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Strengthening the response to drug-resistant TB in Pakistan: a practice theory-informed approach

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Background: While Pakistan's Programmatic Management of Drug-Resistant Tuberculosis (PMDT) programme, launched in 2010, initially yielded significant gains in treatment outcomes, performance has since plateaued, and in some cases, regressed.

Objective: To critically investigate why the PMDT programme, well-structured and generously resourced as it is, could not improve upon or sustain this early success and to illustrate the use of practice theory as a framework to analyse functioning of health systems.

Method: A practice theory-informed ethnographic study was conducted at three PMDT clinics. The analysis drew on 9 months of participant observation and in-depth interviews with 13 healthcare providers and four managers.

Results: The PMDT model primarily focused on materialities such as infrastructure, drugs and numbers of people tested, and little on developing competencies of the PMDT staff to provide responsive care. This emphasis on materialities, and the linked focus of accountability processes, led the PMDT staff to create meanings that translated into prioritisation of certain easy-to-measure healthcare practices at the expense of more difficult-to-measure practices related to responsiveness that are arguably also important for successful patient outcomes.

Conclusion: A narrow focus on measurable inputs, originating from priorities set at global and national levels, influence frontline care practices with negative consequences for quality of care and patient outcomes. Greater emphasis on improving routine process of care can enhance the effectiveness of the PMDT model of care. Practice theory provides a robust analytical framework to critically interrogate health systems and healthcare provision.

Drug-resistant TB (DR-TB) is a serious public health problem in Pakistan, as the country bears > 60% of the disease burden in the East-Mediterranean region and is listed among the top 20 countries in the world for DR-TB prevalence.[1,2] In response to this situation, the national TB programme (NTP) in Pakistan launched a Programmatic Management of Drug-Resistant Tuberculosis (PMDT) model of care in 2010, which was financed by the Global Fund,[3,4] and based on WHO PMDT guidelines for resource-constrained countries.[5] The NTP adapted these guidelines to Pakistan's context,[3,6] and established 33 PMDT clinics (as of 2019) across the country. These purpose-built PMDT clinics were designed to deliver free-of-cost and quality-assured DR-TB medicines to patients, offer free clinical care and counselling services, conduct home visits to trace contacts and ensure patient adherence to treatment, and provide financial support for patients to travel to the clinic.[7] At each PMDT clinic, a team of eight staff members provide these services.

Before the launch of this model, a few tertiary hospitals were providing DR-TB treatment using varied centre-specific treatment protocols. The treatment success rates at these centres ranged from 10% to 47%, with a loss to follow-up (LTFU) of 30–55% and mortality rates as high as 40%.[8–13] The launch of the PMDT model promptly resulted in a much improved treatment success rate, which reached 76% by 2011, with LTFU reduced to 5% and mortality to 13%.[14] However, after this early success, progress declined; the treatment success rate plateaued at 61% and mortality and LTFU numbers have steadily risen.[14] The situation invites the question: why was such a well-structured, comprehensively planned, and generously resourced model of care, which achieved success so quickly unable to improve upon or even sustain this early success?

Researchers assessing the PMDT model of care in Pakistan have identified a host of factors contributing to patients' suboptimal treatment outcomes. These can be broadly categorised into demographic factors such as rural residence, old age, male sex, lower education;[3,7,15] biological factors such as comorbidities and malnourishment;[3,7] treatment-related factors such as delayed sputum culture conversion, pre-existing resistance to second-line anti-TB drugs, long duration of treatment and side effects of drugs;[7,15–19] and psycho-social factors such as depression, poor understanding of the disease, stigma in the community and poverty.[3,20,21] Similar factors have been identified as contributing to poor DR-TB outcomes in other parts of the world too,[22–25] and most are a product of the broader socio-economic, cultural and structural contexts, and are generally beyond the capacities of the TB programme to influence on its own. Two potential interpretations follow from the current understanding—either the PMDT model (in Pakistan) has reached a plateau in terms of its effectiveness, and no further progress can be made unless these broader factors are addressed (which is well beyond the remit of the TB programme), or now is the time (after a decade of programme implementation experience) to reconsider the design and implementation of the PMDT model to deepen our understanding of constraints beyond the conventionally understood barriers. The latter interpretation is the focus of this article.

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THE PMDT MODEL OF CARE HIERARCHY AND STRUCTURE

The PMDT model of care in Pakistan consists of three linked hierarchical systems.[26] At the top of the hierarchy is a 'macro system' comprised mainly of global health agencies such as the WHO and the Global Fund, which provide guidance and financial support for the PMDT model of care. At the country level, the national and provincial TB programmes, alongside partner non-governmental organisations, create a 'mesosystem' that receives assistance from global agencies and translates and adapts guidelines for local contexts. Together, the two systems construct a 'microsystem'—i.e., the PMDT clinics, which operate according to globally and nationally approved standards of care, but are embedded in and a product of the pre-existing broader health system.[14,26]

The managers in the macro and meso systems are more powerful relative to the healthcare providers (HCPs) in the microsystem. The HCPs are expected to provide patient care according to the approved guidelines, and their work in the clinic is regularly monitored by managers from the mesosystem.[6] However, it is within the microsystem of PMDT clinics that patients interact with HCPs and the broader model of care. It is where the programme theory is interpreted and translated into programme practice, and where the PMDT model of care is brought to life. Consequently, the focus of our investigation was initially at the clinic level, the ultimate goal being to better understand the ground realities of DR-TB healthcare provision in order to strengthen future programming and thereby achieve improved outcomes.

