

Multidrug-resistant tuberculosis from the health providers' perspective: strategies for compliance and equity in seeking the care in COVID-19 era (Brazil, 2020)

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Abstract

BACKGROUND: Multidrug-resistant tuberculosis (MDR-TB) itself is a serious phenomenon on a global scale that can worsen with the COVID-19 pandemic. The study aimed to understand the perception of health professionals about multidrug-resistant tuberculosis, their strategies to ensure adherence to treatment and the challenges in the context of the COVID-19 pandemic, in a priority municipality for disease control in the state of São Paulo, Brazil.

METHODS: We conducted a qualitative study and recruited fourteen health professionals, four doctors, three nurses, three nursing technicians, three nursing assistants and a social worker, working in the Ribeirão Preto health system. Remote semi-structured interviews were conducted with these professionals. For data analysis, Thematic Content Analysis was applied according to the theoretical framework defined for the study.

RESULTS: The findings showed the relationship between poverty, inequality and MDR-TB. Concerning the COVID-19 pandemic, reports from professionals show an interference in the monitoring of patients. As for social protection and the benefits that covered the patients, they were cut. Professionals also reported concerns about obtaining COVID-19 and adopting strategies to ensure adherence, as well as reinforcements of the DOTS strategy.

CONCLUSION: The study advances in knowledge by highlighting the challenges faced by the health system for the adherence of MDR-TB patients in a context aggravated by Pandemic. The strategies defined by these health professionals have somehow guaranteed the achievement of equity and avoided the catastrophic encounter between TB-MDR and COVID-19.

Background

Tuberculosis (TB), an infectious disease caused by the bacillus *Mycobacterium tuberculosis*, remains a serious public health problem. Despite the advances made in controlling the disease in recent years, its level on a global scale has still reached critical levels [1].

According to estimates by the World Health Organization (WHO), TB is one of the ten leading causes of death in the world and the main cause of a single infectious agent and, in the last five years, it has occupied the first place in the list of infectious diseases that kills the most [2].

The TB situation becomes more serious as the advance of multidrug-resistance (MDR) is observed, that is, resistance to at least two of the drugs used in the treatment, isoniazid and rifampicin [3]. According to the WHO, it is estimated that a total of 500 thousand cases in 2020 developed resistance to rifampicin, and of these 78% developed multidrug-resistant tuberculosis (MDR-TB) [2].

Due to the low percentage of cure (only 48%) and high mortality (30%), MDR-TB has been a serious threat to health on a global scale [4], becoming even more complex when considered the context of the COVID-

19 Pandemic. There is evidence that it will be a 'catastrophe' the meeting of these two diseases or even the simultaneous occurrence of these phenomena [5].

In Brazil, the main clinical form found is acquired (95% of cases), this is due to the fact that patients are sensitive to the initial treatment drugs, which due to therapeutic discontinuities, become resistant [6]. WHO data show that these patients actually spend 20 times more financial costs when compared to those with sensitive TB [7, 2].

Some determinants are related to MDR-TB, including individual characteristics (age, sex, educational level), behavioral (substance abuse, smoking, alcoholism), clinical (HIV), history of previous treatment, type of resistance, access to health services, social protection and the social context [8].

The determinants of MDR-TB must be understood in addition to the biomedical aspects, incorporating the subjectivity of access, bonding, reception, health needs, adherence, among others [9]. In addition to this understanding, the senses and experiences of the health professional, who are at the forefront of care, can contribute to advancement and equity in the context of care for MDR-TB [10].

Important studies are conducted to understand the challenges of TB care from the perspective of the professional, whether in terms of the quality of care [11] and or professional and patient satisfaction [12], however, no studies have been published that relate to MDR-TB, COVID-19 and the perception of health professionals, highlighting an important knowledge gap.

It is important to carry out an analysis within the context of COVID-19, even to be aware of what measures adopted by professionals have been implemented so that there is no catastrophic encounter between these two diseases, and for patients to continue their treatments, under penalty of community dissemination of MDR-TB, which, like COVID-19, is serious and costly for the health system.

Given the above, the study aimed to understand the perception of health professionals about multidrug-resistant tuberculosis, their strategies to ensure adherence to treatment and challenges in the context of the pandemic of COVID-19, in a priority municipality for disease control o state of São Paulo, Brazil.

