

## Relationship of functional health literacy to patients' knowledge of their own chronic diseases- an Indian perspective

Khushboo Aildasani<sup>1</sup>, Nitin Sharma<sup>2\*</sup>, Navinchandra M. Kaore<sup>3</sup>

<sup>1</sup>Student 2Year, <sup>2</sup>Assistant Professor, <sup>3</sup>Professor and Head, <sup>1,2</sup>Dept. of General Medicine, <sup>3</sup>Dept. of Microbiology, Raipur Institute of Medical Science, Raipur, Chhattisgarh, India

**\*Corresponding Author: Nitin Sharma**

Email: doc\_Nitin@hotmail.com

### Abstract

**Introduction:** Functional Health Literacy is an emerging topic of healthcare system which analyses a person's ability in two aspects-reading and numeracy and is believed to affect patient's health through a number of parameters.

**Objective:** The objective of the study is to establish the relation between functional health literacy of patients and the knowledge of their chronic diseases.

**Materials and Methods:** Total 50 patients were included in the study suffering from diabetes or hypertension or both for more than six months which reported to the General Medicine department of the two tertiary care hospitals. The patients were assessed for their functional health literacy level and knowledge about their disease by using an instrument Rapid Estimate of Adult Literacy in Medicine-Short Form (REALM-SF) and providing separate questionnaires for diabetes and hypertension respectively. The data collected from the above study was maintained in the MS Excel sheet and analysed using the test of proportion and significance.

**Result:** Out of total 50 patients, 27 patients were suffering from diabetes and 16 of hypertension whereas 7 of both diabetes and hypertension. 14/50(28%), 17/50(34%) and 19/50(38%) patients were found to be with inadequate, marginal and adequate health literacy respectively. The literacy scores were correlated with the knowledge in patients of hypertension and diabetes using Pearson's Chi Square test of significance which was found to be highly significant with chi square value of 19.06 and 18.69 for hypertension and diabetic patients respectively with p value of <0.001. **Conclusion:** The functional health literacy is related with the knowledge of the patients about their chronic diseases which can further affect patients' health status and disease outcomes and complications.

**Keywords:** REALM-SF, Adult health literacy, Diabetes, Hypertension.

### Introduction

Patients with chronic diseases like diabetes and hypertension need to have a proper knowledge about their disease for control and management of the disease. Proper management of diabetes is mainly accomplished by a healthy diet, exercise, weight loss and use of appropriate medications. Other important methods for controlling diabetes include insulin injections and regular monitoring of blood glucose level.<sup>1,2</sup> For hypertension, lifestyle changes like weight loss, decreased salt intake, physical exercise and healthy diet help in decreasing the blood pressure.<sup>3</sup> Self-monitoring may support the use of other strategies to control blood sugar levels and medications should be implemented only by a stepped care approach when target levels are not reached.<sup>4</sup>

Health literacy has been shown to be associated with health status in people with chronic illness. The recent World Health Organisation report suggests that over 19% of the world's diabetic Population currently resides in India.<sup>5</sup> Learning about the disease and actively participating in the treatment is important, since complications are far less severe in people who have well managed blood sugar levels.<sup>6,7</sup> Acceptance of their diagnosis by patients is an important part of their education.<sup>8</sup>

Despite the availability of health education materials with relatively consistent content, many of them are at too high level for low- literate patients to comprehend essential points.<sup>9-13</sup> Because of their poor health status, patients with low literacy skills are likely to have even greater educational needs.

Functional Health Literacy (FHL) is the degree to which individuals have the capacity to obtain, process and understand basic health information needed to take suitable health decisions.<sup>14</sup> FHL is influenced by health/ educational systems, media, family, work, community etc.<sup>15</sup> There are 36 health literacy assessment instruments identified, out of which Test of Functional Health Literacy in Adults (TOFHLA) and Rapid Estimate of Adult Literacy in Medicine (REALM) are the most frequently used.<sup>16</sup>

REALM measures a patient's ability to pronounce 66 common medical words and lay terms for body parts and illness.<sup>17</sup> It is designed to assess medical professionals in estimating a patient's literacy level of patient education materials or instructions may be used. It can be administered in one to two minutes by personnel with minimal training. It displays excellent concurrent validity with standardized reading tests, and can be used as a practical instrument for busy primary care settings.<sup>17</sup>