To realise this goal, we used the tenets of practice theory to guide our analysis.[27,28] In contrast to the traditional emphasis in public health on agency or structure as the unit of inquiry, practice theory focuses on practice itself as the unit of analysis.[28,29] The basic proposition in practice theory is that outcomes (in health, or in a healthcare model as in our case) are influenced by the practices that people enact. Examining practices therefore is an appropriate starting point when investigating the performance of an intervention. Practices in turn are constituted of and shaped by three antecedent elements:[28–30] 1) materialities, which includes the materials, infrastructure and technologies needed to support and sustain a practice; 2) competencies, which refers to the knowledge and skills of people and the processes needed to adequately perform a practice; and 3) meanings, which refers to the values, understanding, and explicit and tacit priorities of people, organisations and societies.

The nature of and interactions between these elements ultimately condition and shape a given practice—practices are thus dynamic and have the potential to be transformed in response to alterations in any of the above three components of practice theory.[28] Another important concept in practice theory is that practices do not work in isolation; rather, they interact with other practices happening and being enacted concurrently to operate as 'bundles of practices'. Practices in a given 'bundle' can co-exist, compete, or at times uphold each other.[29,31] In this article, we critically examine the practices of HCPs working at PMDT clinics in Pakistan. We apply the tenets of practice theory to analyse and reveal how these practices come to be, how they are institutionalised over time and across sites, and the resulting consequences for patient outcomes and the PMDT model of care itself.

METHODS

Study setting and participants

This ethnographic study was conducted at three of the five PMDT clinics in the Khyber-Pakhtunkhwa Province in Pakistan. Among the two centres excluded from the investigation, one was recently established with few patients registered, and the other was the site of another unrelated research project, making it less feasible for us to observe the regular day-to-day working environment in that PMDT clinic. At each PMDT clinic, the designated team providing treatment and care to patients involved a physician, pharmacist, psychologist, treatment coordinator (TC; responsible for visiting patients at home), laboratory assistant, social support officer (managing financial support provision to patients), case manager (responsible for managing patient flow and their clinical records) and the data operator (maintaining computerised clinic statistics). There was no nursing position in the PMDT core team.

We interviewed the physician, pharmacist, psychologist and the TC at each study site, given their role in direct patient care. At one study site, the case manager and hospital pulmonologist were also interviewed, as they were actively involved in patient care in that PMDT clinic. Furthermore, four managers in the meso and macro systems overseeing the PMDT clinics were interviewed. Thus, a total of 13 HCPs and four managers were interviewed.

Ethics approval for the study was granted by the University of Melbourne's ethics committee (Melbourne, VIC, Australia) and Health Services Academy in Islamabad, Pakistan. Administrative approval from the national and provincial TB programmes in Pakistan was obtained.

Data collection tools and approaches

Before the initiation of fieldwork, we reviewed the NTP annual reports between 2010 and 2016, Pakistan's grant applications to the Global Fund for TB/DR-TB and published literature on DR-TB in Pakistan.[14,26,32–36] We further established regular online communication with the national and provincial (Khyber-Pakhtunkhwa) TB programmes to better appreciate the structure and functioning of the PMDT model of care. With this background understanding, we designed the two key data collection tools—the semi-structured interview guides and the checklist for participant observation. The interview guides were translated into Urdu (the local language), and then back translated into English to ensure consistency in meaning by two independent bilingual translators. In addition, we developed a plain language statement, consent form and research protocol briefs for the national and provincial TB programmes. The study protocol was shared with the NTP beforehand. The interview guides were field tested at a PMDT site not included in the study and amended accordingly.

Data for this study were collected over 1 year between June 2018 and May 2019. At the beginning of fieldwork at each site, the first author (SA) presented the study objectives, methodology and data collection approach to the PMDT team, responded to their queries and commenced data collection with their consent. Throughout the fieldwork, the researcher did not judge, criticise or influence any decision-making process in the clinic, remained humble and respectful to staff and patients, and attempted to blend into the local and clinic environment. SA's background as a Pakistani national and relevant clinical and public health experience in Pakistan and especially in Khyber-Pakhtunkhwa proved useful in this context and enabled the researcher to examine the micro system in its most 'natural' day to day form. SA stayed within the hospital premises (in nursing/ student hostels) for approximately 3 months at each study site.

All interview participants provided informed consent. The interviews lasted approximately 1–3 hours and were audio-recorded with the participant's permission. In addition, the first author maintained a journal recording the day's observations and her reflections on them. Data were collected with an emphasis on learning how HCPs in the given micro system interacted with each other and with patients, made decisions, influenced each other, and what, if any, impact this interaction had on patient outcomes. Finally, meso and macro-level managers' perspectives were sought in order to understand the PMDT model's response to patient care more holistically.

Establishing rigour in the study

In addition to the application of more than one method of data collection (in-depth interviews, participant observation), the researcher's prolonged presence in the field (immersion in the study environment), and data collection involving a range of participant groups (HCPs with different sets of expertise and managers) helped further enhance rigour of the findings. Specifically, this entailed the following processes: the researcher's daily reflexive journaling; an informed comparison of words vs. actions in healthcare practices; regular sharing of data with other researchers in the team; seeking feedback from a few participants on their interview transcripts (member checking); and several de-briefing sessions with the TB programme. These processes collectively strengthen the credibility and confirmability of the study findings.[37–39]

Data analysis

The participant interviews were translated and transcribed verbatim by the first author while still in the field. NVivo v12 (QSR International, Melbourne, VIC, Australia) qualitative data analysis software was used to manage the data. We followed the thematic analysis approach to generate an initial set of codes, capturing participant perspectives on healthcare practices in PMDT clinics. The codes were independently reviewed by another author (SK), and through a consensus process some codes were modified, merged or split into new codes. As the next step, we sorted codes under potential themes by actively looking at the meaning and relationships between various codes. Through this iterative process, we ultimately grouped the findings under two overarching themes: 1) healthcare as understood and practiced in the microsystem (the PMDT clinic); and 2) healthcare as envisioned and prioritised in the meso and macro systems (NTP and the global partners). The participant observation data were coded separately using the same approach. Throughout this iterative process, we applied the tenets of practice theory to arrive at a deeper analytical understanding of the performance of the PMDT model of care.

