
CHAPTER ONE

Introduction

Introduction

Tuberculosis (TB) is a mycobacterium disease caused by Mycobacterium TB complex. The disease primarily affects lungs and causes pulmonary TB and may affect any organ or tissue. Extra pulmonary TB account for about 30% of all TB cases. ⁽¹⁾

In spite of major advances in diagnosis, treatment and prevention of TB, the disease still constitutes a major health problem throughout the world. About one third of the world's population is infected by Mycobacterium TB, which kills more people than any other single infectious agent. ⁽²⁾

The human immune deficiency virus (HIV) epidemic has the potential to worsen the TB situation, increasing the number of TB cases and accelerating the progression of TB infection to active disease. It is estimated that 50 to 60 % of HIV infected people will develop TB disease in their lifetime when compared to 10% of HIV negative persons infected with TB. ⁽³⁾ World Health Organization (WHO) declared TB a global emergency in 1993. ⁽⁴⁾

Globally In 2010, there were 8.8 million incident cases of TB, 1.1 million deaths from TB among (HIV)-negative people and an additional 0.35 million deaths from HIV-associated TB every year. ⁽⁵⁾ Worldwide every second a person is infected with TB (TB) and every 10 seconds someone dies as a consequence. ⁽⁶⁾

TB is an important health threat in prisons worldwide. ⁽⁷⁻¹¹⁾

On any day worldwide about 10 million people are incarcerated, in prisons, remand centers, police stations, jails, detention centers for asylum seekers, penal colonies, and prisoner of war camps. There is an increasing recognition that the high risk of TB in these settings poses a problem for those imprisoned and for the wider society. The important general measures for TB control in prisons are improvement of prison conditions,

particularly a reduction in overcrowding, improvement of nutrition and hygiene, and guaranteed access to improved prison health services. Knowledge of the epidemiology of TB in prisons, appreciation of what makes control different from control in other settings, and understanding of the principles of TB control are all necessary for governmental and other agencies to contribute to the implementation of effective TB control programme in prisons. ⁽¹²⁾

Despite the fact that the global focus on TB control is on early diagnosis and treatment of people in high TB and TB/HIV-endemic countries, people in prisons are often neglected reservoirs for TB transmission threatening those in the outside community. ⁽¹³⁾

In the literature, TB transmission within the prison system has been well documented. Transmission occurs among prisoners ⁽¹⁴⁻¹⁷⁾ and among professionals working in the prison system. ⁽¹⁸⁾

Longer prison stays are significantly associated with an increased risk for latent and active TB. ^(19, 20)

The level of TB in prisons has been reported to be up to 100 times higher than that of the civilian population. Cases of TB in prisons may account for up to 25% of a country's burden of TB. Late diagnosis, inadequate treatment, overcrowding, poor ventilation and repeated prison transfers encourage the transmission of TB infection. ⁽²¹⁾

Overcrowding and prolonged exposure through long prison sentences (even for seemingly minor offences) promote TB. ^(22, 23) Prisons are a potential "breeding ground" for TB. ⁽²⁴⁾

Correctional facilities have often been cited as reservoirs for TB, presenting a potential threat to the general population. ⁽²⁵⁾ The integration of provincial TB control program with that of jail health services is urgently required. ⁽²⁶⁾

It is considerable importance to implement efficient TB screening on entry. International recommendations agree that the highest priority should be given to detecting TB disease. ^(27, 28)

The Centers for Disease Control and Prevention (CDC) and WHO policy papers for the eradication of TB recommend screening in shelters, prisons, and other congregate-living facilities. ⁽²⁹⁾

TB is a major cause of death in prisons, mainly as a result of overcrowding, poor physical conditions, and lack of adequate treatment. ⁽³⁰⁾

Significant transmission of TB due to undiagnosed index cases may occur in prisons due to high population turnover. ⁽³¹⁾ Much concern has been expressed about the high prevalence of TB in prisons in industrialized countries. ⁽³²⁾

Despite the decline in pulmonary TB in industrial countries, screening remains important, particularly in population groups at special risk such as jail inmates. ⁽³³⁾

The World Health Organization and the International Committee of the Red Cross have joined forces to produce guidelines for the control of TB in prisons and similar institutions in countries with a high prevalence of TB. The internationally recommended strategy for TB control relies on early detection and cure of patients, with a priority for infectious cases. The mobility of prisoners within the system and between prisons and the wider community often makes it difficult for authorities to ensure prisoners with TB complete their treatment. The ministry responsible for health care in prisons is usually not the ministry of health—for example, the ministry of justice or the ministry of interior. These ministries have different priorities and often less experience and less skill in providing health care. The possible consequences of poor TB control are disastrous in a country with poor resources if the prison reservoir of TB leads to an epidemic of multidrug resistant disease in the civilian population. This may already be the case in the republics of the former Soviet Union, which now face difficult choices therefore it is crucial that every agency involved in TB control in prisons must examine the specific features that make control different from that in other settings. Certain features of the prison environment make TB control difficult, but other features may provide an opportunity to implement effective control programmes. For example, the captive audience in prisons should facilitate direct observation of treatment, complete coverage, and health education. A well run prison TB programme may lead to the establishment of an effective national programme, especially in countries where traditional approaches to TB control run counter to the current international recommendations. ⁽¹²⁾

Prisons could be ideal environments for TB control. In planning and implementing effective TB control, prison health services could take advantage of the special features of the prison environment. Having prisoners all in one place should facilitate identification of prisoners with TB, promotion of adherence to treatment, and accurate recording and reporting. Some prisoners have had little access to health care in the community. For these people, a prison with effective health care services could provide an opportunity for access to health care, including TB care. Highlighting the problem of TB in prisons may make prison authorities more aware of the other common health problems in prisons. Mobilization of resources for TB control could pave the way toward better funding of prison health services.

Implementation of DOTS and incorporating the elements of the Stop TB Strategy in prisons could therefore serve as the entry point for improved health services in prisons in general. The opportunity for effective TB control in prisons is also an opportunity to contribute to effective TB control in the wider community. ⁽³⁴⁾

A benefit of effective TB control in prisons is decreased transmission of TB, including drug-resistant tuberculosis, to the wider community. To control TB effectively, DOTS needs to be implemented in prisons.

Experience in a Spanish setting showed that implementation of DOTS led to decreased incidence of TB. To this end, it is crucial to ensure patients' adherence to treatment in prison and after being released from prison. ⁽³⁵⁾

Several factors contribute to delayed TB diagnosis in the prison system. Initial screening specifically targeting TB is rarely applied. Prison health staff members conduct a medical check-up of prisoners upon entry into the prison. Because of a limited number of health staff and an overwhelming

number of prisoners entering concurrently, however, health staff are limited by time; thus, they merely perform a general anamnesis, focusing on current and past history of chronic disease (e.g., hypertension, asthma, diabetes, mental disease) and a rapid physical examination (i.e., vital signs only).^(36, 37)

In the majority of cases, health staff does not ask questions regarding current signs and symptoms of TB. Therefore, infectious patients often go untreated and spend weeks or even months infecting other prisoners in an overcrowded setting before they are detected. The diagnosis and care of TB patients is usually the responsibility of the MoH's NTP, which is not always, or is to varying degrees, linked to prison health services. Not infrequently, diagnoses need to be confirmed by an outside laboratory within the public health or private sector, and treatment can be dispensed (after proper registration) only by the NTP. Communication between these organizations can be difficult, and the transfer of patients, sputum, or medicines from one department to another provides ample opportunity for delays and glitches. Such snags are of particular concern when dealing with HIV-infected individuals, who are frequently sputum-smear negative or have extra pulmonary TB. In such cases, chest radiography or bacteriology examinations, which require referral to a facility outside the prison, are needed.⁽³⁷⁾

In many countries, moving prisoners from one prison to another is common. Prisoners also circulate within prisons because authorities transfer prisoners from one part of the prison to another. Prisoners with undetected TB can thus disseminate the disease to other parts of the prison or even to different prisons. In many countries (often those with high TB burdens), the lack of organization, adequate budgets for prison health, laboratory capacity, trained staff, or a combination of all these

shortcomings result in entry screening being erratic or not being done at all. On weekends, for example, when no trained health care staff are present, screening may not take place and no enforceable system may be set up for having the weekend entries called up for screening later in the week. Since prisoners themselves often do not seek medical help immediately and are thus not detected, they can and do disseminate the disease to fellow prisoners (and staff). ⁽³⁸⁾

TB transmission may be a particular problem among un-sentenced prisoners who are awaiting charge, trial, or sentence, or who are still being investigated and among health care staff and visitors. Facilities in remand prisons and similar holding centers are often poor with limited or non-existent health care services. Overcrowding in such centers tends to be extreme. Delays in the judicial process often prolong what should be a short stay. Since remand prisoners are often not considered part of the prison population, services may not be available to them. For these reasons, prisons often have ideal conditions for TB to disseminate with relative ease within the system and toward the outside through contact with prison staff and visitors. ⁽³⁸⁾

Iraq has been identified as middle TB burden country in the world and ranked 44th according to estimated incidence and 17th of 22 Eastern Mediterranean Region (EMRO) countries according to estimated incidence of all forms of TB cases. Iraq contributes to 3% of the total TB cases in EMRO region and considered among the nine high burden TB countries in the region. ⁽³⁹⁾

WHO Global TB Report, 2011 gives a prevalence of all forms of TB cases in Iraq as 117, incidence 64, notified cases 31, case detection rate (CDR) 48, and mortality rate of 12/100,000 population. ⁽⁴⁰⁾

The prevalence of TB in Iraq, 2011 for age group above 18 years old was 51, and 48 /100,000 for males and females, respectively. ⁽⁴⁰⁾

Diwania and Babil are two of southern Iraqi provinces have 1,200,000 and 1,750,000 inhabitants with one prison, and two prisons, respectively. ⁽⁴¹⁾

This study was conducted in Diwania (Diwania inmate department) and Babil prisons (Babil women light punishments prison) and (Babil men rehabilitation prison).

Objectives:

1. To determine the prevalence of latent and symptomatic TB among the prisoners
2. Identify the potential risk factors of TB in the prisons
3. Assessment of indoor infrastructure environment of the three prisons (entry screening, over crowdedness, ventilation, light exposure and nutritional services)
4. Assessment of public health preventive measures against TB the three prisons.

Comment [Layth1]: How can you identify them, this is a cross-sectional study

CHAPTER TWO

Subjects and Methods

2. Subjects and Method

2.1- Study Design: A cross-sectional study.

