that one third of the diabetes patients had poor knowledge regarding foot care. They lack self-efficacy and management skills highlighting the need for improving functional health literacy (Saeed *et al.*, 2007). Another study conducted in Karachi, reported inadequate knowledge and modifiable risk factor of heart disease among Pakistani population (Khan *et al.*, 2006). Health literacy along with

functional health literacy is neglected area in Pakistan. Even the educated patients in Pakistan have inadequate understanding of their prescription. Effective prescriber-patient communication is missing. Healthcare professionals rarely provide counseling or involve patients in decision making process while setting their treatment goals. Effective educational strategies involving patient focus approach, use of technology and massive media campaign is much required to improve health literacy particularly functional health literacy of patients having chronic diseases in Pakistan (Ulvi *et al.*, 2009).

### Conclusion and Recommendations

The review paper concludes that although there is an adequate level of functional health literacy among chronic disease patients such as type 2 diabetics and hypertensive in developed countries but the level of health literacy in most of the developing countries as well as Pakistan is low. Healthcare providers should recognize barriers related to functional health literacy including inadequate health literacy and social support. Care of diabetes and hypertensive patients can be even more challenging when they have limited print and numerical literacy skills. Prescribers and pharmacists must ensure that they provide easy to understand information and minimize unnecessary complexity when developing patient care plans. Intervention studies must be designed to assess expanded role for educated consumers interacting with responsive health care teams for better control of chronic diseases. Interventions must be devised focusing on self-efficacy, patient satisfaction, coping skills, health literacy and perceptions of social support for management of chronic disease patients. Extensive research must be conducted to identify the gaps between expectations and the actual performance of behaviors related to participation in health care and prevention of diseases especially chronic diseases.

### Conflict of Interest

The authors declare no conflict of interest.

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