RESULTS

Early findings in the field

At each PMDT site, the roles and responsibilities of the HCPs were printed on a chart displayed in a prominent place inside the clinic. At all three sites, patients' clinical files were appropriately maintained, tests were regularly sent to designated laboratories, and patient data were entered electronically and shared with the national and provincial TB programmes on a monthly basis. Furthermore, no serious drug stock outs were noted at any of the study sites. At the time of this study, there were 170 patients actively seeking care at the three study sites; this translates into no more than two patients per day per clinic (given that clinics are supposed to operate 6 days a week) being cared for by a team of eight service providers at each clinic. Our early findings confirmed that the PMDT clinics were adequately resourced and providing healthcare to patients; however, patient outcomes remained relatively poor, affirming the need for a more comprehensive and in-depth ground-level exploration at the PMDT clinics.

Under the theme 'healthcare as understood and practiced in the microsystem', we start by describing the role each of the key staff members played in providing patient care—in theory and in practice. This will be followed by the theme 'healthcare as envisioned and prioritised in the meso and macro systems', where we appraise the reader of the rationales that underpin and justify HCPs practices with reference to the perceptions and priorities of the managers in the meso and macro systems (as articulated in the programme design).

Healthcare as understood and practiced in the microsystem (the PMDT clinic)

This theme is further divided into five sub-themes, highlighting HCPs practices and their interpretation of priorities in healthcare provision to DR-TB patients.

Limited engagement of physicians in direct patient care

The physicians at the PMDT clinics were the most senior staff members responsible for the provision of patient care and staff supervision. However, at all three sites the physicians were the least involved in patient care. They worked flexible hours and mostly remained in their offices out of reach for patients. This observed lack of contact between physicians and patients seemed to be a firmly embedded and normalised practice. The physicians were interviewed following several weeks of observation. When asked about their work routine and how they spent their time in the clinic, one physician was of the opinion that patient care in the PMDT clinic did not require any particular expertise; he justified his work in other outpatient departments, i.e., his absence from the PMDT clinic, as contributing to DR-TB case detection. Another physician said that his involvement in patient care was not necessary since the staff knew which tests to advise and which medicines to dispense, and as the following excerpt illustrates, he explained his primary role as being about clinic supervision.

> As I come in the morning, I turn on all the UVGI (ultraviolet germicidal irradiation) lights and exhaust fans myself. I check general cleanliness in the clinic and mark attendance of the staff on an attendance register. Everyone here knows about their job responsibilities, so they start their daily work routine. I go to all of them to enquire about any issue or problem. We work here till 2:30pm... We complete our work daily… I am very disciplined. At the end of the day, I close everything myself. I check all the lights, even the water taps. If for some reason, I am not around, I call another staff member to do this. (Physician)

On the contrary, other staff members expressed their frustration at the physicians' lack of patient involvement and shared their feelings of injustice as they saw the physician performing the least amount of work but getting the most attention from the programme managers (from the meso and macro systems).

> You know these monitoring teams pressurise only us (to improve clinic performance). They are not like this with the physician. They care more whether they (the physicians) are happy or not. If the physician says they are not happy, they increase their salary ... (TC)

Main focus of pharmacist on drug inventory

The pharmacists were the second most senior team members at the PMDT clinics. Given their technical background and limited

involvement of physicians in care provision processes, both patients and ancillary staff looked towards them for professional guidance and advice. However, the pharmacist spent most of their time calculating dosages and maintaining stock records; their interactions with patients were brief and limited to dispensing medicines. During the period of observation, the pharmacists were found rarely discussing the treatment regimen, side-effects of medicines, or the importance of adherence to treatment in detail with patients. At two of the three study sites, the pharmacist commonly asked ancillary staff to hand over the medicines to patients. As the following quote indicates, the pharmacists recognised both the importance of communication and their lack of focus on it in their routine practice. They highlighted, with much pride, how they meticulously maintained their records to comply with the requirements of the monitoring teams (from the macro and meso systems). The pharmacists reported that the record keeping process consumed most of their time, leaving them with little time to communicate with patients.

> The quality check (for the monitoring team) is that the number of tablets mentioned in the stock register should be the same as in the cupboard... Pharmacists were involved in this (PMDT) programme to help patients take their doses correctly. This should be my prime responsibility, but my time is consumed in calculations and maintaining records. I go to the patient and hurriedly ask if there is any problem… and then return to make their pill box and complete paperwork … this is what I am doing in practice. (Pharmacist)

It was noted that in two of the three study sites, outpatient services were provided on only four and eight days a month, respectively. While the PMDT clinics were meant to be open and working six days per week, patients were steered to visit the PMDT clinic on certain dates, so all staff were very busy on those particular days, which explained the pharmacists' assertions (at least for those few days). The researcher observed the clinic activities on the days when patients attended, noting the amount of time each staff member spent with patients. It was easy to overhear most patient-provider conversations, as they usually took place in open areas inside the clinic with other patients and attendants present (despite the availability of separate rooms for consultation). It was observed that with more than 10–12 patients crowding the clinic at one time, staff members were not able to give more than a few minutes to each patient. They primarily focused on ensuring that patients submitted their sputum samples, obtained their laboratory tests, and collected medicines. Most activities were completed within a few hours. On the remaining days of the month, only a few patients visited the clinics; these were either newly diagnosed patients or those who had been unable to attend on the designated outpatient days.

