Article

Voices from the Patients: A Qualitative Study of Integration of HIV, Tuberculosis, and Primary Healthcare Services in O.R Tambo District, South Africa

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Abstract: Tuberculosis (TB) and human immunodeficiency virus (HIV) epidemics in South Africa have been closely related and persistent, posing a significant burden for healthcare provision. We explored the patients perspectives on challenges and barriers of scaling up TB and HIV integrated services. A descriptive cross-sectional study applying a qualitive research approach was used. Through focus group discusssions (FGDs), we interviewed 29 patients accessing TB and HIV services at the study sites which were selected at primary health care (PHC) clinics in the O.R Tambo district in Eastern Cape, South Africa. Anonymised data was analysed using both content and thematic analysis technique. Challenges and barriers identified included a lack of health education about TB and HIV; an inadequate counselling for antiretroviral drugs (ARVs) and HIV; a lack of awareness of the National TB control program; and poor quality of services provided by the health care facilities. These findings suggest that the O.R. Tambo district needs to strengthen its TB-HIV integration immediately.

Keywords: TB-HIV integration; Challenges and barriers; Patients; O.R Tambo District; Eastern Cape; South Africa

1. Introduction

Tuberculosis (TB) and human immunodeficiency virus (HIV) are strongly associated. People with healthy immune systems may not fall ill from latent TB infection (when a person has TB but does not have any symptoms), but people living with HIV with a low CD4 count are much more susceptible to active TB [1,2,3]. The risk of developing active TB is estimated to be 20 times greater in people living with HIV than in people who are HIV-negative [4,5]. In 2017, 10 million people developed active TB, 9% of whom were also co-infected with HIV. According to the World Health Organization [2], around one-third of the 36.9 million people living with HIV and AIDS worldwide are infected with TB [2,3]. Sub-Saharan Africa is the most affected region, with 70% of the world's co-infection rate [6,7,8,9]. The best estimates for 2020 are 1.3 million TB deaths among HIV-negative people (up from 1.2 million in 2019) and an additional 214 000 among people living with HIV (up from 209 000 in 2019), with the combined total back to the level of 2017 [10-13]. The global coverage of HIV testing among people diagnosed with TB remained high in 2020, at 73% (up from 70% in 2019). However, the absolute number of people diagnosed with TB who knew their HIV status fell from 4.8 million in 2019 to 4.2 million in 2020 (a reduction of 15%) [14,15,16]. The global number of people living with HIV annually provided with TB

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preventive treatment increased from fewer than 30 000 in 2005 to 3.0 million in 2019, with a reduction of 23% between 2019 and 2020, to 2.7 million. [17,18,19,20, 21].

The TB incidence in South Africa is estimated to 615 cases per 100,000 populations, ranging from 427 to 835 cases per 100,000 populations in 2019 [10]. Reduced access to TB diagnosis and treatment due to covid 19 has resulted in an increase in TB deaths [22,23]. As of 2017, 60% of people with TB in the country were HIV positive, 193,000 people living with HIV were diagnosed with active TB, and 56,000 HIV-positive people died as a result of TB [24,25,26]. There is also significant incidence of drug-resistant TB [27,28,29]. In the past decade, the country has made robust efforts to tackle the two diseases simultaneously. In 2009, TB was integrated into the mandate of the South African National AIDS Council (SANAC) alongside HIV, and a joint national strategic plan was developed [38]. This policy has stipulated integration of HIV and TB services nationwide, by the co-location of services [30,31,32,33,34]. The country's 2017-2022 national strategic plan for HIV, TB and STIs describes South Africa as having 'turned a corner' on integration since 2012. This follows the introduction of various national initiatives including the proactive diagnosis of TB among people living with HIV through the use of GeneXpert technology [35,36,37,38]. The country has also provided integrated HIV/TB services for people in correctional facilities, the mining industry, and communities surrounding gold mines and informal settlements, where transmission of both HIV and TB is prevalent. It is also collecting detailed, localised data on HIV/TB disease patterns, related social, economic factors and the uptake on TB and HIV services. HIV/TB 'hotspots' can then be identified within key districts and integrated services targeted more effectively [3, 33]. As a result, TB treatment success rates among people living with HIV are consistently improving.

However, remains of significant disparities between provision in various areas due to a lack of staff qualified to address HIV and TB, drug stock-outs, inadequate infrastructure (such as a lack of private rooms to conduct pre- and post-test counselling) [39,40]. One of the greatest challenges faced by both TB programmes and joint HIV/TB programmes, is multi drug-resistant TB (MDR-TB), strains of TB that are resistant to the drugs, isoniazid and rifampicin (the most effective first-line treatment drug for TB). Among people notified as having MDR-TB in 2017, half also tested positive for resistance to other types of treatment (fluoroquinolones and second-line injectable agents), a significant increase from 39% in 2016 [41,42, 43]. These people are classified as having extensively drug-resistant TB (XDR-TB). A total of 10,800 cases of XDR-TB were reported in 2017, around 200 more than the previous years. Belarus, India, Russia, South Africa and Ukraine accounted for the majority of cases. Those with XDR-TB face an even lower likelihood of treatment success, with only a third (34%) receiving effective treatment [20]. In this study, we aimed to explore the opinions and experiences of patients regarding integration of HIV and TB services into primary healthcare services, including if integration is happening, what it looks like, and possible limitations to its implementation as well as its impact.