2.2-Study population, and study setting:

This is a population study where all prisoners available in Diwania inmate department, Babil women light punishments prison and Babil men rehabilitation prisons were enrolled. All medical and helath personnel working in these prisons were enrolled too. The internal environment of the three prisons was assessed for entry screening, over-crowdedness, ventilation, light exposure and nutritional services. The data collection was done during Aug 1st to Oct 30th, 2012.

2.3- Data Collection.

The data collection was performed at medical ward of each prison. The team responsible for data collection and implementing other investigations was composed of:

1. Two interviewers
2. One health worker implemented the tuberculin skin test (TST)
3. One health worker implemented the chest x-ray (CXR)
4. One health worker collected sputum specimens

A- Data Collection from Prisoners

The questionnaire was developed and tailored by the researcheres after thorough review of literatures and discussion with NTP staff. The questionnair was filled through direct interview with the priosners and the medical staff after ensuring anonymity.

Comment [Layth16]: Revise

In order to facilitate our field work we divided the prisoners according to their detention hall then we preceded data collection and performing the investigations.

2.4-The questionnaire for prisoners:

(Appendix1)

It includes:

- 1- A signed consent paper for agreement to participate in study.
- 2- Socio-demographic data: age, gender, place, immigration, marital status, education, , employment, monthly income and the period spent in prison.
- 3- Smoking habit.
- 4- Clinical history
- 5- Clinical examination
- 6- TST result
- 7- CXR result
- 8- Sputum examination result
- 9- Final classiifcation

Comment [Layth17]: Revise; not clear

B- Data Collection from Medical Staff

A questionnaire for data collection from medical staff in the prison
(Appendix 2) includes:

- 1- Demographic data: age, gender, place.
- 2- Attendance any training regarding TB prevention
- 3- Their knowledge of symptoms of suspected TB cases
- 4- Their practice regarding dealing with suspected case of TB
- 5- Their attitude regarding TB stigma

C- Data collection on indoor environment

A check list was developed to assess the infrastructure of the prison concerning TB related variables. The check list was filled through observation of the investigator.

Comment [Layth18]: spelling

2.5-Indoor assessment form (Appendix 3)

It includes:

1. Prisoners entry screening
2. Presence of isolation room
3. Total capacity of prison
4. Present capacity of prison
5. Occupancy rate
6. Total halls area
7. Number of halls
8. Average hall area
9. Ventilation status
10. Sun light exposure status
11. Food availability and provision

2.6-Performing clinical examination, TST, CXR and sputum microscopy

Following completion of data collection and filling the questionnaire, the prisoners had the following:

Comment [Layth19]: spelling

Comment [Layth20]: spelling

Comment [Layth21]: spelling

1- Clinical examination with concentraion on the chest and TB relevant findings, conducted by a specialized physician from the TB and chest diseases clinic in Diwaniya.

Comment [Layth22]: please add an annex (appendix) Describing TST and its procedure

2- TST (purified protein derivatives) administered by manatoux method intra-dermally by a trained health worker under aseptic technique and read after 48-72 hours later. The tuberculin stored in special call box at 2-8 C⁰ and read by special plastic millimeter ruled ruler.

Comment [Layth23]: Spelling

3- Anteto-posterior view chest x-ray by portable high speed machine done by a trained radiographer and read later by a specialized physician from the TB and chest diseases clinic in Diwaniya.

Comment [Layth24]: Spelling

4- Any prisoner suffering productive cough of two weeks duration and more they submitted to sputum microscopy for AFB. The sputum samples were transported by to TB clinic for sputum microscopy for AFB. Sputum cups labeled with the suspect's name, cell number, and date of sputum specimen collection. A sputum smear examination request form was filled for the laboratory with above information on the suspect. Samples, with the corresponding laboratory request form, were transported on the same day to the TB clinic laboratory for processing.

Comment [Layth25]: spelling

2.7-Performing Indoor Environment Assessment

Comment [Layth26]: interviewers ? I think you mean investigators

This task was done by two interviewers through direct assessment of indoor environment including as mentioned eralier the total capacity and occupancy rate, floor space, ventilation level, sunlight exposure and nutritional services.

Comment [Layth27]: is this done directly or via asking prison employees

Comment [Layth28]: You did not explain how, is this by comparing to standards??

2.8-Operational Definition

A-Final Diagnosis

Comment [Layth29]: Omit and put a reference

The following operational definitions were adopted based on Iraqi guidelines of tuberculosis management and Macleods Clinical Examination 12th Edition by Graham Douglas:

1-Normal Chest Examination: There is normal vesicular breathing, no bronchial breathing and no added sound (wheeze, ronchi and crepitation).

2-Abnormal Chest Examination: Bronchial breathing or presence of added sounds

3-Normal CXR: Clear lung fields and no abnormality detected.

4-Abnormal CXR: Any lung abnormality detected on interpretation by the medical officer (opacities, cavitation, fibrosis, pleural effusion, calcification, any unexplained or suspicious shadow, etc.).

5-latent TB Infection (LTBI): Any case with 10 mm or more induration of tuberculin skin test.

6-Sputum Smear Positive (SSP) TB case: Any case with at least two sputum positive test in sputum microscopy for AFB with radiological chest x-ray abnormalities consistent with TB.

OR: Any case with positive test for AFB with positive culture

7-Sputum Smear Negative (SSN) TB Case: The following diagnostic criteria for smear-negative pulmonary TB are recommended:

. At least three sputum specimens negative for AFB;

And: Radiographic abnormalities consistent with active pulmonary tuberculosis;

And: No response to a course of broad-spectrum antibiotics;

And: A decision made by a clinician to treat with a full course of anti-tuberculosis chemotherapy.

8-Extra-Pulmonary TB: Any case with lesion in the body rather than lungs and showed positive culture test.

B-Infrastructure Assessment

Regarding the infrastructure assessment we used The United Nations Standard Minimum Rules for the Treatment of Prisoners and International Committee of Red Crescent:

Comment [Layth30]: Please insert a reference

1-Total Capacity and Occupancy Rate: The total capacity of a prison is the total number of prisoners that it can accommodate while respecting minimum requirements, specified beforehand, in terms of floor space per prisoner.

The occupancy rate, also known as the population density in the prison, is determined by calculating the ratio of the number of prisoners present at date “T” to the number of places specified by the prison’s official capacity.

Occupancy rate = Number of detainees present at date “T”/ Number of detainees specified by the official capacity x 100

When the ratio obtained exceeds 100 (100 prisoners per 100 places), the situation is one of over-population or “over occupancy”. Conversely, if the figure is lower than 100, the prison is “under-occupied”

2-Floor Space: The floor space in cells and dormitories must never be less than 2m² per prisoner.

3-Ventilation Level: The way of calculating ventilation in places of prisons is to determine the ratio of the size of windows or other openings to the area of the floor.

To renew the air in a satisfactory manner, the following requirements must be fulfilled:

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- The size of the openings must be no less than one tenth of the floor area;

And: Available air space must be no less than 3.5 m³ per person.

The following categorization to assess the ventilation status of prisons:

Satisfactory ventilation level: if prison has two above requirements.

Unsatisfactory ventilation level: if prison hasn't two above requirements.

4: Sun light Exposure: For good light exposure the windows should be large enough to enable the prisoners to read or work by natural light, and should be so constructed that they can allow the entrance of fresh air whether or not there is artificial ventilation.

The following categorization system to assess the sunlight exposure status of prisons was depended:

Good: if prison has above requirement.

Poor: if prison hasn't above requirement.

5- Nutritional Services of Prisons:

For good nutritional services of prisons the following three requirements must be fulfilled:

(a) Prisons' authorities should provide each prisoner an adequate amount of nutritious, healthful, and palatable food, including at least one hot meal daily. Food should be prepared, maintained, and served at the appropriate temperatures and under sanitary conditions.

(b) Prisons' authorities should make appropriate accommodations for prisoners with special dietary needs for reasons of health or age.

(c) Prisons' authorities should not withhold food or water from any prisoner. The standard menu should not be varied for any prisoner without the prisoner's consent, except that alternative food should be permitted for

a limited period for a prisoner in segregated housing who has used food or food service equipment in a manner that is hazardous to the prisoner or others, provided that the food supplied is healthful, palatable, and meets basic nutritional requirements.

The following categorizations system to assess the nutritional services of prisons:

Good: if prison has all three above requirements.

Poor: if prison hasn't all three above requirements.

2.9 Quality Assurance

Quality assurance of the survey was done to detect operational or systematic errors and to improve compliance with the survey procedures.

Quality assurance procedures covered prisoners' intake, collection of clinical information and laboratory procedures. Predetermined audit criteria were set whereby quality assurance was achieved. These included the following:

- Questionnaires were to be completed for all patients participating in the study.
- At least 90% of questionnaires were containing valid information. This was controlled by weekly questionnaire audits to ensure that information was collected correctly.
- The reliability of information collected by the questionnaire was to be assessed by re-interview of a 50% sample of patients in each prison.
- Bacteriological results were to be available for all specimens received, irrespective of the result.

2.10-Ethical Clearance

The official agreement from the Research Ethical Committee in Diwania health directorate for performing the research was obtained besides a signed and verbal consents were taken from prisoners and medical staff. Confidentiality and privacy are considered and the prisoners were given the right to participate, or not in the study without any reward or, otherwise, penalties.

Comment [Layth31]: This is not a pilot study but a pretesting of questionnaire and methods of data collection

2.11 - Pilot Study:

A pilot study was conducted to estimate the time needed to fill the questionnaire and perform the clinical examination and investigations. It helped in amending the questionnaire and find out if there is any difficult or unclear questions in the questionnaire. The pilot study was carried out during Sept, 12-14, 2012 in Diwania prison on a random sample of 10 prisoners from Diwania prison. Results were used to make some minor modifications in the questionnaire.

2.12- Statistical Analysis.

Statistical Package for Social Sciences (SPSS) version 18 was used for data entry and analysis. Chi square and Fisher's exact probability tests used to test association between qualitative variables. In places where Chi square test was not applicable, tables were condensed for the sake of statistical analysis. Level of significance was set at $P \text{ value} \leq 0.05$.

CHAPTER THREE

Results

Results

A total of (955) prisoners were eligible during study period . The response rate was 85% (N=811) and the 15% of the prisoners refused to participate in this study.

Socio-Demographic Data of Prisoners.

The mean age of prisoners was 34.1years and 11.2 standard deviation .

The majority were male 573 (70)%, 745 (92%) were in urban area ,792(98%) non immigrants.