Methods

Study Design

It was a qualitative study, which used the Thematic Content Analysis technique [13], guided by the recommendations of the Consolidated criteria for reporting qualitative research (COREQ) [14].

Theoretical Framework

For the study, the theoretical framework of Social Determinants in Health (SDH) was defined [15] in order to compare the results of the investigation, and to allow incursions on the meaning of MDR-TB for health professionals. This framework leads to reflection on the social structure, therefore structural determinants, of the concept of "social position", of different and unequal opportunities, resulting from

class and power divisions, which greatly influences health inequities. The social mechanisms to face social determinants result from a political and human rights process, involving from communities and the state itself [16].

The social conditions in which people live and work [16] stem from these forces, and the health-disease balance will be determined by the economic, cultural, environmental and biological dimensions [17] and this happens within the framework of MDR-TB.

In micropolitics, a materialization of the intermediary social determinants is access to the structure of health services and adherence to care technologies, and in this sense, we take the work of Bertolozzi et al [18], who conceptualizes it as an unreduced act personal volition, but a process associated with life, which depends on intermediaries (especially health professionals), who in the person's daily life, and the organization of their health work processes, contribute to the accessibility of patients to health services, from a perspective of care and not of disease control. Based on this concept, the principle of equity, which refers to the offer and organization of services according to a gradient of needs, and the willingness of professionals to operate practices in the territories in this logic, of social justice [19]. The issue of equity becomes more challenging, as COVID-19 imposes new work strategies and organization of care on professionals, which lacks further investigative depth [20].

Study Setting

The study was conducted in Ribeirão Preto, located in the interior of the state of São Paulo, Brazil. The choice of the scenario is justified because it is a reference municipality in the treatment and monitoring of MDR-TB and classified as high risk [21]. For the treatment of MDR-TB cases, we have the Hospital das Clínicas of the Ribeirão Preto Medical School (HCFMRP) in the city and the support of the Reference Center in Specialties, in addition, the monitoring of these patients is performed through home visits proposed by the Directly Observed Treatment (DOT). It is important to highlight that in the context of the COVID-19 pandemic, there were some irregularities, especially when it comes to DOT, with reduced frequency of visits and a shortage of professionals. As for routine consultations, some had to be rescheduled in order to minimize exposure to SARS-CoV-2.

Table 1 shows the main characteristics of the scenario under study, in which it is possible to observe that it is a large municipality, with the majority of the population in the urban area, with access to basic sanitation and drinking water, however it is contrasted by the burden of water. TB, with an incidence of 26.45 cases for every 100,000 inhabitants, 9.3% of abandonment, which is an important predictor for MDR-TB.

Table 1
Social context of the municipality under study

Indicator	Metric	Source
Tuberculosis incidence coefficient considering all clinical forms (2019)	26.45 cases per 100,000 inhabitants	Notifiable Diseases Information System (SINAN)
Proportion of abandonment of treatment of new cases of pulmonary tuberculosis with laboratory confirmation	9.30 %	Notifiable Diseases Information System (SINAN)
Tuberculosis Mortality Coefficient	1.73 cases per 100,000 inhabitants	Notifiable Diseases Information System (SINAN)
Proportion of new cases of pulmonary tuberculosis who underwent Directly Observed Treatment	63.03%	Notifiable Diseases Information System (SINAN)
Ribeirão Preto Population	604,682	IBGE, 2010
GDP per capita	51,759.84 R\$	IBGE, 2010
Ribeirão Preto urban population	602,966 (99.71%)	IBGE, 2010
Ribeirão Preto Rural population	1.716 (0.29%)	IBGE, 2010
% of urban population residing in households connected to the SNIS water supply network	99.96%	National Sanitation Information System (SNIS)
% of the urban population residing in households connected to the SNIS sewerage network	99.81%	National Sanitation Information System (SNIS)
% of SNIS treated sewage	94.04%	National Sanitation Information System (SNIS)
Primary Care Coverage	63.90%	e-Gestor AB
Family Health Strategy Coverage	21.58%	e-Gestor AB

Participants

For the selection of participants, contact was made with the Tuberculosis Program of the Epidemiological Surveillance Center of the state of São Paulo for the presentation of the research project. After agreeing, we made contact with the coordination of the Program for the Control of Tuberculosis in Ribeirão Preto and the Infectious Diseases Sector of HCFMRP. Meetings were held with the managers of both organizations to identify key informants and plan data collection. Subsequently, a list of consensus

among the participating organizations was made available containing contacts of key professionals in the study.