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2. Materials and Methods

2.1. Study Setting and Population

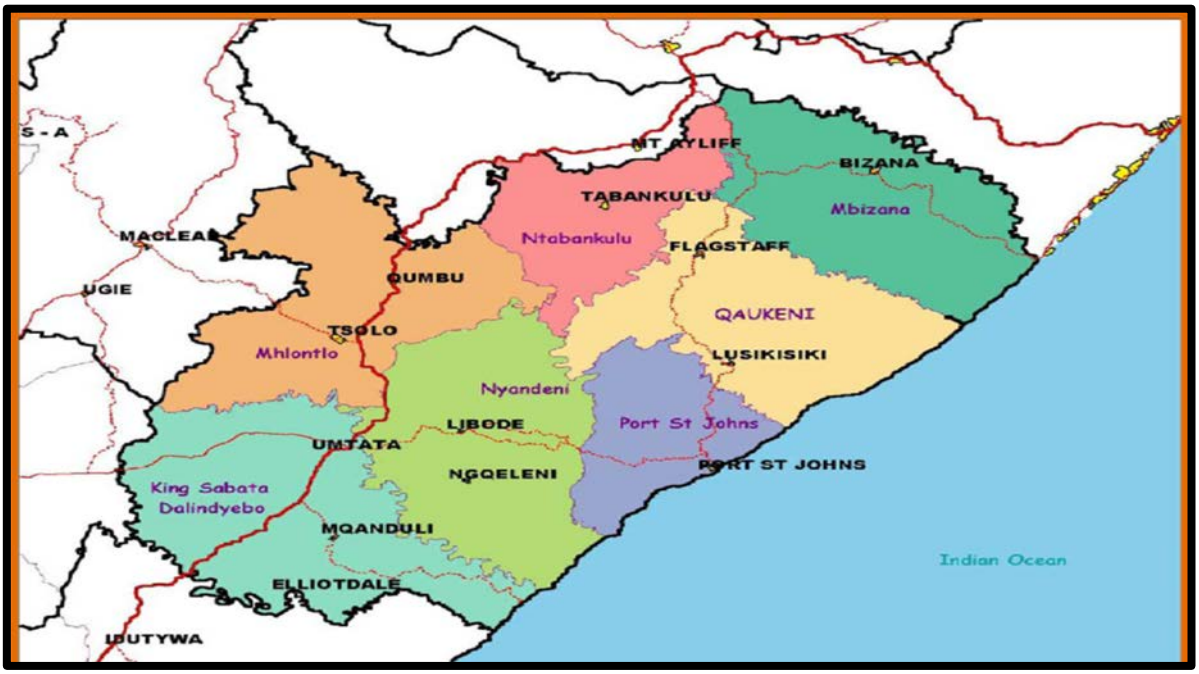

Figure 1. Map of OR Tambo District Municipality. Source: http://isrdp.dplg.gov.za/documents/IDP/ ISRDP/ OR_ Tambo_IDP.pdf. (open access).

The O.R Tambo district is one of the 7 districts of the Eastern Cape province of South Africa (Fig 1). The seat of O.R Tambo is in Mthatha. The vast majority of its population of about 1 676 463 speak Xhosa language [39]. It has a total area of 12,141 Km^2 and an overall density of 3,800/ Km^2. The racial makeup consists of the following: Black African 90.6%, Coloured 6.7%, Indian/ Asian 1.2 %, White 1.0%, of which based on language Xhosa is the most dominating language spoken by 85 % of people, followed by English 8.6 % [39]. The district is named after Oliver Reginald Tambo, who was the South African anti-apartheid politician and central figure in the African National Congress (ANC). The district code is DC 15 and within Wild Coast Region. It is surrounded by Alfred Nzo district (DC44 to the North), Sisonke district (DC43 to the North), Ugu district (DC21 to the North-East), Amathole district (DC12 to the South-West), Chris Hani district (DC13 to the West), and Joe Gqabi district (DC14 to the North-West). Local Municipalities under O.R Tambo district include Ngquza Hill, Port St. Johns, Nyandeni, Mhlontlo and King Sabata Dalindyebo [39]. It has a total area of 12,141 Km^2 and an overall density of 3,800/ Km^2. The district is made up of 4 health sub-districts: King Sabata Dalindyebo sub-district with a population of 442318, Mhlontlo sub-district and its population is 221827, Nyandeni sub-district and its population is 436813, and Qaukeni sub-district with a total population of 659431. O.R Tambo district has been reported to bear the following basic indicators: 64.6% of people are living under poverty with an estimated unemployment rate of 65.5% and the literacy rate of 42.2% [39].

2.2. Inclusion and Exclusion Criteria for the study

All TB and HIV, TB only and HIV only patients who were above the age of 18 to over 60 years and had completed at least one month of TB and or HIV treatment and registered in the selected facilities included in the study. Respondents who had already completed their TB treatment from the date of data collection were included as well in the study.

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2.3. Informed Consent

Before enrolment, invitation to participate in the study and informed consent was obtained from all the participants received (written and verbal informed consent).

2.4. Study Design and Sampling

A cross-sectional study design was used with a qualitative research approach. The study participants (patients) were recruited from the study sites using convenience sampling and pseudo randomisation into focus groups for interviews to ensure diversity in disease history, age, and gender.

2.5. Data collection

We conducted focus group interviews (N = 29) between September and October 2017 before outbreak of Covid 19. The focus group interviews on patients at the clinic sites who were accessing TB and HIV services was conducted in a private room to ensure confidentiality. There were 6 participants in each focus group discussion, both men and women. Each discussion lasted for about 40 minutes and was mostly in the local dialect (Xhosa). The study team consisted of three (3) interviewers—the first author and two hired, specially trained research assistants. The main focus of the interview questions or topics was getting information on the following: Aetiology of tuberculosis, TB transmission and HIV risk factor (susceptibility), understanding on treatment follow up, factors affecting compliance to TB therapy and practices in relation to TB/HIV management in the healthcare facility. All the interviews were audio-taped. Each interview transcript was coded by at least two members of the research team. Coding discrepancies were discussed until consensus was reached.

2.6. Data analysis

All the recording data was translated and transcribed verbatim in Microsoft word and analysed using Nvivo 9.0 software. Further statistical analysis to describe the study population and some quantized qualitative data was performed using the Statistical Package for Social Sciences (SPSS) for windows version 23 (SPSS Inc., Chicago, Illinois, USA). The descriptive statistics were preseneted as counts and percentages.

2.7. Validity of the Instrument

Validity relates to the degree to which the research measures what it is supposed to measure [21]. The researcher focused on the content validity and face validity of the instrument.

2.7.1. Face Validity

Face validity of an instrument refers to the judgment that an instrument is measuring what it is supposed to, based primarily on the local link between the questions and study objectives.

2.7.2. Content Validity

The researcher reviewed the literature and instruments from similar studies. TB Supervisors, TB Technical Advisors and TB and HIV program managers were consulted for comments and inputs before finalizing the instrument [21]. Content validity was also addressed by an extensive literature search to identify the domain of the construct before developing the questionnaire.

2.8. Reliability of the Instrument

To ensure reliability of the instrument, the test re-test method was used, re-administering the same instrument to the same set of respondents.

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3. Results

3.1. Description of the study participants

Of the 29 participants, majority were females 65.52 % (19) and 34.48 % (10) were males, most of them had tertiary 55.17 % (16) and secondary 44.83 (13) , married 31.03 (9), widowed 31.03% (9), 100 % (29) Unemployeed as shown in **Table 1.**

Table 1. Characteristics of the study participants at O.R Tambo District Municipality .

