Original Article

Healthcare Professionals' Knowledge, Attitudes and Practices Related to Insulin use in Diabetes Care: A Cross-Sectional Study

Syed Riazul Hasan[1], Faiza Saeed[2], Imran Mehmud[3]

ABSTRACT

Background: Insulin remains a cornerstone in the management of diabetes, yet its timely initiation and optimal use remain suboptimal in many primary care settings. Understanding the knowledge, attitudes, and practices (KAP) of healthcare professionals (HCPs) is essential to address barriers to its effective use.

Objective: To assess the knowledge, attitudes, and practices of healthcare professionals regarding insulin use in diabetes management and to identify perceived barriers to its optimal utilization.

Methodology: A cross-sectional study was conducted from February to March 2025 involving 124 healthcare professionals mainly family physicians managing patients with diabetes after approval (SGHQ/783). Demographic data, professional experience, and responses to a structured KAP questionnaire were collected through Google Forms after obtaining informed consent for participation. Frequencies and percentages were calculated for categorical variables.

Results: A total of 124 healthcare professionals (HCPs) participated (around 60% male, age range 30–65 years), with a mean clinical experience of 12 years. Although 55% had no formal training on insulin, most showed adequate theoretical knowledge. Only 33% (n = 41) actively prescribed insulin, and confidence in titration was low. Major barriers to insulin use included time constraints (64.5%), fear of hypoglycemia (64%), cost/access issues (63%), patient resistance (56%), lack of training/confidence (52%), and inadequate follow-up systems (43%). Most respondents (75.8%) believed additional training would improve their confidence. Suggestions for improvement included hands-on workshops, simplified guidelines, improved follow-up support, and patient education programs.

Conclusion: The study highlights significant gaps in insulin-related knowledge and practices among healthcare professionals, despite the widespread diabetes burden. Targeted educational programs, clinical decision support tools, and strategies to improve patient acceptance may enhance insulin prescribing confidence and improve diabetes outcomes.

KEY WORDS: Insulin therapy, Healthcare professionals, Diabetes management, Knowledge attitudes and practices, Barriers, Primary care, Hypoglycemia.

INTRODUCTION

Diabetes mellitus (DM) is a rapidly growing public health concern globally, with significant morbidity, mortality, and economic impact. According to the International Diabetes Federation (IDF), approximately 537 million adults were living with diabetes in 2021, and this number is expected to rise to 783 million by 2045.[1] A large proportion of this burden falls on low- and middle-income countries, including Pakistan, where the prevalence of type 2 diabetes has surged in recent

Address for Correspondence: Dr. Syed Riazul Hasan, FCPS (Medicine)
Consultant Physician,
Head of Department
Sindh Government Qatar Hospital,
Karachi – Pakistan.
Email: drriaz222@yahoo.com

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decades due to urbanization, sedentary lifestyles, and dietary changes.[2]

Effective glycemic control is critical in preventing the microvascular and macrovascular complications associated with diabetes.[3,4] While oral antidiabetic drugs (OADs) are often used in the initial stages of type 2 diabetes, insulin therapy remains a vital component of treatment, particularly when OADs fail to achieve glycemic targets.[3,4] Timely initiation and proper titration of insulin have been shown to significantly improve glycemic control and reduce long-term complications. Despite strong evidence and clear guideline recommendations, insulin remains underutilized in many primary care settings.[5-7]

Several factors contribute to the under-use of insulin therapy. On the patient side, fear of injections, stigma related to insulin use, and misconceptions about insulin represent significant barriers. However, equally important are provider-level factors such as lack of confidence in initiating insulin, inadequate training, and concerns about hypoglycemia or treatment complexity. This phenomenon of delay or reluctance in initiating insulin therapy, even when indicated, is referred to as "clinical inertia," and it is particularly problematic in resource-constrained settings where access to specialist care is limited.[5,7]

Primary care physicians and general practitioners serve as the first point of contact for most patients with diabetes. Their knowledge, attitudes, and practices (KAP) regarding insulin use are therefore critical in influencing treatment decisions and long-term disease management. Unfortunately, studies from various countries have shown that many physicians feel unprepared or uncomfortable managing insulin therapy, particularly in terms of dose titration, patient counseling, and managing adverse effects.[4,6,7]

Understanding the perceptions and practices of healthcare professionals is essential for identifying gaps and developing targeted interventions. In the context of Pakistan and similar healthcare systems, where endocrinologists are limited and the majority of diabetes care is delivered by family physicians, empowering primary care providers with the knowledge and skills to initiate and manage insulin is a public health priority.