Out of 811 prisoners there were 462 smokers (57%) with daily average cigarette intake 32 cigarettes. Smoking rate among male and female was 70% and 28% respectively. (Table1)

Of 811 prisoners there were 678 (84%) non complaining from any systemic diseases. (Table1)

Clinical and Radiological Findings of the Prisoners.

The majority of them 652(80%) were normal, 115(14%) were having cough of more than 2 weeks duration, 69(8.5%) having productive cough ,70 (9%) have abnormalities in chest examination and 61(7.5%) have abnormalities in their chest x-ray Table (2).

According to presence of TB disease and LTBI there were There were 718 (88.4 %) of the prisoners classified as normal , 87 (11%) have LTBI, ,4 (0.4%) SSN and 2 (0.2%) SSP. Table (3).

The Prevalence and Characteristics of Prisoners with LTBI.

Of the 811 prisoners there were 87(11%) (95% CI 9.9-10.2) have LTBI and the majority 64(74%) were male ,74(85%) less than 45 years old ,51(59%) smokers and 36(41%) spent more than 12 months in prisons.

Table (4)

LTBI Prevalence Rate in Each Prison.

Regarding the prevalence rate of LTBI in each prison there were 34/220 , 23/ 242 and 30 /349 that is corresponding to (154, 85 and 95) /1000 among prisoners of Diwania inmates department, Babil women light punishments prison and Babil men rehabilitation prison respectively.

Figure (1).

The Prevalence and Characteristics of Prisoners with TB .

The prevalence of TB was 6 (0.7%)(95% CI 1.3—1.4) cases and majority of prisoners with TB were male , less than 45 years old , illiterate , smokers , spent more than 12 months in prison.

All TB cases are managed according to Iraqi guidelines of TB management .**Table (5).**

TB Prevalence Rate in Each Prison.

Regarding the prevalence rate of TB in each prison there were 2/220, 1/242 and 3/349 that is corresponding to (9, 4 and 8.5) / 1000 among prisoners of Diwania inmates department, Babil women light punishments prison and Babil men rehabilitation prison respectively. **Figure (2).**

Comment [Layth37]: Are they paramedic? Medical staff or nursing staff. Up to my knowledge there is no degree is given as a paramedic in Iraq.

Comment [Layth38]: Are they physicians?

Comment [Layth39]: Which staff? Do you mean staff of the health facility inside the prison?

Knowledge, Attitude, and Practice of Prison Paramedical staff.

Out of 83 medical staff there were 64 (77%) males , 76(91.5%) were attained courses on TB control and prevention.

According to the knowledge of staff about symptoms of suspected TB cases, 74(97%) , 3(43%) have correct information about symptoms of TB suspect among of trained paramedical staff and non trained paramedical staff respectively . **Table (6)**

According to the attitude of staff regarding TB stigma, there were 74(97%) , 5(71%) have correct attitude among trained and non trained staff respectively. **Table (6)**

According to the practice of staff regarding dealing with any suspected case of TB, 72(94%) ,6(86%) have correct information about dealing with TB suspected case among of trained paramedical staff and non trained paramedical staff respectively . **Table (6)**

Indoor Environment Assessment.

All studied prisons there were no isolation room for infectious cases, unsatisfactory ventilation, poor sunlight exposure and poor nutritional services. **Table (7)**

Regarding screening of prisoners (at entry or every three months) , all studied prisons have only quarterly screening done by respiratory and chest clinic **Table (8)**

All prisons were overcrowded beyond their original capacities. **Figure (3)** Regarding distribution of prisons according to total surface area of halls in square meter and occupancy rate , the total surface area were 308,704m² and 1056 m² while the occupancy rates were 78,65 and 77 in Diwania

inmates foundation , Babil women light punishments prison and Babil men rehabilitation prison respectively. **Figure(4).**

According to floor space in square meter per one prisoner , the floor spaces were 1.20,2.29 and 2.69 in Diwania inmates foundation , Babil women light punishments prison and Babil men rehabilitation prison respectively as showed in **Figure (5).**

Table (1): Characteristics of prisoners according to socio-demographic and diseased status ;Diwania and Babil prisons -2012.
(N=811 prisoners)

Variables		No.	%
Gender	Male	573	70.7%
	Female	238	29.3%
Age (years)	Less than 45	653	80.5%
	45 and more	158	19.5%
Residency	Urban	745	91.8%
	rural	66	8.2%
Immigration status	Immigrant	19	2.3%
	Non immigrant	792	97.7%
smoking	Yes	462	57%
	No	349	43%
Suffering from other Diseases	Yes	133	16.4%
	No	678	83.6%

Table (2) Characteristics of prisoners according to clinical and radiological findings for chest ;Diwania and Babil prisons -2012.

Characteristic	Number	%
Cough of ≥ 2 weeks	115	14%
Productive cough	69	8.5%
Abnormal findings during chest examination	70	9%
Abnormal findings during CXR	61	7.5%

Table (3) Distribution of prisoners according to TB , LTBI and not infected ; Diwania and Babil prisons -2012.

Final diagnosis	Number	%
Not infected	718	88.4%
LTBI	87	11%
Sputum smear negative SSN	4	0.4%
Sputum smear positive SSP	2	0.2%

**Table (4) Characteristics of prisoners with and without LTBI ;
including those with TB disease Diwania and Babil prisons -2012.**

Variables		LTBI		Statistics	
		Yes	No	Chi square	P Value
Gender	Male	64(73.6%)	509 (70.3%)	0.3	0.5
	Female	23(26.4%)	215 (29.7%)		
Age	Less than 45	74(85.1%)	579(80%)	1.2	0.1
	45 and more	13 (14.9%)	145 (20%)		
Smoking	Yes	51(58.6%)	411(56.8%)	0.1	0.7
	No	36(41.4%)	311(43.2%)		
Educational status	Illiterate	7(8%)	142(19.6%)	11	0.02
	Read and write	17(19.5%)	99(13.7%)		
	Primary	41.1(47%)	277(38.3%)		
	Secondary	12(13.8%)	143(19.8%)		
	Higher	10(11.5%)	63(8.7%)		
Monthly income	Less than 250,000	12(13.8%)	107(14.8%)	1.7	0.7
	From 250,000- <500,000	36(41.4%)	281(38.8%)		
	From 500,000- <750,000	18(20.7%)	161(22.2%)		
	From 750,000- <1000,000	14(16.1%)	92(12.7%)		
	More than 1000,000	7(8%)	83(11.5%)		

Variables		LTBI		Statistics	
		Yes	Yes	Chi square	P Value
Time spent in prison	Less than 12 months	51(58.6%)	424(58.6%)	0.00	0.96
	More than 12 months	36(41.4%)	300(41.4%)		
Suffering from systemic diseases	Yes	12 (13.8%)	121(16.7%)	0.48	0.48
	No	75(86.2%)	603(83.3%)		
Marital status	Married	74(85.1%)	595(82.2%)	0.8	0.8
	Unmarried	11(13.3%)	97(13.4%)		
	Divorced	2(2.7%)	20(2.8%)		
	Widowed	0(0.0%)	12(1.7%)		
Employment	Unskilled	16(18.4%)	161(22.2%)	4.7	0.6
	Solider	3(3.4%)	22(3%)		
	Policeman	12(13.8%)	63(8.7%)		
	Skilled	20(23%)	164(22.7%)		
	Employer	10(11.5%)	90(12.4%)		
	Non-worker	2(2.3%)	26(3.6%)		
	Housewife	22(25.3%)	191(26.4%)		
	Student	2(2.3%)	7(1%)		

Comment [Layth40]: I think you mean soldier??

Table (5) Characteristics of prisoners with and without TB including those with LTBI ;Diwania and Babil prisons -2012.

		Pulmonary TB		Statistics	
variables		Yes	No	Fisher Exact	P value
Gender	Male	4(66.7%)	569(70%)	0.4	0.5
	Female	2(33.3%)	236(30%)		
Age	Less than 45	4(66.7%)	649(80.6%)	0.6	0.3
	45 and more	2(33.3%)	156(19.4%)		
Smoking	Yes	5(83.3%)	457(56.8%)	1.9	0.2
	No	1(16.7%)	348(43.2.4%)		
Educational status	Illiterate	4(66.7%)	145(18%)	10.1	0.006
	Read and write	2(33.3)	114(14.2%)		
	Primary	0(0%)	318(39.5%)		
	Secondary	0(0%)	155(19.3%0		
	Higher	0(0%)	73(9.1%)		
Monthly income	Less than 250,000	2(33.3%)	117(14.5%)	3.6	0.3
	From 250,000-<500,000	3(50%)	314(39%)		
	From 500,000-<750,000	0(0%)	179(22.2%)		
	From 750,000-<1000,000	0(0%)	106(13.2%)		
	More than 1000,000	1(16.7%)	89(11.1%)		
	Others				

		Pulmonary TB		Statistics	
variables		Yes	No	Fisher Exact	P value
Time spent in prison	Less than 12 months	1(16.7%)	474(58.9%)	4.5	0.04
	More than 12 months	5(83.3%)	331(41.1%)		
Suffering from diseases	Yes	3(50%)	130(16.1%)	3.6	0.05
	No	3(50%)	675(83.9%)		
Marital status	Married	6(100%)	663(82.4%)	1.4	1
	Unmarried	0(0%)	108(13.4%)		
	Divorced	0(0%)	22(2.7%)		
	Widow	0(0%)	12(1.5%)		
Employment	Unskilled	3(50%)	153(19%)	5.6	0.71
	Solider	0(0%)	46(5.7%)		
	Policeman	1(16.7%)	74(9.2%)		
	Skilled	1(16.7%)	183(22.7%)		
	Employer	0(0%)	100(12.4%)		
	Non worker	0 (0%)	28(3.5%)		
	Housewife	1(16.7%)	212(26.3%)		
	Student	0 (0%)	9(1.1%)		

Comment [Layth41]: soldier

Table (6) knowledge , attitude and practice of medical staff according to their training on control of TB, Diwania and Babil prisons -2012.

	Trained		Statistics	
	Yes	No	Fisher Exact	P value
Question type				
Information about their knowledge regarding symptoms of suspected TB cases.	Correct 74 (97%) Incorrect 2 (3%)	Correct 3 (43%) Incorrect 4 (57%)	0.00	0.00
Information about their dealing with any suspected case of TB	Correct 72 (94%) Incorrect 4 (6%)	Correct 6 (86%) Incorrect 1 (14%)	0.30	0.33
Information about their attitude regarding TB	Correct 74 (97%) Incorrect 2 (3%)	Correct 5 (71%) Incorrect 2 (29%)	0.00	0.03

Comment [Layth42]: Below, are not questions

Comment [Layth43]: Omit and put correct

Comment [Layth44]: I think you mean knowledge how to deal with.....

