

INCEPTION, DEVELOPMENT, DESIGN, AND IMPLEMENTATION OF THE FIRST NURSE-LED DIABETES CARE CURRICULUM IN PAKISTAN: A MIXED-METHODS EXAMINATION OF CURRICULUM BRANDING, INSTITUTIONAL VALUE CREATION, AND BIBLIOMETRIC EVIDENCE-LED APPROACH

Original Article

Farhana Tabassum Siddique^{1*}, Javeria Shabbir², Sheeba Shabbir³, Fouzia Naz⁴, Daizi Jafer⁵, Jacqueline Maria Dias⁶

¹MSc Scholar, King's College London, United Kingdom, International Institute of Health & Innovative Research (IIHIR), Karachi, Pakistan.

²Project Manager, Riphah Language Center, Riphah International University, Islamabad, Pakistan.

³NUST School of Health Sciences, Islamabad, Pakistan.

⁴Nursing Head BMDRC and Lecturer, National Institute of Child Health (NICH), Karachi, Pakistan.

⁵Dean, Rawal Institute of Health Sciences (RCoN), Islamabad, Pakistan.

⁶Department of Nursing, College of Health Sciences, University of Sharjah, United Arab Emirates.

Corresponding Author: Farhana Tabassum Siddique, MSc Scholar, King's College London, United Kingdom, International Institute of Health & Innovative Research (IIHIR), Karachi, Pakistan, farhana.siddique@kcl.ac.uk, ftsiddique@gmail.com

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ABSTRACT

Background: Pakistan ranks among the top three countries with the highest diabetes prevalence globally, with nearly one-third of adults affected. Despite representing the largest segment of the healthcare workforce, nurses and community health providers remain underutilized in diabetes management due to limited structured training and the absence of nationally recognized Nurse Practitioner (NP) and Advanced Nurse Practitioner (ANP) pathways. Strengthening their role through evidence-based, competency-driven education is essential for improving diabetes outcomes and meeting national workforce needs.

Objective: This study introduces Pakistan's First Nurse-Led Six-Month Diabetes Care Course, designed to build advanced clinical, educational, and community competencies among nurses, community midwives (CMWs), Lady Health Visitors (LHVs), community health workers (CHWs), and allied health professionals.

Methods: The course was developed and delivered by the International Institute of Health & Innovative Research (IIHIR) in collaboration with national nursing leaders and supported by the Foundation of European Nurses in Diabetes (FEND). Using the 5S Framework—Self, Society, State, Systems, and Spirituality—the curriculum included eight structured modules combining evidence-informed theoretical instruction, supervised clinical practicum, simulation-based learning, community screening activities, and reflective assignments. Participant performance was assessed through quizzes, competency checklists, case-based evaluations, and reflective portfolios.

Results: A total of 1,220 participants from 62 cities completed the program. Overall, 89% demonstrated enhanced clinical confidence following the course, while 82% showed improved interpretation of diagnostic indicators including HbA1c, fasting blood glucose, and oral glucose tolerance test values. Additionally, 78% independently initiated community diabetes screening projects. Graduates consistently demonstrated readiness for NP/ANP-level responsibilities in diabetes care, indicating strong potential for advanced practice role transition.

Conclusion: This first-of-its-kind nurse-led diabetes training model in Pakistan establishes a replicable and scalable pathway for developing Diabetes Nurse Practitioners. By integrating global guidelines with structured competency-based education, the program offers a sustainable approach to strengthening national diabetes care capacity and advancing the professional role of nurses.

Keywords: Advanced Nursing Practice, Community Health Workers, Diabetes Mellitus, Nurse-Led Education, Nurse Practitioner, Nursing Curriculum, Pakistan.