The present study was conducted to assess the knowledge, attitudes, and practices of healthcare professionals, particularly family physicians, regarding insulin use in diabetes management. It also aimed to identify the key barriers faced by these professionals in prescribing insulin, with the goal of informing educational and system-level strategies to improve diabetes care in primary care settings.

METHODOLOGY

Study Design and Setting: This was a cross-sectional descriptive study conducted among healthcare professionals mostly family physicians involved in diabetes management at various clinical settings including primary care centers and outpatient departments after taking informed consent. The study was carried out between February to March 2025.The study was approved by the approval committee of Sindh Government Qatar Hospital, Karachi.

Participants: A total of 124 healthcare professionals were included using a non-probability convenience sampling technique . Participants included general practitioners and family physicians who were actively involved in the care of patients with diabetes.

Data Collection Tool: A structured, self-administered questionnaire was developed and validated by subject experts after a thorough literature review. It consisted of the following sections:

- Demographic and professional information (age, gender, years of practice)
- Knowledge regarding insulin types, initiation, and titration
- Attitudes toward insulin use
- Practice patterns related to insulin prescription
- Perceived barriers to insulin use

Ethical Considerations: Informed consent was obtained from all participants. The study protocol was reviewed and approved by the approval committee of Sindh Government Qatar Hospital Karachi (SGQH/783).

Table-I: Baseline Demographic Characteristics of Study Participants (n = 124)

Variable	*n*	*%*
Gender		
Male	74	59.7%
Female	50	40.3%
Age Range (years)		
30–40	38	30.6%
41–50	48	38.7%
51–65	38	30.6%
Years of Clinical Practice		
3–10 years	42	33.9%
11–20 years	58	46.8%
>20 years	24	19.3%
Formal Training on Insulin Use		
Yes	56	45.2%
No	68	54.8%
Professional Qualification		
MBBS only	64	51.6%
MCPS/FCPS Family Medicine	38	30.6%
Others (e.g., diploma, MPH)	22	17.7%

Data Analysis: Data were analyzed using SPSS version 20. Descriptive statistics were presented as frequencies and percentages for categorical variables, and means with standard deviations for continuous variables.

RESULTS

Demographic Characteristics: A total of 124 healthcare professionals (HCPs) participated in the study. The majority were male (60%, n = 74), with an age range of 30 to 65 years. The duration of clinical practice varied from 3 to 25 years, with a mean experience of approximately 12 years. Most participants were practicing in family medicine or general practice settings. (Table-I)

Knowledge About Insulin Use: While 55% of participants reported no formal training on insulin use, a significant proportion demonstrated adequate theoretical knowledge regarding types of insulin, starting doses, and recognition of hypoglycemia. However, only one-third of the participants (approximately 41/124) actively prescribed insulin in their clinical practice. Among these, most expressed limited confidence in insulin titration and dosage adjustments. (Table-II)

Attitudes Toward Insulin: Despite acknowledging the benefits of insulin therapy in improving glycemic control, many respondents lacked confidence in initiating or adjusting insulin independently. A majority agreed that insulin initiation is often delayed or deferred to specialists, highlighting a potential knowledge-to-practice gap.

Practice Patterns: Only about 33% (n = 41) of physicians reported routinely prescribing insulin. Among them, the basal-only and premixed regimens were more commonly used. Insulin titration was infrequent, with only a small fraction of physicians routinely adjusting doses based on blood glucose levels. Follow-up practices also varied widely, with many relying on periodic patient visits rather than structured insulin titration protocols. (Table-II)

Perceived Barriers to Insulin Use: Respondents identified multiple barriers to optimal insulin use in clinical practice. The most frequently cited challenges included Time constraints during consultations: reported by 80 out of 124 physicians (64.5%), Patient resistance to insulin initiation: reported by 56% of respondents, Fear of hypoglycemia: reported by 64% ,Lack of training or confidence in insulin initiation/ titration: reported by 52%, Lack of follow-up support systems noted by 43%, Cost or limited access to insulin: cited by 63%.

