

ASSESSING STAFF READINESS FOR INTEGRATED TUBERCULOSIS DIABETES CARE IN DIFFERENT DISTRICTS OF PAKISTAN: A CROSS-SECTIONAL STUDY USING THE R = MC² IMPLEMENTATION FRAMEWORK

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ABSTRACT

OBJECTIVES

This study aimed to assess TB staff readiness to integrate diabetes care within TB services in selected basic medical units in Pakistan using the R = MC² implementation framework.

METHODOLOGY

We conducted a cross-sectional study to assess staff readiness across 13 TB Basic Management Units in 5 districts of Pakistan from November 2024 to April 2025. We conceptualized readiness in three different domains, that is, Motivation, General Capacity, and Capacity for Change, rather than in one composite index, and we measured it at the construct level. DOTS facilitators directly involved in TB service delivery completed a structured questionnaire measuring motivation (12 items), General Capacity (5 items), and Capacity for Change (4 items). We performed reliability analysis using Cronbach's alpha. Although composite scores were calculated to provide descriptive information, interpretation focused on domain-specific results to maintain theoretical consistency and construct validity.

RESULTS

Thirteen DOTS facilitators from primary (n=4), secondary (n=5), and tertiary (n=4) TB facilities participated. Reliability was acceptable for motivation ($\alpha = 0.802$) and excellent for General Capacity ($\alpha = 0.918$), while Capacity for Change showed moderate reliability ($\alpha = 0.548$). Motivation was high (mean = 4.2), whereas General Capacity was lowest (mean = 2.9), reflecting resource, training, and coordination gaps. Capacity for change was moderate (mean = 3.3). A strong correlation was observed between General Capacity and Capacity for Change ($r = 0.69$, 95% CI 0.20–0.90, $p < 0.009$).

CONCLUSION

The study findings highlighted that staff in TB BMUs were greatly motivated to incorporate TB–DM care, yet the capacity limitations constrain the readiness. Scaling up integrated care should be preceded by strengthening operational resources, coordination, and implementation support.

KEYWORDS: Tuberculosis, Diabetes Mellitus, Integrated Care, Organizational Staff Readiness, Implementation Science, Pakistan

INTRODUCTION

Tuberculosis (TB) and diabetes mellitus (DM) represent two converging global epidemics with profound implications for public health systems.¹ Individuals with diabetes have a two- to three-fold higher risk of developing active TB, and diabetes contributes to delayed sputum conversion, higher relapse rates, and poorer treatment outcomes.² As the global burden of non-communicable diseases (NCDs) continues to rise, the intersection of TB and diabetes poses complex service delivery challenges that extend beyond traditional programmatic boundaries.^{3,4,5} Effective management of this comorbidity requires integrated models of care that link communicable and NCD

services within existing health-system structures. Despite tuberculosis and its comorbidities being prioritized in international policy frameworks for integrated care, the guidelines have been inconsistently and unevenly translated into routine practice.^{6,7} At the facility level, it is usually difficult to integrate diabetes care into routine TB treatment and services due to fragmented health services, vertical funding, and competing priorities. In addition, integration demands bi-directional screening, redesigning care pathways, and the addition of new documentation by frontline providers. These shifts and transformations occur within health systems that are already understaffed, have weak supply chains, and lack consistent leadership backing.⁸ Determining the extent to which these

systems are prepared to change is thus a very important pre-implementation measure. The effectiveness of complex health interventions depends on staff motivation and the organization's ability to change.^{9,10} In the context of TB-diabetes comorbidity, these factors determine the success or failure of integration efforts. Evaluating preparedness or readiness before implementation provides a clear understanding of whether the workforce, institutional culture, and infrastructure are ready for transformation.¹¹ Facilities with higher readiness scores are more likely to adopt integrated innovations and sustain them over the long term. Organizational readiness encompasses both tangible capacities, such as infrastructure, staffing, and training, and intangible factors, such as leadership engagement, trust, communication, and shared vision.^{12,13} Provider motivation and accountability can be maintained by participatory leadership and identification of change champions.^{14,15} In the absence of such readiness, even well-designed interventions can lead to implementation fatigue, resistance, and poor fidelity. Implementation science provides structured approaches to operationalize readiness assessment. The $R = MC^2$ heuristic, first proposed by Scaccia et al.¹⁶, conceptualizes readiness as the product of *Motivation*, *General Capacity*, and *Innovation-Specific Capacity*. This model recognizes that readiness is dynamic and multi-dimensional, requiring attention not only to technical skills but also to contextual enablers that determine whether change efforts take root. By applying $R = MC^2$ to TB service settings (figure 1), this study advances understanding of how staff motivation and organizational systems interact to shape preparedness for integrated TB-diabetes care. The current study aims to measure the motivation of staff in the TB basic medical unit to integrate diabetes care within TB services; assess general and innovation-specific capacities for change in TB facilities; and identify contextual factors influencing readiness for change in resource-limited environments. Findings will provide actionable insights for policymakers and implementers to design targeted capacity-building interventions, strengthen workforce engagement, and promote the sustainable integration of TB-diabetes care in low- and middle-income countries.