Rapid Estimate of Adult Literacy in Medicine –Short Form (REALM-SF) is the short form of REALM. It is a 7-item word recognition test to provide clinicians with a valid quick assessment of patient health literacy. In this, the patients are given 7 medical terms which are used by practitioners to read out loud and recognize.<sup>18</sup>

As diabetes and hypertension are very prevalent diseases in India, the study focuses on these two diseases. The study was performed to find whether patients' knowledge of the disease, from which they are suffering, is related to the health literacy level they have. This is to improve the health quality of the patients with chronic

diseases and prevent the complications of the disease by providing them specific guidelines to follow to manage the disease.

**Materials and Methods**

The study was conducted on the patients suffering from diabetes and hypertension reporting to the OPD/IPD of General Medicine departments of two hospitals situated in Raipur in the span of two months (June- August 2018) after obtaining approval from the Institutional Ethics Committee. (RIMS/IEC- 2018/007). A total of 50 patients diagnosed for over 6 month from Diabetes Mellitus Type I or II, Hypertension, or both were enrolled for the study. The patients suffering from other chronic illness & psychiatric illness were excluded so also the patients who lack basic understanding of Hindi and English language. Written informed consent was taken before estimation their health literacy or knowledge about the disease.

**Estimation of Patients' Functional Health literacy Level**

The tool used for estimating patient's health literacy level was 'Rapid Estimate of Adult Literacy in Medicine- Short Form' (REALM-SF). It is a 7- item word recognition test to provide clinicians with a valid quick assessment of patient health literacy.<sup>18</sup> Enrolled patients were given 7 words like fever, exercise, jaundice, anemia etc. that clinicians often use and patients do not understand. And were asked to read the words out loud. They were allowed to say pass if they do not recognize the word or do not understand its pronunciation and move to the next word. They were given 5 seconds to respond to each word. If the patients fail to answer within 5 seconds, they were asked to move to the next word. The scoring of REALM-SF was classified into 3 categories, i.e., inadequate, marginal and adequate. Patients scoring 0 were categorized under inadequate, those scoring between 1- 6 were put under marginal and those scoring 7 were placed under adequate health literacy level.

**Estimation of Patient's knowledge of their Chronic Diseases**

This was assessed using questionnaires on diabetes and hypertension containing 10 and 8 questions respectively.

The questionnaire included questions based on the general knowledge of the disease like normal and raised blood sugar levels, dietary modifications necessary for controlling blood sugar level in case of diabetes and normal and raised blood pressure levels, lifestyle changes necessary for controlling blood pressure in case of hypertension. The questionnaires were available in two languages i.e. Hindi and English. More than 60 percent score was taken as adequate which accounts to 7 & more for diabetes and 5 & more for Hypertension.

The data collected from the patients using REALM-SF score sheet and questionnaires were maintained in the Microsoft Excel. The relationship between the functional health literacy and knowledge of the patients about their disease was analyzed using Pearson's Chi square test of significance.

**Observations and Result**

The study included 50 patients who reported to the General Medicine department of the hospitals, out of which, 27 were males and 23 were females. The number of diabetes patients in the study were 27, hypertension patients were 16 and 7 patients were suffering from both diabetes and hypertension.

The number of patients with inadequate, marginal and adequate health literacy using REALM-SF score sheet were found to be 14/50(28%), 17/50(34%) and 19/50(38%) respectively. The mean knowledge score of hypertension patients based on their health literacy level was found to be 3, 6 and 6.5 and of diabetes patients was found to be 3, 6.5 and 7.5 for inadequate, marginal and adequate health literacy levels respectively. The percentage of patients answering correctly to a question was evaluated on the basis of health literacy level. [Table 1 & 2]. The literacy scores were then correlated with the knowledge in patients of hypertension and diabetes using Pearson's Chi Square test of significance. [Table 3 & 4]. In both the cases it was found to be highly significant with chi square value of 19.06 and 18.69 for hypertension and diabetic patients respectively with p value of <0.001.

