

**A Survey On
Knowledge, Attitudes and Practices concerning Tuberculosis disease among
the student in Daffodil International University.**



Project Report

This report presented in partial fulfilment of the requirements for the degree of
Bachelor Pharmacy

Submitted To:

The Department of pharmacy
Faculty of Allied Health Science
Daffodil International University

Submitted By:

ID:191-29-1550

Department of Pharmacy
Faculty of Allied Health Sciences
Daffodil International University.

Date of submission: April,2023

APPROVAL

This project paper, “A Survey on Knowledge, attitudes and practices concerning Tuberculosis disease among the student in Daffodil International University” submitted to the Department of Pharmacy, Faculty of Allied Health Sciences, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Pharmacy and approved as to its style and contents.

BOARD OF EXAMINERS

.....

Dr. Muniruddin Ahmed
Professor and Head,
Department of Pharmacy,
Faculty of Allied Health Sciences,
Daffodil International University

.....

Internal Examiner 1

.....

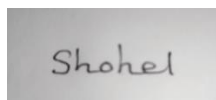
Internal Examiner 2

.....

External Examiner 3

Declaration

I here by state that this project was completed by me in partial satisfaction of the criteria for the degree of Bachelor of Pharmacy under the supervision of Md. Mizanur Rahman, Assistant Professor, Department of Pharmacy, Daffodil International University. No other university or institute has requested the outcomes of this project for the award of a degree.

A rectangular box containing the handwritten name "Shohel" in black ink on a light gray background.

Shohel Miah

ID: 191-29-1550

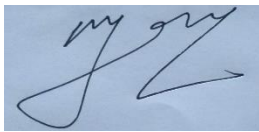
Batch: 21 th C

Department of Pharmacy

Daffodil International University

Certificate

This is to confirm that the research findings included in the thesis work are unique and have not previously been submitted in full for any degree or certificate from this university. The entirety of the current work was submitted as a thesis for the purpose of earning a Bachelor of Pharmacy degree.

A handwritten signature in blue ink on a light blue background. The signature is stylized and appears to read 'Md Mizanur Rahman'.

Md Mizanur Rahman

Assistant Professor

Department of Pharmacy

Daffodil International University

ACKNOWLEDGEMENT

I might want to communicate my profound applause to the All-powerful Allah who has given me the capacity to finish my undertaking work and the chance to concentrate in this subject. A lot of thankful to my honorable project supervisor of Mr. Md. Mizanur Rahman, Assistant Professor, Department of Pharmacy, Daffodil International University for his brilliant direction and steady oversight just as for giving essential data in regards to the task and furthermore for his help in finishing the project.

I would like to express my humble regards to Dr. Muniruddin Ahmed, Professor and Head, Department of Pharmacy, Daffodil International University. I also wish to offer my respect to all of the teachers of Pharmacy Department, Daffodil International University and thankful to other members for their excellent cooperation with us.

Finally, I would like to express my gratitude towards my parents and other family members for their kind cooperation and encouragement which helped me in completion of this project.

`-Shohel Miah



*To my Parents and Teachers,
The people who are constantly supportive of me in all aspects of my life.*

Abstract

BACKGROUND: Mycobacterium tuberculosis, a type of bacteria that most frequently affects the lungs, is the cause of tuberculosis (TB). About 190,000 new cases of tuberculosis (TB) and 80,000 deaths among Bangladeshis occur annually. Despite their being good treatments for the condition, nine individuals still pass away from it every hour. Yet, a diagnosis is not always simple, and therapy takes time. One of the deadliest infectious illnesses, tuberculosis (TB), continues to claim millions of lives each year throughout the world.

Method: A community -based cross -sectional survey was done among 100 individuals' student of Daffodil International university during January to March 2023. Information regarding knowledge, attitude, source of information and practice toward Tuberculosis were composed using a structured questionnaire. Adequacy of knowledge, attitude was summarized as proportion with 95% confidence interval.

RESULTS: 100 people were interviewed, including 51 men and 49 women, with a mean age between 18 and 20 years, and 16% between 21 and 25 years. 84% of respondents said TB is an infectious disease. Cough was named as a symptom by 85% of respondents, 81% thought the BCG vaccine reduced patient numbers, 33% thought tuberculosis occurs more frequently in the winter. Regarding Bangladesh's major health problem, 62% of respondents were favorable. The majority learned about it through television, social networking sites, radio, and newspaper.