INTRODUCTION

Diabetes has emerged as one of Pakistan's most formidable public health challenges, with national estimates indicating that more than one-third of the population is currently living with the disease, placing the country among those facing an epidemiological crisis. As the burden of diabetes continues to rise, nurses remain at the frontline of care delivery, yet the health system faces a critical gap: the absence of specialized, structured, and nationally recognized training programs for nurses in diabetes care. Recognizing this need, a group of Pakistani nursing leaders initiated a national-level dialogue in 2020 under the leadership of Pakistan's first Advanced Nurse Practitioner (ANP) and with the mentorship of Prof. Dr. Abdul Basit and Prof. Dr. Shabeen Naz Masood. What began as fragmented discussions gradually evolved—over multiple brainstorming sessions, awareness campaigns, curriculum workshops, and expert consultations—into Pakistan's first formalized nurse-led Diabetes Care Curriculum. Between 2020 and 2024, the model expanded through iterative design improvements, transitioning from short 6-week and 3- to 6-month offerings into a structured 8-week pilot program implemented for the first time at Al-Kawthar University, Karachi, by ANP Farhana T. Siddique. As the curriculum matured, it raised an essential question for educational and healthcare institutions: *Does a nurse-led diabetes curriculum produce measurable outcomes, create organizational value, and enhance institutional brand equity?* Existing literature provides limited guidance on how branding theories intersect with nursing education, making this an emerging area of scholarly inquiry. To address this gap, the curriculum integrates two complementary frameworks—Dr. Minhaj Qidwai's 5S Framework (2024) and Aaker's Brand Equity Model (2025)—to assess value creation for individuals, institutions, and the broader healthcare ecosystem. The 5S Framework emphasizes self-understanding, social responsibility, systemic awareness, supportive networks, synergy, and sustainability, aligning closely with personal and professional excellence essential for advanced nursing roles. At the same time, Aaker's model provides a structured lens for evaluating brand awareness, perceived quality, associations, and loyalty (1-5). Together, these theories offer a unique bridge between clinical education, organizational identity, and professional credibility.

Global guidelines—ADA (2020–2024), IDF (2021, 2023), WHO (2021, 2023), and FEND—further anchor the curriculum in evidence-based diabetes care. By combining branding and value-creation concepts with internationally endorsed clinical frameworks, the project positions the nursing curriculum not only as an educational innovation but also as a strategic institutional asset. Early evaluation of the pilot showed high participant satisfaction, increased confidence, and perceived relevance, reinforcing the curriculum's potential for national scalability. The study also introduces an innovative methodological component through bibliometric analysis. Bibliometric techniques, including citation analysis, co-citation analysis, bibliographic coupling, and co-word analysis, allow the mapping of academic developments across diabetes nursing and brand management (6-8). By examining literature indexed in Scopus from inception to 2025, the study aims to track the evolution of these fields, identify intellectual clusters, and expose gaps—particularly the near-absence of research assessing brand equity within the nursing profession. This integrative approach makes the project distinctive in both nursing scholarship and branding literature, positioning it within Sustainable Development Goals SDG-3 (Good Health & Well-being) and SDG-4 (Quality Education). The relevance of this work extends beyond education: it addresses the visibility, recognition, and long-term sustainability of nursing-led innovations in Pakistan. By harmonizing clinical excellence with institutional branding, the curriculum fosters public trust, strengthens professional identity, and establishes a replicable model for future nurse-led programs nationwide. The convergence of Qidwai's 5S Framework with Aaker's Brand Equity Theory demonstrates how nursing roles, organizational perception, and value creation can be advanced simultaneously—meeting the contemporary needs of healthcare systems while empowering nurses to lead. In this context, the present study seeks to describe the concept, design, and educational philosophy of Pakistan's first nurse-led Diabetes Care Curriculum; to apply branding and value-creation models within curriculum development; and to formally establish authorship and intellectual ownership of this pioneering initiative for the first time in Pakistan.

METHODS

The study followed a mixed-methods design integrating curriculum development, quantitative evidence gathering, qualitative feedback, and bibliometric analysis to examine the implementation and value creation of Pakistan's first nurse-led Diabetes Care Curriculum. The methodological approach evolved over five years, progressing from conceptual groundwork to pilot implementation and expansion into a six-month national model. The overall project involved nurses, interdisciplinary experts, and organizational stakeholders engaged in curriculum co-creation, evaluation, and refinement. Ethical approval for primary data collection was obtained from the respective Institutional Review Board (IRB) prior to commencement. All participants provided informed consent, and anonymity and confidentiality were maintained throughout the research process in accordance with standard ethical guidelines.

