



## Development of a therapeutic patient education curriculum for healthcare professionals to improve diabetes care in the Eastern Mediterranean region

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### ABSTRACT

**Aims:** Diabetes prevalence in the Eastern Mediterranean Region (EMR) is among the highest globally, yet structured therapeutic patient education (TPE) is inconsistently implemented. This study aimed to describe the multi-phase development, structure, and implementation planning of a WHO-led, diabetes-specific TPE curriculum tailored to the EMR.

**Methods:** A multi-phase, formative approach was used to inform curriculum development. This included a synthesis of existing evidence, a regional situation analysis combining desk review, stakeholder surveys, and semi-structured interviews, and stakeholder consultations. Qualitative data were analysed using a thematic approach, and findings were integrated through an expert-driven, iterative consensus process. Reporting was guided by relevant principles for complex intervention description.

**Results:** The different phases identified key gaps in the organization, content, and delivery of diabetes education across the region, as well as priorities for culturally adapted and competency-based training. These findings directly informed the development of a structured curriculum composed of eight modules, covering core aspects of diabetes management, self-care, and context-specific considerations. The curriculum incorporates defined learning objectives, core content areas, and participatory teaching methods, and is supported by an implementation guide informed by implementation science frameworks.

**Conclusions:** This work provides a transparent description of the development of an evidence-informed, theory-driven TPE curriculum adapted to the EMR. The curriculum offers a structured framework to support the delivery of diabetes education and may be adaptable to other contexts, subject to local contextualization and future evaluation.

### 1. Introduction

Diabetes poses a growing public health challenge worldwide, and is of particular concern in the Eastern Mediterranean Region (EMR). According to the latest global diabetes estimates, diabetes prevalence has risen sharply across all regions over the past three decades, with the EMR among those most severely affected [1]. The EMR includes six of the ten countries with the highest prevalence of diabetes globally, reflecting both the rapid epidemiological transition and persistent

inequities in access to prevention, early detection, and long-term care [1,2]. The region's diversity encompassing high-income countries, low- and middle-income countries (LMICs), and areas affected by conflict and humanitarian crises creates a complex landscape for health service delivery and chronic disease management [3].

Noncommunicable diseases (NCDs) such as diabetes are now the leading causes of morbidity and mortality in the EMR, placing a significant and growing strain on health systems [3]. Diabetes is not only a major cause of premature death, but also a driver of costly

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complications, reduced quality of life, and socioeconomic burden for individuals and communities [4]. These challenges underscore the need for effective, sustainable models of care that extend beyond traditional clinical management to actively engage people living with diabetes (PLwD) in their own health.

Therapeutic Patient Education (TPE) represents a critical, evidence-based approach for achieving this. TPE is a structured, person-centred learning process that empowers individuals to acquire the knowledge, skills, and confidence required to manage their condition effectively [5]. Its added value in NCD management lies in its capacity to support long-term behavioural change, promote treatment adherence, and address the psychosocial dimensions of chronic illness [6,7]. In diabetes care, TPE has been shown to improve glycaemic control, enhance self-efficacy, and reduce the risk of complications [8–10]. By embedding TPE within care systems, health providers can move from a model of information delivery to one of partnership, co-creation, and empowerment, essential elements for sustainable NCD control.

While numerous educational interventions have been piloted in the EMR, many have not yet been fully aligned with the core principles of the TPE model [11]. In response to this gap, the World Health Organization Regional Office for the Eastern Mediterranean (WHO EMRO) led the development of a diabetes-specific TPE curriculum to support healthcare professionals in the delivery of TPE.

The resulting curriculum is designed to support healthcare providers in delivering effective diabetes self-management education, using modular content and adaptable formats. This article details the content development process, its structure, pedagogical underpinnings, and alignment with the TPE competency framework [5]. Its purpose is to document how the curriculum was designed and informed by regional evidence and stakeholder input, rather than to evaluate its effectiveness.