**Table 1:** Percentage of patients correctly answering questions of hypertension

Patient knows that	Inadequate health literacy (n=6)	Marginal health Literacy (n=6)	Adequate health literacy (n=11)
130/80 mm Hg is normal blood pressure	1(16.6%)	4(66.6%)	8(72.7%)
Exercise lowers blood pressure	3(50%)	4(66.6%)	8(72.7%)
Low salt diet lowers blood pressure	5(83.3%)	6(100%)	11(100%)
Weight loss helps in hypertension	1(16.6%)	4(66.6%)	9(81.8%)
Smoking and alcohol contributes in hypertension	1(16.6%)	2(33.3%)	10(90.9%)
160/90 is high blood pressure	2(33.3%)	4(66.6%)	11(100%)
Medications are necessary to maintain blood pressure on regular basis	4(66.6%)	5(83.3%)	10(90.9%)
Hypertension increases risk of cardiac diseases	2(33.3%)	5(83.3%)	10(90.9%)
Mean Knowledge Score	3	6	6.5

**Table 2:** Percentage of patients correctly answering questions of diabetes

Patient knows that	Inadequate health literacy (n=11)	Marginal health literacy (n=12)	Adequate health literacy (n=11)
Diabetes is not a contagious disease	6(54.5%)	10(83.3%)	10(90.9%)
Target blood sugar level in diabetes is 120g/dl (fasting) and 140g/dl (postprandial)	2(18.18%)	7(58.3%)	10(90.9%)
Weight loss helps in controlling diabetes	4(36.3%)	9(75%)	10(90.9%)
Exercise is helpful in diabetes	3(27.2%)	9(75%)	11(100%)
Diabetes does not only affect fat people	1(9.09%)	8(66.6%)	8(72.7%)
It is healthy to eat fruits in diabetes	1(9.09%)	7(58.3%)	9(81.8%)
Dietary modifications help in controlling diabetes	9(81.8%)	12(100%)	11(100%)
Diabetes is not completely curable	5(45.4%)	7(58.3%)	7(63.6%)
If you feel thirsty, weak, and tired, it means your blood glucose level is high	6(54.5%)	10(83.3%)	10(90.9%)
If you feely sweaty, shaky and hungry, it means your blood glucose level is low	2(18.18%)	3(25%)	5(45.5%)
Mean Knowledge Score	3	6.5	7.5

**Table 3:** Comparison between functional health literacy levels in patients of hypertension

	Inadequate health literacy	Marginal health literacy	Adequate health literacy	Total	Chi Square test, degree of freedom and p value	Significance
Inadequate knowledge	6	1	0	7	$\chi^2 (2) - 19.064, df-2, p<0.001$	Highly Significant
Adequate knowledge	0	5	11	16		
Total	6	6	11	23		

**Table 4:** Comparison between functional health literacy levels in patients of diabetes

	Inadequate health literacy	Marginal health literacy	Adequate health literacy	Total	Chi Square test, degree of freedom and p value	Significance
Inadequate knowledge	11	5	1	17	$\chi^2 (2) = 18.697, df- 2, p<0.001$	Highly significant
Adequate knowledge	0	7	10	17		
Total	11	12	11	34		

**Discussion**

In our study, a total of 50 patients were included which were suffering from diabetes, hypertension or both. These were categorized into inadequate, marginal and adequate health literacy level based on their score in the REALM-SF literacy test. 28% patients were found to be with inadequate literacy level, 34% with marginal literacy level and 38% were found to be with adequate literacy level. Another study conducted by IZARD et al. in 2014 in United States of America included REALM-SF where they found the Mean score in the test to be 6.8 which is equivalent to high health literacy.<sup>19</sup>

Other studies including REALM long form were Rathnakar U.P et al., Health Literacy Status, which showed that more than 50% patients had adequate health literacy level and remaining with low health literacy level,<sup>20</sup> Coughlan et al., 2012 which showed 19.1% patients with low health literacy, and 80.9% with high health literacy<sup>21</sup> and Sleath et al., 2014 who found that 14.5% patients were

with low health literacy and 83.3% patients with high health literacy.<sup>22</sup>

Also, in a study by Mark V. Williams et al., which used TOFHLA as health literacy assessment tool, 49% hypertensive patients were found to be with inadequate health literacy, 12% were with marginal and 39% with adequate health literacy. In case of diabetes, 44% patients were found to be with inadequate health literacy and 11% and 45% were found to be having marginal and adequate health literacy respectively.<sup>23</sup>

The advantage of using REALM-SF in our study was rapid screening of the patients for their health literacy level which provide brief, validated results and took approximately 35 seconds to administer in each patient. The limitation of using REALM-SF is that it only assesses the reading ability of medical terms of a person while TOFHLA uses both reading and numeracy for health literacy

assessment. Also, REALM long form comprising 66- words can also be used for more accurate results than REALM-SF.