Comment [Layth45]: revise

Table (7) Distribution of prisons according to indoor environmental assessment ; Diwania and Babil prisons -2012.

Prison	Presence of isolation room	Ventilation status	Light exposure status	Nutritional status
Diwania inmates department	No	Unsatisfactory	Poor	Poor
Babil women light punishments prison	No	Unsatisfactory	Poor	Poor
Babil men rehabilitation prison	No	Unsatisfactory	Poor	poor

Table (8) Distribution of prisons according to screening of prisoners ; Diwania and Babil prisons -2012.

Prison	Entry screening	Quarterly screening
Diwania inmates department	No	Yes
Babil women light punishments prison	No	Yes
Babil men rehabilitation prison	No	Yes

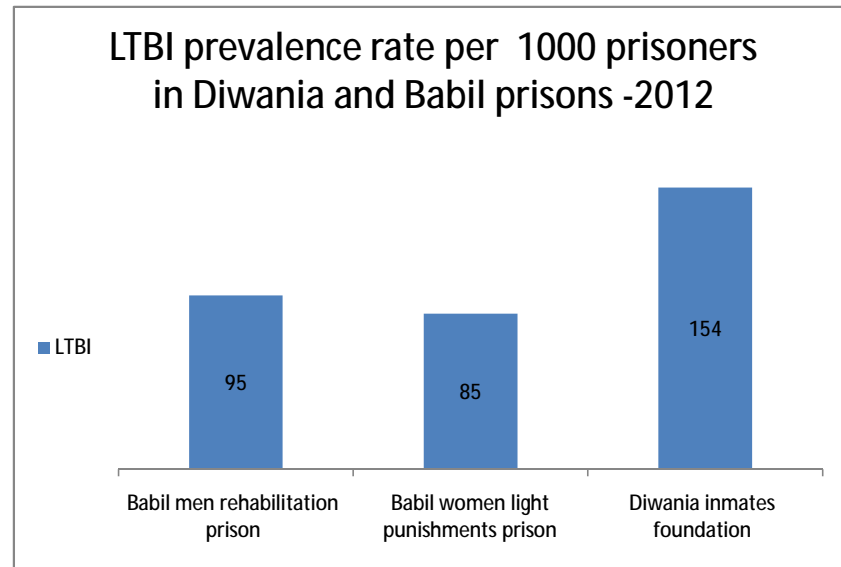


Figure (1) LTBI prevalence rate per 1000 prisoners ; Diwania and Babil prisons-2012.

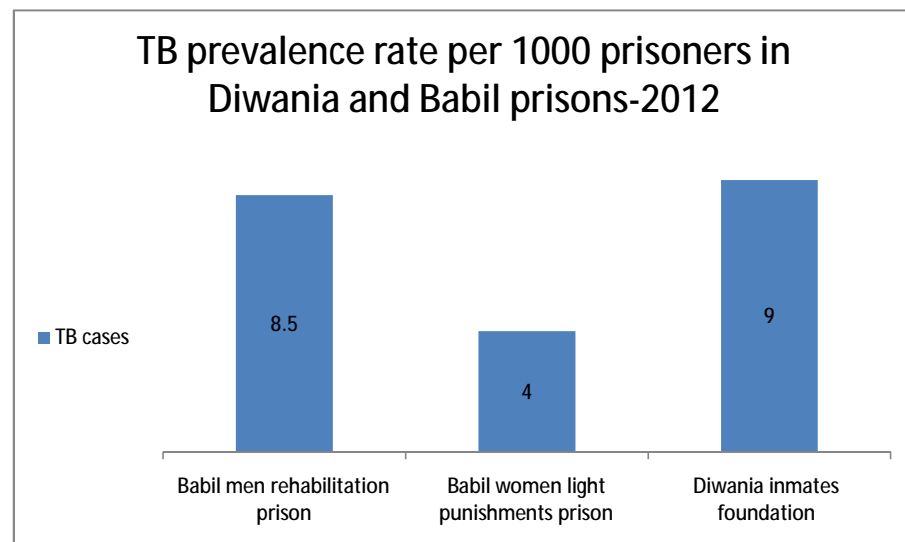
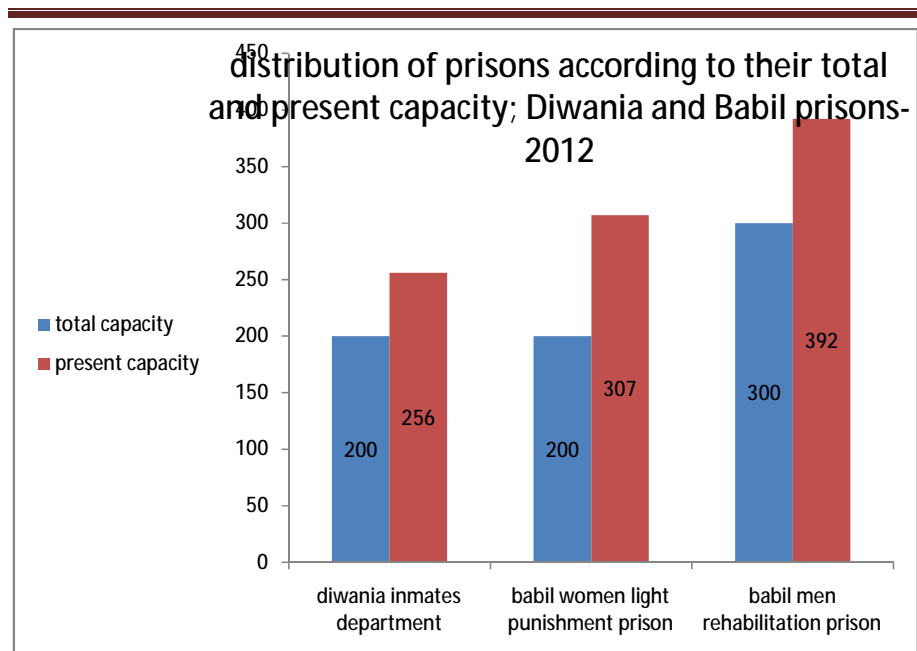


Figure (2) TB prevalence rate per 1000 prisoners in Diwania and Babil prisons-2012



Comment [Layth46]: I think you mean maximum or actual capacity

Figure (3) Distribution of prisons according to their total and present capacity; Diwania and Babil prisons -2012.

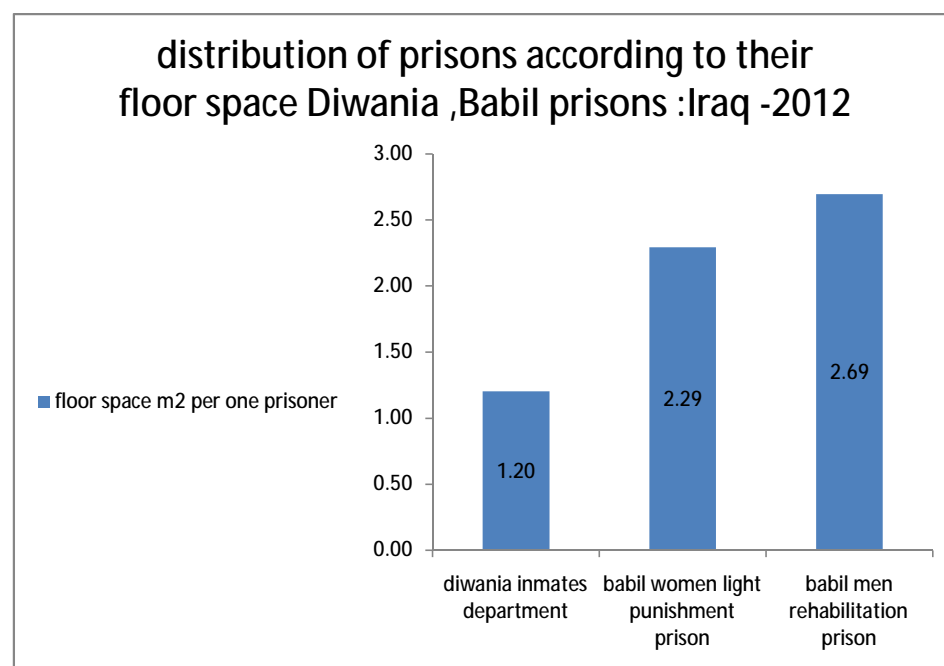


Figure (4) Distribution of prisons according to their floor space in m2 per one prisoner; Diwania and Babil prisons -2012

CHAPTER FOUR

DISCUSSION

Response rate and population size.

Most of the prisoners participated in the current study with a response rate (85%) this reflects their interest towards one of the important health problems facing them.

The mean age of TB complaining prisoners was 37.6 years, the most productive age in the country thus causing enormous social and economic disruption and this similar to findings on study by (Nirman, Bhavan 2005)⁽³⁾ this can be attributed to predominant age groups that usually being incarcerated.

Regarding the total population size and total incidence of TB, our study similar to findings on study conducted by Rieder HL, 2011⁽⁴²⁾ who conducted their study in RS which is the most southern Brazilian state has total population 1,400,000 inhabitants and TB incidence 47/100,000.

LTBI prevalence rate.

In our study the prevalence on LTBI among prisoners was low (11%) in comparison with many studies that showed high prevalence of LTBI among prisoners (46.9%) at entry to this Swiss remand prison (C. Ritter)⁽⁴³⁾, 13% in New South Wales, Australia (Levy M H 2007)⁽⁴⁴⁾ (Butler T 1999)⁽⁴⁵⁾, 18% in Italy (Carbonara S 2005)⁽⁴⁶⁾ 4.6–32.8% in the United States (Lobato M N)⁽⁴⁷⁾ 21.48% in Pakistan (Hussain H 2003)⁽⁴⁸⁾ and 55.5% in Spain. (Martín Sánchez 1995).⁽⁴⁹⁾ and this mainly due to small sample size.

LTBI was associated with low educational status and this goes with Pakistan study conducted by (Hussain H 2003)⁽⁴⁸⁾ and (Carbonara S 2005)⁽⁴⁶⁾ findings conducted in Italy and this may belong to more health care habit in educated people than non-educated.

LTBI was also associated with gender of prisoners (male 11% ,Female 9.5%) and this go with study findings of (Butler T Butler T 1999)⁽⁴⁵⁾ conducted among prison inmates—New South Wales.

TB prevalence rate.