	Variable	Frequency (n=29)	Percentage%
Age	18-29	7	24.13
	30-39	7	24.13
	40-49	4	13.79
	50-59	7	24.13
	Over 60	4	13.79
Population group	White	2	6.89
	Black	27	93.10
Gender	Female	19	65.52
	Male	10	34.48
Marital status	Married	9	31.03
	Single	7	24.14
	Living with a supporter/partner	00	00
	Widowed	9	31.03
	Divorced	4	13.79
Education level	No schooling	00	00
	Primary	00	00
	Secondary	13	44.83
	Tertiary	16	55.17
Religion	Christianity	29	100
Occupation	Employed	00	00
	Self-Employed	00	00
	Unemployed	29	100

3.2. Challenges and barriers to TB-HIV integration knowledge on aetiology of tuberculoses

When interveiewed to elicit knowledge on aetiology of TB and well as the TB-HIV integration, the quantized data was such that the responses to choose from where either "Yes, No, or Don't know. About 58.6 % said they knew TB was caused by smoking while 41.1% did not know that TB was caused by smoking." This is also supported by the explanation presented below from the data that was qualitatively analysed.

"Me I do not know what causes Tuberculosis but I was smoking before but I stopped"

Clinic L, Focus Group Discussion (FDG), Male Patient, Coinfected on Treatment.

Knowledge on TB transmission and HIV risk factor (susceptibility)

The respondents where asked if TB can spread by shaking hands with an infected individual, some said "Yes" (34.5 %), while other respondents said and did not agree with the statement by saying "N0" (31 %). The remaining responded did not knew what was TB "don't know" (34.5%). The participants were asked to choose from "Yes", "No" and "I do not know". This is also supported by the explanation presented below from the data that was qualitatively analysed. This was indicated excerpts from the data is also presented below.

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"I think TB can spread through shaking of hands, maybe when you greet someone"

Clinic M, Focus Group Discussion (FDG), Female Patient, coinfected on Treatment.

The respondents were asked if People with HIV should be concerned about TB, some respondents said "Yes" (48.3 %) while majority of participants said "No" (51.7%). The were expected choose either "Yes" or "No". Majority of participants indicated that they did not knew about epidemiological relationship between TB and HIV. This is also supported by the explanation presented below from the data that was qualitatively analysed. Excerpts from the data is also presented below.

"I do not think you should be concerned about TB when you are HIV positive because you have medication"

Clinic G, Focus Discussion Group (FDG), Female Patient, Coinfected on Treatment.

The respondent were asked if people with HIV are more likely to acquire TB, some respondent said "Yes" (51.7%), while other respondent said "No" (48.3%). The were expected to either to say "Yes" or "No". The response indicated inadequate knowledge of the link and seriousness of TB and HIV as they assume that TB and HIV are like any other disease. This maybe due to lack of education on addressing epidemiological relationship of TB and HIV among coinfected patients. This is also supported by the explanation presented below from the data that was qualitatively analysed. Excerpts from the data is also presented below.

"TB and HIV are just like any other disease now , they go together jusk like blood pressure and other diseases"

Clinic M, Focus Discusision Group (FDG), Female Patient Coinfected on Treament. TB treatment and follow up

The respondents were ask if TB/HIV management is integrated into the general healthcare services in their facility, some responded with "Yes" (55.2%) while others said "No" (44.8%). They were expected to say "Yes" or "No". Those who knew has show a gap on TB and HIV integration. However, there is small difference between respondents who agreed with statement and those who disagreed with the statement. This is also supported by the explanation presented below from the data that was qualitatively analysed. Excerpts from the data also presented below.

"The way I see both TB and HIV are available because I have tested for TB before here"

Clinic M, Focus Discussion Group (FDG), Male Patient Coinfected on Treatment.

The responded were asked if duration of TB treatment is six months, majority of responded "Yes" (65.5%), while other responded said "Do not know" (34.5%). They expected to agree with the statement with "Yes", "No" or "I do not know". Although majority of respondents knew TB treatment duration, however there are few respondents who have a gap in understanding TB treatment duration. This maybe due to lack of consistent health education to all patients who visit facility especially coinfected patients. This is also supported by the explanation presented below from the data that was qualitatively analysed. The excerpts from the data are also presented below.

"I do not know how long does it take to take TB medication"

Clinic M, Focus Discussion Group(FDG), Female Patient Coinfected on Treatment

The responded were asked if they had treatement supporter at home, some said "Yes"(20.7%), while majority said they do not have "No" (79.3%). The expectation was to indicate with "Yes" or "No". Majority of the respondents did not have treatment supporter at home can benefit on direct observation treatment support strategy program (DOTS). However there are those who still has memory to remember when to take medication, even though they might be inconsistences and missed treatment time, DOTS is consistent and highly recommended by World Health Organization. This is also supported by the explanation presented below from the data that was qualitatively analysed. The excerpts from the data is also presented below.

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"I do not have treatment support at home but I know when is the right time to take medication "

Clinic G, Focus Discussion Group (FDG), Female Patient Coinfection on Treatment.

Factors affecting compliance to TB therapy

The responded were asked if long distance from the healthcare facility prevents them seeking care as planned, respondents agreed with "Yes" (75.9%), while some said "No" (24.1%). The response has indicated majority still faced by long distance challenges in accessing their TB and HIV services, however few of the respondents believe that a distance is not a barrier in accessing their TB and HIV services. This is also supported by the explanation presented below from the data that was qualitatively analysed. The excerpts from the data is also presented below.

"distance for me to this facility is not a problem since these services are for my well-being, though roads are very bad".

Clinic L, Focus Discussion Group (FDG), Male Patient Coinfection on Treatment.

The respondents were asked if low awareness and cultural barriers worsen TB and HIV infection, majority said "No" (65.5 %), while some said "Yes" (34.5%). This response indicated that our participants still lack insight on the barriers related in accessing TB and HIV especially low awareness and misconceptions like witchcraft. While few respondents had insight that indeed, low awareness, cultural barriers could cause more prevalence in TB and HIV infection, especially if a patient cannot differentiate signs and symptoms, causal link between TB and HIV. This is also supported by the explanation presented below from the data that was qualitatively analysed.

This was suggested by excerpts from the data presented below.