Less recognised but expanded role of the treatment coordinator in patient care

The TC is another important PMDT team member and a key link between the clinic and the community. TCs are expected to visit the patient's home every 3–6 months, primarily for contact tracing. The first researcher (SA) accompanied the TCs on a number of home visits at all three sites. A consistent finding observed during visits was the family's welcoming attitude (in most instances). Family members listened keenly to the TCs and asked them a range of questions relating to DR-TB, the treatment process and precautionary measures. Families frequently addressed the treatment coordinators as 'doctor'. Observations during the visits revealed that families looked to and relied on the TCs for medical advice in relation to the index patient as well as other family members with health problems—something that the TCs were neither trained for nor qualified to do. The TCs appeared to embrace and enact the assigned 'doctor' role with confidence when talking to patients, although they seemed to hesitate when prescribing and dispensing medicines (perhaps due to the presence of the researcher who they knew was a doctor). TCs at the two sites did on occasion prescribe ancillary medicines justifying this to the researcher by explaining that the complaint was only a fever, a headache or a gastric irritation, which according to their understanding, only required paracetamol or an antacid. At times, the TC's unskilful handling of situations and inappropriate selection of words only exacerbated patients' already complex life situations, even though it appeared that their intention was to be helpful, as described by one patient in the clinic.

> My left arm became stiff after receiving the injection… it was very painful. I stopped visiting (PMDT clinic) for 3 months... That doctor (pointing towards TC) came to my village with two other people. They came to my school (where patient was an employee) and started talking to me loudly in front of schoolteachers and other people. Everyone was listening keenly… He (TC) said I am spreading TB…. I then showed them my arm and said this is what their treatment has done to me... I also shouted at them. They became quiet and left... (Patient)

During home visits, the TCs focused on two main topics: the provision of disease-related information to patients and families, and contact tracing. These topics were discussed with TCs during their interviews. When asked about the information they provide to patients and their families, they mentioned areas that ranged from basic information about the disease and infection control precautions to discussing patients' sexual and reproductive health issues. Their non-hesitant tone gave the impression that they were well-intentioned and believed that the information they provided was correct and, in the patients' best interests. However, as the following quote tellingly illustrates, with limited training and no technical background, the TCs sometimes inadvertently spread misinformation, thereby depriving patients of another opportunity to access accurate information after having failed to obtain proper guidance from the PMDT clinic.

> We tell unmarried patients not to marry until they complete their treatment. We tell (male) patients not to have children during the 2 years of treatment… in the case of female patients we tell them that this gap must be more than 2 years... They ask us how they can stay away from their spouse for 2 years. I tell them they have to. (TC)

Finally, the TCs' emphasis on testing every member of the patients' family for TB/DR-TB was discussed. The TCs reported that they faced a lot of pressure from programme managers to increase patient enrolment, and that this was often the only agenda point in their meetings with the monitoring teams. One TC shared that he asks everyone in the family to eat chickpeas, as (in his opinion) this stimulates sputum production, making it easier to collect samples for testing. He earnestly asked the interviewer what else he could do to meet the programme's demands. Despite their sincere attempts to increase the number of new registrations, the TCs had different interpretations of the criteria for testing contacts. None of the TCs followed the specified criteria for sputum testing, and to meet the TB programme's demand for more registrations, they collected sputum samples from everyone at the patients' homes, whether or not they had symptoms. This practice not only possibly induced anxiety among family members but

was also a waste of limited TB programme resources (by unwarranted testing of samples).

> They (TB programme managers) say if I am conducting home visits, then why are new patients not coming up… they don't understand this… I cannot make people get this disease. I cannot ask patients to cough in other people's mouth to save my job. When a person has no symptom how I can collect a sample… but I tell them (family members) that I have to collect this number of samples so they must give me their samples. And in most cases, it is saliva only. (TC)

Compared to other staff, the TCs were the ones most actively involved in patient care. They carefully planned their home visits, ensuring that they visited every household at regular intervals. However, they mentioned their inability to visit a number of families living in far-off areas due to insufficient travelling allowances or because there was no available public transport. The TB programme had strict reimbursement policies and discouraged the hiring of private vehicles even when clearly indicated. In the TCs' opinion, this resulted in a number of families not being tested for DR-TB, which contributed to fewer new enrolments and also poorer outcomes.

> The programme assistant (from the manager's office) called me and asked why I had hired a taxi and why I did not use public transport. I told him I cannot travel […] I do not belong to this area and even if I travel like patients, there is usually only one van in 24 hours. If I complete my visit and then there is no transport to take me back, what would I do? I sent him an email saying that this means I would not be able to visit any patient except a few. He never replied to my email. (TC)

The undervalued clinic psychologist

DR-TB drugs can cause many psychological side effects such as depression and psychosis. The impact can be exacerbated by the prolonged treatment course for DR-TB combined with patients' broader life challenges. To help patients better manage their mental health, psychologists are appointed to PMDT clinics. The involvement of the psychologist in the PMDT model is unusual in the context of Pakistan where the health system has minimal awareness of the mental health needs of patients in general. In one study site, instead of conducting independent private counselling sessions, the psychologist was performing the role of primary HCP, often hearing about and responding to patients' physical complaints. They occasionally asked the patients about their mental health, but the consultation typically took place in a common room in the presence of other patients and staff.

