DIABETIC GUIDELINES;

A CROSS-SECTIONAL SURVEY OF SELF REPORTED BARRIERS TO DIABETIC GUIDELINES ADHERENCE BY PHYSICIANS IN LAHORE PAKISTAN.

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ABSTRACT… Introduction: Diabetic guidelines are important tools to provide evidence based structured diabetic care. There are no national guidelines and it has been noted that diabetic care is suboptimal in Pakistan. The objective of our study was to identify various contextual barriers and propose possible solutions for improving diabetic guideline adherence in Pakistan. **Study Design:** Quasi experimental study. **Setting:** Two hospitals in Lahore, Pakistan. **Period:** Jan to Dec 2016. **Methodology:** We analyzed data of 53 Physicians from two hospitals in Lahore Pakistan. These physicians were recruited in a quasi-experimental study done by the authors to check the effectiveness of m-health technology for improving diabetic guideline adherence and also to check the various barriers to diabetic guidelines adherence. The responses were obtained on Likert scale and were analyzed by factor analysis. **Results:** Majority of participating physicians were postgraduate trainees 34(64.1%) and females 33(62.3%). Majority 41(77.3%) were in the age group 20-29 years. Majority of the physicians agreed that diabetic guidelines were helpful in diabetic management 46(86.8%) however they also noted several barriers to diabetic guidelines adherence. These barriers were grouped into organizational, lack of information, patients and physicians related factors by factor analysis. Majority of the physicians cited lack of patient care time, patient work overload, noncompliance as well as financial constraints in diabetic patients and lack of diabetic guideline information among doctors and patients as major barriers for adherence to diabetic guidelines. Cultural differences between doctors and diabetic patients and lack of incentives and consequences for doctors for adherence to diabetic guidelines were not considered as important as the rest of the variables. **Conclusion:** This study illustrates the various contextual barriers for diabetic guidelines implementation categorized into patient factors; physician factors; lack of information and health care organizational factors. It is important to identify and mitigate these barriers for effective diabetic guidelines implementation.

Key words: Diabetes Mellitus, Guidelines, Patients, Physicians Practice Patterns.

INTRODUCTION

Diabetes mellitus is a chronic disease which increases the morbidity and mortality in patients.[1] According to World Health Organization (WHO) the prevalence of diabetes mellitus in Pakistan was 9.8% in a population of 189 million in 2016 and is projected to increase to almost 14 million patients by 2030.[2] Diabetes if not properly managed can increase the risk of coronary artery disease, kidney failure, blindness, stroke, and limb amputations. Therefore, early diagnoses and proper management is crucial to prevent diabetes related morbidity and mortality. Diabetic guidelines provide updated, evidence-based, standardized diabetic care recomendations.[3] It has been noted that interventions like improved blood sugar, blood pressure, lipid control and screening for retinopathy, nephropathy, neuropathy are not only cost effective but also feasible in developing countries.[1] Current literature has shown that clinical practice guidelines are not widely used by health care professionals.[4] There are no national evidence-based national diabetes guidelines or standards in Pakistan and diabetic guidelines are generally not used in health care centers in Pakistan.[2] Studies have shown that simply disseminating the guidelines does not ensure compliance by physicians but requires efforts to

make these guidelines more implementable in different context given their unique constraints.[5]

Despite the increased prevalence of diabetes[1] and lack of adequate care[2] there are very few studies done about the use of evidence based diabetic guidelines in Pakistan. This data is a part of the interventional study done by authors to improve adherence to diabetic guidelines using m-Health technology. The objective of this study is to present the physicians' views about the use and barriers to diabetic guidelines.

Rationale of the Study
To check physicians' views about the use and barriers to diabetic guidelines in Lahore Pakistan. Identification and strategies to mitigate these barriers should be prioritized in the national health care goals if we want to improve the overall adherence to diabetic guidelines by health care professionals.