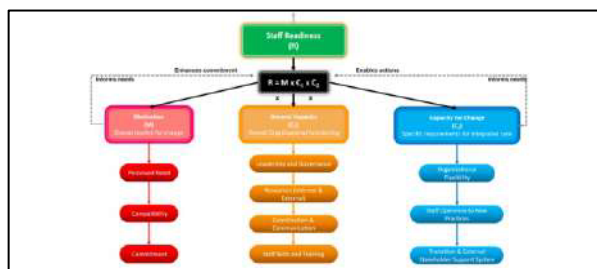


Figure 1: Conceptual framework for the current study for $R=MC^2$

METHODOLOGY

We employed a cross-sectional study design to assess the readiness of TB health facility staff to implement integrated diabetes care. The study used a staff readiness assessment tool, following the $R = MC^2$ framework, to measure three domains: motivation, general capacity, and innovation-specific capacity for change. The study was conducted from November 2024 to April 2025 at 13 TB BMUs across primary, secondary, and tertiary levels of care in 5 districts across 2 provinces in Pakistan, representing diverse geographic, demographic, and health system contexts. The initial readiness assessment of the same facilities was conducted, and the findings are published in a separate journal. Participants included TB health facility staff (DOTs) who were directly engaged in service delivery. Inclusion criteria were: (1) at least six months of experience in TB service delivery, and (2) direct involvement in patient management or coordination of TB-related services. A structured, self-administered questionnaire was adapted based on implementation science frameworks, particularly the Consolidated Framework for Implementation Research (CFIR) and the Readiness for Integrated Care Questionnaire (RICQ).^{17,18} The adapted and locally contextualized tool underwent expert validation and reliability analysis. It assessed three readiness domains: Motivation, General Capacity, and Capacity for Change—capturing individual, organizational, and contextual determinants relevant to DOTS facilitators within the TB program. *Motivation*: This domain evaluated the extent to which DOTS facilitators perceived integrated TB-diabetes care as important, appropriate, and beneficial to their routine work. Twelve items measured perceived advantages, compatibility with existing DOTS practices, alignment with TB program goals, and leadership encouragement. Responses were recorded on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree), with higher scores indicating greater motivation to support integration. This domain corresponds to CFIR constructs such as relative advantage, compatibility, and organizational priority. *General Capacity*: This domain assessed the structural and organizational support available to facilitators for implementing diabetes screening, referral, and follow-up alongside TB care. It covered leadership commitment, staff skills and training, availability of essential resources (e.g., diagnostic tools and supplies), and coordination mechanisms between TB and diabetes services. Items were rated on the same 5-point Likert scale, with higher scores indicating stronger organizational capacity. *Capacity for Change*: This domain examined facilitators' adaptability and willingness to implement

new practices required for TB-diabetes integration. Four items assessed openness to modifying workflows, perceived adaptability of facilities, availability of supportive structures such as supervision and guidance, and support from external stakeholders. Responses were again rated on a 5-point Likert scale, where higher scores reflected greater readiness to adopt change. Reliability analysis was conducted first, followed by a staff readiness assessment at the selected BMUs, where an integrated diabetes care package was planned for implementation. Participants provided informed consent, and confidentiality was ensured. Questionnaires were administered during off peak hours in designated areas of the facility to minimize disruption to clinical activities. Data were entered and analyzed using SPSS version 29. Consistent with the $R = MC^2$ heuristic, Motivation, General Capacity, and Capacity for Change were treated as distinct readiness domains. Each construct was analyzed descriptively at the domain level. Although composite scores were calculated for descriptive purposes, interpretation focused on domain-specific results to maintain theoretical alignment and construct validity. The scores were calculated as follows: For each section (Motivation, Capacity, and Capacity for change), the mean score was calculated as follows: Mean Score for Section = $\frac{\sum \text{Item Scores}}{\text{Number of Items in Section}}$.