Against this backdrop, this article provides one of the first detailed descriptions of the development of a WHO-led TPE curriculum specifically tailored to diabetes care in the EMR. While recent systematic reviews have evaluated the effectiveness of TPE interventions and synthesized regional needs [12], no prior publication has documented a multi-phase curriculum development process and an implementation-science-based implementation guide. This contribution fills a major gap in the literature on competency-based diabetes education within LMIC settings. To our knowledge, in the past two years only one systematic review has examined TPE for diabetes in LMIC settings [13], but none have addressed curriculum development. Recently, the authors of the present manuscript published a synthesis of TPE-related interventions and needs specifically in the EMR [12], which confirmed the scarcity of structured, competency-based TPE programmes and highlighted substantial gaps in patient empowerment, participatory pedagogy, and provider training. These findings formed a key component of the WHO-mandated situation analysis and directly informed the present curriculum development process. Despite these reviews, no publication to date has described the design and structure of a comprehensive WHO-led TPE curriculum or the accompanying implementation guidance for diabetes care.

This work builds on prior contributions by the authors in the field of therapeutic patient education and diabetes self-management, including recent systematic reviews and digital health interventions [6,9,14–16].

## 2. Methods

The development of the diabetes-specific TPE curriculum followed a multi-phase, evidence-informed process grounded in international frameworks for behavior change and self-care support (Fig. 1). This study adopts a multi-phase, formative design aimed at documenting the development of a diabetes-specific TPE curriculum. The objective was not to evaluate effectiveness, but to describe the processes used to inform curriculum design based on available evidence, stakeholder input, and implementation science frameworks. As an overarching approach, the process was guided by the Self-care Competency

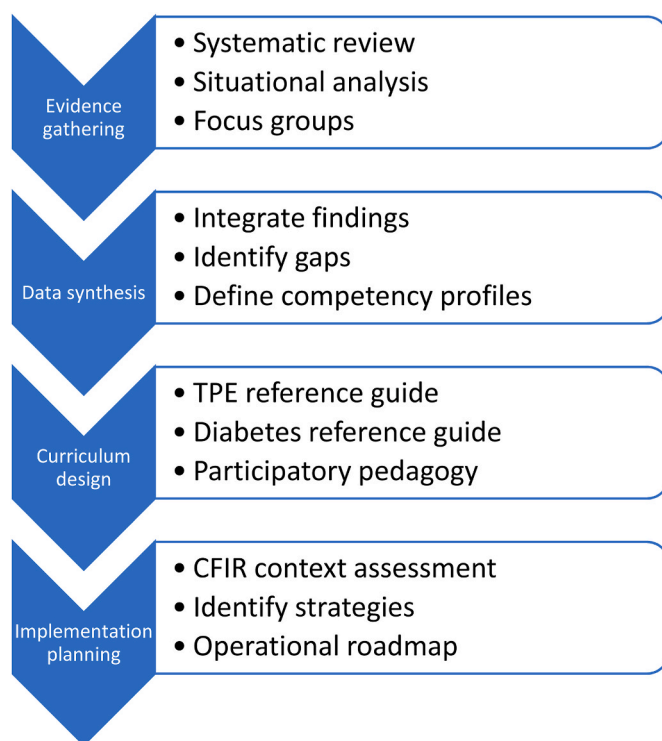


Fig. 1. Curriculum development process.

**Legend:** The curriculum was developed through a structured process. This approach ensured alignment with regional needs and WHO standards.

Framework: Volume 3 – Curriculum Guide for Health and Care Workers to Support People's Self-Care, developed by WHO [17], which recognizes self-management as a critical component of the broader self-care continuum. In addition, the Core Processes model was used to structure the design and thinking process throughout curriculum development [18]. This model emphasizes a systematic, theory-informed pathway for developing behavior change interventions, ensuring that decisions are anchored in research, behavioral science, and stakeholder input [18].

Reporting of this curriculum development process follows the TIDieR (Template for Intervention Description and Replication) guidance for describing complex health interventions, as recommended by the EQUATOR Network. As this study focuses on curriculum development rather than a formal systematic review or evaluative study, reporting standards were adapted accordingly. Detailed implementation parameters (e.g., session duration, delivery fidelity) will be defined and evaluated during the pilot phase of the programme.