It was adopted as inclusion criteria, professionals who work or have worked directly in the monitoring of patients with MDR-TB. Thus, fourteen health professionals participated in the study, four doctors, three nurses, three nursing technicians, three nursing assistants and a social worker with ties to the health system of Ribeirão Preto. The duration of these professionals' activities varies between five and twenty-eight years in the care of TB, which shows an important experience.

Sampling and non-participation

Intentional sampling was used, defined by theoretical saturation, which, when establishing the final sample size, interrupted the inclusion of new participants, based on the redundancy and convergence of meaning and meaning obtained during data collection and analysis [22]. In the selection of the sample, eighteen professionals were contacted, four of whom refused to participate, of these four, two did not answer the contact e-mails and the other two reported being overloaded in their work environments due to being on the front line against the pandemic. The minimum number of subjects defined for the study was fourteen, with the need to contemplate informants with homogeneous characteristics, conforming to a smaller sample of smaller dimensions, as evidenced by classic studies in the area [23].

Interviews

Contacts with the professionals were initiated, with a view to consenting to participate in the study and scheduling the interviews. From this, data collection started by the main researcher who received previous training to approach the subjects, based on references in qualitative research [24].

Semi-structured interviews were conducted between June and August 2020, where professionals had the possibility to discuss their experiences, based on the main focus exposed by the researcher [25]. For Minayo [24], the interview privileges obtaining information through individual speech, which reveals structural conditions, value systems and transmits representations of a certain group through a spokesperson.

The interviews lasted an average of 40 minutes, conducted through an online tool and telephone calls using an audio recording application, following WHO's recommendations for social distance as a result of the SARS-CoV-2 pandemic. During the interviews, the researcher made some records which were considered as reflections for the study.

Data analysis

The interviews were transcribed in full, from that point on, the data were analyzed using the thematic content analysis technique [13]. The steps used to treat the data were the pre-analysis where the testimonies' floating reading was performed, which constituted the corpus of the analysis, followed by the exhaustive reading of the material; during the analysis, the record units (phrases) were selected, forming a section of the reports and subsequent organization. Next, the thematic grid was organized, from which the following thematic categories emerged "The impacts of social determinants of health for

the occurrence of MDR-TB”; “Strategies for adherence and achieving equity” and “Challenges for adherence and equity in the context of the COVID-19 Pandemic”. Chart 2 contains the key issues addressed in the interviews. Table 2 shows the main synoptic categories of key questions addressed in the interviews.

Table 2
Synoptic table of the categories of key questions addressed in the interviews

Analytical categories	Empirical categories
The impacts of social determinants of health for the occurrence of MDR-TB	<ul style="list-style-type: none"> - High social vulnerability; - Homeless people; - Deprived of liberty; - Low education level; - Inadequate food; - Legitimate Drugs and Illicit Drugs
Strategies for adherence and achieving equity	<ul style="list-style-type: none"> - Social benefits as a way to improve nutrition; - Social benefits like “bargain” for treatment; - Basic basket as a facilitator for the treatment; - Access to health services; - Directly Observed Treatment.
Challenges for adherence and equity in the context of the COVID-19 Pandemic	<ul style="list-style-type: none"> - Patients with MDR-TB may be more susceptible to COVID-19; - COVID-19 as an obstacle to the follow-up of TB-MDR treatment.

In order to guarantee the anonymity of the research participants, in the presentation of the statements, the letter “P” was used to refer to physician, “N” for nurses, “NT” for nursing technicians, “NA” for nursing assistants and finally “SW”, for social worker, followed by a numerical sequence from one to fourteen.