"Low awareness, stigma and cultural barrier can increase TB and HIV infection because of lack of knowledge, at times you can think you are bewitched"

Clinic L, Focus Discussion Group (FDG), Male Patient Coinfection on Treatment

Practices in relation to TB/HIV management in the healthcare facility

The respondents were ask if when diagnosed with TB were done VCT and HIV test, some said "Yes" (51.7%) while (48.3) said "No". The response given was indication that TB and HIV is not fully integrated, therefore, there are still some gaps in quality TB and HIV integration, as respondents indicated. However, some had VCT while diagnosed with TB, maybe it might happen that dates for VCT were different, hence there was slight difference between those who said "Yes" and said "No".

This is also supported by the explanation presented below from the data that was qualitatively analysed. Excerpts from the data is also presented below.

"Even today I am here to take the bloods for VCT as not everybody is testing today, so I came for an appointment and to get my medication too"

Clinic M, Focus Discussion Group (FDG) Male Patient Coinfected on Treatment

The respondents were asked if when diagnosed with HIV was sputum taken for AFB taken, some said "Yes" (17.2%) while majority of respondents said "No" (82.8%). Although few responses indicated that they did took sputum, but majority have not took sputum, an indication that TB and HIV services are inadequate. However, few respondents did took sputum when diagnosed with HIV, possible it might be the issue of inconsistency from the facility on continuing taking sputum. This is also supported by the explanation presented below from the data that was qualitatively analysed.

As this was also indicated excerpts from the data presented below.

"I never cough for sputum but I took bloods for VCT maybe I am still going to take sputum"

Clinic Q, Focus Discussion Group (FDG), Female Patient Coinfected on Treatment.

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The respondents were asked if they received education and counselling on ARVs and HIV, diet, TB and prevention strategies, some said "Yes" (27.6%) while majority said "No" (72.4%). Majority of the respondents did not receive adequate and comprehensive education on ARV,HIV, diet and TB, an indication of clinical outcomes among coinfected respondents for integration of care. There are few respondents who had received education and counseling on ARVs, HIV and prevention strategies, possible it might happen that there was inconsistency of these health educational programs, hence others missed it. This is also supported by the explanation presented below from the data that was qualitatively analysed. Excerpts from the data is also presented below.

"I have never received a good health education on ARVs, HIV and TB, nutrition and prevention"

Clinic L, Focus Discussion Group (FDG), Female Patient Coinfected on Treatment.

The respondents were as if was there an Infection Prevention and Control nurse in the facility, some said "Yes" (20.7%) while majority said "No" (79.3%). The majority of respondents did not agree with the availability of infection control nurse, an indication that the facility is at risk of infection, as no nurse responsible for effective implementation of infection prevention and control practices. However, there are few of respondents who knew infection control available at their facility. This is also supported by the explanation presented below from the data that was qualitatively analysed.

This was also indicated excerpts from the data presented below.

"I have not seen an infection control nurse since I started taking my treatment at this clinic, I know that nurses do help us"

Clinic G, Focus Discussion Group (FDG) Male Patient Coinfected on Treatment.

The respondents were asked if they are aware of the National TB control program, majority said "No" (55.2%) while some said "Yes"(44.8%). The majority of respondents were not aware about National TB program, an indication that respondents are at risk of developing mortalities and morbidity attributable to TB like multiple drug resistance. However, there are some respondents knew National TB control program, it could be maybe members of the National control program visited the clinic while those said yes had their review dates at the same time dates with National control program members. It might be visits of members was not consistent hence patients do not know them. This is also supported by the explanation presented below from the data that was qualitatively analysed. The excerpts from the data is also presented below.

"I do come to the clinic but I was never told what is this National TB control program, maybe if nurses can tell me I can to understand what is it for"

Clinic Q, Focus Discusion Group (FDG), Female Patient Coinfected on Treatment.

The respondents were asked if quality of TB services was good at their clinic, some said "Yes" (10.3%), while majority said "No" (89.7%). The response rate indicated that majority of respondents believe that the quality of TB and HIV services still very inadequate in their facilities. However, few respondents still believed that there was good quality of TB services available at their clinic. This is also supported by the explanation presented below from the data that was qualitatively analysed. The excerpts from the data is presented below.

"We have never received a good health education on TB and HIV programmes, nutrition and prevention measures I think there is still gap for quality improvement"

Clinic L, Focus Group Discussion (FDG), Females on Coinfection.

Respondent were asked if they prefer to seek treatment at nearest clinic, majority said "Yes" (86.2%) while some said "No" (13.8%). The majority of respondents still prefer to access their services in their nearest hospital, a strong determinant of adherence to their treatment. According to respondents, for hospital services there are catastrophic costs implications like travelling. However very few who do not mind to get services away from their area of residing with reasons known by them. This is also supported by the explanation presented below from the data that was qualitatively analysed. The excerpts from the data is presented below.

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"Both services are available for me here I do not want to go to a hospital, besides I don't have money to travel to hospital, Its costly and frustrating"

Clinic L, Focus Discussion Group (FDG), Male Patient Coinfected on Treatment.

Patients' recommendations for improvement

The respondent were asked if do they are feeling good about receiving TB treatment and ARV elsewhere not at their current nearest facilities, some said "Yes" (27.6%), while majority of respondent "No" (72.4%). Majority of the respondents are happy to get their services where they are residing, however there are those who prefer to get services elsewhere most probably due to lack of quality at their facility in O.R Tambo or fear of being stigmatized by their fellow community members. This is also supported by the explanation presented below from the data that was qualitatively analysed. The excerpts from the data is also presented below.

" I prefer to get all my medication here because it is easy and does not cost like travelling as my home is not far from this clinic, however health education need to be strengthened about the TB and its medication"

Clinic M,Focus Discussion Group (FDG) Male Patient Coinfected on Treatment.

The respondent were asked if are they are willing to support awareness campaigns on TB and HIV, majority said "Yes" (86.2%) while some said "No" (13.8%). The majority were willing to support the awareness campagnes to address behavioural changes and reduction of stigma attachement on TB and HIV especially around their community, however there are those that are not willing to support these awarenesses maybe due to stigma and discrimination fears. This is also supported by the explanation presented below from the data that was qualitatively analysed. Excerpts from the data is presented below.

"It is important to to tell people about HIV and TB even go to our communities for awareness so as to reduce stigma as well".

Clinic M, Focus Discussion Group (FDG), Male Patient Coinfected on Treatment.

