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Original Article

Impact of Functional Health Literacy in Chronic Disease Management: The Public Health Dilemma in Pakistan

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ABSTRACT

Inadequate health literacy among patients of chronic diseases may lead to inappropriate use of medicine, low adherence to medication and lack of functional social support. **Objective:** The present study was designed to assess performance of functional health literacy among hypertensive and diabetes type II patients in Pakistan. **Methodology**: A descriptive cross-sectional study design was used. A pre-validated tool Rapid Estimate of Adult Literacy in Medicine (REALM) was self-administered to a sample of 382 diabetic and hypertensive patients treated in public and private healthcare facilities in two cities of Pakistan. After data collection, data was cleaned coded and entered in SPSS version 21.0. Descriptive statistics comprising of frequency and percentages was calculated. Mann-Whitney and Kruskal-Walis ($p \geq 0.05$) were performed to find out the difference among different variables. **Results:** The results of the present study showed poor functional health literacy among diabetic and hypertensive patients in Pakistan. The composite mean scores for functional support (2.54, ± 1.752) and adult literacy (1.76, ± 2.304) were low whereas readiness ruler was (6.86, ± 7.00) which indicated positive approach of the patients to change. **Conclusion:** The results of the present study concluded poor health literacy and inadequate perceived functional social support among diabetic and hypertensive patients in Pakistan. Healthcare providers should recognize inadequate health literacy and social support as foremost barriers to be addressed towards patient non-compliance.

Keywords: Functional health literacy, diabetes type II, hypertension, quality of care, Pakistan

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INTRODUCTION

Functional health literacy is comprised of skills that allow an individual to read consent forms, medicine labels and health care information as well as allow him/her to understand written and oral information provided by the physicians, nurses, pharmacists, or other health care professionals. Beside this functional health literacy also help an individual to follow directions by taking medication correctly, adhering to self-care at home and keeping appointment schedules [1]. Assessment of health literacy including mental, cognitive, communicative and psychological skills of patients especially for chronic diseases like diabetes and hypertension is an important area to be addressed for health promotion [2].

The prevalence of chronic diseases such as diabetes type II and hypertension have been increasing at an alarming rate worldwide. Both diseases have become a global concern especially in developing countries. The cost of spending on the medicines has been increased in these countries leading to increased morbidity and mortality rate [3]. Inadequate health literacy effects health and clinical outcomes. Poor health literacy has been reported common among patient with chronic disease, racial and ethnic minorities and elderly persons resulting in inappropriate use of medicine, low adherence to medication and lack of functional social support [4].

Different barriers related to functional health literacy among adults might be linked to functional disability. English language is also another important barrier towards appropriate pronunciation and comprehension for patients especially from developing countries including Pakistan [5]. Identifying these problems faced by diabetic and hypertensive patients can improve their medication knowledge and adherence resulting in better self-management of their diseases. Improved understanding and numeracy skills are required in diabetic and hypertensive patients so they could be able to read and comprehend information for appropriate use of their medication [6].

Extensive research is required to provide baseline data regarding current status and barriers effecting functional health literacy among patients having chronic diseases in Pakistan. Therefore, the present study was designed to assess performance of functional health literacy including functional social support, patient willingness or readiness to change, medication knowledge and adherence among hypertensive and diabetes type II patients in Pakistan.

METHODOLOGY

A descriptive cross-sectional study design was used to assess the performance of functional health literacy of hypertensive and diabetes type II patients in Pakistan. National bioethical committee is present for this type of research and it states that only institutional head approval is required for this type of study [7]. Moreover in Pakistan, questionnaire-based studies do not need any endorsement from Ministry of Health. Despite that, prior information was sent to the Ministry of Health, Government of Pakistan for the execution of this research. For data collection approval from MS of the hospitals and respective prescribers was taken. Informed and verbal consent for participation was also taken from the respondents. Respondents were ensured for the confidentiality of information verbally as well as confidentiality under taking was signed by the principal investigator. Study site for this research included public and private healthcare facilities, community pharmacies and clinics located in twin cities of Pakistan. The sampling frame comprised of diabetes type II and hypertensive patients treated in private and public sector hospitals, clinics and community pharmacies. Patients suffering from diabetes type II and hypertension and aged 20 years or above were included in the study. Patients aged less than 20 years and with qualification less than matriculation were excluded from this study.