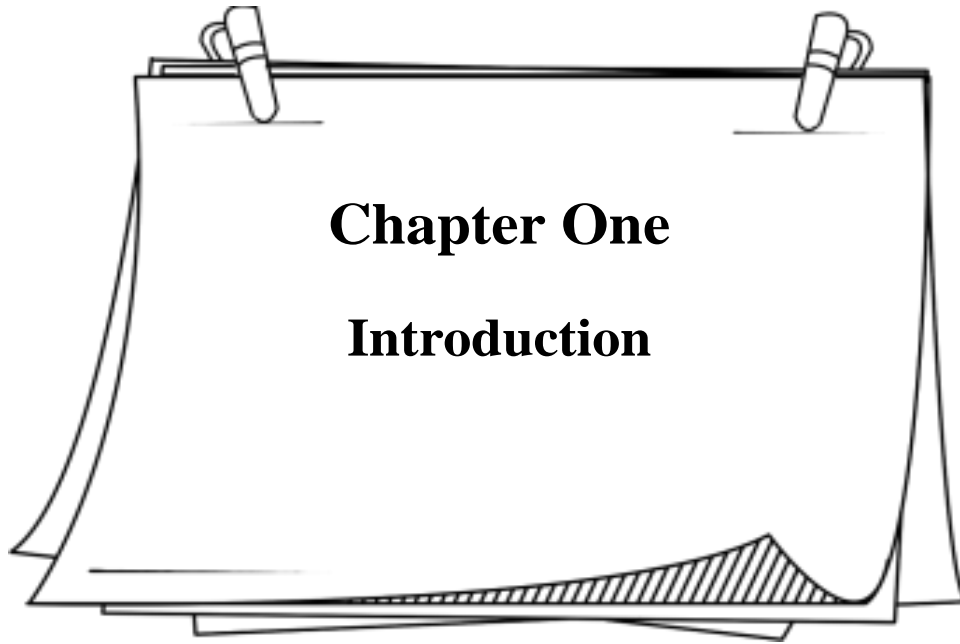
CONCLUSION: The current study discovered that the awareness regarding Tuberculosis and bacterial infection control measures was satisfactory to an extent. Hence, large-scale information, education, and communication campaigns need to be done at frequent intervals for population.

Keywords: Awareness, Tuberculosis, Communicable disease.

INDEX

Chapter	Lesson	Topic	Page No
01		Introduction	01-09
	1.1	Discovery of tuberculosis Bacteria	3
	1.2	The phases of TB immunological life cycle	3-4
	1.3	Tuberculosis Diagnosis and Management	4-5
	1.4	Global status of tuberculosis:	5-6
	1.5	Tuberculosis status in Bangladesh	6
	1.6	Complications of Tuberculosis	7
	1.7	Antitubercular Drugs	8-9
02		Literature review	10-11
03		Objective of the study	12-13
04		Method & materials	14-16
	4.1	Type of study	15
	4.2	Sampling Technique	15-16
	4.3	Procedure of data collection	16
	4.4	Data processing and analysis	16
05		Result & discussion	17-24
	5.1	Socio-demographic study	18-19
	5.2	Knowledge of Tuberculosis disease	19-20
	5.3	Attitude of Respondents' Towards Tuberculosis	21-22
	5.4	Good practices of Tuberculosis	22-23
	5.5	Source of information TB	23.-24
06		Discussion	25-26
07		Conclusion	27-28
07		Reference	29-35

I



1.Introduction:

The etiological agent of tuberculosis (TB), the most common infectious cause of death, is *Mycobacterium tuberculosis* (Fanning, 1999). Around 3.3 million new active smear-positive cases were identified in 1995. These cases were added to an estimated 4 million previous cases, which resulted in approximately 2-3 million deaths (Sudre & Kochi, 1992). The prevalence of *Mycobacterium tuberculosis* infection is about one third of the global population. Between 2.5 and 3.2 million instances were reported year on average over the past ten years. In 1990, 2.6 to 2.9 million people died from tuberculosis worldwide, with an estimated 8 million new cases (Chowdhury et al., 1997). I. Nine more thanas were added in phase two (1992–1994), and eight more thanas were added in phase three (1995). An 8-month oral regimen was the treatment plan starting in 1995 (Barberis et al., 2017). As extrapulmonary types of tuberculosis become more prevalent, there is a resurgence in interest in them. Pleura and lymph nodes are the two extrapulmonary organs that are most frequently found. Their diagnosis, which is based on clinical, radiological, bacteriological, and histological findings, is frequently challenging (Skoura et al., 2015). Teenagers may exhibit adult-type pulmonary tuberculosis (TB), which carries a high risk of spreading to close friends and family members and includes upper lobe cavity illness and smear-positive sputum (Ketata et al., 2015). To lessen the toll of suffering and monetary loss brought on by this long-standing disease, adequate control methods in a more localized setting and ongoing activity evaluation are required (Margarit et al., 2017). To assess the use of a PCR-based assay for the detection of the *Mycobacterium tuberculosis* complex (MTC) in clinical settings (Muhumuza et al., 2006). Improved diagnostic tests for active tuberculosis (TB) are needed to provide prompt and effective treatment, provide high sensitivity for all patients, and shorten the time to diagnosis. While measuring *M.tb*-specific immune responses is frequently used to detect infection in the absence of TB

symptoms (also known as latent TB infection), immunodiagnostics are not currently used to treat active TB disease (Halliday et al., 2019).

1.1 Discovery of tuberculosis Bacteria:

Paleomicrobiology has identified the tuberculosis agent in thousands of years old animal and human skeletons (Donoghue, 2016). Robert Koch, a well-known scientist, succeeded in isolating the tubercle bacillus and revealed this amazing discovery to the Association of Physiology in Berlin on March 24, 1882 (Barberis et al., 2017).