Interpretation of Scores

Overall Mean Score Range	Readiness Level	Interpretation
4.5 - 5.0	Very High Readiness	The organization's staff is well prepared to integrate diabetes care into the TB control program.
3.5 - 4.4	High Readiness	The organization's staff is ready, though some areas need improvement.
2.5 - 3.4	Moderate Readiness	The organization staff shows moderate readiness but requires significant improvements in several areas.
1.5 - 2.4	Low Readiness	The organization's staff is low on readiness and needs major improvements before integration can be achieved.
1.0 - 1.4	Very Low Readiness	The organization's staff is not ready for integration and needs substantial development in all areas.

This study was approved by the Ethics Review Committee (ERC) of the Institute of Public Health & Social Sciences, Khyber Medical University, Peshawar (Ref # KMU/IPHSS/Ethics/2024/EG/200). The departmental permissions were obtained from the

National and Provincial TB programs to conduct the study. The authors conducted the study in accordance with the ethical guidelines of the Declaration of Helsinki (1964).

RESULTS

The reliability analysis to evaluate the internal consistency and psychometric adequacy of the three readiness subscales: Motivation (12 items), General Capacity (5 items), and Capacity for Change (4 items). Initially, Cronbach's alpha coefficient was computed for each subscale. Alpha was then calculated with the usual formula for Cronbach's alpha:

$$\alpha = \frac{N}{N-1} \left(1 - \frac{\sum \text{Var}(\text{item})}{\text{Var}(\text{total})} \right),$$

This formulation assumes tau-equivalence and serves as a baseline estimate of reliability. The Motivation scale showed acceptable internal consistency (Cronbach's $\alpha = 0.802$), while General Capacity demonstrated excellent reliability ($\alpha = 0.918$). Capacity for change showed moderate internal consistency ($\alpha = 0.548$). Item-total analysis indicated that the item "External stakeholders support our integration efforts" had a very low corrected item-total correlation ($r = 0.081$). Removing this item would increase Cronbach's alpha to 0.708, exceeding the commonly accepted threshold of 0.70. Despite this statistical improvement, the item was retained for conceptual reasons. Capacity for change was defined to include both internal adaptability and external system support influencing implementation. External stakeholder engagement is particularly important for integrating TB and DM services where inter-program coordination is required. Removing this item would narrow the construct to internal adaptability alone, reducing content validity and failing to capture the multi-dimensional nature of change capacity in resource-constrained health systems. The tool was then used to measure the DOTs facilitators' readiness at the 13 TB BMUs, where integrated TB diabetes care was planned as part of the project.⁷ Across the 13 TB Basic Management Units, DOTs facilitators reported consistently high motivation to integrate diabetes care into TB services (Table 1), with 92.4% agreed or strongly agreed that integration would improve TB treatment outcomes (46.2% agree; 46.2% strongly agree), 100% agreed that integration would enhance service efficiency and fit well with current practices, and 92.3% agreed that staff could clearly see patient benefits. Additionally, 76.9% strongly agreed that clear incentives are needed to support integration.