In our study, the patients' knowledge was assessed by providing questionnaires to them on diabetes and hypertension containing 10 and 8 questions respectively. The patients with inadequate knowledge rate were found to be 6/6 (inadequate), 1/6 (marginal) and 0/11 (adequate) while those with adequate knowledge rate were 0/6 (inadequate), 5/6 (marginal) and 11/11 (adequate) in case of hypertension. In case of diabetes, the patients with adequate knowledge rate were 0/11 (inadequate), 7/12 (marginal) and 10/11 (adequate).

In our study, the correlation was determined between the knowledge of the patients of diabetes and hypertension and their functional health literacy level using the Pearson's Chi Square test and the value of Chi Square was found to be  $\chi^2 (2) = 19.064$ ,  $p < 0.001$  and  $\chi^2 (2) = 18.697$ ,  $p < 0.001$ . The study was highly significant and the functional health literacy was found to be correlated with the knowledge of the patients.

The mean score of patients with inadequate, marginal and adequate health literacy in diabetes was found to be 3, 6.5 and 7.5, while that in hypertension was 3, 6, and 6.5. A study performed by Mark V. Williams et al., 1998, showed mean scores of diabetic patients with adequate health literacy was  $8.1 \pm 1.6$ , while that of patients with inadequate and marginal health literacy were  $5.8 \pm 2.1$  and  $7.1 \pm 2.0$ . The mean scores of hypertensive patients with adequate, marginal and inadequate health literacy was found to be  $16.5 \pm 2.3$ ,  $15.2 \pm 2.2$  and  $13.2 \pm 3.1$  respectively.<sup>23</sup>

Thus it can be concluded that knowledge of patients about their chronic diseases is affected by their health literacy level and thus their health management and preventive measures are affected. According to Mark V. Williams et al., inadequate knowledge about the effect of diet and weight on blood pressure may contribute to the poor blood pressure controls and lack of knowledge about the symptoms of hypoglycaemia and hyperglycaemia and its treatment may be life threatening.<sup>23</sup>

According to a study by Woolridge KL et al., other factors like patients' health beliefs may also affect adherence and disease outcomes.<sup>24</sup> A study by S. Plimpton et al. stated that half the adult population needs easy-to-read materials and low-literate patients cannot fully comprehend medical advice using standard patient education methods.<sup>25</sup>

## Conclusion

The study has established the relationship between the functional health literacy of patients having chronic diseases and their knowledge about the disease which can affect the management of the disease and other preventive measures to be taken in chronic diseases. This study can be used to improve the health conditions of the patients by providing them requisite knowledge about their diseases and methods to control their disease outcomes in a large population. This can benefit the society in decreasing complications and disease prevalence in the community at large.

## Acknowledgement

We would like to acknowledge the ICMR for choosing the topic under short-term studentship program. We would also like to thank the committee of Agrawal Hospital, Raipur for allowing us to do the research in their hospital. Also we would like to acknowledge Statistician cum tutor, Ms. Manisha D. Tembhekar and Mr. Pasang Tshering, Assistant Professor, Physiology Department for helping through statistical analysis.