The respondents asked if quality of care should improve at their facility, majority said "Yes" (72.4%) while some said "No" (27.6%). The majority of respondents has recommended that services need to improve, an indication that TB and HIV services were inadequate. However there were few of those participants that are still happy with the current quality of services delivered due to trust to their health care workers and facilities. This is also supported by the explanation presented below from the data that was qualitatively analysed. The excerpts from the data is presented below.

Quality is still need to improve, we have been told about vegetables like spinach and cabbage and condom use but we need a good health education on TB and HIV programs, nutrition and other prevention of TB and HIV"

Clinic L, Focus Discussion Group (FDG), Male Coinfected on Treatment.

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The following themes and sub-themes has emerged from the study, see the summary on table 2 below:

Summary of Themes and Sub-themes

Table 2. Patients perceptions about quality of integration of HIV, tuberculosis, and primary healthcare services in O.R Tambo District Municipality.

Themes	Sub themes
Aetiology of tuberculoses.	Sub-optimal knowledge of TB by participants.
TB transmission and HIV risk factor (susceptibility).	Lack of knowledge on how TB can be disseminated and its epidemiological link to HIV.
TB treatment and follow up.	Knowledge gaps on TB duration and lack of supporters at home of the study participants.
Factors affecting compliance to TB therapy.	Participants can access the medication irrespective of distance, however, there participants lack knowledge on barriers affecting adherence in TB medication.
Practices in relation to TB/HIV management in the healthcare facility.	Major gaps identified by the study participants in relation to integration of TB and HIV management at their health facilities.
Patients' recommendations for improvement.	The study participants recommended and proposed quality improvement strategies be implemented by O.R Tambo District Municality in their health facilities.

4. Discussion

This study was designed to understand patient's perceptions on integration of TB and HIV/AIDS services into the primary health care systems: implementation challenges and impact on Tuberculosis control program in O.R. Tambo District. Most of the findings from this study were also highlighted in other studies conducted in other countries. Summary of the main themes that emerged from the study findings can be seen in **Table 2**. Our study observed that majority of patients knew that TB was caused by smoking, about 58.6%, however there are some gaps identified as some other patients there was low understanding of TB cause. Kigozi *et al.,* [5] from South Africa had reported their 60.2% patients knew that TB is spread by bacteria. These findings are consistent with those of Croome etal., [6], Chimbindi *et al.,* [7], Daniels *et al.,* [8], Council SANAC [9] and WHO, [10] had reported that almost 96% of their patients were aware that TB is not a hereditary disease. Das *et al.,* [11] from Tripura, Paramasivam *et al.,* [12] from Mumbai and Samal *et al.,* [13] from Chattisgarh had reported that 14.1%, 35.2%, and 95.0% of their patients respectively were aware that TB is caused by germs/bacteria. The study revealed barely 34.5 %, believed that TB can spread by shaking hands with an infected individual. These findings indicate that patients understanding of TB transmission is still sub-optimal. These findings are consistent with other studies that have been conducted elsewhere, study observe that TB patients had different perceptions about TB in Kenya [14]. For the TB infected patients in the study, there were those patients that do not take serious the consequencies of HIV, this was highlighted by 51.7 % of rate response on chances of acquiring TB when you HIV positive. These findings are consistent with other studies that observed TB mortality statistics about 50-60% of patients who takes these ARVs are still comparing HIV and TB like any disease, which impede control of coinfection [11,12]. On integration of TB and HIV, about 55.7 % of respondense have agreed that services are integrated. These findings indicated that the district of O.R Tambo municipality still has implementing gaps to full integration of TB and HIV control programme. However, the directives, policies, and guidelines from South Africa National DOH to co-locate and integrate both services at a single facility, without adequate implementation guidance, failed to integrate

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HIV-TB health care delivery as other studies observed [2]. Studies elsewhere have observed that patient centred gaps negatively impacting TB treatment outcomes include: financial expenses associated with accessing health services - especially in HIV-TB co-infected persons who require multiple health visits; sub-optimal treatment adherence from poor patient understanding and motivation, or unmanageable side effects - the latter observed more frequently with concomitant TB therapy and ART [13,14]. Nearly 12 million TB-related HIV deaths were averted in the period 2000–2020 because of TB/HIV-related interventions (full integration) [15,16,17,18]. Integration of TB-HIV care, strong management and leadership at the health district and facility level have been shown to be predictors of good TB and HIV treatment outcomes as studies have demonstrated elsewhere [19,20,21,22,23]. These findings aligns with those of Kanyerere *et al.,* [24] in Kenyanian clinics, while in Durban, South Africa Health Systems Trust observe similar findings [26]. The study observed that 65.5 % of respondents knew TB treatment duration. Studies elsewhere have observed that pulmonary TB patients had suboptimal knowledge about TB treatment and duration, 34.5 to 40 % patients. This has highlighted that to achieve elimination of TB (The End TB 2030), health care workers needs to change the way they present health education to their patients. Mbuthia *et al.,* [26] and UNAIDS [27,28] on their studies on barriers of optimal TB treament observed that inadequate knowledge about the TB disease causes an underutilization of the health services, delay in seeking diagnosis, and poor treatment adherence amongst TB patients. Similarly, studies elsewhere who have witnessed the rise of TB drug resistance especially facilities who still using stand alone programming of TB and HIV integration approach [29,30]. With these findings, Direct Observation Treatment Support, have been acknowledged to play significant role according to WHO [1], "it is most cost-effective way to stop the spread of TB in communities with a high incidence by improving cure rates in district like O.R Tambo District Municipality, the deprived districts . Directly Observed Therapy Shortcourse (DOTS) is composed of five distinct elements: political commitment; microscopy services; drug supplies; surveillance and monitoring systems and use of highly efficacious regimens; and direct observation of treatment [4]. Studies elsewhere highlighted the similar observation in different countries, Fernandez-Lazaro *et al.,* [31] in Brazil, Owiti *et al.,* [32] in Kenya and Obaromi et *al.,* [33], Hassan *et al.,* [34] and Kigozi *et al.,* [5] in South Africa. Our study observed that the TB testing on HIV respondence and HIV testing on TB was inadequate with response rate of no testing at 82.8%. A recent study in South Africa reported that 39% of patients with TB were not screened at the primary care setting, and among those screened, 62% were not tested for TB [35]. The World Health Organization advises that if screening is carried out properly, between 10 and 20% of PLHIV report at least one symptom suggestive of TB [1,10].