Table 1: TB BMUs Staff Motivation for Integrated TB-DM Care
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S. No	Item	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
M1	Integrating diabetes care into TB control will improve patient outcomes in TB treatment.	0 (0%)	0 (0%)	1 (7.7%)	6 (46.2%)	6 (46.2%)
M2	Integrated TBDB care will enhance the efficiency of our health services.	0 (0%)	0 (0%)	0 (0%)	7 (53.8%)	6 (46.2%)
M3	This integration will provide our organization with a competitive advantage.	0 (0%)	0 (0%)	0 (0%)	8 (61.5%)	5 (38.5%)
M4	Integrating diabetes care will fit well with our current practices.	0 (0%)	0 (0%)	0 (0%)	9 (69.2%)	4 (30.8%)
M5	This integration aligns with the Provincial TB Control Program organization's mission and values.	0 (0%)	0 (0%)	3 (23.1%)	8 (61.5%)	2 (15.4%)
M6	Our staff believes that this integration will be beneficial.	0 (0%)	1 (7.7%)	1 (7.7%)	6 (46.2%)	5 (38.5%)
M7	Integrating diabetes care is a top priority for our organization.	0 (0%)	2 (15.4%)	1 (7.7%)	7 (53.8%)	3 (21.3%)
M8	The provincial TB program actively supports the integration of diabetes care.	0 (0%)	2 (15.4%)	1 (7.7%)	7 (53.8%)	3 (21.3%)
M9	There should be clear incentives for integrating diabetes care into TB control.	0 (0%)	1 (7.7%)	0 (0%)	2 (15.4%)	10 (76.9%)
M10	The benefits of integrating diabetes care will be visible quickly.	0 (0%)	2 (15.4%)	0 (0%)	8 (61.5%)	3 (21.3%)
M11	Successful integration in other organizations can inspire confidence in our team.	0 (0%)	1 (7.7%)	0 (0%)	8 (61.5%)	4 (30.8%)
M12	Staff members can easily see how this integration will benefit patients.	0 (0%)	1 (7.7%)	0 (0%)	8 (61.5%)	4 (30.8%)

In contrast, General Capacity was weaker and more heterogeneous (Table 2). While 53.8% reported active leadership support for integrated care, only 53.9% indicated that staff had the required skills, and the same proportion reported inadequate resources. Additionally, 53.9% disagreed that TB and diabetes services have clear coordination and communication channels, highlighting structural and organizational gaps.

Table 2: TB BMU Staff General Capacity for Integrated TBDM Care

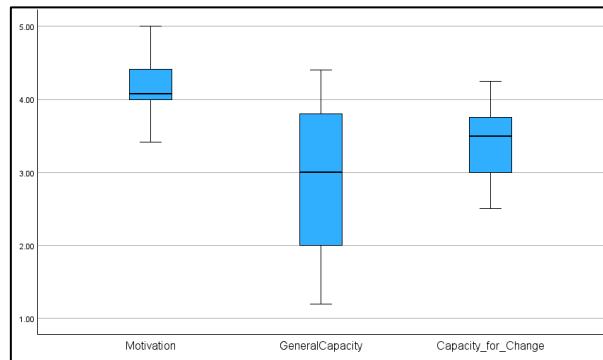
S. No	Item	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
C1	Leaders in PTP actively support integrated care initiatives and are committed to providing necessary resources.	2 (15.4%)	3 (23.1%)	1 (7.7%)	7 (53.8%)	0 (0%)
C2	Our staff has the necessary skills to manage both TB and diabetes, with training programs and continuous education for ongoing learning.	0 (0%)	5 (38.5%)	1 (7.7%)	6 (46.2%)	1 (7.7%)
C3	Our organization has sufficient resources (e.g., financial, technological, medical equipment, and supplies) to support integrated care.	2 (15.4%)	5 (38.5%)	2 (15.4%)	2 (15.4%)	2 (15.4%)
C4	We have access to external resources to aid in the integration process.	1 (7.7%)	5 (38.5%)	3 (23.1%)	4 (30.8%)	0 (0%)
C5	There is a clear plan for coordinating care between the TB and diabetes departments, and communication channels are established to ensure smooth coordination.	1 (7.7%)	6 (46.2%)	4 (30.8%)	1 (7.7%)	1 (7.7%)

Capacity for change was moderate (Table 3): 69.2% of respondents said that facilities are flexible and can change quickly, and 77.0% said that staff are receptive to new practices. Nevertheless, only 38.5% reported having sufficient support systems during transition, and 46.2% were neutral about external stakeholder support.

Table 3: TB BMU Staff Capacity for Change for Integrated TB-DM Care

S. No	Item	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
1	Our health facility is flexible and can adapt quickly to changes.	1 (7.7%)	2 (15.4%)	1 (7.7%)	9 (69.2%)	0 (0%)
2	We, as staff members, are open to adopting new practices.	0 (0%)	1 (7.7%)	2 (15.4%)	8 (61.5%)	2 (15.4%)
3	We have a support system in place for staff during the transition period.	0 (0%)	5 (38.5%)	3 (23.1%)	5 (38.5%)	0 (0%)
4	External stakeholders support our integration efforts.	1 (7.7%)	4 (30.8%)	6 (46.2%)	0 (0%)	2 (15.4%)

Box plots (Figure 2) show the median, interquartile range, and overall spread of Motivation, General Capacity, and Capacity for Change scores across the 13 facilities.