METHODOLOGY
Study Design
This data is a secondary outcome that was looked at from the original quasi-experimental study to check the effects of m-health intervention for improving diabetic guideline adherence in Lahore Pakistan in 2016. The study population was selected from two hospitals in Lahore Pakistan. We picked one medical unit in each hospital for our study and all the medical house officers / post graduate trainees (PG trainees) in that unit were offered to voluntarily participate in the study. The knowledge, attitude and practice of diabetic guidelines were checked prior to starting the intervention.

Study Objective
To check physicians' views about the use and barriers to diabetic guidelines in Lahore Pakistan and to propose possible strategies to overcome them.

Inclusion Criteria
Medical officers/ post graduate trainees in the medical units of the participating hospitals who were seeing at least 10 or more diabetic patients a month in the past 1 year.

Exclusion Criteria
Physicians who could not assure at least 6 months of participation in the study as the original study was an interventional study.

Sample Size Calculation for the Primary Outcome
Sample size was calculated based on assumptions for our primary outcome and was calculated to be 56. Adjusting for 10% attrition rate final sample size recruited was 62.

Study Tool
Physician Questionnaire was pretested closeended questionnaire developed by Center for disease control(CDC)USA.[6]

Data Collection and Analysis
Questionnare was self adminstered by physicians and inculded demographic data and responses about the barriers to diabatic guideline adherence were measured on five point likert scale.The likert scale rated the responses from 1 to 5 with 1 being not important, 2 as important, 3 as neither important nor unimportant,4 as somewhat imporatnt and 5 very important. The responses were entered using SPSS program version 20. Descriptive data was presented as frequencies and percentages. The responses were added up and frequencies were cacluated by collapsing the likert scale into three categories. Factor analysss of the various responses was done. Descriptive data was presented as frequencies and percentages. An initial pilot study was done on a sample of seven physicians and final external review by two experts in the field of diabetes management was done before collecting the data. The pilot study data was not included in the study.

Written consent was obtained from physicians and ethical approval was obtained from Institutional Review Board of Health Services Academy and Jinnah hopsital.

RESULTS
Sixty two physicians were enrolled and fifty three physicians (85.5%) completed the study. Majority of participating physicians were

postgraduate trainees 34(64.1%) and females 33(62.3%). Majority 41(77.3%) were in the age group 20-29years, had no post graduate degree 46(86.8%) and were seeing 10-20 patients daily 25(47.5%). Majority of the physicians agreed that diabetic guideline were helpful in diabetic managment 46(86.8%) however they also noted several barriers to diabetic guidelines adherence.

As noted in Table-I majority of the physicians cited lack of patient care time, patient work overload, noncompliance as well as financial constraints in diabetic patients, lack of diabetic guideline information among doctors and patients as major barriers for adherence to diabetic guidelines. Cultural differences between doctors and diabetic patients and lack of incentives and consequences for doctors to use diabetic guidelines were not considered as important as the rest of the variables.

Factor analysis of responses about barriers for adherence to diabetic guidelines was done using four component analysis explaining almost 62% of the variance in the responses about the barriers for adherence of the diabetic guidelines (as noted in Table-II and Figure-1). As shown in Figure-1 and Table-II self-reported diabetic guidelines barriers were grouped into four groups (F1,F2,F3,F4) based on their contribution to the total variance.

Factor 1(F1) included items lack of patient care time+ work overload + noncompliance in diabetic patients (Organizational factors). Factor 2(F2) included lack of diabetic guideline information among doctors+ lack of diabetic guideline information among diabetic patients+ financial constraints in diabetic patients (Lack of information factors). Factor 3(F3) included lack of Incentives for doctors managing diabetic patients to use diabetic guidelines+ lack of consequences for doctors managing diabetic patients to use diabetic guidelines +lack of education in diabetic patients (Physician related factors) and Factor 4(F4) included cultural differences between doctors and diabetic patients + lack of knowledge of clinical terms in diabetic patients (Patients related factors).
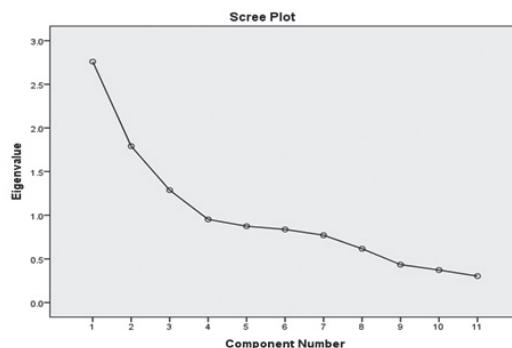

