



## ROLE OF PHARMACIST AS DIABETES EDUCATOR: A LITERATURE REVIEW.

<sup>1</sup>Zarmeena Qazi, <sup>2</sup>Madeeha Malik\* and <sup>3</sup>Azhar Hussain

<sup>1</sup>M.Phil Scholar, Hamdard Institute of Pharmaceutical Sciences, Hamdard University, Islamabad Pakistan.

<sup>2</sup>\*Director/Associate Professor, Hamdard Institute of Pharmaceutical Sciences, Hamdard University, Islamabad Pakistan.

<sup>3</sup>Dean/Professor, Hamdard Institute of Pharmaceutical Sciences, Hamdard University, Islamabad Pakistan.

**\*Author for Correspondence: Dr. Madeeha Malik**

Director/Associate Professor, Hamdard Institute of Pharmaceutical Sciences, Hamdard University, Islamabad Pakistan.

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### ABSTRACT

The role of pharmacist has been changed from drug manufacturer and drug seller to a patient counselor at present. Increased prevalence of diabetes during the recent years has placed pharmacist in a valuable position to prove themselves as an important member of multidisciplinary team member in the management of diabetic patients. The aim of this paper is to analyze different research findings on current role of pharmacist in diabetes management and education in developed and developing countries as well as in Pakistan. A total of 59 studies were reviewed regarding impact of pharmacist on diabetes management. The review concluded that involvement of pharmacist improved diabetes knowledge, medication adherence, glycemic control and can reduced HbA1c levels and micro and macro vascular complications in developed and few developing countries. However, the role of pharmacist in patient education and counseling has not been acknowledged yet in Pakistan. Moreover no data is available regarding patient knowledge and prescriber's adherence to standard treatment guidelines regarding treatment goal of diabetes. Policy making and strict action plan is limited. There is an urgent need of formulating various policies to reinforce the involvement of pharmacist in diabetes management team.

**KEYWORDS:** pharmacist improved diabetes knowledge, medication adherence, glycemic control.

### INTRODUCTION

Diabetes is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both.<sup>[1]</sup> According to WHO, the total prevalence of diabetes globally was estimated 9% among 18 year adult and above in 2014.<sup>[2]</sup> Diabetes is a medical emergency for which number of medicines including insulin is available to treat it. Along with medication, diet restriction is also advised to control blood sugar level in diabetic patients. Lower HbA1c level 0.25-0.5 was reported in patients who adhered to their dietary plan as compared to those who did not.<sup>[3]</sup>

Many factors contribute towards uncontrolled diabetes i.e; literacy rate, patient knowledge, attitude beliefs and behavior in management of diabetes, non adherence to medications, lack of knowledge of prescribers regarding standard guidelines, lack of diabetes related education, dietary non restriction and unavailability of specialized person in management of diabetes. More than half of the patients are unaware of their diabetic goals and have little to no knowledge regarding dietary control and standard guidelines. Diabetes education program is one of the most helpful programs to provide awareness to the diabetic patients according to their needs. Health education results in adequate knowledge which is

associated with good metabolic control and prevention of complication associated with diabetes mellitus and its therapy.<sup>[4]</sup> Diabetes education involve the management of hyper and hypo hypoglycemia in patients. Pharmacist are playing vital role in diabetes management world wide. Pharmacists are easily accessible to patients and health care providers. Physician are more effective in treating acute condition than chronic condition despite the fact that chronic conditions need more time to manage.<sup>[5]</sup> By knowing this fact, diabetes presents more involvement of pharmacist in management of diabetes.<sup>[5]</sup> Pharmacists can play a role in patient identification, assessment, education, referral, and monitoring.<sup>[5]</sup>