**Figure 2: Distribution of Organizational Staff Readiness Domains across Selected TB Facilities**

Composite MC² scores are presented in Table 4 only as descriptive information and were not used for interpretation or classification, consistent with construct-level profiling recommended in the R = MC² framework.

Table 4: Readiness Domains Scores (MC²) Across Facilities

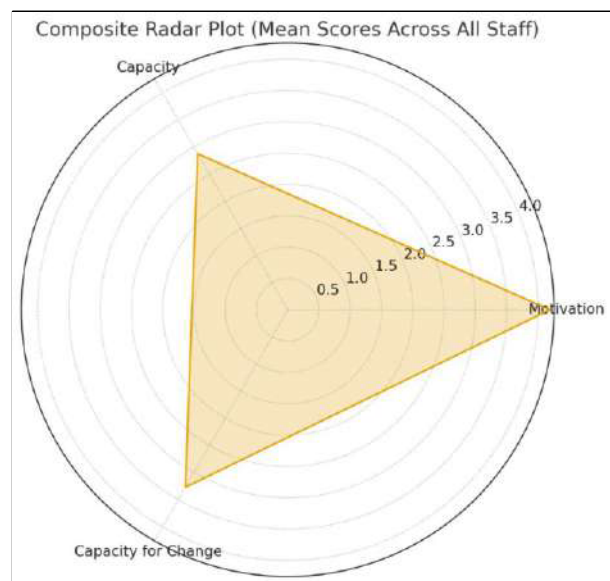
Facility Staff	Motivation (M)	General Capacity (C)	Capacity for Change (CC)	Readiness Score (MC ²)
Primary	4.25	3.40	3.50	50.57
Primary	4.00	1.80	2.50	18.0
Primary	3.42	2.00	3.00	20.52
Primary	4.42	4.40	4.25	82.65
Secondary	4.17	3.80	3.75	59.42
Secondary	3.83	2.60	3.00	29.87
Secondary	4.00	4.00	3.50	56.0
Secondary	4.50	2.00	2.75	24.75
Secondary	4.08	3.00	3.25	39.78
Tertiary	5.00	3.80	3.75	71.25
Tertiary	4.83	1.20	3.00	17.38
Tertiary	4.08	3.40	3.50	48.55
Tertiary	3.92	2.00	3.75	29.40

Inter-Domain Relationships among Readiness Constructs

To examine the internal structure of organizational readiness, Motivation, General Capacity, and Capacity for Change were analysed as separate domains. Pearson correlation analysis showed weak associations of Motivation with General Capacity ($r = 0.14$, 95% CI -0.45 to 0.64) and Capacity for Change ($r = 0.07$, 95% CI -0.50 to 0.60), indicating that staff motivation was largely independent of facility structural capacity. In contrast, General Capacity and Capacity for Change were strongly correlated ($r = 0.69$, 95% CI 0.20 to 0.90 , $p < 0.009$), suggesting that facilities with stronger infrastructure and organizational support report greater adaptability to change. Due to the small sample size, these findings should be considered exploratory.

Table 5: Exploratory Correlation among Readiness Domains

Comparison	r	P-Value	95% CI
Motivation and General Capacity	0.136	0.658	-0.453 to 0.636
Motivation and Capacity for Change	0.069	0.823	-0.503 to 0.595
General Capacity and Capacity for Change	0.694	0.009	0.203 to 0.895

**Figure 3: Composite Radar Plot (Mean Score Across Staff)**

The composite radar plot (Figure 3) shows that motivation had the highest mean score (4.2), indicating strong staff support for TB-DM integration. General Capacity was the lowest (2.9), reflecting resource and training gaps, while Capacity for Change was moderate (3.3). Overall, high motivation is limited by weaker operational capacity.