### 2.1. Phase 1: Situation analysis

The first phase consisted of a comprehensive situation analysis aimed at mapping existing TPE practices for diabetes within the EMR. This work combined three main sources of evidence.

- a systematic desk review of published studies;
- a regional survey conducted across 13 EMR countries, with a total of 15 respondents representing national stakeholders;
- semi-structured interviews were conducted with a purposive sample of approximately 9 key informants across 9 EMR countries, including healthcare providers, policymakers, and patient representatives. These included participants from 3 low-income, 4 lower-middle-income, and 1 high-income country. Participants were selected to ensure representation across key stakeholder groups and diverse health system contexts within the EMR

This desk review complemented a previously published systematic review conducted by the authors in the EMR [12], which provided a comprehensive synthesis of intervention effectiveness and regional gaps. The literature review focused on identifying interventions that demonstrated measurable effects on self-care behaviours, treatment adherence, and empowerment of (PlwD). The regional survey gathered data on the availability, scope, and implementation of TPE programmes, as well as perceived barriers to their delivery. Interviews provided richer, context-specific insights into both the systemic challenges and enabling factors affecting TPE implementation in diverse settings. All data were synthesized to highlight common patterns, structural gaps, and opportunities for improvement, ultimately informing the definition of core competency profiles for both PlwD and healthcare professionals (HCPs). Qualitative data from interviews were analysed using a thematic approach to identify recurring patterns and key themes across settings, which were then synthesized to inform curriculum development.

## 2.2. Phase 2: Stakeholder consultations

To ensure the curriculum was co-created and not only locally relevant but also widely applicable, WHO EMRO convened a series of stakeholder consultations involving a diverse working group. Participants included endocrinologists and diabetes experts from across the EMR, international leaders in TPE and chronic disease education, representatives from civil society, people with lived experience of diabetes, and WHO country office staff engaged in prior TPE-related initiatives. The Geneva WHO Collaborating Center for Education and Long-Term Follow-Up Strategies for Chronic Diseases played a central role in supporting curriculum design, drawing on international best practices and ensuring alignment with the WHO TPE competency framework.

Workshops focused on co-developing educational strategies to support treatment adherence and self-management, identifying implementation barriers, and designing adaptable formats suitable for diverse healthcare settings. To further embed person-centeredness, a focus group discussion was organized as part of a global event, bringing together individuals living with diabetes to articulate the competencies they valued for self-management and the experience they had of their care providers. Their input directly informed the content and structure of the curriculum.

## 2.3. Phase 3: Curriculum design

Two competency profiles emerged from this process: one for PlwD, defining the self-care capabilities necessary for daily diabetes management; and one for HCPs, outlining the essential knowledge, communication skills, and pedagogical competencies required for effective TPE delivery.

The curriculum was structured around these profiles and comprises two interlinked components. The TPE Reference Guide, based on the HCP profile, introduces the conceptual and methodological foundations of TPE, including adult learning principles, health literacy, patient empowerment strategies, and behaviour change techniques. It also incorporates a train-the-trainer (ToT) model and offers both online modules and in-person activities. The Diabetes Reference Guide, based on the PlwD profile, provides practical content for self-management education, organised into thematic modules. Each module aligns with specific competencies and integrates clinical guidance, psychosocial considerations, interactive exercises, culturally adapted examples, and communication tips.

Designed to be modular and flexible, the curriculum can be delivered in a variety of formats, from group workshops to individual counselling sessions and digital platforms, and is adaptable for use by multidisciplinary teams.

The translation of findings from the different phases into competency profiles and curriculum structure followed a pragmatic, expert-driven consensus process involving iterative review and refinement by a

multidisciplinary team.

## 2.4. Phase 4: Implementation planning

In parallel with the curriculum design, WHO EMRO developed a regional Implementation Guide to facilitate its adoption and sustainability. The Consolidated Framework for Implementation Research (CFIR) was applied to assess the healthcare system context, identify barriers and facilitators to TPE integration, and guide the creation of tailored, context-sensitive strategies. This framework enabled the development of a roadmap that could be adapted to the varied realities of EMR health systems, taking into account factors such as workforce readiness, stakeholder engagement, and alignment with national health policies.