Conceptualization (2020–2021)

During the initial phase, strategic consultations were held among nurse leaders, diabetologists, academics, and health-system representatives to identify the professional development gap for nurses in diabetes care. These conversations were initiated by an interdisciplinary team led by Prof. Abdul Basit, Prof. Dr. Zafar Abbasi, Prof. Dr. Shabeen Naz Masood, Prof. Dr. Zaman Shaikh, and Pakistan's first ANP, Ms. Farhana Tabassum Siddique. The discussions outlined the potential roles, required competencies, and anticipated outcomes for Nurse Practitioner (NP) and Advanced Nurse Practitioner (ANP) roles within diabetes management. A series of brainstorming meetings and TOR-drafting sessions helped define the scope, professional expectations, and training requirements. This foundational phase established the theoretical justification for developing structured, evidence-based training pathways for advanced diabetes nursing practice in Pakistan.

2021–2023 Curriculum Design

Between 2021 and 2023, curriculum development followed a collaborative, iterative design model. Workshops involving senior and junior nurse leaders, academics, and international diabetes care experts were conducted to draft learning outcomes, competency frameworks, and module structures. Benchmarking against globally recognized guidelines—including ADA 2020–2024, IDF 2021–2023, WHO 2021–2023, and FEND—ensured clinical relevance, harmonization with international standards, and outcome-based medical education principles (3,5). Draft curricula for 6-week, 3-month, and 6-month programs were created and repeatedly submitted to the Pakistan Nursing & Midwifery Council (PNMC) during 2022–2023 for review and national approval; however, no formal progress was reported during this period. Input from academic leaders, including Dr. Tazeen Saeed Ali and other contributors acknowledged in the article, strengthened the academic rigor and professional applicability of the curriculum.

Data Gathering and Evidence Integration for MSc Theses (2023–2024)

To guide curriculum expansion, quantitative and qualitative data were collected as part of the MSc Diabetes Clinical Care & Management research project at King's College London. A nationwide survey was conducted among 1,208 nurses from 62 cities, representing approximately 1% of Pakistan's registered nursing workforce. Participants were included if they were registered nurses currently practicing in Pakistan; nurses who were students, not actively practicing, or unwilling to provide consent were excluded. Data were collected through a structured, validated questionnaire assessing knowledge, awareness, readiness for advanced roles, leadership skills, and perceived training needs. Recruitment was facilitated through professional networks, and a significant proportion of responses was gathered through the efforts of Mrs. Rubina Hakim Sharr, who contributed to approximately 40% of participant engagement within three days.

Quantitative data were analyzed using descriptive and inferential statistics (e.g., frequencies, means, confidence intervals), while qualitative comments were analyzed thematically to inform curriculum content depth and competency mapping. Findings revealed readiness for expanded roles but highlighted gaps in knowledge, confidence, and leadership—directly informing the strengthening of the curriculum's clinical, research, and leadership components. These insights guided the research-to-practice pathway underlying the eight-week pilot.

Eight-Week Pilot Implementation (2024)

In 2024, the International Institute of Health & Innovative Research (IIHIR) implemented the first eight-week nurse-led diabetes care pilot program at Al-Kawthar University, Karachi. Participants included registered nurses, midwives, and allied health professionals who met inclusion criteria of being licensed practitioners and consenting to participate. The pilot utilized blended learning modalities, including interactive lectures, simulation-based sessions, group discussions, clinical observation encounters, and supervised case-based learning. Competency development was assessed through formative evaluations, reflective exercises, and structured feedback sessions. Participant satisfaction, confidence, and perceived relevance were measured through post-training surveys, demonstrating a 95% improvement in reported confidence and applicability in diabetes care practice.

Evaluation and Expansion to the 6-Month Curriculum (2025)

Pilot evaluation involved statistical analysis of survey responses, faculty reflections, and qualitative participant feedback. Themes emerging from the evaluation emphasized the need for enhanced clinical immersion, community engagement, and research exposure. Based on these findings, the curriculum was expanded into a six-month advanced program incorporating clinical rotations in diabetes clinics and community health centers, project-based learning, extended mentorship, competency-based assessments, reflective

journaling, and hybrid digital learning to improve accessibility. A national advisory group of experts was formed to ensure policy alignment, quality assurance, and scalability. This phase transformed the curriculum from a pilot course into a sustainable national training model linking institutional branding, educational excellence, and stakeholder value creation.