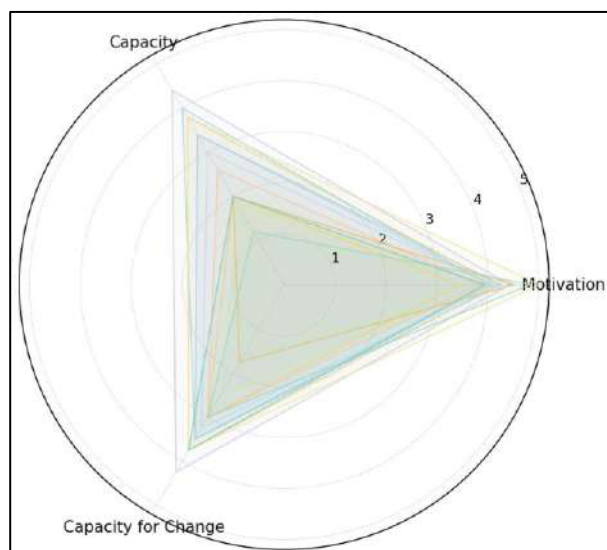


Figure 4: Staff Readiness to Change Overlaid Composite Radar Plot

The overlaid radar plot (Figure 4) shows consistently high motivation across staff, while General Capacity is lower and more variable, indicating uneven structural support. Capacity for change shows moderate variation. Overall, motivation is strong, General Capacity is the main barrier, and Capacity for Change is moderate.

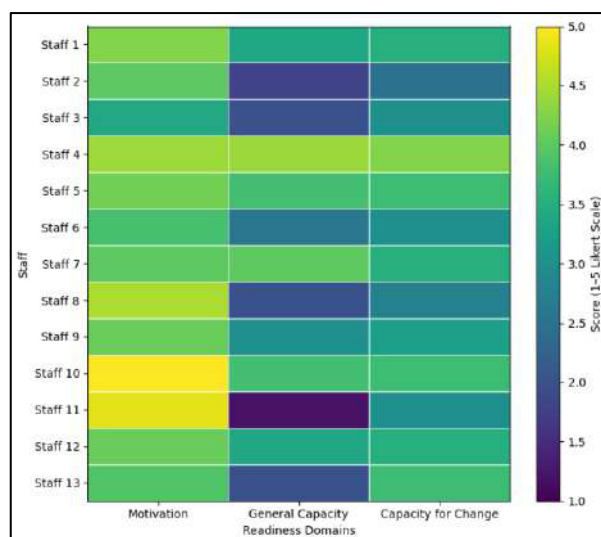


Figure 5: Heat map of Readiness Domains across TB BMUs Staff

The heatmap displays the distribution of the three readiness domains across the 13 staff respondents. It displays color gradients to indicate the size of each domain score. Motivation scores were consistently high across staff, whereas General Capacity showed greater variability with several lower scores. Most respondents demonstrated moderate capacity for change.

DISCUSSION

This study provides one of the first empirically grounded TB staff readiness profiles for integrating diabetes care within tuberculosis (TB) services in Pakistan, using the $R = MC^2$ heuristic, which divides readiness into three categories: Motivation, General Capacity, and Capacity for Change. The analysis of DOTS facilitators showed that staff motivation was consistently high, General Capacity was the weakest and most variable, and Capacity for Change was intermediate. The imbalance between willingness and operational capacity suggests an area that implementers and policymakers may prioritize to improve TB staff readiness to initiate integrated TB-diabetes care in low-resource environments. The scores for motivation were clustered in the upper range across facilities and staff, indicating strong endorsement of the benefits of integration, perceived patient value, and alignment with the organization's mission. The trend is similar to the results of integrated-care readiness research in healthcare and hospital systems.¹⁹ In such studies, there is a varied level of intrinsic motivation and capacity of healthcare workers to implement patient-centered innovations, despite the lack of structural supports or low facility readiness.^{20,21,22} Similar endorsement in LMIC contexts has also been observed in integration efforts involving HIV-NCD services and maternal health.^{22,23,24} From a theoretical perspective, $R = MC^2$ conceptualizes readiness as multiplicative rather than additive.^{25,26} Lack of capacity cannot be compensated for solely by high motivation. When capacity drops to near zero, preparedness fails no matter the people's motivation. Our findings support this observation. Despite a high level of motivation and commitment to integration among almost all DOTS facilitators, many facilities still scored moderately in readiness due to structural and resource deficits. It is worth noting that the lack of differentiation in motivation makes it less helpful for distinguishing between staff. This finding is consistent with the organizational change literature, which suggests that commitment to change is a common pattern that lacks predictive power for implementation success unless structural preparedness is also present.²⁷ Thus, while motivation constitutes an enabling condition, it does not explain variation in readiness across facilities in this study. The high motivation observed may reflect broader contextual factors. In Pakistan, TB is managed through a vertical program with highly standardized protocols and donor-supported performance monitoring. Such systems may foster normative commitment and a sense of program identity, thereby enhancing the willingness to embrace complementary innovations. However, when resources