Sample Size and Sampling Procedure: Calculation of sample size was performed by using Rao soft sample size calculator to determine the size of sample representing the population of diabetes type 2 and hypertensive patients. Sample size was calculated as 382 to achieve 95 % confidence interval with 5% margin of error. As no list of diabetic and hypertensive patients was available, convenience sampling technique was used to select the respondents. According to convenience sampling all the respondents that were available at time of data collection were selected.

Data Collection Tool: Data collection tool used in this study was REALM. Written permission had been obtained from Duke-UNC. The tool was slightly modified according to study objectives and socio-demographics of the country. REALM-R comprised of 31 items in total which were divided into five subscales. The Duke-UNC section 1 includes functional social support questionnaire (FSSQ) which is an eight-item instrument to measure the strength of the person's social support network. Section 2 included assessment of to assess a person's knowledge and ability to read and comprehend information necessary for appropriate medication use. The patient was asked about their

medication, name of medication, indication of medication, frequency of medication, timing of medication, medication effects, medication storage pattern, refill date. Section 3 included assessment of medication adherence based on six items including questions regarding medication name & strength, direction to use, perceived efficacy and problems. Section 4 included the Readiness-to-Change Ruler which assessed a person's willingness or readiness to change. The Readiness-to-Change Ruler presented motivational state relative to a changed specific behavior, and served as the basis for motivation-based interventions to changed elicit behavior a quick assessment was done by a person. A 10 on the right side of the scale indicated "already changing" and a 0 on the left side of the scale indicated "not prepared for change". While section 5 was comprised of REALM-R, a word recognition test identified risk for poor literacy skills by people. REALM-R was used for special consideration like pronunciation, visual acuity, examiner sensitivity, articulation problem.

Scoring of the Tool: In Section 2, on a 1 to 5 scale each question was scored ranging from "As much as I would like" received a score of 5 and "Much less than I would like" received a score of 1. The score from all eight questions were summed (maximum 40) and then divided by 8 and to get an average score. Higher the average score indicated greater social support perceived by the patients. Section 3 Medical knowledge gaps from the assessment were identified by the results. Next to each question a check marked was placed correctly answered by the person. In section 4 Medication non adherence, non-adherence results were screened (Problem Areas Detected). In Section 5 Readiness ruler, a score above 5 to consider change was supported and encouraged that showed the willingness by the person. In section 6 REALM-R Word List, the outcome of the test was recorded by the REALM-R Examiner Record. As an error any word that was not attempted or was mispronounced counted. An "X" placed next to each work that was not attempted or mispronounced by the person and a check marked ("√") next to each word was placed that was pronounced correct by the person. A score of 6 or less were considered risk for poor health literacy by them.

Reliability and Validity of the Tool: Two focused group discussions had been conducted at different time intervals with experts from hospitals, regulatory authorities and pharmaceutical industries for face and content validation of the tool. Beside this pilot testing was conducted at 10 % of the sample size to test the reliability of the tool. Value of cronbach alpha for the tool was 0.78 which was satisfactory.

Data Collection and Analysis: Data was collected by the principal investigator. The respondents were identified and after obtaining written/ verbal consent from them, the questionnaire was hand delivered to them. The questionnaire was collected back on the same day to avoid study biasness. After data collection, data was cleaned coded and entered in SPSS version 21.0. Skewness test was performed and histograms with normal curves were used to check the normal distribution of data. Descriptive statistics comprising of frequency and percentages was calculated. The non-parametric tests including Mann-Whitney and Kruskal-Walis ($p \geq 0.05$) were performed to find out the difference among different variables.

RESULTS

Demographic Characteristics of Respondents: Out of 382 respondents, 45.8% (n=175) were male while 54.2% (n=207) were female. Nearly ninety one percent of the total respondents were selected from public sector and 8.9% were selected from private sector. Of the total respondents, 94.2% (n=360) were selected from hospital and 5.8% (n=22) from community pharmacies. Regarding the level of qualification of respondents, 68.8% (n=263) were matriculate, 15.7% (n=60) were intermediate, 10.7% (n=41) were graduate, 4.2% (n=16) were masters and 0.5% (n=2) were having M.Phil degrees. A detailed description is given (Table 1).