Figure-1. Factor analysis of responses about barriers to implement diabetic guidelines

	Important		Neither Important Nor Unimportant		Not Important	
	n	%	n	%	n	%
Lack of patient care time	50	94.3	1	1.9	2	3.8
Noncompliance in diabetic patients	50	94.3	1	1.9	2	3.8
Patient work overload	49	92.5	0	0	4	7.5
Financial constraints in diabetic patients	50	94.3	1	1.9	2	3.8
Lack of education in diabetic patients	46	86.8	3	5.7	4	7.5
Lack of diabetic guideline information among diabetic patients	46	86.8	0	0	7	13.2
Lack of diabetic guideline information among doctors	45	84.9	2	3.8	6	11.3
Lack of knowledge of clinical terms in diabetic patients	40	75.5	8	15.1	5	9.4
Lack of consequences for doctors not using diabetic guidelines	38	71.7	7	13.2	8	15.1
Cultural difference between doctors and diabetic patients	36	67.9	5	9.4	12	22.6
Lack of incentives for doctors to use diabetic guidelines	36	67.9	3	5.7	14	26.4
Table-I. Descriptive data of self-reported barriers to diabetes guideline use as noted by the participating physicians						

Barriers	Component			
	1	2	3	4
Lack of patient care time	.688			
Work Overload	.706			
Lack of Diabetic Guideline information among Doctors		.666		
Lack of Diabetic Guideline information among Diabetic patients		.688		
Cultural Difference between Doctors and Diabetic Patients				.855
Lack of education in Diabetic patients			-.711	
Lack of knowledge of Clinical terms in Diabetic patients				.744
Noncompliance in Diabetic patients	.740			
Financial Constraints in Diabetic patients		.710		
Lack of Incentives for Doctors managing Diabetic patients to use Diabetic Guidelines			.681	
Lack of Consequences for Doctors managing Diabetic patients to use Diabetic Guidelines			.644	

Table-II. Distribution of items to factors on the basis of factor loadings.

DISCUSSION

There is increasing evidence that controlling risk factors related to diabetes mellitus can lead to improved clinical outcomes however a majority of diabetics have been noted to have less than optimal control of blood sugar, blood pressure and lipids.[7] Guidelines are important tools for improving evidence based structured care in chronic diseases. Studies have shown that physicians use clinical guidelines inconsistently and their implementation is fraught with several challenges and their actual translation is less than ideal.[4] Many factors are blamed for this which are not only related to health care professionals but also to patients, as well as organizational and socioeconomic setup of the clinical care.[8,9] It has also been seen that countries which do not have national diabetic guidelines, individual physicians pick different international guidelines leading to variable diabetic care.[10]

In our study majority of physicans agreed that guidelines were helpful in diabtic care but they also listed a lot of barriers to thier regular use. This is similar to another systemic survey which showed that even though a majority (70%) of physicians believed that diabetic guidelines were useful educational tools leading to improve diabetic quality care, only one third believed thier usefulness in individualized diabetic care. Twenty three percent of them also thought that guidelines were impractical and could potentially increase risk of litigation.[11,12] The physicians in our study

identified various barriers to diabetic guideline adherence. Factor analysis of content of the items was used to group them into four metrics which captured factors related to organizational setup, lack of information, physician and patient related factors. The remaining items were not included because they did not load on any factor and had very minimal variation. Other studies have also identified three broad categories which impact guideline adherence and include health care professionals, health care organizations, and those orientated toward health care consumers.[8,9,13]