Regarding the prevalence of active TB cases among prisoners in our study was 740 per 100,000 and it is consist with many studies findings, (F. Chaves 1997 in Spain 2283)⁽¹⁴⁾ ,(R. Coninx 1995 in Azerbaijan 4667)⁽⁵⁰⁾ ,(P. Bollini 1997 in Moldova 2640)⁽⁵¹⁾ ,(D. F. Wares 1997 in Russia 7000)⁽⁵²⁾ ,(S. Nateniyom 2004 in Thailand 1226)⁽⁵³⁾ ,(B. Karibushi 1999 in Rwanda 3363)⁽⁵⁴⁾ ,(A. Sanchez et al 2005 in Brazil 1439)⁽⁵⁵⁾ ,(A. Aerts 2000 in Georgia 5995)⁽⁵⁶⁾ ,(D. S. Nyangulu 1997 in Malawi 5124)⁽⁵⁷⁾ , and (R. J. Coker 2003 in Russian federation 9930).⁽⁵⁸⁾

On other hand lower prevalences were reported from prisons of some United states (156) ,(S. E. Valway 1994)⁽¹³⁾ and European countries France(41) (A. Aerts 2006)⁽⁵⁹⁾ , The relatively lower prevalence in these countries could be due to a good TB control strategy and low TB incidence in the general population as well as in the prisons.

There was association between active TB and time spent in prison and this go with findings of study conducted by (Aerts 2000 in Georgia)⁽⁵⁶⁾ and this can explained by more time spent in prison mean more chance for getting infection.

Basically, there are three reasons for the higher prevalence rates of TB universally observed in prisons. First, prisoners are at a higher risk of being infected with TB than is the general population. They are predominantly young male adults who come from less privileged social classes and have a low educational level. Second, prisoners have a higher

rate of risk factors or a lifestyle that predisposes them to developing active TB, once infected. Finally, the conditions of the prison environment, such as overpopulation, inadequate ventilation, poor hygienic and nutritional conditions, as well as limited access to health care facilities, can facilitate the dissemination of TB (WHO 1998)⁽⁶⁰⁾, (Aerts A 2000)⁽⁵⁶⁾ and (Hutton MD 1993).⁽⁶¹⁾

Indoor infrastructure assessment

On analysis of infrastructures of prisons all it were overloaded and there is small area distance and this not consist with guidelines for control of TB.⁽⁶²⁾⁽⁶³⁾

Regarding the indoor ventilation and sunlight exposure, our findings not go with study finding of Assessment of health services to prisoners in (Andorra)⁽⁶⁴⁾ because that The Andorran Ministry of Justice and the Interior , under whose jurisdiction prison health is regulated, has expressed its commitment to advancing the health systems as well as service and program delivery throughout the prisons system.

In all three prisons there was no a well identified isolation room for any confirmed TB cases and this not go with principals of control of TB. ('Guidelines for the control of tuberculosis')⁽⁶²⁾, ('Guidelines for the control of tuberculosis in prisons').⁽⁶³⁾

In our study it was not possible to conduct the questionnaire interviews in strict privacy due to security reasons, and self-reported data, especially to sensitive questions (e.g. monthly income) may entail some response bias. As the study design was cross-sectional, and thus limited to estimating prevalence of infection; incidence, and risk factors associated with LTBI and TB disease in prisons warrant further evaluation using a prospective

study design and this agree with findings of Hussain H⁽⁴⁸⁾ study which was conducted in North West Frontier Province, Pakistan.

Even the check for the bedding and bunk beds very important in assessment of infrastructures environment of prisons as motioned by (Pier Giorgio)⁽⁶⁵⁾ , in our study there were some obstacles to assess these services due to prisons rules.

Our study reveal that all studied prisons were overcrowded and this go with findings of (H.Reyes.2007)⁽³⁸⁾. Many prisons all over the world are overcrowded well beyond their official capacities. Overcrowded prisons facilitate the spread of TB because prisoners are in close contact with one another, often for 12 hours or more a day without access to the outside. Rates of overcrowding vary from system to system. In some countries, prisoners' living spaces in the cells are less than 1 square meter per person, their bunks are stacked three tiers high, or they must sleep in turns; however, they may have access to the outside for most of the daytime period. Elsewhere, there may be somewhat more space per person, yet the prisoners are locked inside their cells for much longer periods, thereby spending less time outside. Overcrowding, poor ventilation due to inadequate infrastructure (lack of windows) or covering of windows by prisoners (to block cold air from entering the room in cold climates or by hanging of clothes on bars), and prolonged confinement inside cells are all factors conducive of transmission of airborne diseases. Furthermore, many prisoners are heavy smokers, adding to the unhealthy atmosphere in overcrowded cells, and standards of hygiene are often poor.

Screening of prisoners.

Our study revealed there is no entry screening in all three studied prisons and this disagree with findings of (M. A. Lawal 2009)⁽⁶⁶⁾ study conducted in a Nigerian medium security prison and (P. Yanjindulam 2001)⁽⁶⁷⁾ where prisoners undergo TB screening twice, once when they are detained and again when they are allocated to a prison facility after conviction and this difference due to support from the Global Fund to Fight AIDS, Tuberculosis and Malaria (the Global Fund) has made it possible to ensure that all new prisoners are screened for TB.

Entry screening in prisons is aimed at detecting undiagnosed active TB, so patients can initiate therapy and transmission can be interrupted inside the prison. Entry screening also is aimed at identifying patients who were receiving TB therapy before imprisonment to ensure that they complete their treatment. Overall, the purpose is to detect and decrease the prevalence of active TB. (D. L. Saunders)⁽⁶⁸⁾, (M. C. Layton)⁽⁶⁹⁾, (C. C. Leung)⁽⁷⁰⁾ and (M. Puisis).⁽⁷¹⁾

Our findings revealed that symptoms based screening is a simple, rapid, and cheap tool for identifying those prisoners who require a full work-up for TB and it can be completed even by nonmedical staff in prisons and this agree with findings of (D. L. Saunders)⁽⁶⁸⁾, (M. C. Layton)⁽⁶⁹⁾, (C. C. Leung)⁽⁷⁰⁾ and (M. Puisis).⁽⁷¹⁾

In the present study, one symptom was identified as being associated with the presence of active TB, cough of more than 2 weeks duration and this go with those reported in studies Aerts A 2000⁽⁵⁶⁾ and F. Chaves 1997⁽¹⁴⁾

Considering the diagnostic actions of TB in prisons, the study suggests improvements in the actions of the search for respiratory symptoms that make the early diagnosis of TB in prisons possible, especially regarding their continuity, in addition to improving the quality of the healthcare in prisons and the articulation with other services and this agree with Oliveira HB 2004 ⁽⁷²⁾, Abrahão RM 2006 ⁽⁷³⁾, Niero R.19861986⁽⁷⁴⁾, A Sanchez 2005⁽⁵⁵⁾ and A Sanchez 2006⁽⁷⁵⁾.

Findings from this study suggest that the ISTC standard, a single question about cough _2 weeks, might be used to screen prisoners and identify those needing further evaluation and this go with study finding conducted by (S. X. Jittimane 2007).⁽⁷⁶⁾

Considering Screening all prisoners at entry with chest radiography ,in our findings there is no such screening even it is beneficial for identifying undiagnosed active TB as concluded by (D. L. Saunders 2001) ⁽⁶⁸⁾ and this due to that this strategy adapted only in industrial countries.

Studies show its utility in finding prisoners who would have been missed by symptom screening alone. Prisoners with abnormal chest radiography are then followed up with sputum examination. The strategy has also been demonstrated to reduce delays in the diagnosis of TB, reducing the time of exposure to other prisoners.(T. Jones2001). ⁽⁷⁷⁾

In addition, it is a cost-effective measure for case detection.(S. Den Boon 2006).⁽⁷⁸⁾

Unfortunately, in resource-limited settings, chest radiography screening is not readily available because of cost and logistical barriers. Implementing it requires equipment and a continuous supply of reagents and maintenance. Trained and experienced personnel have to read the films.

Prisoners in facilities without radiography machines have to be transported outside the prison, which is complicated by legal and security issues. Despite implementation constraints (i.e., cost and logistics), the high sensitivity of screening through chest radiography compared to symptom-based assessment cannot be ignored. (WHO). 2008 ⁽⁷⁹⁾ As an entry screening strategy in prisons, chest radiography should not replace symptom assessment to identify persons who should undergo further evaluation for active disease; however, it can be used together with a symptom questionnaire. (S. Den Boon 2006).⁽⁷⁸⁾

In our studied prisoners we use TST to identified the LTBI and we used cut-off points (10 mm) considered to reduce overestimation of infection (positivity) and this agree with (Macintyre R 1997) ⁽⁸⁰⁾ study which conducted in Maryland prisons and (C. Ritter 2012) ⁽⁴³⁾ study which conducted in Swiss remand prison.

The TST is recommended by WHO as the standard technique for mass screening of latent MTB infection. The major advantage of the test is that it can identify latent MTB infection before it develops to the disease stage; additionally, it is relatively inexpensive to perform. While a multitude of TST exist, the Mantoux test is the most quantifiable, and allows the determination of sensitivity and specificity at different cut-off points. As we observed a discrepancy between positive TST results and origin from a country with routine BCG vaccination so we not take in our consideration the BCG vaccination status of prisoners therefore ,a high percentage of positive TST results in the current study could not be explained by BCG vaccination and this similar to what was concluded by (C. Ritter2012)⁽⁴³⁾ in study of prevalence of positive tuberculosis skin tests during 5 years of screening in a Swiss remand prison.

Regarding use of TST, even the measurement of gamma interferon (IFN-gamma) released from PPD-stimulated blood lymphocytes is a specific, sensitive and rapid method of detecting Mycobacterium tuberculosis infection (- Streeton JA1998)⁽⁸¹⁾, we used TST test due to availability and cost effectiveness .

Passive case finding must be complemented with active case finding or screening. Selection of diagnostic methods and the combination of passive and active finding, including frequency of active case finding, largely depend on the prevalence of TB, in the community and the prison setting and on the availability of resources.

Totally effective screening for TB in prisons is confounded by the lack of a completely sensitive and specific screening method. The WHO recommends screening by review of TB symptoms for all prisoners together with the strategic use of TST and chest radiographs. Despite its lack of sensitivity, TB symptoms screening is rapid and inexpensive and it is essential for identification and early treatment of TB cases among prisoners.⁽²⁰⁾

The use of targeted versus universal chest radiographic screening for TB however should depend on a variety of factors such as the incidence of TB disease, prevalence of LTBI, suspected frequency among prisoners, infection control consideration and cost effectiveness.⁽²⁰⁾

The importance of active case finding in prisons, including rigorous entry screening, has been emphasized previously in the literature, and it has become an important component of TB control in prisons in many

countries.^(25,82,83) Nevertheless, entry screening with sensitive diagnostic methods has yet to be systematically implemented in many developing countries.⁽⁸⁴⁾

Regarding the knowledge , attitude and practice of paramedical staff working in prisons toward TB , our study differ from (Abebe DS)⁽⁸⁵⁾ study that conducted among eastern Ethiopian prisoners to assess knowledge , attitude and practice of prisoners toward TB.