Assessment of Functional Social Support among Diabetes Type II and Hypertensive Patients: The result highlighted that functional social support perceived by diabetes type II and hypertensive patients 'as much less than they would like" in terms of different variables was: care (n=205, 53.7%), love and affection (n=208, 54.5%), sharing problems at work or with my housework (n=208, 54.5%), financial matters discussion (n=213, 55.8%), social interaction (n=204, 53.4%) and advice & counseling regarding important things in life (n=206, 53.9%). A detail description is given (Table 2).

Assessment of Medicine Knowledge and Adherence among Diabetes Type II and Hypertensive Patients in Pakistan: The results showed that most of the respondents had correct medication knowledge in terms of: regarding name of medication (n=249, 65.1%), indication of medication (n=376, 98.4%), frequency of medication (n=355, 93%), timing of medication

(n=369, 97%) and refill date (n=344, 90.0%) A detailed description is given (Table 3).

Prescribing Trends for the Treatment of Diabetes and Hypertension in Pakistan: Out of 382 respondents the most commonly used anti-hypertensive drugs were: eziday (losartan) (n = 246,.28 %), ascard (aspirin) (n=32, 8.37%), loprin (Aspirin) (n=13, 3.40%). On the other hand, most common anti-diabetic drugs used were: insulin (n=128, 33.50%), Glucophage (metformin) (n=66, 17.27%), daonil (glibenclamide) (n=12, 3.14%) and getryl (glimepriride) (n=8, 2.09%). A detailed description is given in (Table 4).

Table 1 Demographic Characteristic of Respondents

Demographic character		**n (%)**
Age	20-29 Y	10 (2.6)
	30-39 Y	71 (18.6)
	40-49 Y	114 (29.8)
	≥50 Y	187 (49)
Gender	Male	175 (45.8)
	Female	207 (54.2)
Marital Status	Married	372 (97.4)
	Unmarried	10 (2.6)
Field of Practice	Hospital	360 (94.2)
	Community Pharmacy	22 (5.8)
	Hospitals	360 (94.2)
Sector	Public	348 (91.1)
	Private	34 (8.9)
Level of Qualification	Matriculation	263 (68.8)
	Intermediate	60 (15.7)
	Graduation	41 (10.7)
	Masters	16 (4.2)
	M Phil	2 (0.5)
Occupation	Government Job	70 (18.3)
	Private Job	57 (14.9)
	Own Business	66 (17.3)
	Jobless	21 (5.5)
	House Wife	168 (44.0)
Monthly Income	Rs .10, 000-19,000	218 (57.1)
	Rs.20, 000-29,000	74 (19.4)
	Rs. 30,000-39,000	34 (8.9)
	Rs. 40,000-49,000	0 (0)
	≥Rs.50, 000	56 (14.7)

Table 2 Assessment of Functional Social Support among Type II Diabetes and Hypertensive Patients

Indicator	As much as I would like n (%)	Almost as much as I would like n (%)	Some, but would like more n (%)	More Less than I would like n (%)	Much less than I would like n (%)
I have people who care what happens to me.	119 (31.2)	31 (8.1)	8 (2.1)	19 (5.0)	205 (53.7)
I get love and affection	109 (28.5)	37 (9.7)	9 (2.4)	19 (5.0)	208 (54.5)
I get chances to talk to someone about problems at work or with my housework.	103 (27.0)	37 (9.7)	18 (4.7)	16 (4.2)	208 (54.5)
I get chances to talk to someone I trust about my personal or family problems.	102 (26.7)	40 (10.5)	9 (2.4)	22 (5.8)	209 (54.7)
I get chances to talk about money matters.	99 (25.9)	35 (9.2)	16 (4.2)	19 (5.0)	213 (55.8)
I get invitations to go out and do things with other people.	112 (29.3)	39 (10.2)	8 (2.1)	19 (5.0)	204 (53.4)
I get useful advice about important things in life.	108 (28.3)	41 (10.7)	14 (3.7)	13 (3.4)	206 (53.9)
I get help when I am sick in bed	121 (31.7)	32 (8.4)	12 (3.1)	15 (3.9)	202 (52.9)

Table 3: Assessment of Medicine Knowledge and Adherence among Type II Diabetes and Hypertensive Patients in Pakistan