Pharmacist provided patient counseling might be considered as an important element in implementing the disease management program. Patient counseling by pharmacist improves outcomes of therapy as pharmacist provides counseling regarding disease, medications and life style modifications.<sup>[6]</sup> It has been studied that those poorly controlled diabetic patients who are clinically managed by pharmacist showed an improvement in their HbA1c levels.<sup>[7]</sup> A patient care team including pharmacist can help patient in delaying their rate of co morbidities by making laboratory and medication recommendations, adequately understanding and using

their medications.<sup>[8]</sup> Treatment for diabetes become complex day-by-day which has further increased the need of patient counseling on medication adherence and side effects.<sup>[9]</sup>

## METHODOLOGY

The electronic databases PubMed, Google Scholar and Science direct were searched for articles published from 2000 to 2014. The search terms used were pharmacist,

diabetes educator and diabetes education. Full research paper and abstracts were searched and included in this review. Total 56 studies were included in this review. Forty seven studies were from developed countries and 9 from developing countries. In Pakistan, to the best of our knowledge no study had been conducted yet on pharmacist as a health care member of diabetes care team (Table 1).

**Table 1: Details of country and number of included papers**

Regions	Number of studies	Countries
Developed countries	47	USA, North Carolina, Canada, Georgia, Michigan, Scotland, Australia, UK, California
Developing countries	9	Jordan, Chile, South Africa, India Thailand, Iran, Hong Kong
Pakistan	-	-
Total		56

## DISCUSSION

### Role of pharmacist in diabetes care team in developed countries

Counseling by pharmacist can improve patient care. Study conducted in USA reported that patients reviewed by pharmacist for education and optimizing drug therapy improved patient HbA1c along with patient's lipid and blood pressure goals.<sup>[11]</sup> Another study revealed that patient counseling by pharmacist improved outcomes of therapy as pharmacist provide counseling regarding disease, medications and life style modifications.<sup>[6]</sup> Pharmacist are capable for individual patient education which increases patient interest and also helps pharmacist in managing each and every problem of patient by involving patient. Study from South Carolina concluded that clinical pharmacist involvement significantly lowered HbA1c value by setting specific goals for each patient and by considering his/her diet and exercise, drugs and dosages when required.<sup>[12]</sup> A meta-analysis carried out on different pharmacist interventions revealed that pharmacist played their role in medication and therapeutics, patient counseling and also helped in physician education to achieve patient goals for improving clinical outcomes.<sup>[13]</sup> Being the member of health care team, pharmacist interventions can significantly improve glycemic goals of patient with most complex treatment regimen.<sup>[10]</sup> As an active member, community pharmacist can help in early detection of diabetic patients by screening of individual with risk factors e.g positive family history, obesity, older age, history of GDM, hyperlipidemia/hypertension, sedentary lifestyle.<sup>[5]</sup>

Diabetes management by pharmacist in comparison to other member of multidisciplinary care team showed more effective results and up to 1.2% reduction in glycated hemoglobin levels along with 15% to 30% improvement in overall completion of screening in high risk patients.<sup>[14]</sup>

Diabetes effects direct and indirect treatment cost to patients in terms of pain, comorbidities, loss of work, stress, disabilities and micro and macro vascular complications.<sup>[15]</sup> Average cost for treatment of diabetes in developed countries reported to be approximately 8% of the total budget.<sup>[15]</sup> A study conducted in Carolina suggested that at the end of 20<sup>th</sup> century, the total cost of treating diabetes exceeded \$98 billion in 10 million cases which was a great burden on both community and patients but involving pharmacist in health care team reduced over all cost of diabetes by providing cognitive services. The study also suggested that pharmacist must work as certified diabetes educator to help patients in improving clinical outcomes.<sup>[16]</sup> Until now most of the studies have been conducted on nurses as diabetes educator, but no study to the best of our knowledge has been conducted regarding perceptions of patient about role of pharmacist as diabetes educator and has considered diabetes educator as a separate profession.