In this study due to difficulties at jail it was not possible to collect sputum for more than three days to diagnosed SSN . Besides it was difficult to produce sputum on demand i.e. spot specimen, so documentation of all three negative specimens was not possible, while all the other criteria were followed and we consider one sputum specimen instead of two for diagnosis SSP and this similar to what found in study of prevalence of pulmonary tuberculosis in Karachi central prison (N. A. Rao 2002)⁽⁸⁶⁾. Findings from this study suggest that the ISTC standard, a single question about cough _2 weeks, might be used to screen prisoners and identify those needing further evaluation. Its advantages include yield, simplicity and the fact that non-health care personnel can perform this initial assessment.

Operational researches.

Countries must conduct operational research to improve TB case detection and adopt the most effective TB case detection strategy.(WHO 2008)⁽⁴⁰⁾ Operations research projects should be promoted and designed to address operational problems that are identified during the assessment, implementation, and monitoring and evaluation steps. Results can be used to enhance the implementation of the Stop TB Strategy in prisons and

formulate relevant, evidence-based solutions and policies. These efforts should include other institutions (i.e., universities and research centers) to assist in protocol development, financing, data collection, data analysis, and report writing. The potential contribution of these institutions should be valued and used. Topics that can assist decision makers and program managers in adopting and strengthening sound and evidence-based policies for TB control include the following, (Guidelines for the control of tuberculosis in prisons).⁽⁶²⁾

- Understanding the factors associated with diagnostic and treatment delays from the provider and patient perspectives
- Ensuring an efficient referral system between prison and civilian services.
- Establishing effective diagnostic practices of providers (use of chest radiography over microscopy)
- Using incentives and enablers for providers and patients
- Understanding the stigma attached to TB
- Designing interventions to implement and improve TB/HIV collaborations
- Knowing the risk factors for TB.

Documentation on the TB situation in prisons in developing countries is limited^(87–90) and very few studies have quantitatively evaluated TB control programmes in prisons.⁽⁹¹⁾

These data can support future public health policies aimed at interventions to implement optimal programs of early detection of cases

and the systematized adoption of strategies of directly observed therapy, adapted to the local conditions of the these prison system, thereby contributing to reducing transmissibility.

Despite the following methodological limitations, the present study underscores the importance of increasing knowledge of the magnitude of TB in prison system populations in view of the lack of local data on this issue.

Limitations:

We are aware that this study had certain limitations:

1. Some security and Organizational issues was affect the field work specially conduct the questionnaire interviews in strict privacy.
2. Prisoners who left prison rapidly (after 1–5 days on average) and did not show symptoms at entry were not screened.
3. The WHO recommends that persons in the general population should have at least two positive sputum smears to be diagnosed with SSP TB , three negative sputum smears to diagnosed with SSN TB ,however, in this study, one sputum smear was considered diagnostic.

CHAPTER FIVE

Conclusions and Recommendations

Conclusions:

1. In comparison with the national TB prevalence , pulmonary TB in the prisons is greater than 13 and 17 times of national figure in male and female respectively in the same age group. . Periodic screening of all prisoners is recommended.
2. All prisons were overcrowded , unsatisfactory ventilated , poor sun light exposure and poor nutritional services.
3. There was high proportion of smokers among prisoners .
4. There is association between educational status of prisoners and LTBI.
5. Educational status of prisoners and their time spent in prison were associated with TB disease.
6. Findings from this study suggest that the ISTC, a single question to prisoners done by paramedical staff at entry time to prison about cough more than 2 weeks, might be used to screen prisoners and identify those needing further evaluation.
7. The specific features of prisons and of prisoners necessitate specific approaches to tuberculosis control that are different from those used in the general population by establishment entry screening and monthly active case detection.
8. As trained paramedical staff have more information about TB control , therefore training courses of paramedical staff has important role in enhancement of their knowledges thus increase case detection among prisoners.

Comment [Layth47]: Revise the term

Comment [Layth48]: omit

Recommendations:

1. Although dependent on the availability of resources of health system , an active surveillance of TB through active case findings for early detection by entry screening is crucial for TB control in prisons .
2. It is important to emphasize that the implementation of a standardized TB reporting system in the prison health system to evaluate the impact of any future preventive measures.
3. Expand the training courses regarding TB control to include all health personnel in prisons.
4. Environmental controls in prisons including clear definition of infectious zones for isolation infectious cases to reduce transmission in addition with use of masks and/or personal respirators.
5. Forbidding smoking or establishment special zones for smoking inside prisons beside an Establishment health education anti-tobacco campaigns inside the prison .
6. Coordination with prisons authorities to reduce overcrowding and to improve living conditions for all prisoners reduce transmission of TB which can be partly addressed by building more modern prisons .
7. Despite the primary role of ensuring public safety, prisons may becoming an essential components of public health infrastructure through engage it in the public health system.
8. Future studies should measure the impact of the indoor environment of prisons on TB transmission..

CHAPTER SIX

References

References:

- 1-David L. Heymann, MD, Editor APHA CDCM Control of Communicable Diseases Manual 18th Edition. An official report of the American Public Health Association 2008 page 607. [\[link\]](#)
- 2-WHO.global tuberculosis control | WHO report 2008.[PDF \[link\]](#)
- 3-Nirman, Bhavan Revised National tuberculosis control program (RNTCP)-key fact and concept, central TB Division, DGHS, MOHFW, new-Delhi.110011; 2005PDF page2. [\[link\]](#)
- 4-Hong YP, Kwon DW, Kim SJ et al ,survey of knowledge ,attitude and practices for tuberculosis among general practitioners.Tuber Lung Dis. 1995 Oct;76(5):431-5. [\[link\]](#)
- 5-WHO.Global tuberculosis control WHO report 2010
[PDF \[link\]](#)
- 6-Pieter Jacob Haasnoot, Tijs Evert Boeting, Moignet Ole Kuney, and Jos van Roosmalen Knowledge, Attitudes, and Practice of Tuberculosis among Maasai in Simanjiro District, TanzaniaM. Global epidemiology of tuberculosis: prospects for control. SeminRespirCrit Care Am J Trop Med Hyg. 2010 October 5; 83(4): 902–905.[\[link\]](#)
- 7-MacNeil J R, Lobato M N, Moore M. An unanswered health disparity: tuberculosis among correctional inmates, 1993 through 2003. Am J Public Health 2005; 95: 1800–1805 [\[link\]](#)

8- MacNeil J R, McRill C, Steinhauer G, Weisbuch J B, Williams E, Wilson M. Jails, a neglected opportunity for tuberculosis prevention. Am J Prev Med 2005; 28: 225–228. [\[link\]](#)

9- World Health Organization. Global tuberculosis control: surveillance, planning, financing. WHO/HTM/TB/2006.362. Geneva,Switzerland: WHO, 2006. [\[link\]](#)

10- Roberts C A, Lobato M N, Bazerman L B, Kling R, Reichard A A, Hammett T M. Tuberculosis prevention and control in large jails: a challenge to tuberculosis elimination. Am J Prev Med 2006; 30: 125–130. [\[link\]](#)

11- Snider D E Jr, Hutton M D. Tuberculosis in correctional institutions. JAMA 1989; 261: 436–437 [\[link\]](#)

12- Rudi Coninx, medical officer ,Dermot Maher, medical officer, and Hernán Reyes, visiting research scholar,c and Malgosia Grzemska, medical officer-Tuberculosis in prisons in countries with high prevalence BMJ. 2000 February 12; 320(7232): 440–44 [\[link\]](#)

13-S. E. Valway, R. B. Greifinger, M. Papania et al. 1994. Multi-drug–Resistant Tuberculosis in the New York State Prison System, 1990–91. Journal of Infectious Diseases 170(1): 151–56. [\[link\]](#)

14-. F. Chaves, F. Dronda, M. D. Cave , et al. 1997. A Longitudinal Study of Transmission of Tuberculosis in a Large Prison Population.American Journal of Respiratory and Critical Care Medicine 155(2): 719–25. [\[link\]](#)

15-MacIntyre CR, Kendig N, Kummer L, Birago S and Graham NMH. Impact of tuberculosis control measures and crowding on the incidence of tuberculous infection in Maryland prisons. Clin Infect Dis. 1997;24:1060–1067. [\[link\]](#)

16- Centers for Disease Control. Transmission of multidrug-resistant tuberculosis among immunocompromised persons, correctional system-- New York, 1991. JAMA. 1992;268(7):855-6. [\[link\]](#)

17- Jones TF, Craig AS, Valway SE, Woodley CL, Schaffner W. Transmission of tuberculosis in a jail. Ann Intern Med. 1999;131(8):557-63. [\[link\]](#)

18- Steenland K, Levine AJ, Sieber K, Schulte P, Aziz D. Incidence of tuberculosis infection among New York State prison employees. Am J Public Health. 1997;87(12):2012-4. [\[link\]](#)

19- Antônio Carlos Moreira LemosI; Eliana Dias MatosII; Carolina Nunes BittencourtIII Prevalence of active and latent TB among inmates in a prison hospital in Bahia, Brazil* J. bras. pneumol. vol.35 no.1 São Paulo Jan. 2009 [\[link\]](#)

20. Kendig N. Tuberculosis control in prisons. Int J Tuberc Lung Dis. 1998;2(9 Suppl 1):S57-63. [\[link\]](#)

21- WHO Tuberculosis in prisons *PDF*[\[link\]](#)

22- Simon Johnstone-Robertson, Stephen D Lawn, Alex Welte et al Tuberculosis in a South African prison – a transmission modelling analysis South African Medical Journal, Vol 101, No 11 (2011) [\[link\]](#)

23- Bellin EY, Fletcher DD and Safyer SM. Association of tuberculosis infection with increased time in or admission to the New York City jail system.