Factor 1 (Organizational Factors) included items like time constraints for patient care, clinical work overload and noncompliance in diabetic patients *as barriers to* the guideline implementation. Other studies have also shown that physicians have time and work overload constraints required for multidimensional diabetic care.[14] In Pakistan a similar study showed that physicians were spending only 8.5 minutes per patient.[15] Similarly a study done in China noted that increased workload made it difficult for health care professionals to adhere to the guidelines.[16] Health care system related factors including organizational setup, human & financial resources were also noted to be important factors for effective implementation of the guidelines.[14] Additionally other studies have also noted noncompliance of patients based on their beliefs, commodities and available social & financial resources as important determinants for

successful diabetic guidelines implementation.[16,17]

Factor 2 category (Lack of information related factors) *included items related to* lack of diabetic guideline information in doctors and patients. Other studies have also identified lack of knowledge and culturally sensitive diabetic education as a barrier to diabetes guideline implementation.[17] In India it was noted that a substantial percentage (~60%) of diabetic patients were unaware of diabetic complications.[18] It has been noted that *patients who lack* health information have difficulty in adopting healthy life style for adequate diabetes managment.[16] Lack of knowledge about the guidelines among physicians also effects the implement ability of the guidelines.[19] Other studies have identified poor awareness among physicians (22.7%), lack of applicability of western guidelines (22.7%) as barriers for guidelines usage.[20] A study done in Rawalpindi Pakistan showed 85% of physicians had knowledge of diabetic complications but very few were following diabetic guidelines.[21]

Factor 3 category identified lack of Incentives and consequences for doctors managing diabetic patients to use diabetic guidelines (Physician related factors). Physician's attitude and motivation have been noted to be important determinants for adherence to the diabetic guidelines. Several reasons for lack of adherence by health care professionals have been noted in literature including contextual constraints as well presence of co morbidities among their patient population which are different from the patient population studied in experimental settings with strict inclusion/exclusion criteria.[10] Additionally lack of incentives and consequences have also been identified as barriers for guideline implementation.[14] In another study specifically it was seen that financial incentives led to a modest increase in intermediate outcomes of diabetic care, however the effects on terminal outcomes were not as clear. Additionally there were concerns that giving financial incentives might lead to decrease in the intrinsic motivation of providers, promote unethical behavior and inequalities in provision of health care.[22] Lack of consequences was also identified as a barrier for adherence

by physicians in the study. A longitudinal study done to check the effect of incentives showed increased diabetic retinopathy screening rate from 85% to 89% initially during the first five years when financial incentives were attached for the retinopathy screening. After the incentives were removed the screening rates fell to 80%.[23]

Factor 4 category (Patient Factors) identified cultural difference between doctors and diabetic patients, lack of knowledge of clinical terms in diabetic patients as reasons for non adherence in our study. Patient factors are also important determinants for diabetic guideline adherence. Heath care professional's perception about their patient's compliance will also determine their recommendations for adherence to diabetic guidelines.[14] Collaboration between diabetic patients and health care workers in a conducive socio-cultural environment is important to ensure adequate compliance of patients to recommendations.[17] Low patient health literacy has been identified by 46(86.8%) of physicians in our study as a barrier to adherence to the diabetic guidelines. Knowledge of diabetes and its complications has also been noted to be poor in patients in other studies from Pakistan. In a study conducted in rural Islamabad it was observed that knowledge about diabetes including awareness of complications of diabetes was only 35%.[24] Similarly a study done in India showed that 75% of the diabetics were not familiar with diabetes care or its complications.[25] Another study from Saudi Arabia showed that even though overall diabetic knowledge was 67.4% only about 50% of the patients were aware of diabetic complications.[26]