### Role of pharmacist in diabetes care team in developing countries

Pharmacist could play a vital role in community by providing intensive diabetes education both to patients and physicians. Face-to-face individual or group education improves knowledge better than pamphlets and leaflets.<sup>[17]</sup> An other study conducted in Iran showed that involvement of pharmacist in diabetes control program in addition with pamphlets, pill bx etc. improved glycemic control, FBS and medication adherence.<sup>[18]</sup>

Like developed world, in developing countries pharmacist is also performing their role in management of diabetes. Pharmacist-led pharmaceutical care plan showed a significant difference in knowledge and treatment which improved outcomes in terms of better HbA1c level.<sup>[19]</sup> It was concluded in a study held in Qatar that pharmacist participation in health related issue increased pharmacist's professional responsibilities and

also improved knowledge regarding pharmacy profession among patients.<sup>[20]</sup> Study conducted in India demonstrated that education and services provided by pharmacist were very effective in managing type II diabetic patients.<sup>[21]</sup> In developing countries greater workload on prescribers make them unable to provide complete diabetes knowledge regarding diet, exercise and life style modifications. A study conducted in India emphasized on the role of pharmacist as diabetes educator to overcome this problem.<sup>[22]</sup> Pharmacist led patient education was considered as important element for diabetic patients management as counseling provided by pharmacist improved patient believes and perceptions regarding diet, exercise and therapy management which in turn enhance patient's quality of life and glycemic control.<sup>[23]</sup> Study conducted in India suggested that it is immense duty of pharmacist to help in management of chronic illness like diabetes by providing education and.<sup>[24]</sup> Study conducted in India revealed that drug counseling had a little impact on diabetes management outcomes but by providing drug related knowledge and modifying drug taking behaviors, daily life counseling and diet modification improved patient disease management.<sup>[25]</sup> An other study concluded that pharmacist one-on-one education on diabetes not only improved diabetes knowledge and medication adherence but also reduced the cardiovascular risk by lowering total cholesterol and LDL level.<sup>[26,27]</sup> However, to the best of our knowledge no study has been conducted yet regarding perceptions of pharmacist regarding their role as diabetes educator and perception of prescribers regarding pharmacist role as diabetes educator in developing countries.

#### **Current scenario of diabetes in Pakistan**

According to WHO the total prevalence of diabetes in 2011 in Pakistan was 12.9 million (10% of total population) out of which patients diagnosed with diabetes were 9.4 million, undiagnosed were 3.5 million, pre-diabetics were 38 million people (20.5% women and 15.9% men diagnosed as prediabetics).<sup>[28]</sup> It has been estimated that Pakistan is known as the 7<sup>th</sup> largest country in terms of highest prevalence of diabetes and will be 4<sup>th</sup> largest by the year 2030.<sup>[28]</sup>

#### **Role of pharmacist in diabetes care team in Pakistan**

Most important factor effecting diabetes is underestimating the importance of diabetes education. Pharmacist is an important member of health care team. The idea of involving pharmacist for diabetics education to improve patient compliance was initiated in September, 2005 while proper training was started in January, 2006 in Pakistan. Few people receive diabetes education in Pakistan and most of the population remains unaware regarding diabetes complications and even normal blood glucose levels.<sup>[29]</sup> Majority of the patients in Pakistan did not receive any diabetes education.<sup>30</sup> Remaining patient report that they received only minimum time for education from their health care practitioners due to heavy patient load in OPD.<sup>[30]</sup> A

study conducted in Karachi, showed that patient knowledge, beliefs and practice regarding diabetes management was unsatisfactory.<sup>[29]</sup> Lack of trained educators has been the main reason for comprehensive diabetes education and counseling regarding diet and life style modifications.<sup>[31]</sup>

To the best of our knowledge no study has been conducted yet regarding perceptions of pharmacist regarding their role as diabetes educator and perception of prescribers regarding pharmacist role as diabetes educator in Pakistan. Unfortunately the role of pharmacist has not been well acknowledged yet in Pakistan which is one of the main reasons for acceptance of importance of diabetes educator in Pakistan.