The WHO issued TB-HIV collaborative guidelines on TB and HIV, these guidelines were meant for overburdened districts like O.R Tambo District, these guidelines are emphasing intensified case findings, voluntary counseling testing , establishing and strengthening mechanisms for integrated delivery of TB and HIV services [1]. Studies that have been conducted in various areas have highlighted similar findings , Paramasivan *et al.,* [36] in Kerala, Sinshaw *et al.,* [37] in Ethiopia and SANAC [38] in South Africa. Our study has indicated that, distance to the facility was not a barrier to patients as respondents were happy and trust health providers of their facilities response of 86.2%, however there were those respondents that are living far from health facilities, distance and infrastructure was challenging to those respondents. Fernandez-Lazaro et al. ,[31] observe in their studies that care-seeking behaviour among individuals with TB-HIV related symptoms in Tanzania was not found to be associated with distance to their health care facility. Statistics South Africa characterize O.R Tambo district as disconnected impoverished with lots of challenges in socio-economic challenges, unemployement deprivation especially economical active group [39] as highlited in **table 1**. Studies by Addo *et al.,* [40] and Sathar *et al.,* [41] had observed majority of the patients in low income countries are coming from poor background some tend to missed appointements date because of the distances and lack of

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money to honor their clinic visits, only those who living proximal to health facilities do benefit. Our study indicated that respondents lack understanding that low awareness, cultural and stigma are making TB and HIV high in overburdened areas with digreeing with the statement, about 65.5 %. Studies elsewhere have observed that issues of stigma are very important in the battle against HIV/AIDS especially in Africa since it may affect patient attendance at healthcare centres for obtaining antiretroviral (ARV) medications and regular medical check-ups [42] . Stigmatization creates an unnecessary culture of secrecy and silence based on ignorance and fear of victimization [42,43,44]. These findings are aligned with those of WHO, [45,46] in 'HIV-Associated Tuberculosis factsheet' that about 80% of respondents still faced challenges of being stigmatised and discrimination in our health care facilities, this makes TB and HIV services inaccessible especially deprived communities. Similarly, studies by Jannati *et al.,* [47] share their findings with these findings of our study. The lack of infection control coordinator for TB was indicated by the study as majority respondents, about 79.3% of the patients were not aware about his/her availability . Infection Prevention and control (IPC) can reduce the risk of TB transmission even in settings with limited resources [11]. Studies published elsewhere, had similar findings in their studies, whereby the facilities have only infection control guidelines but official appointment of infection control nurse is not available because of limited budget [14, 43]. The lack of awareness about National TB cotrol program among by patients was indicated by study. National TB programme has crucial role to play in designing and carrying out operational research that involves the evaluation of programme operations aimed at improved policy-making, better design and operation of health systems and more efficient methods of service delivery [1,2]. Studies from low income countries who observed that overburdened countries by high coinfection rate, has observed that the National TB programme is available but members are not adequately active in making it known at the health facilities [9,10].What has emerged from the study is the willingness of the patients supporting awareness to their community of which that can contribute to reduction of stigma and discrimination attached to TB and HIV patients, 86.2% agreed.These awarenesses can assist to raise public awareness and understanding about one of the world's deadliest infectious killers – TB and HIV and their devastating health, social and economic impact on people around the world. Studies in Malawi, Botswana and Kenya, have demonstrated recovered patients are delivering medication door to door, doing awareness, hence stigma and discrimination has reduced and awareness is remarkable improved [24, 26]. Majority of respondents, about 72.4% of the patient preferred their nearest facilities for their medication, hence recommended that the quality and accessibility of TB and HIV services need to improve. These findings have been shared by WHO, [1] putting emphasise that services at the community level must be within reach, a distance 5 kilometers in between must be maintain.

4.2. *Opportunities in upscaling TB and HIV care integration in O.R Tambo district*

Our study documented perceived strengths from the patients whereby the district can integrate TB and HIV control programmes, duration of the treatment taking is known by the participants, long distance from the healthcare facility does not prevent them seeking TB and HIV as planned, knowledge of sputum follow-up test when is it done, knowledge that both discrimination and stigma makes the management of TB and HIV very poor. These perceived strength have been observed by other studies elsewhere [13,18,19]. The district has the strength and potential to implement integrated TB and HIV because of the 90 percent of staff permanent employed by the provincial department of health, employed health professionals have knowledge in differences between test kits for TB and common symptoms of TB, they know diagnosis of TB using AFB sputum, chest x-ray and also upward referral system is another opportunity, number of existing staff, infrastructure, health information systems**.** UNAIDS [27,28] and WHO, [44,45] have advo-

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cating that countries from sub-saharan region, can utilise whatever they have for in starting process of integration of TB and HIV control programmes, not to wait until resources are available because resources are scarce. The study has demonstarted that majority of the patients were economically active (less than 60 years) only 4 who were at 60 years, however they were not working. Our study is consistent with studies by UNAIDS [28] where they have shown in their studies about 65 %-70% people who mostly common associated with high coinfection are those of most economically active but who cannot find the job especially in low income countries.

4.3. Study limitations

The potential weaknesses was the study was limited only to the TB and HIV patients because the district is the worst affected by both diseases [17,33]. This study could have been done at large scale but due to very limited funding and time we had to choose the five clinics and their patients. The time contraints was limitation as these clinics and staff were very busy with week activities. Our study was limited by measures used for the purposes of the study. Access to these respondents was limitation as well due to socio-economic factors like income and employment and social supports as majority of patients were unemployed and majority dependent on social grant [39]. The study was limited to cross-section in nature and assessed respondents perceptions of the obligation at specific time.

4.4. Conclusion

Our study shown that patients lacks knowledge on TB, however some patients still have little understanding on TB, while other patients have misconception of whitchcraft when it comes to TB infection and touching of hands. Majority of patients did not had knowledge on how TB can be transmitted and its epidemiological linkage to HIV. Our study observed that knowledge gaps on TB duration and lack of treatment supporters at home of the study participants. In addition, majority of patients are still lack understanding about the dangerous deadly combination of TB and HIV. Majority of patients in the study have revealed lack of treatment supporters at their places, however the majority of patients are still prefer getting their TB and HIV services at their nearesr facilities as their trust to their facilities and health care staff Patients still have poor insight on barriers of accessing TB and HIV, especially low awareness, culture, stigma and discrimination. Study demonstrated that patients who are TB diagnosed, do not get voluntary counseling and testing services, while HIV patients do not test for TB. There was lack of comprehensive health education to coinfected patients about TB, HIV and diet. Study revealed that National TB control and infection control coordinator was not known by patients. Out of all the patients, recommended that the quality of TB and HIV services should improve at this O.R Tambo District Health Facilities. The study recommend that TB and HIV services should improve with comprehensive educational programmes of TB and HIV to patients so as to scale up quality fully integrated TB and HIV for control in the district.