Our study has identified various self-reported barriers to diabetic guideline adherence by physicians in Lahore Pakistan. The barriers identified show that diabetes is a multidimensional disease with various stakeholders including patients, heath care professionals and the health care organizations impacting adherence to diabetic guidelines.[27] Strategies to improve adherence to diabetic guidelines must target all these stakeholders. Lack of knowledge among physicians and patients about the diabetic guidelines was identified as a reason for lack of

adherence to diabetic guidelines. Strategies to improve information about diabetic guidelines should include educational programs for health care professionals as well as patients. Diabetic patients must be given information through culturally sensitive education campaigns including both conventional strategies like drama, skits as well as new modes of communication like short message service and internet. Efforts to change the behavior of the diabetics to improve life style care given their socio-cultural constraints and close monitoring of patient's compliance must be ensured by proper record keeping and referrals where needed.[28] Diabetes guideline information must be an integral component of any diabetic teaching programs. Uniformity of the diabetic care by development and scaling of national diabetic guidelines must be ensured with broad consensus of the end-users. If it is not possible to develop new national diabetic guidelines due to limitations of resources than a hybrid of international guidelines recommendations with local consensus of diabetic care experts may be the next best option. Physicians had identified work overload and time constraints as a major constraints for guideline adherence. Development of health care human, financial, and technical resources are integral for effective diabetic guideline implementation. The various barriers identified in our study underscore the importance of understanding the local constraints and views of the end users which might ultimately determine whether particular guidelines are followed or not. The respondents in our study also identified lack of incentives for physicians as a barrier for adherence to the guidelines, The complex nature of diabetic care requires a team management approach of various health care specialists. The training and monitoring of this team must target predetermined quality care clinical outcomes. Future studies must be done to check the effect of pay for performance and other incentives for quality diabetic care. Regular record keeping and audit will help determine the progress of improving the overall adherence to the guidelines. The complex nature of diabetic care requires a team management approach of various health care specialists. The training and monitoring of this team must target predetermined

quality care clinical outcomes. The health care organization's political will have a major role in bringing this crucial health care problem to the limelight to maximize strategies for removing barriers and ultimately improving adherence to diabetic guidelines. National health policy should include guidelines for implementing diabetic care preventive measures for physicians and health care organizations to minimize the morbidity and mortality related to diabetes mellitus.

Limitations and strengths of the study: Small sample size and self-selection of participants limits generalization of the results. Our study focused exclusively on physicians' perspectives about the barriers to the diabetic guideline adherence. However, they are only one part of the team involved in diabetic care. Views from patients, other health care professionals and health managers might give a better overall picture of the barriers. Interplay of the various barriers and their effect on clinical outcomes as well as lack of in-depth qualitative analysis limits causal inferences of the various barriers to the quality of diabetic care. However, our study was an exploratory study and did generate useful data about the barriers for diabetic guideline's adherence. The strengths of the study are that we used a standardized questionnaire with a good response rate from respondents and this study is one of the very few done in Pakistan on this topic.

CONCLUSION
Physicians in our study identified major barriers to implementation of diabetic guidelines which were broadly classified into organizational factors, information related factors, physicians and patients' factors. Identification of these contextual barriers and mitigating their effect will help in successful implementation of diabetic guidelines in broader contexts. Future studies should be done to monitor the effectiveness of these strategies in the clinical outcomes of diabetic care.

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> ## STORMS MAKE TREES TAKE DEEPER ROOTS.
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> *"Unknown"*

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Noreen Rahat Hashmi	NRH[1] was responsible for the original conception and design of the study including data collection, analysis and interpretation and write up of the study.	
2	Shahzad Ali Khan	SAK[2] contributed to the study design, supervised data collection, analysis and approved the final write up.	
3	Kashif Aziz Ahmad	KAA[3] contributed to study design, data collection, data analysis and final write up.	
4	Ahmed Ali Hashmi	AAH[4] contributed in study design, data collection, data analysis, editing and final write up.	