## 3. Results

### 3.1. Findings from the Systematic review and implications for curriculum design

The systematic review of published studies on TPE interventions in the EMR demonstrated that such interventions were consistently associated with measurable improvements in diabetes self-management. Across the included studies, participants reported increased adherence to medications, more frequent blood glucose monitoring, and improvements in diet and physical activity. Biological outcomes also showed positive changes, with several studies reporting significant reductions in glycated haemoglobin (HbA1c) and fasting blood glucose. These benefits were particularly pronounced in interventions incorporating structured behavioural change strategies such as goal-setting, action planning, and problem-solving techniques.

While variability was observed in anthropometric measures such as body mass index and waist circumference, the overall direction of effect supported the value of TPE approaches in the region. The review also identified a lack of comprehensive integration of TPE's three core components — knowledge, skills, and confidence — within most interventions. Moreover, limited application of shared decision-making and participatory methodologies highlighted the need for a more standardised, person-centred framework for TPE delivery.

These findings informed the integration of behavioural change strategies, competency-based learning objectives, and evidence-aligned content within the curriculum modules.

### 3.2. Findings from the regional Situation analysis and implications for curriculum design

The regional situation analysis revealed considerable variation in the delivery and scope of TPE.

Three main themes emerged from the situation analysis: variability in programme structure, limited standardisation of educational content, and gaps in healthcare provider training.

In many countries, educational activities were inconsistently implemented and often limited to one-way health promotion messages rather than structured, interactive learning. There was a widespread absence of standardised TPE programmes, and formal training in TPE for healthcare professionals was rare.

Respondents also noted limited emphasis on person-centred approaches and minimal integration of behavioural change strategies. Structural barriers, including workforce shortages, competing healthcare priorities, and inadequate institutional support further restricted the systematic adoption of TPE. Despite these challenges, the analysis identified existing initiatives and local expertise that could serve as entry points for scaling structured, competency-based TPE in the region.

These insights guided the prioritisation of a structured, standardised, and competency-based curriculum design adapted to diverse healthcare system contexts.

### 3.3. Findings from Stakeholder consultations and lived experience Input

Stakeholder consultations, supported by a focus group of individuals with lived experience of diabetes, provided critical input to ensure the curriculum was person-centred and contextually relevant.

Key themes emerging from stakeholder consultations included the need for culturally adapted content, interactive teaching methods, and flexible delivery formats.

Participants from across the EMR and international settings highlighted competencies that PLwD value most for effective self-management such as problem-solving skills, effective communication with healthcare providers, and the ability to adapt daily routines to changing health needs.

Healthcare professionals emphasised the importance of training in participatory teaching techniques, motivational interviewing, and culturally sensitive communication. Discussions also addressed the need for adaptable curriculum formats to meet the realities of diverse healthcare settings, from resource-rich urban centres to fragile and humanitarian contexts. The inclusion of both regional and international experts ensured that the curriculum was designed for global applicability, while reflecting the unique challenges and opportunities within the EMR.

These contributions directly informed the inclusion of participatory teaching methods, culturally adaptable content, and flexible delivery formats within the curriculum.

### 3.4. Structure and components of the developed TPE curriculum

Drawing on the evidence from the systematic review, situation analysis, and stakeholder input, two competency profiles were established, one for PLwD and one for healthcare professionals. These profiles formed the foundation for the development of a modular, flexible TPE curriculum designed for multidisciplinary use.

The TPE Reference Guide introduces the conceptual and methodological foundations of TPE, including adult learning theory, health literacy, patient empowerment, and behavioural change strategies. It is intended for all healthcare providers working with people living with chronic conditions and supports a train-the-trainer (ToT) approach. The Diabetes Reference Guide focuses on practical, condition-specific content structured into thematic modules. Each module integrates clinical knowledge with psychosocial considerations, interactive activities, culturally adapted examples, and communication strategies aligned to the competency framework.

The curriculum is adaptable for delivery through group workshops, individual consultations, and digital platforms, enabling its integration into varied health system contexts. By embedding participatory methods such as role-play, storytelling, and peer learning, the curriculum shifts diabetes education from information delivery toward empowerment and collaborative learning (Fig. 2).