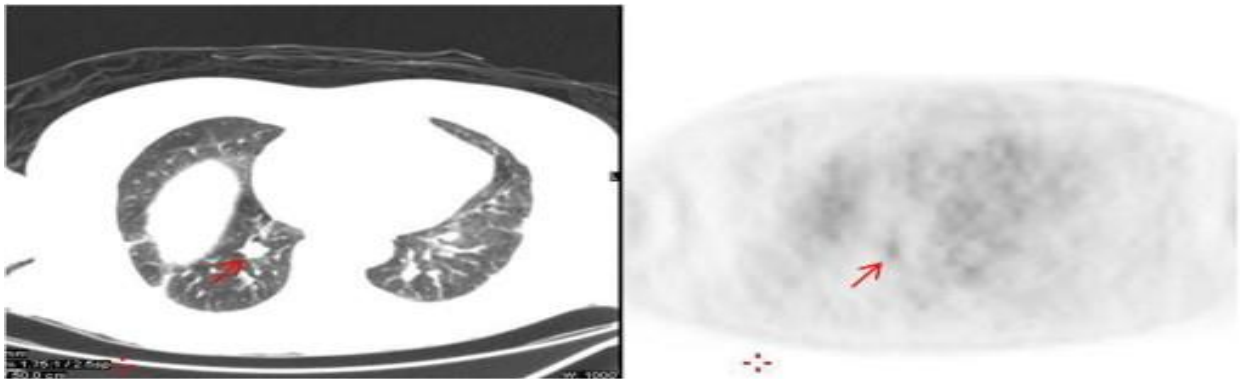
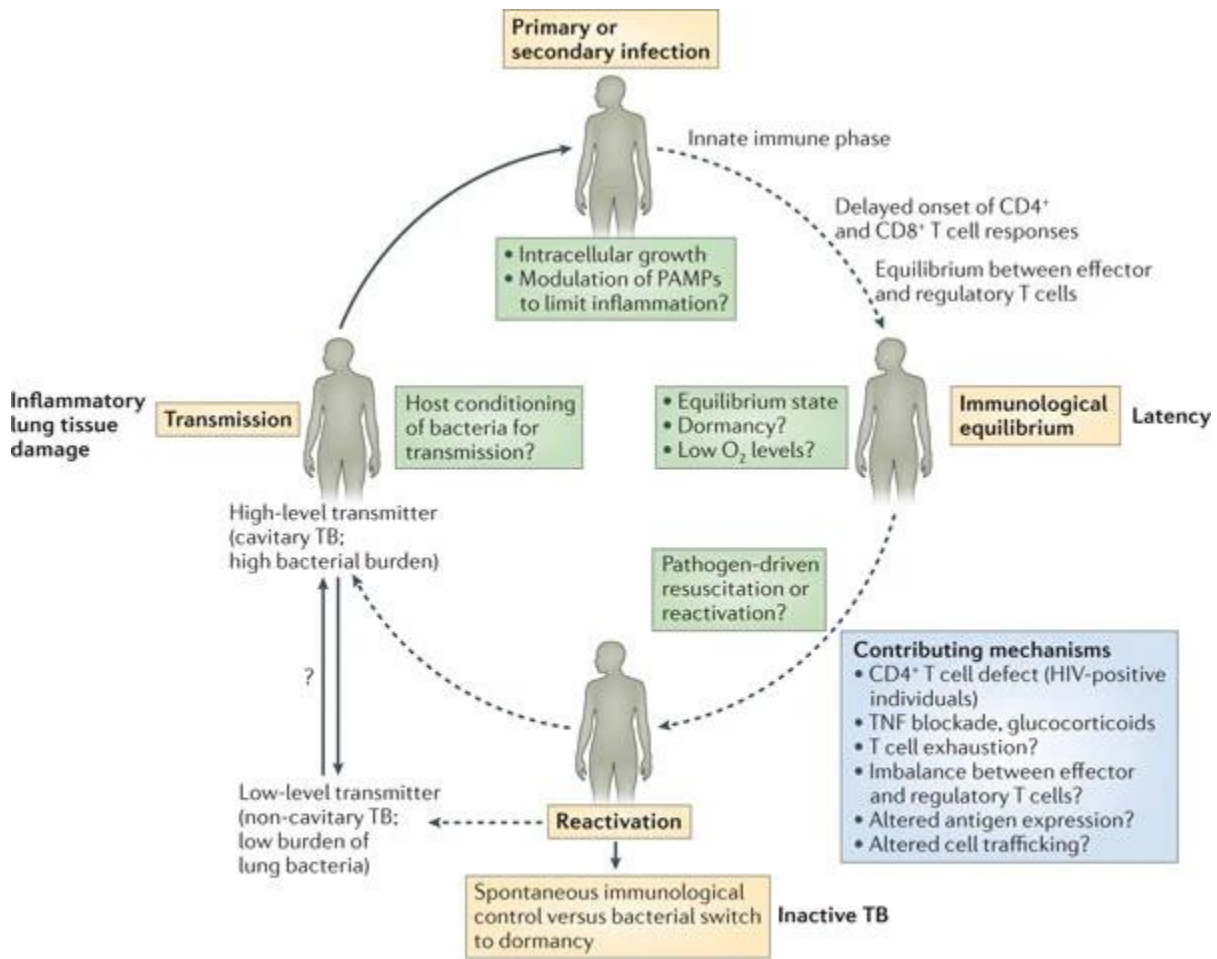


Figure 1. shows a 1.5 cm right lower lobe nodule that is moderately 18F-FDG avid (SUVmax 2). Cancer and TB are among the possible diagnoses for this lesion (Skoura et al., 2015).

1.2 The phases of Tuberculosis immunological life cycle (Ernst, 2012).

Mycobacterium tuberculosis immune responses are only partially efficient; they typically cause the bacteria to go dormant but infrequently result in their complete elimination. Sadly, *M. tuberculosis* may be brought back from its latent state, and this is the main method of transmission. A thorough understanding of the processes or correlates of immunity to *M. tuberculosis* infection, as well as the reasons why immunization fails to eliminate the pathogen, has not yet been obtained from studies in animal models or humans. It is believed that this thesis would offer a foundation

for research to comprehend immunity to *M. tuberculosis* and to direct the development of a tuberculosis vaccine (Ernst, 2012).



Nature Reviews | Immunology

Figure 2. Tuberculosis immunological life cycle.