Indicator	Yes n (%)	No n (%)
Correct knowledge regarding name of medication	249 (65.1)	133(34.9)
Correct knowledge regarding indication of medication	376 (98.4)	6 (1.6)
Correct knowledge regarding frequency of medication	355 (93)	27 (7)
Correct knowledge regarding timing of medication	369 (97)	13 (3)
Correct knowledge regarding refill date	344 (90.0)	38 (10)
Correct knowledge regarding direction to use	314 (82)	68 (18)

Table 4 Most Commonly used Antihypertensive and Anti Diabetic Drugs for the Treatment of Diabetes and Hypertension

Antihypertensive drugs	n (%)
Eziday (Losartan)	24 (6.28)
Ascard (Aspirin)	32 (8.37)
Loprin (Aspirin)	13 (3.40)
Anti-diabetics drugs	
Insulin	128 (33.50)
Glucophage (Metformin)	66 (17.27)
Daonil (Glibenclamide)	12 (3.14)
Getryl (Glimepiride)	8 (2.09)
Combination	
Insulin + glucophage	22 (5.75)
Insulin + ascard	15 (3.92)
Insulin + daonil	10 (2.61)
Insulin + eziday	12 (3.14)
Glucophage + eziday	20 (5.23)
Insulin +Glucophage +ascard	6 (1.57)
Insulin +Glucophage +eziday	7(1.83)
Insulin +loprin	7 (1.83)

Rapid Estimate of Adult Health Literacy among Diabetes Type II and Hypertensive Patients: The correct word recognition by type II diabetes and hypertensive patients was: allergic (n = 142, 37.2 %), jaundice (n = 73, 19.1 %), anemia (n = 95, 24.9 %), fatigue (n = 19, 5 %), directed (n = 163, 42.7 %), colitis (n = 15, 3.9 %), constipation (n = 109, 28.5 %) and osteoporosis (n = 51, 13.4 %). A detailed description is given (Table 5). **Comparison of Mean Scores of Functional Social Support, Readiness Ruler and Adult Health Literacy among Diabetes Type II and Hypertensive Patients in Pakistan:** The results showed that the overall adult health literacy was poor. The social support perceived by the diabetes type II and hypertensive patients was inadequate. However, those who were treated at the community pharmacies and at private sector perceived relatively better functional social support. The readiness ruler indicated that patients were willing to consider change if supported and encouraged. A detailed description is given (Table 6).

Table 6 Comparison of Mean Scores of Functional Social Support, Readiness Ruler and Adult Health Literacy among Diabetes Type II and Hypertensive Patients in Pakistan

Demographics		Functional social support				Readiness Ruler				Adult Health Literacy			
		Mean	S.D	Median	IQR	Mean	S.D	Median	IRQ	Mean	S.D	Median	IQR
Setting of service received	Hospitals	2.43	1.733	1.00	3	6.82	1.551	7.00	1	1.59	2.208	0.00	3
	Community pharmacy	4.06	1.309	4.44	1	7.45	1.184	7.50	2	4.18	2.343	4.50	4
Age	20-29 Y	2.05	1.602	1.12	3	7.10	0.568	7.00	0	1.90	2.079	1.50	4
	30-39 Y	2.23	1.656	1.00	3	7.10	1.136	7.00	1	2.30	2.626	1.00	5
	40-49 Y	2.49	1.735	1.00	3	7.15	1.285	7.00	1	1.69	2.199	0.00	3
	≥50 Y	2.69	1.792	1.62	4	6.57	1.758	7.00	2	1.64	2.255	0.00	3
Gender	Male	2.50	1.717	1.00	3	7.02	1.529	7.00	1	2.02	2.529	0.00	5
	Female	2.57	1.785	1.00	4	6.72	1.529	7.00	2	1.55	2.078	0.00	3
Marital status	Married	2.57	1.758	1.06	4	6.84	1.549	7.00	1	1.75	2.303	0.00	3
	Unmarried	1.31	0.904	1.00	0	7.50	0.527	7.50	1	2.20	2.440	1.50	4
Sector	Public	2.39	1.724	1.00	3	6.83	1.554	7.00	1	1.49	2.132	0.00	2
	Private	4.08	1.216	4.44	1	7.18	1.290	7.00	1	4.56	2.163	5.00	2
Level of Qualification	Matriculation	2.43	2.962	1.00	3	6.70	1.562	7.00	2	1.45	2.059	0.00	2
	Intermediate	2.64	1.773	2.00	4	7.05	1.556	7.00	1	2.08	2.632	0.00	5
	Graduation	2.58	1.791	1.00	4	7.32	1.274	7.00	1	3.00	2.674	2.00	6
	Masters	3.78	1.697	4.62	3	7.50	1.265	8.00	1	2.75	2.595	2.00	6
	M Phil	3.00	2.828	3.00	0	7.50	0.707	7.50	0	0	0	0	0
Occupation	Government Job	2.41	1.700	1.00	3	7.09	1.520	7.00	1	1.83	2.502	0.00	3
	Private Job	2.69	1.762	2.00	4	7.44	1.282	8.00	1	2.12	2.479	1.00	5
	Own Business	2.15	1.573	1.00	3	6.91	1.389	7.00	1	1.98	2.490	1.00	5
	Jobless	2.32	1.858	1.00	4	6.19	1.778	7.00	3	1.62	2.156	0.00	4
	House Wife	2.72	1.811	1.88	4	6.63	1.577	7.00	2	1.55	2.093	0.00	3
Monthly	Rs .10, 000-19,000	2.30	1.697	1.00	3	6.63	1.596	7.00	2	1.30	1.925	0.00	2
	Rs.20, 000-	2.44	1.734	1.00	3	7.11	1.340	7.00	1	1.88	2.432	0.50	3