JAMA. 1993;269:2228–2231. [\[link\]](#)

24-Ahmed S, Newton A, Allison T. Tuberculosis in a Yorkshire prison: case report. Source 1. Humber Health Protection Unit, East Yorkshire, United Kingdom. Eurosurveillance Monthly Release 2007: Volume 12/ Issue 9 ▶ Article 7 [\[link\]](#)

25-Aerts A, Hauer B, Wanlin M, Veen J.
Tuberculosis and tuberculosis control in European prisons.
Source Belgian Lung and Tuberculosis Association, Brussels, Belgium.
Int J Tuberc Lung Dis. 2006 Nov;10(11):1215-23 [\[link\]](#)

26-Rao NA. Prevalence of pulmonary tuberculosis in Karachi central prison. Source Pulmonary Section, Department of Medicine, Aga Khan University Hospital, Karachi . JPMA August 2004 [\[link\]](#)

27-World Health Organization. Status paper on prisons and tuberculosis.
EUR/07/5063912. Geneva, Switzerland: WHO, 2007 [\[link\]](#).

28- United States Agency for International Development, The
Tuberculosis Coalition for Technical Assistance / International
Committee of the Red Cross. Guidelines for control of tuberculosis
in prison. Washington DC, USA: USAID, TB/CTA,
ICRC, 2009 [\[link\]](#)

29-Francis J, Reed A, Yohannes F, Dodard M and Fournier AM.
Screening for tuberculosis among orphans in a developing country.
Am J Prev Med. 2002 Feb;22(2):117-9 [\[link\]](#)

30-Stern V. problems in prisons worldwide, with a particular focus on Russia. Source International Centre for Prison Studies, School of Law, Kings College, London, United Kingdom. Article first published online: 10 FEB 2006 DOI: 10.1111/j.1749-6632.2001.tb11367.x[\[link\]](#)

31-MacIntyre CR, Kendig N, Kummer L, Birago S, Graham NM and Plant AJ. Unrecognised transmission of tuberculosis in prisons. Source Department of Public Health & Community Medicine, Westmead Hospital, NSW, Australia. rainam@cmed.wsahs.nsw.gov.au Eur J Epidemiol. 1999 Sep;15(8):705-9. [\[link\]](#)

32-Nyangulu DS, Harries AD, Kang'ombe C and et al tuberculosis in a prison population in Malawi. Source National Tuberculosis Control Programme, Ministry of Health, Malawi, Central Africa. Lancet. 1997 Nov 1;350(9087):1284-7 [\[link\]](#)

33- Chevallay B, de Haller R and Bernheim J [Epidemiology of pulmonary tuberculosis in the prison environment]. [Article in French] Schweiz Med Wochenschr. 1983 Feb 19;113(7):261-5. [\[link\]](#)

34- T. Rodrigo, J. A. Caylà, P. García de Olalla, et al. 2002. Effectiveness of Tuberculosis Control Programmes in Prisons, Barcelona 1987–2000. International Journal of Tuberculosis and Lung Disease 6:1091–97. [\[link\]](#)

35- A. Marco, J. A. Caylà, M. Serra, et al. 1998. Predictors of Adherence to Tuberculosis Treatment in a Supervised Therapy Programme for Prisoners before and after Release. Study Group of Adherence to Tuberculosis Treatment of Prisoners. European Respiratory Journal 12: 967–71 [\[link\]](#)

-
- 36- M. S. Arias. Unpublished. Assessing the Tuberculosis Situation and Control Program in National Penitentiaries in Cambodia. A 2008 report to the Tuberculosis Control Assistance Program and USAID [\[link\]](#)
- 37- M. S. Arias. Unpublished. Assessment of Prisons in Indonesia. A 2007 visit report to the Tuberculosis Control Assistance, the Royal Netherlands Anti-TB Association (KNCV), and USAID. [\[link\]](#)
- 38- H. Reyes. 2007. Pitfalls of TB Management in Prisons, Revisited. International Journal of Prison Health 3(1):43–67. [\[link\]](#)
- 39- Yousif K. Alkhayat M. survey of knowledge, attitude and practice , Enhanced response of TB ACSM Iraq ;middle east journal of family medicine 2009 vol.17.7 (1) [\[link\]](#)
- 40- WHO global report 2011. [\[link\]](#)
- 41- Daiwania and Babil directorate health offices data.
- 42- Rieder HL, Anderson C, Dara M, Hauer B, Helbling PK and Kam M, Zwahlen M 2011. Methodological issues in quantifying the magnitude of the tuberculosis problem in a prison population. Int J Tuberc Lung Dis 15: 662-667. [\[Links \]](#)
- 43- C. Ritter and B. S. Elger Prevalence of positive tuberculosis skin tests during 5 years of screening in a Swiss remand prison. University Centre of Legal Medicine of Geneva and Lausanne, Geneva, Switzerland.. Int J Tuberc Lung Dis. 2012 Jan;16(1):65-9. doi: 10.5588/ijtld.11.0159 [\[link\]](#)
- 44- Levy M H, Butler T G, Zhou J. Prevalence of Mantoux positivity and annual risk of infection for tuberculosis in New South Wales prisoners,
-

1996 and 2001. NSW Public Health Bull 2007; 18: 119–124. N S W Public Health Bull. 2007 Jul-Aug;18(7-8):119-24.[\[link\]](#)

45- Butler T, Levy M. Mantoux positivity among prison inmates—New South Wales, 1996. Aust NZ J Public Health 1999; 23:185–188.[\[link\]](#)

46- Carbonara S, Babudieri S, Longo B, et al; GLIP (Gruppo di Lavoro Infettivologi Penitenziari). Correlates of Mycobacterium tuberculosis infection in a prison population. Eur Respir J 2005;25: 1070–1076.[\[link\]](#)

47- Lobato M N, Leary L S, Simone P M. Treatment for latent TB in correctional facilities: a challenge for TB elimination. Am J Prev Med. 2003 Apr;24(3):249-53 [\[link\]](#)

48- Hussain H, Akhtar S, Nanan D. Prevalence of and risk factors associated with Mycobacterium tuberculosis infection in prisoners, North West Frontier Province, Pakistan. Int J Epidemiol. 2003 Oct;32(5):794-9[\[link\]](#)

49- Martn Snchez V, Alvarez-Guisasola F, Cayl J A, Alvarez J L. Predictive factors of Mycobacterium tuberculosis infection and pulmonary tuberculosis in prisoners. Int J Epidemiol. 1995 Jun;24(3):630-6[\[link\]](#)

50- R. Coninx, B. Eshaya-Chauvin, and H. Reyes. 1995. Tuberculosis in Prisons. Lancet 346: 238–39. [\[link\]](#)

51- P. Bollini. 1997. HIV/AIDS Prevention in Prisons: A Policy Study in Four European Countries. Paper presented at the Joint WHO/UNAIDS European Seminar on HIV/ AIDS, Sexually Transmitted Diseases and Tuberculosis in Prisons, December 14–16, Warsaw, Poland.[\[link\]](#)

52- D. F. Wares and C. I. Clowes. 1997. Tuberculosis in Russia. Lancet 350: 957. [\[link\]](#)

53- S. Nateniyom, S. Jittimane, N. Ngamtrairai, et al. 2004. Implementation of Directly Observed Treatment, Short-Course (DOTS) in Prisons at Provincial Levels, Thailand. International Journal of Tuberculosis and Lung Disease 8(7): 848–54. [\[link\]](#)

54- B. Karibushi and G. Kabanda. 1999. Tuberculose dans les prisons du Rwanda. International Journal of Tuberculosis and Lung Disease 3(9): S19. [\[link\]](#)

55- A. Sanchez, Gerhardt G, Natal S, et al. Prevalence of pulmonary tuberculosis and comparative evaluation of screening strategies in a Brazilian prison. Int J Tuberc Lung Dis. 2005;9(6):633-9. [\[Links \]](#)

56- Aerts A, Habouzit M, Mschiladze L, Malakmadze N, Sadradze N and Menteshashvili O. Pulmonary tuberculosis in prisons of the ex-USSR state Georgia: results of a nation-wide prevalence survey among sentenced inmates. Int J Tuberc Lung Dis. 2000;4(12):1104-10. [\[Links \]](#)

57- D. S. Nyangulu, A. D. Harries, C. Kang'ombe, et al. 1997. Tuberculosis in a Prison Population in Malawi. Lancet 350: 1284–87. [\[link\]](#)

58- R. J. Coker, B. Dimitrova, F. Drobniowski, et al. 2003. Tuberculosis Control in Samara Oblast, Russia: Institutional and Regulatory Environment. International Journal of Tuberculosis and Lung Disease 7(10): 929–32. [\[link\]](#)

59-A. Aerts, B. Hauer, B. Wanlin , et al. 2006. Tuberculosis and Tuberculosis Control in European Prisons. International Journal Tuberculosis and Lung Disease 10(11):1215–23. [\[link \]](#)

60-World Health Organization. Guidelines for the control of tuberculosis in prisons. Geneva: WHO; 1998. [PDF](#) [\[Links \]](#)

61- Hutton MD, Cauthen GM and Bloch AB. Results of a 29-state survey of tuberculosis in nursing homes and correctional facilities. Public Health Rep. 1993;108(3):305-14. [\[Links \]](#)

62- Guidelines for the control of tuberculosis in prisons PDF WHO and international committee of the red cross. [PDF](#) [\[link\]](#)

63- Guidelines for the control of tuberculosis in prisons Tuberculosis Coalition for Technical Assistance and. International Committee of the Red cross. [PDF](#) [\[link\]](#)

64- Assessment of health services to prisoners in Andorra [\[link\]](#)

65- Pier Giorgio Nembrini , water, sanitation, hygiene and habitats in prisons [PDF](#) [\[link\]](#)

66- M. A. Lawal, M. Omili, T. O. Bello, ,L. Onuha, and A. Haruna. Tuberculosis in a Nigerian medium security prison. Medical unit, Kuje Medium Security Prison, Kuje, Abuja, Nigeria, Prison Medical Centre, Prison Village, Airport Road, Abuja, Nigeria_Benin journal of postgraduate medicine vol 11 ,no 1 2009 [\[link\]](#)

67-P. Yanjindulam Reduction of tuberculosis burden among prisoners

in Mongolia: review of case notification, 2001–2010 INT J TUBERC LUNG DIS 16(3):327–329 © 2012 The Union. [\[link\]](#)

68- D. L. Saunders, D. M. Olive, S. B. Wallace, et al. 2001. Tuberculosis Screening in the Federal Prison System: An Opportunity to Treat and Prevent Tuberculosis in Foreign-Born Populations. Public Health Reports 116:210–18. [\[link\]](#)

69- M. C. Layton, K. J. Henning, T. A. Alexander, et al. 1997. Universal Radiographic Screening for Tuberculosis among Inmates upon Admission to Jail. American Journal of Public Health 87(8):1335–37. [\[link\]](#)