are not matched, this motivational capital can deteriorate over time. General Capacity was the most heterogeneous and weakest dimension. Scores ranged widely from 1.20 to 4.40. This trend suggests that overall capacity may play an important role in explaining variation in staff and facility readiness.²⁸ The organizational readiness theory highlights the fact that general capacity entails leadership participation, infrastructure, workforce competencies, and sufficient resources. The empirical literature consistently finds that resource constraints and poorly aligned workflows are the greatest barriers to integrating chronic disease services into a communicable disease platform.²⁹ Among the most important bottlenecks in TB-DM dynamics are the lack of glucometers, supply chain disruptions, and ambiguous referral pathways, which limit staff capacity.³⁰ The present study's findings strongly echo those patterns. Although leaders were seen as moderately supportive, a significant number of respondents reported inadequate resources and unclear coordination mechanisms. These results are consistent with findings from integrated NCD screening programs in LMICs, where the readiness gaps were mostly structural rather than attitudinal.^{6,31} The observed visual association between general capacity and composite readiness in our study may indicate that general capacity can mediate the relationship between Motivation and implementation behavior.³² In another way, motivation can only be converted into readiness when there is adequate operational scaffolding.³³ Without that support, motivated staff members might experience a disconnect between their perceptions of what is important and what they can actually do. This may result in frustration or burnout.³⁴ In our study, Capacity for Change occupied an intermediate position, indicating moderate openness to new workflows and adaptability. The mid-range scores are also in line with the available literature, which indicates that medical personnel tend to describe openness to change when it is associated with perceived patient benefit, despite their readiness to do so.³⁵ However, workload pressures and supervisory climate appear to influence adaptive capacity strongly, facilitating or limiting adaptability.³⁶ In settings where staffing is already stretched, adaptability can reach a level of fatigue with change and with insufficient operational support, despite overall staff readiness to embrace new practices.³⁷ Our empirical data also suggests that perceived external stakeholder support is relatively weaker than internal adaptability, which is of paramount importance. This distinction is critical. Integration of DM care into routine TB services in Pakistan requires coordination among traditionally separate vertical programs, which are often funded and managed independently. Fragmented governance may weaken inter-programme

trust and shared responsibility, potentially limiting the prospects for successful organisational change even when internal employees are prepared to contribute. WHO guidelines emphasize bidirectional screening for TB-diabetes, yet implementation remains uneven.³⁸ This study shows that the main barrier is not staff resistance but limited operational capacity. Using the $R = MC^2$ framework, the study provides a theory-based assessment of staff readiness and validates key constructs through facility-level comparisons and visual analyses. Findings highlight strong staff motivation but inadequate resources, training, coordination, and infrastructure. For effective TB-DM integration in Pakistan, programs should strengthen capacity through targeted training, diagnostic tools, workflow redesign, and supervisory support. Policies should align TB and NCD funding, incorporate routine readiness assessments, and treat staff readiness as a continuous management tool for sustainable scale-up.

LIMITATIONS

The cross-sectional design captures readiness as a static construct. During implementation, readiness is likely to evolve due to its dynamic nature. The sample size and inclusion of selected facilities may limit generalizability and statistical inference. Self-reported responses may introduce social desirability bias, particularly in the Motivation domain, where low variance suggests possible ceiling effects.

CONCLUSIONS

This study indicates that frontline workers in Pakistan's TB program are generally motivated to integrate diabetes care; however, operational and structural limitations reduce overall readiness. The gap between staff motivation and infrastructure highlights that motivation alone cannot drive system-wide change. Policymakers should prioritize capacity building and structural support to translate TB-DM integration from policy into practice, even in resource-constrained health systems.

CONFLICT OF INTEREST: None

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The authors accept responsibility for all aspects of the work and will ensure that any concerns regarding the accuracy or integrity of any part are properly investigated and resolved.



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