**Conflict of Interest:** None.

## References

1. American Association of Diabetes Educators. AADE. Position statement: individualisation of diabetes education and management. *Diabetes Educator* 1995;21:105-6.
2. American Diabetes Association. National standards for diabetes self-management education programs and American Diabetes Association review criteria. *Diabetes Care*. 1996;19:5114-8.
3. Poulter, NR; Prabhakaran, P; Caulfield, M (22 August 2015). "Hypertension". *Lancet* 386(9995):801-12.
4. Glynn, Liam G; Murphy, Andrew W; Smith, Susan M; Schroeder, Knut; Fahey, Tom. Interventions used to improve control of blood pressure in patients with hypertension. *Cochrane Database Systemic Rev* (3) ecd005182.
5. Wild S, Roglic G, Green A, Global Prevalence of diabetes, estimate for the year 2000 and projections for 2030. *Diabetes Care* 2004;27:1047-53.
6. Nathan DM, Cleary PA, Backlund JY, Genuth SM, Lachin JM, Orchard TJ, Raskin P, Zinman B et al. Intensive Diabetes Treatment and Cardiovascular disease in patients with type 1 diabetes. *New England J Med* 353(25):2643-53.
7. The Diabetes Control; Complications Trial Research Group. The effect of intensive diabetes therapy on the development and progression of neuropathy. *Annals Internal Med* 122(8):561-68.
8. Grueninger UJ, Arterial Hypertension: lessons from patient education. *Patient Educ Counsel* 1995; 26:37-55.
9. Leitcher S, Nieman J, Moore R, Collins P, Rhodes A. Readability of self-care instructional pamphlets for diabetic patients. *Diabetes Care* 1981;4:627-30.
10. Boya M, Citro K. Cardiac patient education literature: Can patients read what we give them? *J Card Rehab* 1983;3:513-538.
11. Meade C. Byrd, J. Patient literacy and readability of smoking education literature. *Am J Public Health* 1989;79:204-206.
12. Davis T., Crouch M, Willis G, Miller S, Adbehoub. The gap between patient reading comprehension and the readability of patient education materials. *J Fam Pract* 1990;31:533-8.
13. Dixon E, Park r. Do patients understand written health information? *Nurs Outlook* 1990;38:278-86.
14. Ratzan SC, Parker RM. 2000. Introduction. In: National Library of Medicine Current Bibliographies in Medicine: Health Literacy. *NLM Pub CBM* 2000-1.
15. Passamai Maria da Penha Baiao, Sampaio Helena Alves de Carvalho, Dias Ana Maria Iorio, Cabbral Lisidna Almeida. Functional health literacy: reflections and concepts on its impact on the interaction among users, professional and the health system. *Interface* (Botucatu) [Internet]. 2012;16(41):301-14.
16. Marques Suzana Raquel Lopes, Lemos Stela Maris Agniar. Health Literacy assessment instruments: literature review. *Audiol Commun Res* [Internet]. 2017;22:e1757.
17. Davis TC et al. Rapid Assessment of literacy levels of adult primary care patients. *Family Med* 1991;23:433-5.

18. Arozulla AM, Yarnold PR, Bennett CL. Development and validation of a short form, rapid estimate of adult literacy in medicine. *Med Care* 2007;45(11):1026-33.
19. IZard, Hartzler A, Avery DI, Shih C, Dalkin BL, Gore JL et al. User-centered design of quality of life reports for clinical care of patients with prostate cancer. *Surg* 2014;155(5):789-96.
20. Rathnakar U.P, Madhuri B., Ashwin K, Unnikrishnan B, Ashok SK, Udupa AL. Evaluation of health literacy status among patients in a tertiary care hospital in Coastal Karnataka, India. *J Clin Diagn Res* 2013;7(11):2551-4.
21. Coughlan D, Sahn L, Byrne S. The importance of health literacy in the development of 'Self Care' cards for community pharmacies in Ireland. *Pharm Pract* 2012;10(3):143-50.
22. Sleath BL, Blalock SJ, Muir KW, Carpenter DM, Lawrence SD, Giangiacomo AL et al. Determinants of self-reported barriers to glaucoma medicine administration and adherence: a multisite study. *Ann Pharmacother* 2014; 48 (7):856-62.
23. Mark V. Williams, MD; David W. Baker, MD, MPH; Ruth M. Parker, MD; Joanne R. Nurs, PhD. Relationship of functional health literacy to patients' knowledge of their chronic disease. *Arch Intern Med* 1998;158(2):166-72.
24. Woolridge KL, Wallston KA, Graber AL, Davidson P. The relationship between health beliefs, adherence, and metabolic control of diabetes. *Diabetes Educ* 1992;18:495-500.
25. Plimpton S, Root J. Materials and strategies that work in low literacy health communication. *Public Health Rep* 1994;109:86-92.

**How to cite this article:** Aildasani K, Sharma N, Kaore NM. Relationship of functional health literacy to patients' knowledge of their own chronic diseases- an Indian perspective. *J Community Health Manag* 2019;6(2):59-63.