70- C. C. Leung, C. K. Chan, C. M. Tam et al. 2004. Chest Radiograph Screening for Tuberculosis in a Hong Kong Prison. International Journal of Tuberculosis and Lung Disease 9(6): 627–32. [\[link\]](#)

71- M. Puisis, J. Feinglass, E. Lidow, and M. Mansour. 1996. Radiographic Screening for Tuberculosis in a Large Urban County Jail. Public Health Reports 111(4): 330–34. [\[link\]](#)

72- Oliveira HB and Cardoso JC. Tuberculose no sistema prisional de Campinas, São Paulo, Brasil. Rev Panam Salud Públ. 2004;15(3):194–9. [\[link\]](#)

73- Abrahão RM, Nogueira PA and Malucelli MI. Tuberculosis in county jail prisoners in the western sector of the city of São Paulo, Brazil. Int J Tuberc Lung Dis. 2006;10(2):203–8. [\[link\]](#)

74- Niero R. Tuberculose pulmonar em uma prisão: Casa de Detenção de São Paulo 1976-1980. Temas IMESC Soc Dir Saúde. 1986;3(1):25-38.[\[link\]](#)

75-A. Sanchez Fournet N, , Massari V ,et al. Development and evaluation of tuberculosis screening scores in Brazilian prisons. Public Health. 2006;120(10):976-83[\[link\]](#) -

76- S. X. Jittimanee, N. Ngamtrairai, M. C. White and S. Jittimanee
A prevalence survey for smear-positive tuberculosis in Thai prisons
int J tuberc lung dis 11(5):556–561 © 2007 The Union [\[link\]](#)

77- T. Jones and W. Schaffner. 2001. Miniature Chest Radiography Screening for Tuberculosis in Jails. American Journal of Respiratory Critical Care Medicine 164:77–81. [\[link\]](#)

78- S. Den Boon, N. W. White, S. W. P. van Lill, et al. 2006. An Evaluation of Symptom and Chest Radiographic Screening in Tuberculosis Prevalence Surveys. International Journal of Tuberculosis and Lung Disease 10: 876–82. [\[link\]](#)

79- World Health Organization (WHO). 2008. Global Tuberculosis Control 2008: Surveillance, Planning, Financing. Geneva: WHO, p. 57[\[link\]](#)

80- Macintyre R, Kendig N, Kummer L, Birage S, Neil MH. Impact of tuberculosis control measures and crowding on the incidence of tuberculosis in Maryland prisons. Clin Infect Dis. 1997;24:1060–67.[\[link\]](#)

81- Streeton JA, Desem N, Jones SL. Sensitivity and specificity of a gamma interferon blood test for tuberculosis infection. Int J Tuberc Lung Dis 1998;2:443–50.[\[link\]](#)

82- Legrand J, Sanchez A, Le Pont F, Camacho L, Larouzé B. Modeling the impact of tuberculosis control strategies in highly endemic overcrowded prisons. PLoS One 2008; 3: e2100.[\[link\]](#)

83- Centers for Disease Control and Prevention. Prevention and control of tuberculosis in correctional and detention facilities: recommendations from CDC. MMWR Recomm Rep 2006;55(RR-9): 1–[\[link\]](#)

84- Levy M H. Tuberculosis control practices in some prison systems of the Asia-Pacific Region, 1997. Int J Tuberc Lung Dis 1999; 3: 769–773.[\[link\]](#)

85-Abebe DS, Biffa D, Bjune G, Ameni G, Abebe F Assessment of knowledge and practice about tuberculosis among eastern Ethiopian prisoners Int J Tuberc Lung Dis. 2011 Feb;15(2):228-33, i.[\[link\]](#)

86- N. A. Rao 2002 Prevalence of Pulmonary Tuberculosis in Karachi Central Prison (Pulmonary Section, Department of Medicine, Aga Khan

University Hospital, Karachi.) JPMA (journal of Pakistan medical association) August 2004.[\[link\]](#)

87- Banu S, Hossain A, Uddin M K, et al. Pulmonary tuberculosis and drug resistance in Dhaka central jail, the largest prison in Bangladesh. PLoS One 2010; 5: e10759. [link](#)

88- Sanchez A, Larouzé B, Espinola A B, et al. Screening for tuberculosis on admission to highly endemic prisons? The case of Rio de Janeiro State prisons. Int J Tuberc Lung Dis 2009; 13:1247–1252.[\[link\]](#)

89- Habeenzu C, Mitarai S, Lubasi D, et al. Tuberculosis and multidrug resistance in Zambian prisons, 2000–2001. Int J Tuberc Lung Dis 2007; 11: 1216–1220[\[link\]](#)

90- Noeske J, Kuaban C, Amougou G, Piubello A, Pouillot R. Pulmonary tuberculosis in the Central Prison of Douala, Cameroon. East Afr Med J 2006; 83: 25–30. [\[link\]](#)

91- Harries A D, Nyirenda T E, Yadidi A E, Gondwe M K, Kwanjana J H, Salaniponi F M. Tuberculosis control in Malawian prisons: from research to policy and practice. Int J Tuberc Lung Dis 2004; 8: 614–617.[\[link\]](#)

Questionnaire form.

:General Instructions •

Please fill out all the requested data.

Before starting the interviewer, introducing yourself and explain the objectives of the study and the contents of informed consent in case of approval responder, then ask him to sign a consent.

Make sure that participant understood the question.

Make sure all questions to all respondents in same manner .

Make sure the respondent to answer each question. Make sure that the answers placed in the appropriate places

See the questionnaire at the end of the interview, and then sign it.

Peace all questionnaires filled to the field supervisor on a daily basis

Date of Interview / / 2012

Serial Number:_____

Province name:_____

Name prison:_____

Name of the interviewer :_____

Signature of the interviewer _____

_____ Name field supervisor:_____

Signature of field supervisor:

Informed consent for community members and patients

Study Title:

Prevalence of Latent and Symptomatic Tuberculosis among Prisoners in
Diwania and Babil Governorates.

The purpose of the study:

know Prevalence of Latent and Symptomatic Tuberculosis among
Prisoners in Diwania and Babil Governorates

Action:

Search to know Prevalence of Latent and Symptomatic Tuberculosis
among Prisoners in Diwania and Babil Governorates through direct
interview with indoor environmental assessment of prisons and finally
study of knowledge , practice and attitude of paramedical staff toward
tuberculosis control.

Risks / hassles:

No risk resulting from your participation in this study, even if you decide
not to answer any question or decided to stop the interview at any time.

Benefits.

There are no personal benefits to you from participating in the study. It is
expected the presence of societal benefits from the study, where health
authorities will benefit from the information of the study to improve health
services for TB patients and the community.

Rights of respondents:

The participation is voluntary and you may choose to stop the interview at any time and without any penalty. You have a right to inquire about any understandable points.

Confidentiality:

Will not be authorized for answers to anyone and will remain unidentified. You will not be writing your name on the questionnaire or keep them in any other records. The data would be destroyed in the event of withdrawal from the interview. The information can be accessed only by members of the research team and research purposes only.

Consent Form

Co-approval :

I am announcing that I have been informed with all previous information and explained to me and I had a full opportunity to ask questions and got answers enough about all the questions posed and announced my voluntary participation in this study and I know my full right to withdraw from the study without any penalty.

Name -----
of participant:

Sign -----
of participant :

In case of the participant's inability to read the form and the need for someone to explain

The name of the person who -----
explained the form

Adress of the person who has to -----

The signature of the -----explain the form
person who has to explain of the form

:----- :•

Signature of interviewer

First-Demographics profile of the prisoner.

Question (1): What is your age in years ?

Age

Question (2): sex ?

Male

Female

Question (3): What is the type of residence before prison ?

Urban

Rural

Question (4): Are you a displaced or refugees ?

Yes

Not

Question (5): What is your marital status ?

Single

Married

Divorced

Widow

Question (6): what is your educational level?

Do not read or write

There is no formal education, but I can read and write

primary education

Secondary education

university degree or above

Question (7): What kind of work?

Employee

Skilled workers

Unskilled worker

Student

Soldier

Policeman

Housewife

Unemployed

Other (please specify)

Question (8): How much is your monthly income, the Iraqi dinar ?

less than 250,000 dinars

More than 250,000-less than 500,000 dinars

More than 500,000 dinars –Less than 750,000

More than 750,000dinars – less than one million

More than one million dinars

Question (9): How long (in months) you spent in prison yet ?

Question (10): Are you a smoker? Quantify

Yes

No

Quantity

Second: clinical characteristics and test results for the prisoner.

Question (11): Do you suffer from other diseases? Mention it.

Yes

No

Diseases

Question (12): Do you suffer from a chronic cough for more than two weeks?

Yes

No

Question (13): Is the clinical examination done to the prisoner ? What is the result?

Yes

Do not

Result

Question (14): Is the TST done to the prisoner? What is the result?

Yes

No

Result

Question (15): is the CXR done to the prisoner? What is the result?

Yes

No

Result

Question (16): is the sputum examination done to the prisoner? What is the result?

Yes

No

Result

Question (17): Final diagnosis of a prisoner and taking the necessary treatment?

TB free

LTBI

SSP

SSN

Extra pulmonary TB

Taking treatment

Indoor environmental assessment of the prison.

Question (1): What is the capacity of the prison? What is existing number of prisoners? What is the occupancy rate?

The capacity of the prison

Existing number of prisoners

Occupancy rate

Question (2): What is the total surface area of imprisonment in square meters?

Total surface area

Question (3):What is the average surface area allocated in square meters per prisoner?

Average surface area per prisoner

Question (4):the level of ventilation in the prison

Good

Medium

Bad

Question (5):the level of sunlight exposure in the prison?

Good •

Medium

Bad

Question (6): what is the level of nutritional services in the prison?

Good

Medium

Bad

Question (7): Is there a screening system to prisoner as soon as he or she arrives to prison or be checked periodically to ensure he o she TB free?

Entry screening

Periodic screening

There is no screening

Question (8): Is there special isolation room for infective TB patients during the period of infection?

Yes

No

Knowledge, attitudes and practices of paramedical staff in prison toward the TB.

(Fills by each member of the paramedical staff in prison.)

Question (1): What is your age in years ?

Age

Question (2): Gender ?

Male

Female

Question (3): Are you trained on a program to control tuberculosis ?

Yes

No

Question (4): Do you know the symptoms of suspected TB patient? mention it.

Yes

No

Symptoms

Question (5): Did you know the necessary measures that must be taken in the event of suspected tuberculosis patient? Mention it.

Yes

No

Measures

Question (6): Do you consider tuberculosis as a stigma?

Yes

No

I do not know