Results

The impacts of social determinants of health for the occurrence of MDR-TB

Regarding the category, most professionals reported how the SDH directly affect the treatment and follow-up of these patients with MDR-TB. With this, the phrases below elucidate the question of social classes, considering that those who are in lower positions tend to suffer painfully with MDR-TB.

“Clearly there are population groups that are more likely to get sick, the main difference has to do with the socioeconomic condition, housing, education, health, this is classic, everyone knows this” (P.2)

“There are patients who have a very low social level, it seems that he doesn’t care much, he thinks it is nothing and he continues in his life” (NT.10)

In addition, the issue of the patient's willingness to carry out this follow-up was also expressed, which, according to the report, some do not have much interest in treating, and may be related to the condition of this patient's life.

“Sometimes they don't think it's important to treat “oh, I'm bad, I have no prospect of improving, my life so I have no interest in treating” because he already lives in a miserable condition, most patients are patients who have a bad condition” (P.3)

Below are excerpts that refer to the abandonment of initial treatment of sensitive TB and as a result of non-adherence, often also related to the social aspect, TB can become multidrug-resistant.

“We have already had patients that they abandoned treatment, and then they became resistant to the initial drugs and became resistant, due to abandonment” (NA.13)

“Sometimes multiresistant returns are people from a very low social level, unfortunately they end up not adhering to the treatment” (NT.8)

Other reports were related to the indiscriminate use of alcohol and other drugs. Some respondents were unable to disentangle the fact that some patients are drug users from being on the street.

“Often they are patients who live on the street or are drug addicts and they don’t have much concern about taking care of themselves, this ends up influencing the treatment” (NT.9)

“Sometimes the patient stops treating because of the social situation, of being a homeless person, of being a drug user” (NA.13)

The statement below emphasizes, in addition to social issues, the educational level, which results in a better understanding of the patient as to the importance of carrying out the treatment correctly, as according to reports many of them do not adhere and TB ends up becoming multidrug-resistant.

“The social, educational, economic vulnerability does interfere, not that we don't have resistant TB in other niches, but if he has a difficulty understanding, if he has a difficulty in taking medication, whatever the reason he has a chance to develop a resistance is greater” (N.7)

Adherence strategies in the treatment of MDR-TB and achieving equity

We tried to understand, in this category, the strategies that have been used to achieve adherence and equity. Among them, we identified that social protection actions and compensatory policies influence adherence to the treatment of patients with MDR-TB.

The interviewed professionals made relationships between the social protection network and the successful treatment of these patients. This fact is understandable due to the fact that these factors are interconnected, since for the continuity of treatment there must be subsidies. Benefits such as family allowance and basic food basket were frequently cited by respondents.

“He is very calm when he has some social assistance, he is more adherent because he does not want a problem at all, it is a negotiation like this” (NA.12)

“Sometimes he will depend on this family allowance to be able to move from his home to the Health Unit, I think that once they link and end without the person realizing it, forcing them to adhere” (N.5)

Another important aspect that emerged from the interviews are the “bargains” made by the professionals with the objective of making the patient carry out the treatment, these “bargains” are made from the benefits that these patients had to access.

“The basic food basket helped us a lot, the so-called “bargain” “If you do this, you come here to get the basket” then “if you go to HCFMRP, collect the exams, pass an appointment, and take the medication every day for a certain time you have the right to a basic food basket” we used to tie this a lot” (NA.11)

“When we had a basic basket, it was a bargaining chip, we said “if you take it, if you do it, there will be a basket” that for them was the maximum, unfortunately” (SW. 14)

The research participants stated that the coverage of social protection during the treatment of MDR-TB becomes an extremely important factor for the monitoring of these patients. Everyone believes that this contributes positively to better assistance and greater success with a positive outcome.

Challenges for adherence and equity in the context of the Covid-19 Pandemic

We also identified that the majority of professionals interviewed see COVID-19 as an extremely important factor in the interference of the treatment of patients undergoing follow-up for MDR-TB. In general, the professionals interviewed brought COVID-19 as an aggravating factor in the treatment of MDR-TB, as expressed in the following statements.