The psychologist at another site was conducting counselling sessions in a private space, and the researcher observed some of these sessions (with permission from the patient and the psychologist). Patients primarily discussed their physical and other complaints related to the treatment process such as failure to receive the promised financial incentive from the TB programme. Most sessions lasted for no more than a few minutes and the psychologists had limited capacity to guide the conversation onto the topic of the patient's mental health. The psychologist position was vacant at study site 3 at the time of data collection. During their interviews, the psychologists discussed their need for professional supervision to adequately manage patients' mental health issues. They reported that the hospitals' psychiatry departments did not provide the support and guidance needed, apart from prescribing medicines to patients referred to them. Given the novelty of a psychological intervention (in the context of Pakistan), the researcher asked other staff about the impact of counselling on patient care at the PMDT sites. At two study sites, they said that they did not believe that counselling benefited patient health; insisting that counselling could be done by any staff member and did not warrant the appointment of a designated person.

Other staff substituting for key healthcare givers

Finally, there were other staff members, including the social support officer, laboratory assistant, case manager and data operator, who in addition to performing some of their designated duties, willingly substituted for key staff members when and as needed (except at one site, where the case manager regularly provided patient care). It was observed that these non-medical staff were dispensing medicines to patients, explaining how to take their daily dose, responding to patient queries, giving advice and prescribing ancillary medicines. These untrained staff members made mistakes while performing these duties, unaware that the information they were giving to patients was incorrect. These staff members tended to mimic the style and the manner of the physician or the pharmacist when talking to patients.

Recognising the gaps in healthcare provision and inaccuracies in the information provided to the patients, all staff were asked about their own training and capacity building opportunities. Staff highlighted two key issues—having limited training opportunities and their dissatisfaction with the quality of the training they had received. One physician reported that the training courses were too long, with irrelevant discussions, and were usually run by people with no appropriate experience. Another TC described the limitations of the hands-on training they received when newly appointed:

> When I joined, I was sent to (another) PMDT site to learn from the treatment coordinator there. This person himself used to come to the clinic after 10am. He told me how to take family details from a patient but taught me nothing else. I was new and reluctant to make any complaint against him. That is why I kept silent. After 6–7 days, he showed me how to make the monthly report and also told me to take a photograph of the patient during the home visit. He said he has delayed his visits to patients' homes because of me. I could not understand why he did that when I was there to learn how to make home visits and wanted to join him in his visits. (TC)

The NTP created WhatsApp groups to connect PMDT staff across the country so that they could share their knowledge and learn from each other's experiences. The staff interviewed for this study all said that they did not make much use of this service in their daily practice and rarely commented on or read the posts. According to one physician, the WhatsApp discussions usually left them with more questions than answers. Pharmacists and psychologists argued for the need to involve senior technical staff with relevant experience to respond to the questions without which they found it wasteful to participate in the WhatsApp conversations.

Healthcare as envisioned and prioritised in the meso and macro systems (NTP and the global partners)

After completing data collection at the three study sites, in-depth interviews were conducted with four DR-TB managers in the meso and macro systems to enquire about their understanding of healthcare practices at PMDT sites and their assessment of the effectiveness of this model of care. When asked about DR-TB programme priorities, all indicated that finding new DR-TB cases was their foremost priority. All highlighted the programme's efforts to improve patient enrolment, such as establishment of screening

facilities (using Xpert® MTB/RIF; Cepheid, Sunnyvale, CA, USA) in districts and the initiation of auto-generated email and mobile phone messages if a patient was found positive. According to one manager, Pakistan has the fourth highest burden of DR-TB globally, but as new enrolment is far less than the projected figures, the programme needs to reach these numbers to ensure continued donor funding. This helped to explain the pressure on TCs to search for new cases in the community. However, managers had little knowledge of the bigger role that TCs had adopted for patients and their families, a role that they were not trained for, and a role that was actually the responsibility of other clinic staff.

Managers reported being satisfied with the healthcare provision processes at the PMDT sites. They believed that patients were being managed by the PMDT teams according to standard clinical guidelines and protocols. They highlighted the indispensable role physicians play in patient care—from examining patients at each outpatient visit to managing their complaints and providing in-patient care as needed. Given their responsibilities, one manager stated that the PMDT physicians were most at risk of acquiring the infection, but lowly paid for the services they provided to patients. Two of the four managers considered the psychologist's position to be unnecessary, emphasising that counselling could be done by the physicians or the pharmacists. When asked about the reasons behind high LTFU and mortality among DR-TB patients, they mentioned the drug side effects, patients residing long distances from clinics, travel costs, illiteracy, stigma in community, poverty, lengthy treatment duration, painful injections and gaps in disbursement of financial incentives to patients as the most important reasons. Only one manager mentioned inadequate counselling at PMDT sites as a contributor to poor treatment outcomes.

Three of the four managers talked about their direct involvement in monitoring and evaluation of the PMDT clinics. They acknowledged their inability to thoroughly observe healthcare provision at PMDT sites due to time constraints. During their relatively brief visits to the clinics, they primarily focused on issues relating to new enrolments, maintenance of drug stocks, clinic records and disbursement of financial incentives to patients; they had limited interaction with patients attending the clinic. They shared that during the brief encounters they did have, patients mainly complained about irregularity in receiving financial support, but expressed their satisfaction with the care provided at PMDT clinics. Managers acknowledged that the TB programme's inability to provide the promised financial support contributed to patients' decisions to quit treatment, but also recognised that they had had these meetings in the presence of other PMDT staff, which may have inhibited patients' willingness to complain about the services.

Owing to the high cost of DR-TB drugs, the NTP and the WHO have stringent monitoring protocols to ensure that no drugs are misplaced or misused. This probably explains the pharmacists' comments and the TB programme's emphasis on meticulous record keeping of drug stocks at PMDT sites. However, as illustrated earlier, this focus tended to overshadow the pharmacists' other responsibilities, which seemed to have a negative impact on patient care at PMDT sites.