#### **CONCLUSION**

This review paper highlighted the role of pharmacist as patient counselor rather than a drug manufacturer or drug seller particularly in diabetes management. Diabetes education is one of the most accurate ways to manage glycemic challenges at present as pharmacological treatment alone cannot produce excellent result. Patient must be fully equipped with adequate knowledge regarding life style modifications, diet and exercise for appropriate control of blood glucose level Pharmacist can play effective role in the provision of this knowledge which will not only help the patient to manage diabetes appropriately but will also highlight the role of pharmacist among the community.

#### **REFERENCE**

1. Association AD. Diagnosis and classification of diabetes mellitus. *Diabetes Care.*, 2010; 33(1): S62-S9.
2. WHO. Diabetes Fact Sheet. [Online] 2015 January [cited 2015 Mar 29]. Available from: URL: <http://www.who.int/mediacentre/factsheets/fs312/en/>.
3. Delahanty LM, Halford BN. The role of diet behaviors in achieving improved glycemic control in intensively treated patients in the Diabetes Control and Complications Trial. *Diabetes Care.*, 1993; 16(11): 1453-8.
4. Afridi M, Khan MN. Role of health education in the management of diabetes mellitus. *Journal of the College of Physicians and Surgeons--Pakistan: JCPSP.*, 2003; 13(10): 558-61.
5. Campbell RK. Role of the pharmacist in diabetes management. *American Journal of Health-System Pharmacy.*, 2002; 59(9): S18.
6. Palaian S, Chhetri A, Prabhu M, Rajan S, Shankar P. Role of pharmacist in counseling diabetes patients. *The internet Journal of pharmacology.*, 2005; 4(1).
7. Jameson JP, Baty PJ. Pharmacist collaborative management of poorly controlled diabetes mellitus: a randomized controlled trial. *The American journal of managed care.*, 2010; 16(4): 250-5.
8. Pepper MJ, Mallory N, Coker TN, Chaki A, Sando KR. Pharmacists' impact on improving outcomes in