Contribution: ND: designed the study, collected data from various data sources, contributed in data analysis and interpretation of findings, and drafted the manuscript. KE: revised the study design and edited final version of the manuscript. TA: contributed in data analysis, interpretation of findings and edited the final version of the manuscript.

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Informed Consent Statement: The study conducted an informed consent (IC) process, and the participants were requested to sign IC forms and prior to enrolment into the study.

Data Availability Statement: The data presented in this study are available on request. The data files generated and analyzed during the current study are available from the corresponding author upon request.

Declaration of Competing Interest: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper

References

1. World Health Organization. Global tuberculosis report 2021. Available online https://www.who.int/publications/i/item/9789240037021. Accessed 1 Nov 2021..
2. Anku, P.J. ; Amo-Adjei, J.; Doku, D.T.; Kumi-Kyereme, A. Integration of tuberculosis and HIV services : Exploring the perspectives of co-infected patients in Ghana. *Global Public Health*, 2018 : https://doi.org/10. 1080/17441692.2017.1385823 PMID : 28984493.
3. Addo, J., Pearce, D., Metcalf, M. et al. Living with tuberculosis: a qualitative study of patients' experiences with disease and treatment. *BMC Public Health* **22**, 1717 (2022). https://doi.org/10.1186/s12889-022-14115-7.
4. Gyimah, F.T.; Dako-Gyeke, P. Perspectives on TB patients' care and support: A qualitative study conducted in Accra Metropolis, Ghana. Glob. Health 2019, 15, 1–9. [CrossRef] [PubMed]
5. Kigozi, N.G., Heunis, J.C., Engelbrecht, M.C., Janse van Rensburg, A.P., van Rensburg, H.C. Tuberculosis knowledge, attitudes and practices of patients at primary health care facilities in a South African metropolitan: Research towards improved health education. BMC Public Health. 2017;17:795.
6. Croome, N.; Ahluwalia, M.; Hughes,L.D.; Abas, M. Patient-reported barriers and facilitators to antiretroviral adherence in sub-Saharan Africa**.** AIDS; (2017);31(7):995-1007.
7. Chimbindi, N. ; Bärnighausen, T. ; Newell M.L. 'Patient satisfaction with HIV and TB treatment in a public programme in rural KwaZulu-Natal : Evidence from patient-exit interviews', *BMC Health Services Research* 14, 32. PMID : (2014), 10.1186/1472-6963-14-32.
8. Daniels, J., Medina Marino, A.; Glockner, K.; Grew, E.; Ngcelwane, N.; Kipp, A. Masculinity, resources, and retention in care: South African men's behaviors and experiences while engaged in TB care and treatment. Soc Sci Med. 2021;270: 113639.
9. Council SANAC. Let our actions count: South Africa's national strategic plan for HIV, TB and STIs 2017–2022, 2017. Pretoria: South African National Aids Council.
10. World Health Organization (WHO). Tuberculosis Report, WHO, 2020, 24 July 2022 [online]. Available at www.who.int [Accessed 24 March 2022].
11. Das, R.; Baidya, S. A study on knowledge of pulmonary tuberculosis and DOTS among pulmonary tuberculosis patients in west Tripura district, India. SAARC J Tuberc Lung Dis HIVAIDS. 2015;12:1–7.
12. Paramasivam, S.; Thomas, B.; Chandran, P.; Thayyil, J.; George, B.; Sivakumar, C.P. Diagnostic delay and associated factors among patients with pulmonary tuberculosis in Kerala. J. Fam. Med. Prim. Care 2017, 6, 643–648. [CrossRef] [PubMed].
13. Samal, J. Perception and knowledge of tuberculosis and its services among slum dwellers in Chhattisgarh. Indian J Respir Care. 2017;6:828–31
14. Grace Wambura Mbuthia et al. Knowledge and perceptions of tuberculosis among patients in a pastoralist community in Kenya: a qualitative study. Pan African Medical Journal. 2018;30:287. [doi: 10.11604/pamj.2018.30.287.14836].
15. Godinho de Seixas Maciel, E.M. et al. Social determinants of pulmonary tuberculosis treatment nonadherence in Rio de Janeiro, Brazil. *Plos One Medicine Health*, (2018),10:651. Fulltext. [Online], Available, http://www.biomedcentral.com/1471-2458/10/651. [Downloaded: 05/10/2021 07:50 PM].
16. World Health Organization : Global tuberculoses report **.** Geneva : World Health Organization 2017. Available oline http://apps.who.int/iris/bitstream/handle/10665/259366/9789241565516-eng.pdf?sequence=1 (accessed 02/10/2022).
17. World Health Organisation . The Global tuberculosis report. Geneva: World Health Organization 2020. *Licence: CC BY-NC-SA 3.0 IGO*. Available on: https://apps.who.int/iris/bitstream/handle/10665/336069/9789240013131-eng.pdf[03 November 2022].
18. Harries, A.D. ; Lin, Y. ; Kumar, A.M.V. ; S. Satyanarayana, S. ; Takarinda, K.C. ; Dlodlo,R.A. ; Zachariah, R. ; Olliaro, P.What can National TB Control Programmes in low- and middle-income countries do to end tuberculosis by 2030? F1000 Research, (2018)7,1011. [CrossRef].