Income	29,000												
	Rs. 30,000-39,000	2.65	1.749	1.75	4	7.03	1.605	7.00	1	2.85	2.798	2.00	6
	≥Rs.50, 000	3.52	1.687	4.44	4	7.30	1.347	7.50	1	2.75	2.651	2.00	5
Composite		2.54	1.752	1.00	4	6.86	7.00	1.534	10	1.76	2.304	0.00	8

DISCUSSION

Functional health literacy has been perceived as major barrier for chronic disease patients. Patient centered care can improve disease outcomes by focusing on patient health literacy especially among chronic disease patients [8]. The results of the present study showed poor health literacy among diabetes and hypertensive patients in Pakistan. Most of them were unable to recognize and comprehend basic medical terminologies. Poor literacy level and English language as second language in the country might be the associated factors for inadequate health literacy among patients. A study conducted in USA also reported reading fluency as the main barrier related to poor health literacy. Death and mortality among elderly cardiovascular patients was reported due to inadequate health literacy measured by reading fluency [2]. The results of the present study highlighted that most of the diabetes type II and hypertensive patients were aware of their medication regimen. They had correct knowledge regarding indication, frequency, timing of medication, refill date and direction to use. The findings of the present study further revealed that although the patients had better knowledge regarding medication use but adherence to the regimen was still poor. This might be due to lack of counseling and support to the patients. Similar findings were reported from another study highlighting better knowledge might not always be translated into better medication compliance [9]. The results of the current study reported although most of the diabetes type II and hypertensive patients agreed regarding usage of medicine, did not perceived any drug related problems and had positive perceptions regarding drug efficacy. But still inadequate functional social support was perceived by most of the diabetes and hypertensive patients. This low support might be the cause of poor adherence and health literacy among diabetes and hypertensive patients in Pakistan. Similar findings were reported from a study conducted in USA which showed inadequate perceived functional social support among diabetes and hypertensive patients. The study further highlighted that social support, diabetes self-care and glycemic controls have indirect effect on health literacy. Moreover, enhancing social support in patients with limited health literacy can improve glycemic control and disease outcomes [10].

Furthermore, the results of the present study reported that most of the diabetes and hypertensive patients were willing to change and improve their current disease status. Medication adherence can be improved through better provider communication. Similar findings were reported from a study conducted in South Africa highlighting the need of adoption of patient centered approach to assist and motivate patients to become effective in their self-care [11].

Conclusion

The results of the present study concluded poor health literacy and inadequate perceived functional social support among diabetes and hypertensive patients in Pakistan. Although, most of the patients were aware of their medication regimen but this knowledge was not translated into better medication adherence. They had positive perceptions regarding efficacy of the drugs and were willing to change their behavior and improve their current disease status. Healthcare providers should recognize inadequate health literacy and social support as common barriers and care of diabetes and hypertension can be even more challenging for patients 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. Two way communication of provider with the patients can reduce the chance of misunderstanding, potential adverse effects and better treatment adherence.

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