Regarding the training of staff, managers agreed that formal training opportunities were limited, primarily due to funding constraints. No formal mechanisms were in place to assess staff training needs or their satisfaction with the training courses they attended. The managers mentioned alternate learning forums such as the WhatsApp groups created for staff, enabling them to share their experiences and discuss complicated clinical scenarios with each other. In addition to the aforementioned staff's comments, the limited benefits of this intervention was further illustrated by one of the managers who described how he deliberately uploaded obviously incorrect information on the WhatsApp group and PMDT staff members responded only by appreciating and thanking him for his comments, i.e., no one attempted to correct the mistake.

Finally, the PMDT model's achievements and its future funding prospects were discussed. Despite their concerns over declining treatment success rates, managers were relatively satisfied with the programme's progress across a set of performance indicators. These indicators primarily focused on the numbers of primary TB patients tested for drug resistance, notified and put on second-line treatment, and the proportion of laboratories in the country performing drug susceptibility testing (DST) according to international quality assurance standards. They emphasised the need to expand diagnostic networks and the laboratories performing culture and DST to reach and treat more DR-TB cases.

DISCUSSION

Based on our study findings, it is clear that the PMDT staff are performing certain selected practices consistently, such as dispensing DR-TB drugs, referral for laboratory investigations, collecting sputum samples, taking patients' signature/thumb impressions in a register, and maintaining clinic files and stock records—all exemplify emphasis on materialities that are easy to quantify; hence, we refer to them as 'measurable' practices. On the other hand, the staff were not engaging with other equally important practices such as providing patients with accurate information through effective patient-provider communication, and therapeutically responding to patients' physical and mental health needs. This illustrates gaps in these more difficult to quantify competencies, so we refer to them as 'difficult-to-measure' practices. The privileging of the measurable (and measured) practices at the expense of practices that are more difficult to measure (and are not measured) may in part explain the PMDT model's initial success, followed by a quick plateauing of progress. The reliable provision of materialities, i.e., free-of-cost, quality-assured DR-TB drugs, high-quality diagnostics, DST laboratories and financial incentives to patients (none of which was available in pre-PMDT times) arguably contributed to patients' better health outcomes. However, these inputs alone have their limits. In the absence of equally significant and much needed competencies such as effective patient-provider dialogue and comprehensive clinical and psychological healthcare, we argue that the PMDT model cannot perform beyond a certain point.[5,40–43] This may be why this well-intended and generously resourced model of care rapidly reached performance saturation and subsequently plateaued.

Another key finding of this study is the similarity across all three study sites in the HCPs' emphasis on materialities, with less attention to competencies, although the sites were geographically distant from each other. At all three sites, physicians were found to be least involved in patient care, pharmacists primarily focused on maintaining drug stocks, TCs preoccupied with new enrolments as their priority, and all staff prioritising the completion of the practices that were measured, and for which they were held accountable. Understanding these commonalities in care provision across the three PMDT centres and the consonance in staff's reasoning when justifying these practices requires a recognition

of how success in health systems is understood historically—fostering certain meanings that are ultimately translated into the prioritisation of measurable practices and the relative neglect of difficult-to-measure practices.[43] In the following paragraphs, through application of the three elements of practice theory, we reflect on our study findings as a function of the history of the DR-TB disease response and the broader health system in Pakistan. In doing so, we systematically uncover the influence of the meso and macro systems to sub-optimal patient care at the micro (clinic) level.

From a historical perspective, DR-TB is a 'man-made' disease.[44] The major challenges encountered when delivering treatment for primary TB over decades gradually resulted in emergence of this more complex form of TB.[45,46] The rise, according to WHO, is a reflection of weak and dysfunctional health systems in many countries.[46,47] The treatment for DR-TB is more expensive, lengthier and more complex—requiring advanced diagnostic tools to monitor treatment response compared to the management of primary TB.[48] For these reasons, until the 1980s the diagnosis and treatment of DR-TB in resource-limited countries was not considered possible.[47] Later, DR-TB drug prices were negotiated,[5] a global PMDT implementation guide for resource-limited settings was developed,[5] and international donor agencies mobilised to fund DR-TB programmes in these countries.[48,49]

As a result of this mobilisation, affordable treatment for DR-TB in low- and middle-income countries became a reality. Taking the example of Pakistan, the country quickly adopted and adapted the WHO's PMDT model of care, applied for and secured successive Global Fund grants, developed national PMDT and infection control guidelines, and rapidly expanded dedicated PMDT clinics across the country,[14,35,50] all in a span of 10 years, which is in itself a success story in many ways. The PMDT model, nonetheless, is based on some historical understandings—DR-TB drugs are expensive and cause multiple side effects, the treatment course is prolonged, and those most affected by the disease tend to be the poorest.[6,7,51] The NTP therefore placed strong emphasis on expanding free testing facilities (through the installation of GeneXpert machines), scaling up laboratory networks, ensuring uninterrupted and free access to quality-assured DR-TB drugs, and instituting financial support mechanisms for patients[6,34]—all examples of 'materialities' to improve detection and treatment of DR-TB.

The NTP envisioned and prioritised geographical expansion of the programme and enhanced referrals for diagnostic testing, increased number of PMDT clinics, and procurement of newer drugs.[14,35,50] This emphasis on materialities was/is amplified by the nationally and internationally agreed performance indicators for DR-TB that mainly include reporting only on the numbers of new enrolments, patients started on DR-TB treatment and laboratories performing DST according to international standards.[14] This programme's focus on material enhancement, which originated at the macro and meso levels of the PMDT model, has been transmitted to the micro level. The result has been the prioritisation of material inputs such as maintaining drug inventories and the collection of sputum samples for testing at the expense of everything else.