1.3 Tuberculosis Diagnosis and Management

Clinical, immunological, microscopy, radiography, and bacterial culture are frequently used techniques for TB screening and diagnosis. Also, to diagnose and

define TB, new developments in molecular diagnostic techniques, such as MTBDRplus, loop-mediated isothermal amplification (LAMP), line probe assay (LPA), GeneXpert, and whole genome sequencing (WGS), have been used (Acharya et al., 2020). Outpatient care is routinely used to treat active TB. To plan visits and increase adherence, patients with active TB should be managed in cooperation with regional public health offices and TB control organizations. Patients with active TB should wear a basic surgical mask when they are outside or around other individuals (Sia & Wieland, 2011).

1. 4 Global status of tuberculosis

The leading infectious cause of death worldwide is tuberculosis, and drug-resistant strains of the illness pose a serious threat to the security of global health. On March 24, 2018, World Tuberculosis Day, we provide an up-to-date review of the situation with the tuberculosis epidemic, suggested diagnostics, medication treatments, and vaccines, progress in care delivery and prevention, progress in research and development, and steps that need to be taken to speed up progress(Kochi, 1991) . One third of the world's population, or around 1,700 million individuals, currently have or have had Mycobacterium TB infections. The overall prevalence of infection is comparable between industrialized and developing countries. Yet, 75% of infected people live in underdeveloped nations and 80% of infected people in industrialized countries are under the age of 50(Floyd et al., 2018). The prevalence of Mycobacterium tuberculosis infection is about one third of the global population. An average of 2.5 to 3.2 million cases were reported year worldwide during the past ten years, with population growth offsetting a recent little decline in notification

rates. In the world, 8 million people were thought to have tuberculosis in 1990, and 2.6 to 2.9 million perished from it (Islam et al., 2017).

1.5 Tuberculosis status in Bangladesh

The WHO Global TB Report states In 2016, Bangladesh was one of the world's 30 countries with the highest TB burden, and the disease claims 73, 000 lives there each year. Moreover, the prevalence of Multi Drug Resistant Tuberculosis (MDR-TB), which has become a serious issue for disease prevention, is rising (Paton et al., 2019).

Table 1: Tuberculosis status in Different Years (Stoptb, 2020):

Year	People developing TB	On Treatment
2010	326,000	153,892
2011	330,000	154,358
2012	334,000	168,683
2013	338,000	184,506
2014	342,000	191,166
2015	346,000	206,000
2016	349,000	222,248
2017	353,000	242,639
2018	357,000	267,143
2019	361,000	291,595
2020	366,000	295,225

In comparison to GBD's estimate of 1 322 916 deaths, WHO's estimate of 1 768 482 deaths related to TB was 445 566 deaths lower, or 29% of the average of the two figures. Bangladesh (49 863) is one of the nations with the highest absolute disparities in death rates(García-Basteiro et al., 2018).

1.6 Complications of Tuberculosis:

1. Neurologic Complication: The most feared consequence of spinal TB is neurologic problems. Patients who experience paraplegia while their spinal tuberculosis is still active need active treatment and have a better prognosis than those who experience paraplegia years after the initial illness has healed. Early identification and rapid treatment can prevent neurologic dysfunctions related to active TB of the spine. Surgery should be performed while the disease is still active in order to reduce kyphosis in patients with TB of the spine who are expected to develop a severe kyphosis (60°) after finishing treatment(Jain, 2002).

2. Drug resistant: The emergence of drug-resistant TB (DR-TB), the fight against TB and the advancements made in TB treatment over the past several decades are in danger of failing. Patients with DR-TB who show poor results in antibiotic treatment regimens or who require lengthy treatment with second-line medicines or injectable medications are increasingly being considered for lung resection as a treatment option, there is no way to remove this part from our stakes(Madansein et al., 2015).

3. Thoracic sequelae: Tuberculosis can affect the lungs and extrapulmonary organs, depending on the virulence of the bacterium and the host's resistance. Whether a patient receives treatment or not, several sequelae and difficulties can develop in the pulmonary and extrapulmonary regions of the thorax. These can be follow as Airway lesions include bronchiectasis, tracheobronchial stenosis, and broncholithiasis; parenchymal lesions include tuberculoma, thin-walled cavity, cicatrization, end-stage lung destruction, aspergilloma, and bronchogenic carcinoma; and vascular lesions include pulmonary or bronchial arteritis and thrombosis, bronchial artery (Kim et al., 2001).

1.7Table 2: Antitubercular Drugs (Researchgate, 2023).