### 3.5. Implementation planning and CFIR-aligned Implementation guide

In parallel with curriculum development, WHO EMRO created an Implementation Guide to support the adoption and sustainability of TPE in the EMR. This guide is structured using the Consolidated Framework for Implementation Research (CFIR), which was applied to assess context, identify barriers and facilitators, and develop tailored strategies for integration into national health systems.

The guide outlines practical steps for embedding TPE into routine care, including building institutional capacity through ToT programmes, securing policy alignment, engaging stakeholders at multiple levels, and monitoring progress through defined indicators. The strategies are presented in a structured format and illustrated in the accompanying figure, which maps each recommendation to CFIR domains such as intervention characteristics, inner and outer settings, and individual implementation factors.

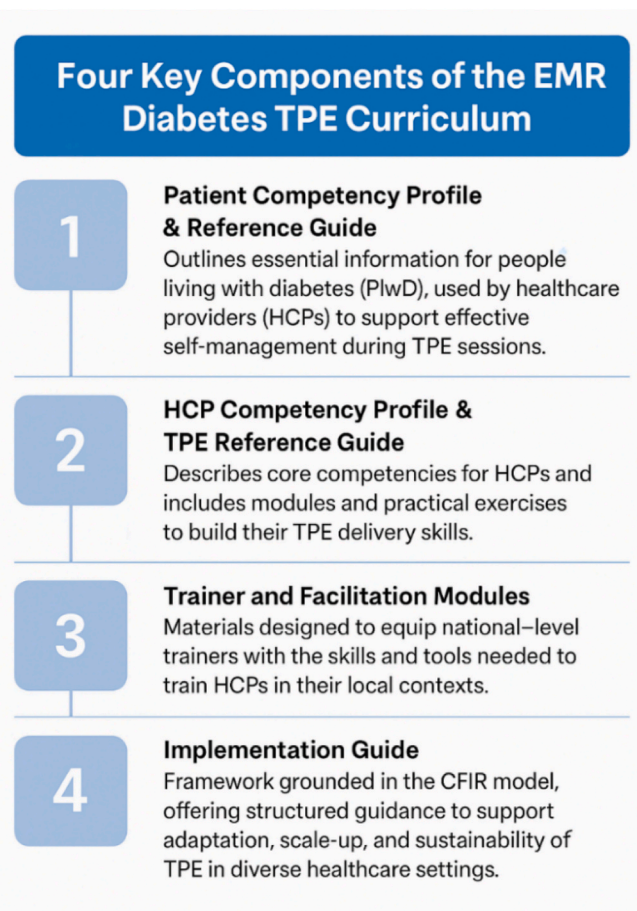


Fig. 2. Focus areas of the curriculum.

**Legend:** This infographic outlines the key deliverables developed including patient and provider competency profiles, trainer modules, and an implementation guide aligned with CFIR principles.

Together, these findings provided the empirical and contextual foundation for the development of a structured, competency-based TPE curriculum adapted to the needs of the EMR (see Table 1).

## 4. Discussion

The present manuscript builds upon the findings of our recently published systematic review of TPE interventions and needs in the Eastern Mediterranean Region [12]. That review synthesized regional evidence and highlighted substantial gaps in structured, competency-based diabetes education, including limited patient-centred pedagogical approaches and insufficient provider training. The current manuscript represents the next stage of this work by describing the development of a comprehensive WHO-led TPE curriculum and its associated implementation framework. To illustrate how the present work extends this evidence base, Table 2 summarizes the distinctions between the prior systematic review and the present curriculum-development process.