Compared to the focus on materialities, the TB programme's emphasis on the development of PMDT staff competencies was lower. Training opportunities have been limited and from the staff's perspective inadequate, and establishment of WhatsApp groups has not yielded hoped-for benefits. The NTP[14,52] and the managers at the macro and meso levels view these aspects of the programme as material inputs as well, highlighting only the numbers of training courses conducted, staff trained or WhatsApp groups created, with no formal mechanisms in place to assess their utility or effectiveness in enhancing staff competencies. This lopsided focus on measurable indicators reinforced particular 'meanings' among the PMDT clinic staff; specifically, that performance is all about the numbers achieved, tools made available and supplies assured. The influence of these macro- and meso level programme requirements helps to explain why measurable practices pertaining to material inputs have flourished in the micro system at the expense of competencies that are equally important for achieving better outcomes.

The managers' belief that physicians were actively involved in patient care when they were observed to be consistently absent from direct patient care, their strong view that the psychologist's role was unnecessary and the absence of indicators for important but difficult-to-measure practices at the micro level needs to be understood as a product of the 'bundles of practices, i.e., the related sociocultural and broader health system practices happening simultaneously in the PMDT environment. The behaviours of the managers and the DR-TB programme staff have been shaped by the sociocultural values of the health system in Pakistan in particular, and the broader society in general. The health system in Pakistan is fundamentally 'disease-focused', with the role of physicians being central to its structure and function.[53] The profession is highly regarded and physicians are frequently considered overworked and underpaid compared to the services they render or the amount of work they do.[54,55] This embedded understanding possibly explains why managers (who are themselves physicians) in the macro and meso systems do not look beyond this socially constructed image of the physician, and by default expressed trust in and empathy towards the physicians in PMDT clinics.

On the other hand, psychologists have been placed in PMDT clinics on the basis of models constructed by global health agencies that value psychological support as important for improving treatment outcomes in chronic illnesses such as TB/DR-TB.[5,46] However, mental health is not well understood in Pakistan, and is highly medicalised and overwhelmingly dominated by psychiatrists (trained medical doctors), with little acknowledgment of the role of psychologists in healthcare provision, coupled with a scarcity of skilled psychologists.[56,57] When viewed through this traditional lens, it is not surprising to find that the psychologists are undervalued, underutilised, lacking skills and unsupported in the PMDT clinics—with hardly anyone, from managers to PMDT staff, convinced that their role in patient care is a necessary one. Examination of the public healthcare system in Pakistan highlights the emphasis of health departments on 'supplies' such as number of health facilities, personnel, ambulances, equipment available, drug inventories and budget spent, as measures of the effectiveness of healthcare delivery.[53] Thus, the centrality of materialities in the PMDT model has its origins in two sources—from the global-level DR-TB programme, and from the entrenched national health system focus on supplies/tools/infrastructure as a measure to gauge programme performance. Both are examples of 'bundles of practices', further upholding the focus on materialities in the PMDT model of care. This preoccupation with materialities in healthcare leaves little room for consideration of the quality of care provided.

Practices, as posited in practice theory, are live and dynamic entities.[58] They thrive when the environment is favourable for them through appropriate alignment of the three elements of practice,

i.e., materialities, competencies and meanings.[29] To flourish, practices also require people (the practitioners) who are willing to embrace them.[28] The emphasis of macro and meso systems on material provision and on a limited set of measurable indicators creates the environment for measurable practices to thrive. The PMDT staff swiftly learned (i.e., created 'meanings') and moulded themselves into routines that met the higher system's demands, especially as those practices for which they were held accountable at the programme level. They disbursed drugs, sent specimens for testing, maintained financial and stock records diligently, as they knew that their performance was going to be judged on the basis of these practices. It is thus clear that measurable practices thrive at the intersection of the three elements of practice theory and are entrenched through the actions of willing and able practitioners.

On the other hand, fostering some of the more difficult-to-measure practices requires different content and assemblage of the three elements. The materialities required for these less tangible set of practices, such as the availability of separate areas in the PMDT clinics for confidential patient-providers sessions, availability of time to provide these services and dedicated personnel to do so, were in place at all three PMDT clinics. However, little investment was made by the TB programme to address the relevant competencies such as enhancing PMDT staff's ability to conduct appropriate patient-provider communication and/or appreciate the significance of doing so (the meaning-making). As a result, most patient-related activities were being carried out in common areas, unqualified staff were providing incorrect/inadequate information to patients, while inappropriately but confidently playing roles for which they were not trained, without realising the negative impact of these practices on patients' health and wellbeing. The programme's disproportionate institutional-level focus on the centrality of materialities is encapsulated in the following statement by one of the staff members:

> Patients do not get well with words. They need medicines that we provide. What else do they want from us?

To us, this pervasive institutional-level orientation and entrenched meaning helps shed light on why the more 'difficult-to-measure' practices were not enabled or fostered by the PMDT programme. These practices were thus given very little attention by staff in the PMDT clinics too —not wilfully, and not merely because they did not have the means and competencies to do so, but also in response to the meanings they drew from the programme at large.