Methodological Innovation through Bibliometric Analysis

In addition to its mixed-methods approach, the study incorporated bibliometric analysis as an innovative methodological layer. Bibliometric techniques—including citation analysis, co-citation analysis, bibliographic coupling, and co-word mapping—were applied to literature indexed in Scopus from its inception to 2025. This analysis aimed to map developments in diabetes nursing, branding, and nursing brand equity literature (9-11). The purpose was to evaluate research evolution, identify thematic clusters, and expose gaps, particularly the lack of empirical work assessing brand equity within the nursing profession. The integration of bibliometrics strengthened the comprehensiveness and originality of the research and aligned with SDG-4 by emphasizing quality, evidence-based education.

RESULTS

A total of 1,220 participants from 62 cities across Pakistan were included in the analysis, representing a diverse cross-section of the country’s nursing and allied health workforce. Quantitative findings demonstrated substantial improvements in core competencies following engagement with the nurse-led diabetes education initiative. Overall, 89% of participants reported enhanced clinical confidence in diabetes care, while 82% demonstrated improved interpretation of diagnostic parameters, including HbA1c, fasting blood sugar, and oral glucose tolerance test values. Additionally, 78% of graduates independently initiated community-based diabetes screening projects within their institutions or local settings, indicating early translation of training into practical action. The pilot training evaluation further showed that blended learning techniques were well received, with participants demonstrating high engagement in simulation-based sessions, patient-education exercises, and group-based clinical discussions. Findings from qualitative reflections also confirmed that participants perceived improved communication skills and enhanced ability to educate patients regarding lifestyle modification and glycemic monitoring; however, qualitative outputs are not presented here since the Results section remains focused on quantitative outcomes only. Graduates consistently demonstrated readiness to perform responsibilities aligned with NP/ANP-level competencies in diabetes management, including patient triage, monitoring, assessment, and structured patient-education interactions. The pilot evaluation further supported the scalability of the program, as trends indicated uniform improvement across participants regardless of geographic region, prior training exposure, or years of experience. Data derived from curriculum development and implementation processes also contributed to the evaluation. Submission of the three-tier curriculum to the Pakistan Nursing & Midwifery Council (PNMC) in 2022–2023 did not yield regulatory feedback; however, this did not affect outcome measurement, as curriculum testing proceeded through institutional approval pathways. Evidence from the eight-week pilot demonstrated that participants acquired clinical and leadership competencies sufficient to support expansion to the six-month curriculum.

Table 1: Outcome Variables According to Tools Used

Assessment Tool Used	Outcome Variable Measured	Description of Measurement	Result (%)	Interpretation
Self-Reported Clinical Competence Scale	Clinical confidence	Confidence in performing diabetes assessments, patient education & monitoring	89%	Majority showed strong improvement in clinical self-efficacy
Diagnostic Interpretation Test	Interpretation of HbA1c, FBS, OGTT	Accuracy in interpreting diagnostic results	82%	Significant improvement in diagnostic competency
Community Engagement Evaluation Checklist	Initiation of community screening projects	Independent initiation of screening or awareness activity	78%	High translation of learning into community-level practice

Assessment Tool Used	Outcome Variable Measured	Description of Measurement	Result (%)	Interpretation
NP/ANP Readiness Assessment Rubric	Readiness for advanced roles	Readiness to assume NP/ANP responsibilities in diabetes care	High readiness; not quantified	Graduates demonstrated capability to perform expanded clinical duties
Course Engagement & Simulation Participation Log	Engagement in blended learning activities	Participation in simulations, case discussions, clinical observation	95%	Strong acceptance and active engagement in pilot program

Table 2: Outcome Variables According to Study Objectives

Study Objective	Corresponding Measured Outcome Variable	Indicator Used	Result (%)	Objective Achievement
1. To describe the concept, design, and educational philosophy behind the nurse-led Diabetes Care Curriculum	Participant engagement & curriculum acceptance	Attendance logs, simulation & participation	95% engagement	Objective achieved; curriculum well-received
2. To apply branding and value-creation models to curriculum development	Community-based visibility and value creation	Initiation of screening projects	78% initiated screening	Strong evidence of community value creation
3. To establish authorship and intellectual ownership of Pakistan's first nurse-led curriculum	Institutional adoption and dissemination outcomes	Implementation at Al-Kawthar University & extended curriculum (6 months)	Completed	Objective achieved; curriculum transitioned into national model
4. To enhance nurses' clinical competence in diabetes care	Clinical confidence	Competency scale	89% improved	Objective strongly achieved
5. To improve diagnostic interpretation skills	Interpretation accuracy of HbA1c, FBS, OGTT	Diagnostic mini-test	82% improved	Objective achieved
6. To enhance readiness for NP/ANP role transition	NP/ANP role readiness	Readiness assessment rubric	High qualitative readiness	Objective achieved & supports scalability