The introduction of a structured TPE approach in the EMR marks a novel and innovative shift in diabetes care management within the region (Table 2). Historically, diabetes education has often been limited to didactic, information-heavy models, which do not adequately engage patients or support behavioural change [6,9,19]. By contrast, the new curriculum embeds participatory, patient-empowering methods such as role play, peer learning, and co-construction of knowledge. This transition represents a meaningful step toward more collaborative, responsive, and sustainable models of care [10,20]. Identified gaps in regional

**Table 1**  
Overview of the diabetes-specific TPE curriculum modules.

| Module   | Learning Objectives  | Key Content Areas  | Teaching Methods                           |
|--|--|--|--|
| <b>Understanding diabetes and its treatment</b>          | Improve disease literacy and understanding of diabetes mechanisms    | Pathophysiology, types of diabetes, treatment principles   | Interactive sessions, visual aids          |
| <b>Managing hyper- and hypoglycemia</b>                  | Recognize and manage acute glycemic events                           | Symptoms, prevention strategies, corrective actions        | Case-based learning, role-play             |
| <b>Diabetes treatment</b>                                | Understand pharmacological and non-pharmacological treatment options | Insulin, oral medications, treatment adjustments           | Practical demonstrations, group discussion |
| <b>Healthy lifestyle and nutrition</b>                   | Promote sustainable dietary and physical activity behaviors          | Nutrition principles, physical activity, weight management | Group discussion, goal-setting exercises   |
| <b>Self-monitoring of blood glucose</b>                  | Develop skills for effective glucose monitoring                      | SMBG techniques, interpretation of results                 | Demonstration, hands-on practice           |
| <b>Self-care and complication prevention</b>             | Strengthen daily self-care practices                                 | Foot care, complication prevention, adherence              | Role-play, peer exchange                   |
| <b>Diabetes during Ramadan</b>                           | Adapt diabetes management during fasting                             | Risk stratification, medication adjustments                | Scenario-based learning, discussion        |
| <b>Diabetes in emergencies and humanitarian settings</b> | Manage diabetes in crisis contexts                                   | Acute complications, resource-limited care                 | Simulation, problem-solving exercises      |

**Table 2**  
Comparison of the authors' recent EMR review and the current curriculum-development manuscript.

| Element                       | Previous systematic review                                 | Current Manuscript   |
|-------------------------------|--|--|
| <b>Publication type</b>       | Systematic review with narrative synthesis                 | Curriculum development methodological paper                                    |
| <b>Objective</b>              | Map TPE interventions, needs, and gaps in the EMR          | Develop a WHO-led TPE curriculum and implementation guide                      |
| <b>Scope</b>                  | Evidence across EMR countries; intervention-level outcomes | Competency-based curriculum + provider modules + patient modules               |
| <b>Methods</b>                | Systematic search, study appraisal, narrative synthesis    | Multi-phase situation analysis + stakeholder consultation + co-design          |
| <b>Patient involvement</b>    | Considered in evidence base, not embedded in study design  | Directly integrated through lived-experience consultation                      |
| <b>Implementation science</b> | Not assessed   | Central component (CFIR-aligned implementation framework)                      |
| <b>Contribution to field</b>  | Defines "why" structured TPE is needed in the EMR          | Provides the "how" for operationalizing structured TPE                         |
| <b>Practical outputs</b>      | Evidence gaps and recommendations                          | Curriculum, competency profiles, modules, tools, and implementation strategies |

Legend: The table clarifies how the 2025 systematic review provided the analytical foundation for identifying gaps in diabetes-related TPE within the EMR, while the present manuscript describes the subsequent WHO-supported curriculum development process and its operationalization.

TPE practices and the curriculum's response are described in [Table 3](#). A major strength of the curriculum lies in its alignment with the

**Table 3**  
Identified gaps in regional TPE practices and the curriculum's response.

| TPE Implementation Gap  | Consequence  | Curriculum Solution  |
|---|--|--|
| <b>Fragmented and inconsistent educational interventions</b>          | Variability in education quality and content delivery      | Regionally harmonized, modular curriculum design           |
| <b>Absence of standardized TPE programs across countries</b>          | Difficulty in scaling and sustaining education initiatives | Use of WHO TPE framework to guide content standardization  |
| <b>Lack of formal TPE training for healthcare providers</b>           | Inconsistent TPE delivery and low facilitator confidence   | Train-the-trainer model and structured facilitator guide   |
| <b>Minimal use of participatory, behavior-change methods</b>          | Poor patient engagement and short-lived outcomes           | Integration of adult learning and participatory techniques |
| <b>Insufficient focus on patient empowerment and lived experience</b> | Mismatch between program content and patient priorities    | Inclusion of lived experience and empowerment principles   |

Legend: The table summarizes structural and educational gaps in TPE implementation across the EMR and how the new curriculum addresses them with structured, evidence-based solutions.