“I believe that he already has a compromised lung, and having contact with COVID-19 can make it worse” (N.6)

“They already have a pulmonary disorder so they may be more susceptible to COVID-19” (P.1)

“It is a conclusion since the literature is indicating, the patient with tuberculosis is a patient who has a serious comorbidity because the shock organs are the lungs where the virus is located” (P.4)

In the testimonies, we observed the possible interference of COVID-19 in the diagnosis of patients with MDR-TB, considering that according to professionals, in this pandemic moment the focus is on COVID-19, knowing that the disease has classic signs and symptoms of other pathologies.

“We may have a problem due to medication adherence and the general difficulty in seeking the service, sometimes thinking that it is all COVID-19” (N.7)

“So I think that this COVID-19 thing is getting in the way, it seems that the people are just aiming for that, anyone who arrives with shortness of breath, with something "ah, it's COVID-19" and does not do an x-ray, does not collect sputum” (NA 13)

Another factor brought as an aggravation of compliance with the treatment of patients with MDR-TB in the context of the pandemic is the irregularity of the ODD, since this monitoring has been done once a week, which is not the ideal way, as these patients constant supervision, as it is a pathology that is difficult for patients to adhere.

“The issue of TDO, of being supervised for the time being is once a week on behalf of COVID-19, lack of professional had a very big impact because it was daily, and now it is weekly” (NA 11)

“Yes, the pandemic unfortunately hindered a lot because the TDO is self-administered sometimes the person doesn't care, they don't want to take the medicine, they won't take it on their own, very complicated” (NT 10)

According to the theoretical framework defined for the study, the three axes that conformed are not independent, keeping a relationship between them, as elucidated in Fig. 1. It is possible to observe the determinants as an impact for the condition of multi-resistance (income, housing, housing, material circumstances of the territory), adherence as the materialization of an investment in technologies and care strategies, such as DOT, social protection and intersectoral actions, compensatory policies aimed at addressing inequalities in the territory to advance equity, and finally COVID - 19, as a stressor for the patient's follow-up to treatment.

Discussion

This study sought to understand the perception of health professionals about MDR-TB, their strategies to ensure adherence to treatment and challenges in the context of the pandemic of COVID-19, in a priority municipality for disease control in the state of São Paulo, Brazil. The results found signal the issues that permeate SHD, and also strategic mechanisms adopted to achieve adherence, having COVID-19 as an important stressor.

It is important to highlight that the professionals expressed great concern at the meeting between MDR-TB and COVID-19, since the situation of the pandemic has interfered in all the dynamics of patients diagnosed with MDR-TB, and if the treatment is interrupted, there are chances of dissemination of the disease. MDR-TB, which can make it a difficult to control situation, weakening the response capacity to confront MDR-TB.

Regarding the approach of professionals to understand MDR-TB, it must be said that they are extremely important actors because they have a broader view of the problems and difficulties that are encountered

in carrying out the monitoring of patients with MDR-TB, however many times these they are powerless in the face of the need to solve problems with their patients.

During the interviews, many professionals reported that the fact that the patient has progressed to MDR-TB is often due to the social class in which he / she is inserted, stating that low-income population groups are more likely to fall ill. Knowing that poverty is one of the most important determinants of TB, it can also worsen the health condition of individuals [26]. Thus, TB and poverty maintain a dependency relationship, as poverty can be associated with precarious health conditions, as these can produce poverty, by reducing opportunities for work and subsistence [27].

In addition, we have a lack of adherence to treatment, according to reports, the interviewees link non-adherence to the fact that these patients are on the street, are drug users and, consequently, poverty as a direct influence in these cases, leading to abandonment. According to [28], adherence to treatment is a multidimensional phenomenon, associated with factors such as the conception of the disease, the treatment itself, the relationship between the health system and professionals.

In order to minimize the dropouts, adherence strategies in the treatment of MDR-TB were presented by most of the interviewees, an example of which are the benefits that were offered to this public. The social protection that covers TB patients can provide a means for them to reduce treatment defaults, especially for the poorest [26]. A meta-analysis carried out with data from nine randomized clinical trials involving 1,687 participants showed that social protection strategies improve access to health care and, consequently, adherence to TB treatment [26]. For these interviewed professionals, this question was seen as something positive to maintain regular follow-up, as these actions enable access, the bond that they often use as a subsidy for the adequate treatment.