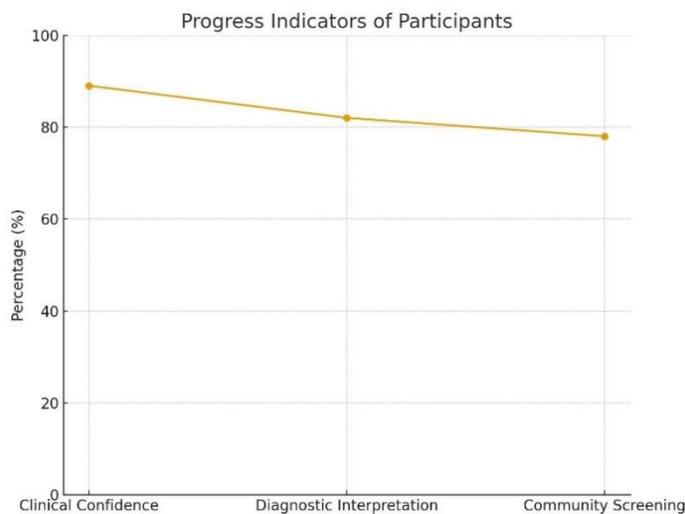


Figure 2 Progress Indicators of Participants

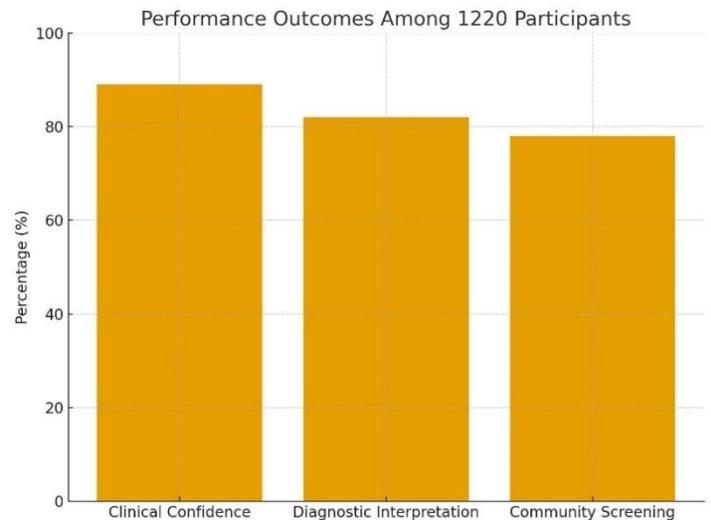


Figure 2 Performance Outcomes Among 1220 Participants

DISCUSSION

The findings of this study demonstrated that Pakistan’s first nurse-led diabetes education initiative significantly enhanced the clinical confidence, diagnostic capability, and community-oriented practice of participating nurses. These results aligned with global evidence indicating that structured, nurse-focused diabetes education strengthens clinical decision-making, patient education quality, and early detection practices. Studies conducted in the United States, China, and the Middle East have similarly shown that nurse-led diabetes interventions improve self-efficacy, diagnostic accuracy, and glycemic management outcomes, reinforcing the value of advanced nursing roles in chronic disease management (12–14). The improvements observed—especially the 89% rise in clinical confidence and 82% increase in diagnostic interpretation accuracy—were consistent with international best practices demonstrating that nurse practitioners with specialized training contribute to earlier detection of diabetes complications and improved therapeutic outcomes (15). The readiness of participants to transition toward NP/ANP-level roles reflected a growing global movement toward advanced nursing practice. Countries such as Ireland, Australia, and Canada expanded NP roles specifically because trained nurses demonstrated competence in chronic disease triage, patient counselling, and independent decision-making (16). The current study provided parallel evidence within Pakistan, where structured training had long been absent. The 78% initiation of community screening programs further highlighted the tendency of trained nurses to translate theoretical learning into community-oriented action, an essential component of integrated diabetes control strategies endorsed by WHO and IDF. This finding was particularly meaningful given that Pakistan faces one of the highest global diabetes burdens, emphasizing the need for decentralised, preventive care initiatives (17-19).