WHO TPE competency framework, which identifies knowledge, practical skills, and confidence as key enablers of effective self-management. These competencies have been validated across chronic disease contexts as essential for improving long-term outcomes. By translating these competencies into clear learning objectives, the curriculum addresses both the biomedical and psychosocial dimensions of diabetes care. This comprehensive approach mirrors successful TPE models in other regions and supports the growing consensus that integrated, participatory education is central to improving quality of care and health outcomes for PLwD [19,21].

In addition, the inclusion of context-specific modules, such as the Ramadan-focused component, reflects the cultural relevance of the curriculum while illustrating its broader applicability. Although grounded in regional practices, such modules may also serve as adaptable models for addressing fasting-related diabetes self-management in other religious, cultural, or personal contexts.

While the initiative was anchored in the EMR context, it was conceived from the outset as a model with potential relevance beyond the region. Its transferability is supported by its grounding in WHO frameworks, its modular and competency-based design, and its adaptability to different resource settings, including high-income, low- and middle-income, and fragile contexts. However, implementation in other regions will require contextual adaptation to local health systems, cultural factors, and workforce capacities.

The diversity of the region encompassing high-income countries, low- and middle-income countries, and fragile or conflict-affected settings provided an ideal testing ground for designing a flexible, adaptable approach. This diversity allowed the curriculum to be informed by a wide range of health system realities, ensuring its relevance in other regions facing similar challenges or resource constraints. The involvement of international experts and alignment with global WHO frameworks further reinforce its applicability to multiple healthcare settings worldwide [17,18].

Importantly, the Implementation Guide developed alongside the curriculum serves as a practical resource for implementers, providing the "know-how" needed to translate the curriculum into practice. Structured according to the CFIR framework [18], it helps users assess context, identify barriers and facilitators, and develop tailored strategies for integration into national healthcare systems. This operational focus is essential for bridging the gap between curriculum design and real-world uptake, enabling implementers to move beyond theory to sustained, scalable application.

Finally, while the curriculum and Implementation Guide are designed for adaptability, their ultimate impact will depend on

sustained investment in training, policy integration, and monitoring. Future research should focus on piloting the curriculum in diverse contexts, evaluating both patient-level and system-level outcomes, and refining the approach based on implementation experience. By doing so, the EMR-originated model can contribute to strengthening TPE capacity and person-centred care worldwide.

This study has several limitations. As a formative curriculum development study, it does not include formal evaluation of effectiveness or quantitative validation of competency outcomes. Additionally, the processes described relied on a pragmatic, multi-source synthesis of evidence and stakeholder input rather than formal consensus methods. While this approach reflects real-world program development, it may limit reproducibility in strictly methodological terms. Future work should focus on piloting the curriculum in diverse settings, assessing its impact on patient and system-level outcomes, and refining its components based on implementation experience.

Given the absence of published WHO-led curriculum development frameworks for diabetes education in the EMR and the increasing global emphasis on structured DSMES, competency-based training, and implementation science in NCD care, this manuscript is expected to serve as a reference for future regional and international initiatives. The detailed documentation of the curriculum architecture, competency framework, pedagogical principles, and CFIR-aligned implementation strategies provides tools that are likely to be cited in forthcoming research on diabetes education, patient empowerment, and health workforce development in similar settings.

## 5. Conclusion

The diabetes-specific TPE curriculum developed in the EMR provides a practical, adaptable tool for strengthening person-centred diabetes care. Together with the accompanying Implementation Guide, it offers both the content and the operational strategies needed to integrate structured patient education into diverse health systems.

Its design for flexibility ensures potential application well beyond the EMR, supporting countries in embedding evidence-informed, participatory approaches into routine care. The next priority is to pilot the curriculum in varied contexts, assess its impact on patient and system outcomes, and refine it for broader scale-up. Through this process, the model can contribute to advancing global capacity for effective, sustainable TPE.

## Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Zoltan Pataky reports article publishing charges was provided by Swiss National Science Foundation. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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