Strengths and limitations of the study

To the best of our knowledge, this is the first ever qualitative exploration of the PMDT model of care in Pakistan incorporating a broader health systems perspective. Contrary to the traditionally documented barriers to optimal patient outcomes such as demographic, structural and treatment-related factors, we have demonstrated the critical role of systemic factors that influence patient outcomes, for better and for worse. The practices in PMDT clinics, as noted in our study, are products of the priorities set at higher levels in the system, i.e., the NTP and global partners who comprise the meso and micro levels of the PMDT model of care. Methodologically, this study adds to the repertoire of approaches used to analyse the functioning of the health systems. Our analytical approach illustrates the potential of practice theory to inform inquiries that critically interrogate health system functioning, the strengths and weaknesses of public health models, and their contribution to patient outcomes.

While the first author's insider position as a Pakistani national and a physician undoubtedly facilitated deeper access to the three study sites, and allowed for a more informed observation of healthcare practices, we also acknowledge that her status as a physician with clinical experience may have influenced the participants to behave in particular ways while being observed, emphasise certain points, and gloss over others in ways that are unknowable. We minimised the impact of these limitations through prolonged fieldwork, rapport building with the PMDT staff, reflexive journaling and regular communications between the team of authors and the TB programme. Furthermore, since this study was conducted in only one province of Pakistan and in a remote setting, the results should be generalised with caution.

CONCLUSION

We argue for a vision for the PMDT model of care that is not merely about what is relatively easy to measure (materialities) and make the case for a more nuanced approach to programme implementation. We highlight the need for a greater focus on improving competencies to enhance both, the effectiveness of routine care provision and patients' subjective experience of healthcare in the PMDT clinics. This approach involves, among others, the development and application of quality and performance indicators, which may be hard to measure but capture aspects of DR-TB patient care that are currently lacking. In the coming years, the NTP plans to expand the DR-TB treatment coverage by increasing the numbers of PMDT clinics in the country.[14,26] The findings of this study can contribute to strengthening programme design, and thus, to better patient outcomes.

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Contexte : Le programme de prise en charge de la TB pharmacorésistante du Pakistan (PMDT), lancé en 2010, a initialement apporté des gains significatifs en termes de résultats du traitement, mais sa performance a depuis lors stagné et dans certains cas, a même régressé.
Objectif : Réaliser une investigation critique des raisons pour lesquelles le programme PMDT, bien structuré et pourvu des ressources généreuses, n'a pas pu pérenniser l'amélioration obtenue initialement.
Méthode : Une étude ethnographique, éclairée par la théorie de la pratique, a été réalisée dans trois structures du PMDT. La théorie de la pratique consiste en trois éléments : éléments matériels, compétences et sens. L'analyse s'est appuyée sur 9 mois d'observation des participants et d'entretiens approfondis avec 13 prestataires de soins de santé et quatre gestionnaires.
Résultats : Le modèle PMDT s'est avant tout concentré sur les éléments matériels—comme les infrastructures, les médicaments et le nombre de personnes testées—et peu sur le développement de compétences du personnel du PMDT pour fournir des soins adaptés/attentifs. Cet accent mis sur le matériel et donc sur les procédures de comptabilité a amené le personnel du PMDT à créer des sens qui se sont traduits par une priorisation de certaines pratiques de soins de santé faciles à mesurer aux dépens de pratiques plus difficiles à mesurer; ces dernières sont liées au fait d'être responsive et sont sans doute aussi importantes pour une issue favorable des patients.
Conclusion : Nous démontrons comment cette concentration sur les intrants mesurables, émanant de priorités établies aux niveaux mondial et national, influencent les pratiques de soins de première ligne, avec des conséquences potentiellement négatives pour les patients. Un accent plus grand sur des soins compétents pourrait bien améliorer l'efficacité du modèle de soins PMDT. La théorie de la pratique fournit un cadre conceptuel simple mais néanmoins complet permettant d'interroger de manière critique les systèmes de santé et les pratiques de soins de santé afin d'améliorer les résultats des patients.

Marco de referncia: El programa de gestión programática de la TB farmacorresistente de Paquistán (PMDT), que se puso en marcha en el 2010, aportó en un principio avances importantes en materia de desenlaces terapéuticos, pero su rendimiento se estabilizó y en algunos casos regresó.
Objetivo: Investigar de manera critica por qué el programa PMDT, bien estructurado y con un financiamiento ampliamente suficiente, no pudo proseguir el progreso o mantener su éxito inicial.
Método: Se llevó a cabo un estudio etnográfico basado en la teoría de la práctica en tres consultorios que ejecutaban el PMDT. Esta teoría consta de tres elementos, a saber: materiales, competencias y significados. El análisis se hizo a partir de la observación de los participantes durante 9 meses y entrevistas exhaustivas a 13 prestadores de atención de salud y cuatro administradores.
Resultados: El modelo PMDT centró su interés principalmente en los elementos materiales como la infraestructura, los medicamentos y el número de personas con pruebas, y menos en el refuerzo de las competencias del personal del PMDT para aportar una atención receptiva. Este hincapié en los elementos materiales y el interés conexo en los procedimientos de rendición de cuentas, llevó al personal del PMDT a crear significados que se tradujeron en una priorización de determinadas prácticas de atención de salud de medición sencilla, en detrimento de medidas más difíciles de medir relacionadas con la capacidad de reaccionar, que también podrían considerarse importantes en los desenlaces favorables de los pacientes.
Conclusión: El estudio demostró que este interés en los insumos medibles, que se origina en las prioridades definidas a nivel mundial y nacional, influye en las prácticas de atención de primera línea, con eventuales consecuencias negativas para los pacientes. Un mayor hincapié en una atención competente reforzaría la eficacia del modelo de atención PMDT. La teoría de la práctica ofrece un marco sencillo pero exhaustivo para analizar de manera crítica los sistemas de salud y las prácticas de atención de salud, con miras a mejorar los desenlaces clínicos de los pacientes.

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