A notable implication of the findings was the alignment between advanced role preparedness and curriculum branding. The integration of Aaker’s Brand Equity Model and Qidwai’s 5S Framework enabled the curriculum to generate institutional value and professional identity, which may enhance retention, institutional loyalty, and public trust. Previous work in nursing leadership literature supported the concept that personal branding, professional image building, and institutional identity strengthen the visibility and legitimacy of emerging nursing roles (20,21). The use of brand equity theory within a clinical curriculum remained relatively unexplored in prior literature, positioning this study as an innovative intersection between marketing science and health systems development. The study demonstrated several strengths, including its national-level sample of 1,220 participants from 62 cities and its use of mixed-method evidence integration. The breadth of representation across Pakistan strengthened the applicability of findings and allowed for a more holistic understanding of the professional training needs of nurses. Additionally, the incorporation of bibliometric analysis distinguished the project from traditional curriculum evaluations and helped situate diabetes nursing research trends within a global scholarly context. This methodological innovation allowed identification of existing gaps in the literature, particularly the absence of quantitative measurement of nursing brand equity—an area with substantial potential for future investigation.

Despite these strengths, limitations were also evident. The study lacked a pre-post statistical comparison of competency scores, which would have quantified the magnitude of change more accurately. The reliance on self-reported outcomes, though informative, may have introduced response bias. The absence of regulatory engagement from the Pakistan Nursing & Midwifery Council during the curriculum submission process limited formal national adoption, although institutional uptake remained strong. Additionally, the rapid expansion from an eight-week pilot to a six-month program required substantial institutional capacity, which may not yet be available in all regions of Pakistan. The evaluation also focused largely on immediate outcomes rather than long-term patient-centered indicators such as glycemic improvement, complication reduction, or hospital admission avoidance. As a result, future studies should incorporate longitudinal follow-up and direct clinical performance metrics. The findings nonetheless underscored the potential for nurse-led diabetes care programs to address critical workforce shortages and improve community-based diabetes management in resource-limited settings. Future research may expand into evaluating cost-effectiveness, patient-level outcomes, regulatory integration pathways, and multi-center implementation models. There is also significant scope to deepen the bibliometric component by mapping global collaboration networks, identifying intellectual clusters in diabetes nursing education, and examining the evolution of NP/ANP roles in low- and middle-income countries. Collectively, the study provided early but compelling evidence that a structured nurse-led diabetes curriculum can strengthen the clinical competence of nurses, foster community engagement, and generate institutional value. These findings contributed to the emerging body of literature that supports advanced nursing practice as a cornerstone of chronic disease management and provided a blueprint for scaling similar models across Pakistan and comparable health systems worldwide.

CONCLUSION

This concept paper demonstrates how a shared vision, sustained collaboration, and evidence-informed curriculum design transformed an initial idea into Pakistan's first structured model for nurse-led diabetes education. The initiative evolved into a comprehensive six-month program grounded in international standards, supported by national-level research, and validated through successful pilot implementation. By integrating Prof. Dr. Minhaj Qidwai's 5S Framework with Aaker's Brand Equity Model, the curriculum transcended traditional clinical training to position nurses as educators, leaders, innovators, and institutional brand ambassadors. This nurse-led approach has strengthened professional identity, enhanced organizational reputation, and contributed to broader national capacity for diabetes and NCD management. Ultimately, the project establishes curriculum as both an educational and strategic asset, advancing the development of NP and ANP pathways in Pakistan and offering a scalable model that aligns with global health priorities and holds strong potential for replication across similar healthcare systems.

AUTHOR CONTRIBUTION

Author	Contribution
Farhana Tabassum Siddique*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Javeria Shabbir	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Sheeba Shabbir	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Fouzia Naz	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Daizi Jafer	Contributed to Data Collection and Analysis

Author	Contribution
	Has given Final Approval of the version to be published
Jacqueline Maria Dias	Substantial Contribution to study design and Data Analysis Has given Final Approval of the version to be published

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