However, a weakness brought to the study is that regular monitoring of patients with MDR-TB has been hindered by the situation of COVID-19, given that many professionals had to decrease home visits due to the lack of professionals and subsidies. The interpersonal relationship that takes place between patients and health professionals in the performance of DOT, is of paramount importance for the motivation and follow-up of the treatment, assessment of the risk of abandonment, and also for the management of side effects, however, interrupting this process can affect the continuity of patients.

Thus, new conformations of the health system and care practices are being considered in the context of the pandemic, with emphasis on the implementation of Web-DOT, which enables remote monitoring of TB patients and guarantees this adherence [29] as well as mobilizing family volunteers to supervise these patients under treatment.

The study also showed a great concern of the professionals with the worsening of the patient's health situation, given that they are already with MDR-TB and if they also contracted COVID-19, they would have great chances of more severe conditions, due to the condition of the lung weakened by MDR-TB. In addition, no patient was reported under this condition, but a great effort by the professionals to prevent the situation.

In the literature, it is observed that therapeutic discontinuities also result from the form of organization of health services, which sometimes has an incompatible functioning agenda, from a patient who is working in formality and or informality [30], the requirement for the patient to visit the health center, sometimes very far from home, without any financial support from the health system which requires an approach also with this actor.

The elimination of TB runs through the question of understanding the determinants of MDR-TB in the light of different perspectives, including that of professionals who are on the front line of care. The issue of MDR-TB was already a challenge in the country, due to the low percentages of adherence, and it can intensify with the pandemic, however the study showed a commitment on the part of professionals to face the situation, to achieve equity in care.

The limitations of the study refer to the scope of the study, with a qualitative orientation, thus preventing generalizations for the population from which the study participants come, and in addition, due to the approach used online, which may have prevented researchers from being able to capture other forms of communication, non-verbal. It would be of great importance for future studies to include patients diagnosed with MDR-TB in order to carry out an investigation on both sides of the therapeutic relationships. However, the study brought relevant points for qualification and development of services, being one of the first, which has been working with MDR-TB in the context of the pandemic.

Conclusion

The study advances knowledge by highlighting the challenges faced by health professionals working in the health system for adherence to treatment and monitoring of patients diagnosed with MDR-TB in the social context aggravated by the COVID-19 pandemic. The strategies defined by these health professionals to some extent have guaranteed the achievement of equity, avoiding the catastrophic encounter between TB-MDR and COVID-19.

List Of Abbreviations

COREQ	Consolidated Criteria for Reporting Qualitative Research
DOT	Directly Observed Treatment
HCFMRP	Hospital das Clínicas of the Ribeirão Preto Medical School
MDR	Multidrug-Resistance
MDR-TB	Multidrug-Resistant Tuberculosis
SDH	Social Determinants in Health
TB	Tuberculosis
WHO	World Health Organization

Declarations

Ethics approval and consent to participate

The study was approved by the Research Ethics Committee of the Ribeirão Preto School of Nursing at the University of São Paulo, under the number of the Certificate of Presentation for Ethical Appraisal (CAAE) protocol: 19520819.0.0000.5393. Based on Resolution No. 466, of December 12, 2012, all participation had the subject's consent online and or verbalized, and a copy of the Informed Consent Form (ICF) was sent via email. Anonymity and confidentiality were guaranteed, ensuring their voluntary participation in the research.

Consent for publication

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Availability of data and materials

The data contains potential identification of each study participant, such as full name, date of birth, age and local of residence. In addition, data were collected from a small group of participants in a priority city in Brazil. All participants were informed about the study objective, and how their confidentiality would be protected, as well as their rights to withdraw from the study at any time. The participants included in this study gave their consent to use only anonymized quotes in this research. All relevant data are within the paper. The raw individual participant's interview transcripts are not publicly available due to confidentiality and privacy concerns. The first author has registered their details, as well as contact data in case of interest in collaborative work or further information.

Competing interests

The authors declare that they have no competing interests

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Authors' contributions

LLLS and RAA participated in the conception of the project, as well as the analysis and interpretation of the data and the wording of the article; FLS, JAC, RCF and SD participated in the analysis and interpretation of the data and also a relevant critical review of the intellectual content. ATIB, YMA, ACVR, TZB, FBPC, LSA, AAM, and IF participated in drafting the manuscript and the relevant critical review of the intellectual content. All the authors have read and approved the final manuscript.