19. Padayatchi, N.; Daftary, A.; Naidu, N.; Naidoo, K.; Pai, M. Tuberculosis: treatment failure, or failure to treat? Lessons from India and South Africa. *BMJ Glob Health*, (2019),4(1):e001097.
20. WHO. Global tuberculosis report in Geneva; 2018. World Health Organization. CC BY-NC-SA 3.0 IGO [accessed December 2021].
21. Uebel, K. ; Guise, A. ; D. Georgeu, D. ; Clovin, C. ; Lewin, S. ; 'Integrating HIV care into nurse-led primary health care services in South Africa : A synthesis of three linked qualitative studies', *BMC Health Services Research* 13, (2013a) 171. PMID : , 10.1186/1472-6963-13-171.
22. UNAIDS. Tuberculosis and HIV UNAIDS 2019. Joint United Nations Programme on HIV/AIDS, [accessed online 03/08/2022].
23. Srivastava, K.; Kant, S.; Narain, A.; Bajpai, J. *European Respiratory Journal.* Tuberculosis in women: A reflection of gender inequity, (2018).
24. Kanyerere, H. et al. 'The rise and fall of tuberculosis in Malawi: associations with HIV infection and antiretroviral therapy'**.** *Tropical Medicine and International Health*, Volume 21, Issue 1, p.101-107; (2016).
25. Health System Trust. District Health Barometer 2015/16; Health System Trust: Durban, South Africa, 2017.
26. Mbuthia, G.W.; Olungah, C.O.; Ondicho, T.G. Knowledge and perceptions of tuberculosis among patients in a pastoralist community in Kenya: A qualitative study. Pan Afr. Med. J. 2018, 30, 287.
27. UNAIDS. 'Ending tuberculosis and AIDS 2018: a joint response in the era of the Sustainable Development Goals – country submissions' p.6 [pdf] (accessed August 2022).
28. UNAIDS. 'Press release 2017: UNAIDS warns that countries will miss the 2020 target of reducing HIV-associated TB deaths by 75% unless urgent action is taken' (accessed November 2022).
29. Naidoo, K.; Gengiah, S.; Yende-Zuma,N.; Padayatchi, N.; Barker,P.; Nunn, P.; Subrayen, P.; Abdool Karim, S.S.;.Addressing challenges in scaling up TB and HIV treatment integration in rural primary healthcare clinics in South Africa (SUTHI): a cluster randomized controlled trial protocol. *Implement Sci. Nov*, (2017); 13;12(1):129. doi: 10.1186/s13012-017-0661-1.
30. Manosuthi, W. ; Wiboonchutikul, S. ; Sungkanuparph, S. Integrated therapy for HIV and tuberculosis. *AIDS Res. Ther.,* (2016); 13(1):1–12.
31. Fernandez-Lazaro, C.I.; García-González, J.M.; Adams, D.P.; Fernandez-Lazaro, D.; Mielgo-Ayuso, J.; Caballero-Garcia, A.; Racionero, F.M.; Córdova, A.; Miron-Canelo, J.A. Adherence to treatment and related factors among patients with chronic conditions in primary care: A cross-sectional study. BMC Fam. Pract. 2019, 20, 1–12
32. Owiti, P.; Zachariah,R. ; Bissell, K. ; Kumar, A.M. ; Diero, L.; Carter, E.J. et al. Integrating tuberculoses and HIV services in rural Kenya : uptake and outcomes. *Public Health Action,* (2015) ; 5(1): 36–44. https://doi.org/ 10.5588/pha.14.0092 PMID : 26400600.
33. Obaromi,D.; Ndege, J.; Yongsong, Q.Disease mapping of tuberculosis prevalence in Eastern Cape Province, South Africa. *Journal of Public Health volume*, (2018) ;27 ; pp : 241–248.
34. Hassan, A.O. ; Olukolade, R. ; Ogbuji, Q.C. ; Afolabi, S. ; Okwuonye ; L.C. ; Kusimo, O.C. et al. Knowledge about tuberculosis: A precursor to effective TB control-findings from a follow-up National KAP study on tuberculosis among Nigerians. Tuberc Res Treat 2017. 2017 6309092.
35. World Health Organization: Stop TB Partnership; 2017. Data Action for Tuberculosis Key, Vulnerable and Underserved Populations, Working document.
36. Paramasivam, S.; Thomas, B.; Chandran, P.; Thayyil, J.; George, B.; Sivakumar, C.P. Diagnostic delay and associated factors among patients with pulmonary tuberculosis in Kerala. J. Fam. Med. Prim. Care 2017, 6, 643–648.
37. Sinshaw, Y. ; Alemu, S. ; Fekadu, A. ; Gizachew, M. Successful TB treatment outcome and its associated factors among TB/HIV co-infected patients attending Gondar University Referral Hospital, Northwest Ethiopia : An institution based cross-sectional study. *BMC Infect Dis* , (2017) :1-9.
38. South African National AIDS Council . 'Let our actions count 2017: South Africa's National Strategic Plan on HIV, TB and STIs 2017-2022' [cited 20/07/2022 02:15].
39. Statistics South Africa ; 2012. Census 2011 Statistical release – P0301.4 [accessed 15/11/2021.
40. Ereso BM, Yimer SA, Gradmann C, Sagbakken M (2020) Barriers for tuberculosis case finding in Southwest Ethiopia: A qualitative study. PLoS ONE 15(1): e0226307. https://doi.org/ 10.1371/journal.pone.0226307.
41. Sathar F, Velen K, Peterson M, Charalambous S, Chetty -Makkan CM. "Knock": a qualitative study exploring the experience of household contacts on home visits and their attitude towards people living with TB in South Africa. BMC Public Health. 2020;20(1):1047.
42. Rajalakshmi M, Kalaiselvan G, Sudhakar R, Dhikale PT. An explora - tory mixed method study on the follow up status and quality of life among recurrent tuberculosis patients in South India. Indian J Tuberc. 2020;67(4):515–22.
43. van der Westhuizen H-M, Dorward J, Roberts N, Greenhalgh T, Ehrlich R, Butler CC, et al. (2022) Health worker experiences of implementing TB infection prevention and control: A qualitative evidence synthesis to inform implementation recommendations. PLOS Glob Public Health 2(7): e0000292. https://doi.org/10.1371/journal.pgph.0000292.
44. World Health Organization. 'HIV-Associated Tuberculosis 2018: factsheet' [pdf][accessed 23/08/2022 06:50 PM].
45. World Health Organization. WHO Policy on Collaborative TB/HIV Activities 2015: Guidelines for national programmes and other stakeholders. Geneva: WHO [Accessed 23/ 10/2022 08:20 PM].
46. WHO: Global tuberculosis report. Geneva, Switzerland 2019: World Health Organization. 24 July 2022 [online]. Available at www.who.int [Accessed 20 October 2022].
47. Jannati, A. ; Sadeghi,V. ; Imani, A. ; Saadati, M. Effective coverage as a new approach to health system performance assessment : a scoping review. *BMC Health Serv. Res.* , 2018 ;18(1) :886.