Despite fair knowledge, these barriers significantly impacted their confidence and willingness to initiate insulin in eligible patients.

When asked whether additional training on insulin use and titration would improve their confidence, a majority of healthcare professionals (n = 94; 75.8%) responded "Yes", indicating a strong willingness to enhance their competencies through continuing education. Meanwhile, 18 respondents (14.5%) were "Not sure", and 12 (9.7%) felt it would not make a significant difference.

Participants also provided open-ended suggestions to improve insulin use in primary care. Key recommendations included.

Hands-on workshops and refresher courses on insulin initiation and dose titration, Development of simplified insulin guidelines and algorithms tailored for use in busy primary care settings, Strengthening follow-up systems and access to diabetes educators for

Table-II: Knowledge, Attitude, and Practice (KAP) Related to Insulin Use (n = 124)

KAP Item	*n*	*%*
Routinely prescribe insulin in practice	41	33.1%
Confident in insulin titration	37	29.8%
Adequate theoretical knowledge about insulin types	88	71.0%
Delay insulin initiation due to lack of confidence	65	52.4%
Refer patients to specialists for insulin initiation	77	62.1%
Identified Barriers		
Time constraints during consultations	80	64.5%
Patient resistance to insulin	69	55.6%
Fear of hypoglycemia	79	63.7%
Lack of training/confidence	65	52.4%
Lack of follow-up support	53	42.7%
Cost or limited access to insulin	78	62.9%

Table-III: Perceptions Regarding Additional Training and Suggestions to Improve Insulin Use (n = 124)

Item	*n*	*%*
Would additional training on insulin use and titration improve confidence?		
Yes	94	75.8%
No	12	9.7%
Not sure	18	14.5%
Suggestions to improve insulin use in primary care (open-ended)		
Hands-on workshops and refresher training	78	62.9%
Simplified insulin guidelines and titration algorithms	66	53.2%
Strengthened follow-up systems and diabetes educator support	58	46.8%
Cost reduction and consistent insulin availability	72	58.1%
Patient education and awareness programs	64	51.6%

patient support, Reducing insulin cost and ensuring consistent supply through government or institutional support and Patient awareness programs to reduce fear and stigma associated with insulin. (Table-III)

DISCUSSION

This study highlights important gaps in the knowledge, attitudes, and practices (KAP) of healthcare professionals regarding insulin use in diabetes care. While most participants acknowledged the importance of insulin in managing diabetes, only one-third were regularly prescribing insulin in their clinical practice. Even among those who did, many lacked confidence in initiating and titrating insulin doses. The key barriers identified—lack of training, time constraints, fear of hypoglycemia, and patient resistance—are consistent with findings from other studies in Pakistan and the broader South Asian region.

Similar trends have been observed in earlier research from Pakistan. Hassan J et al. reported significant clinical inertia among primary care physicians, with delays in initiating insulin even in poorly controlled patients with long-standing diabetes.[8] The most commonly reported barrier to initiating insulin therapy among patients in the study was the difficulty associated with carrying insulin. There was a near-significant association observed between the duration of diabetes and the perceived difficulty in carrying insulin. Additionally, a statistically significant association was found between the patients' economic status and their fear of insulin use due to external influences. Specifically, individuals from lower economic strata were more likely to report being frightened by others regarding insulin therapy. These findings are consistent with the present study. Additionally, they emphasized the systemic lack of structured insulin education programs in the primary care setting, further contributing to hesitancy and underuse as reported in other studies.[9,10]

Studies conducted by Shera AS et al in Karachi[11] and Aslam MN in Azad Jammu and Kashmir[12] examined family physicians' prescribing behaviors and found that less than 40% felt confident in managing insulin therapy independently. The primary factors limiting insulin use included lack of access to certified diabetes educators, inadequate clinical guidelines tailored to primary care, and high patient load. Our study reinforces these limitations, with nearly 70% of participants citing time constraints as a significant barrier—an especially relevant issue in busy outpatient settings with limited consultation time per patient.