- patients with type 2 diabetes mellitus. *The Diabetes Educator.*, 2012; 38(3): 409-16.
9. Sisson E, Kuhn C. Pharmacist roles in the management of patients with type 2 diabetes. *Journal of the American Pharmacists Association: JPhA.*, 2008; 49: S41-5.
  10. Collins C, Limone BL, Scholle JM, Coleman CI. Effect of pharmacist intervention on glycemic control in diabetes. *Diabetes research and clinical practice.*, 2011; 92(2): 145-52.
  11. Armor BL, Britton ML, Dennis VC, Letassy NA. A review of pharmacist contributions to diabetes care in the United States. *Journal of pharmacy practice.*, 2009.
  12. Ragucci KR, Fermo JD, Wessell AM, Chumney EC. Effectiveness of pharmacist-administered diabetes mellitus education and management services. *Pharmacotherapy: The Journal of Human Pharmacology and Drug Therapy.*, 2005; 25(12): 1809-16.
  13. Nkansah N, Mostovetsky O, Yu C, Chheng T, Beney J, Bond CM, et al. Effect of outpatient pharmacists' non-dispensing roles on patient outcomes and prescribing patterns. *The Cochrane Library.*, 2010.
  14. Hayward RA, Krein SL, Vijan S. Proactive case management of high-risk patients with type 2 diabetes mellitus by a clinical pharmacist: a randomized controlled trial. *The American journal of managed care.*, 2005; 11: 253.
  15. Nichols-English GJ, Provost M, Koopalum D, Chen H, Athar M. Strategies for Pharmacists in the Implementation of Diabetes Mellitus Management Programs. *Disease Management & Health Outcomes.*, 2002; 10(12): 783-803.
  16. Cranor CW, Christensen DB. The Asheville Project: short-term outcomes of a community pharmacy diabetes care program. *Journal of the American Pharmacists Association.*, 2003; 43(2): 149-59.
  17. Berg J, Dodd S, Dodd S. The role of a community pharmacist in diabetes education: diabetes education. *Journal of Endocrinology, Metabolism and Diabetes in South Africa.*, 2009; 14(3): 148-50.
  18. Farsaei S, Sabzghabae AM, Zargarzadeh AH, Amini M. Effect of pharmacist-led patient education on glycemic control of type 2 diabetics: a randomized controlled trial. *Journal of research in medical sciences: the official journal of Isfahan University of Medical Sciences.*, 2011; 16(1): 43.
  19. Jarab AS, Alqudah SG, Mukattash TL, Shattat G, Al-Qirim T. Randomized controlled trial of clinical pharmacy management of patients with type 2 diabetes in an outpatient diabetes clinic in Jordan. *J Manag Care Pharm.*, 2012; 18(7): 516-26.
  20. Wilbur K. Pharmacy student perceptions of public health service roles and responsibilities. *International Journal of Pharmacy Practice.*, 2011; 19(3): 179-84.
  21. Sriram S, Chack LE, Ramasamy R, Ghasemi A, Ravi TK, Sabzghabae AM. Impact of pharmaceutical care on quality of life in patients with type 2 diabetes mellitus. *Journal of research in medical sciences: the official journal of Isfahan University of Medical Sciences.*, 2011; 16(1): S412.
  22. Adepu R, Ari SM. Influence of structured patient education on therapeutic outcomes in diabetes and hypertensive patients. *Asian J Pharm Clin Res.*, 2010; 3(3): 174-8.
  23. Adepu R, Rasheed A, Nagavi B. Effect of patient counseling on quality of life in type-2 diabetes mellitus patients in two selected South Indian community pharmacies: A study. *Indian Journal of Pharmaceutical Sciences.*, 2007; 69(4): 519.
  24. Palaian S, Acharya LD, Rao PGM, Shankar P, Nair NM, Nair NP. Knowledge, attitude, and practice outcomes: evaluating the impact of counseling in hospitalized diabetic patients in India. *P AND T.*, 2006; 31(7): 383.
  25. Suppavitiporn S, Chindavijak B, Onsanit S. Effect of diabetes drug counseling by pharmacist, diabetic disease booklet and special medication containers on glycemic control of type 2 diabetes mellitus: a randomized controlled trial. *Journal of the Medical Association of Thailand= Chotmaihet thangphaet.*, 2005; 88(4): S134-41.
  26. Phumipamorn S, Pongwecharak J, Soorapan S, Pattharachayakul S. Effects of the pharmacist's input on glycaemic control and cardiovascular risks in Muslim diabetes. *Primary care diabetes.*, 2008; 2(1): 31-7.
  27. Leung WY, So W-Y, Tong PC, Chan NN, Chan JC. Effects of structured care by a pharmacist-diabetes specialist team in patients with type 2 diabetic nephropathy. *The American journal of medicine.*, 2005; 118(12): 1414. e21-. e27.
  28. Pakistan DI. Diabetes Statistics in Pakistan. [Online] 2013, May 8 [cited 2015 Mar 8] Available from: URL: (<http://diabetespakistan.com/treatment/2013/05/08/diabetes-statistics-in-pakistan/>).
  29. Rafique G, Azam S, White F. Diabetes knowledge, beliefs and practices among people with diabetes attending a university hospital in Karachi, Pakistan., 2006.
  30. Gul N. Knowledge, attitudes and practices of type 2 diabetic patients. *J Ayub Med Coll Abbottabad.*, 2010; 22(3): 128-31.
  31. Jabbar A, Hameed A, Chawla R, Akhter J. How well do Pakistani patients and physicians adhere to standards of diabetes care. *Int J Diab Dev Ctries.*, 2007; 27(3): 93.