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Figures

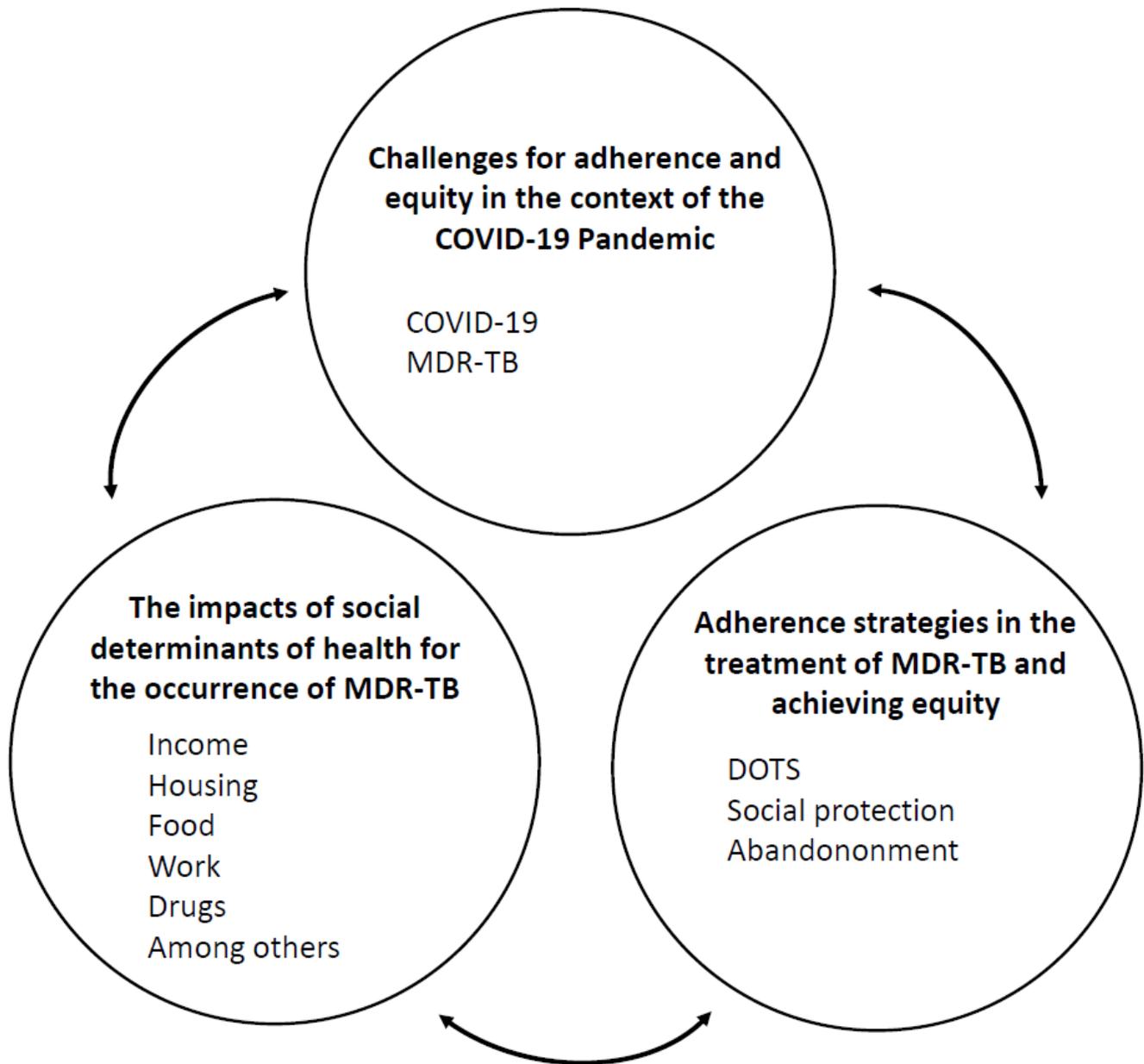


Figure 1

Flowchart of integration of the categories under study