Comparable findings have also been reported from other South Asian countries. A study in Bangladesh by Islam MA et al. showed that more than 60% of general practitioners delayed insulin initiation due to fear of patient resistance and their own uncertainty about insulin regimens.[13] Like our participants, physicians reported that insulin dose titration was particularly challenging due to the need for close follow-up and lack of decision-support tools. Additionally it was noted that both patients and providers shared a negative perception of insulin, with physicians citing patient refusal and insufficient counseling resources as major barriers.[13]

Furthermore, the fear of hypoglycemia reported by more than half of our participants is a well-documented deterrent in many low-resource settings. The absence of proper monitoring tools, lack of formal education in managing insulin-induced hypoglycemia, and concern over medico-legal implications make physicians wary of insulin therapy. These concerns are not unfounded,

but they underscore the need for better access to glucometers, patient education, and institutional support in follow-up care.[14,15]

An additional dimension of our findings was the perceived lack of formal training among participants. While insulin is widely available, especially in public-sector hospitals and pharmacies in Pakistan, its proper use requires skill and confidence. Studies from other LMICs, also reported similar gaps in confidence, often relying on specialist consultation even in straightforward insulin-requiring cases.[15-17] This further delays timely initiation, especially in rural areas with limited specialist access.

Patient resistance was another commonly reported challenge. Several participants noted that patients were fearful of injections or held strong cultural beliefs that insulin signaled disease severity or "end-stage" diabetes. This "psychological insulin resistance" is not unique to Pakistan. Studies from India and Nepal have similarly identified cultural beliefs, lack of awareness, and stigma associated with insulin as significant deterrents.[5,11-13]

Taken together, these findings suggest a pattern of underutilization of insulin due to both provider-related (lack of knowledge, confidence, time) and patient-related (misconceptions, fear, non-adherence) barriers across the South Asian region. Given the growing burden of diabetes and the limited number of endocrinologists, there is a pressing need to equip primary care physicians with the skills and tools necessary to initiate and manage insulin therapy confidently.

Addressing these gaps will require a multi-pronged approach. Structured training programs and continuing medical education (CME) focused on insulin therapy should be prioritized, particularly for family physicians and general practitioners who serve as frontline diabetes care providers. Development and dissemination of simplified insulin protocols, visual titration guides, and use of digital decision-support tools may improve physician confidence. Importantly, involving diabetes educators and nurses in patient education may reduce the burden on physicians and help improve patient acceptance of insulin.

Limitation of the study: The study used a convenience sampling technique, which may limit the generalizability of findings.Additionally, self-reported data may be subject to response bias. Also the study did not evaluate actual prescribing practices through patient record audits.

CONCLUSION

There is a clear gap between knowledge and practice among healthcare professionals with respect to insulin use in diabetes care. Lack of training, time limitations, and fear of hypoglycemia contribute to the underutilization of insulin, despite its known benefits.

To improve diabetes outcomes, structured training workshops, decision support tools, and interdisciplinary care models involving nurses and educators should be implemented. Addressing both provider- and patient-level barriers is essential for overcoming therapeutic inertia in diabetes management.

Recommendations:

- Organize hands-on insulin prescribing and titration workshops for general practitioners.
- Develop simplified insulin initiation protocols for primary care.
- Involve diabetes educators to support both patients and physicians.
- Further studies using mixed-methods or qualitative designs could provide deeper insights into contextual barriers.

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Authors Contribution:

SRH: Concept and design, Data interpretation, writing, and review the manuscript.
FA: Data interpretation, writing, and review the manuscript.
IM: Interpretation of data, edit and review the manuscript.

AUTHORS:

1. Dr. Syed Riazul Hasan, FCPS (Medicine)
   Consultant Physician,
   Head of Department
   Sindh Government Qatar Hospital,
   Karachi – Pakistan.
2. Dr. Faiza Saeed, MBBS, MRCGP
   Resident Medical Officer,
   Sindh Government Qatar Hospital,
   Karachi – Pakistan.
3. Dr. Imran Mehmud, FCPS (Medicine)
   Consultant Physician,
   Sindh Government Qatar Hospital,
   Karachi - Pakistan.