Group	Drugs
First-line oral anti-TB agents	Isoniazid, Rifampicin, Ethambutol, Pyrazinamide
Injectable anti-TB agents	Streptomycin, Amikacin
Fuoroquinolones	Moxifloxacin, Ofloxacin
Oral second-line anti-TB agents	Ethionamide, Cycloserine
Agent with unclear role in treatment of drug resistant TB	Linezolid

Isoniazid

Isoniazid (INH), a crucial frontline anti-TB medicine, has been used to treat TB infection for more than 60 years and is one of the most successful medications available. Unfortunately, due to widespread long-term use and even abuse, bacterial strains that are resistant to INH are increasing in number. It has been hypothesized that adding lipophilic moieties to the INH structure may improve the drug's ability to penetrate bacterial cells and combat tuberculosis. INH derivatives with higher lipophilicity are therefore becoming one of the most promising anti-TB drugs. In fact, the INH derivative LL-3858 is currently in the first phases of a phase II clinical trial for the treatment of TB and may receive approval soon (Hu et al., 2017).

Ethambutol

Ethambutol, rifampicin, isoniazid, and pyrazinamide are among the earliest treatments for tuberculosis (TB). Ethambutol is regarded as a bacteriostatic medication because it prevents the bacilli from reproducing by interfering with the formation of arabinogalactan in the cell wall(Lee & Nguyen, 2020).

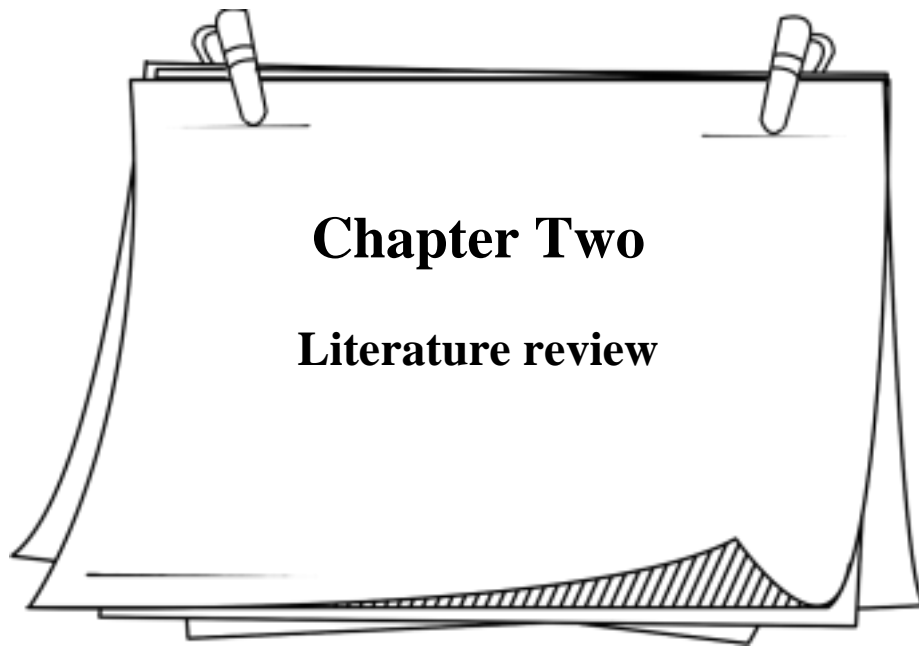
A crucial element of second-line therapy for the treatment of multidrug-resistant tuberculosis is ethionamide (ETA).

Streptomycin:

The first antibiotic used in tuberculosis prevention campaigns, streptomycin, interferes with ribosome-level protein production. This study demonstrates that some clinical isolates of Mycobacterium TB exhibit streptomycin resistance due to base substitutions at position 904 in the 16S rRNA or missense mutations in the rpsL gene, which encodes ribosomal protein S12(Crofton & Mitchison, 1948).

Ethionamide:

A crucial element of second-line therapy for the treatment of multidrug-resistant tuberculosis is ethionamide (ETA). We have shown that ETA is activated by S-oxidation prior to engaging with its cellular target by synthesizing radiolabeled ETA and studying drug metabolites produced by entire Mycobacterium tuberculosis (MTb) cells(Riddell et al., 1960).

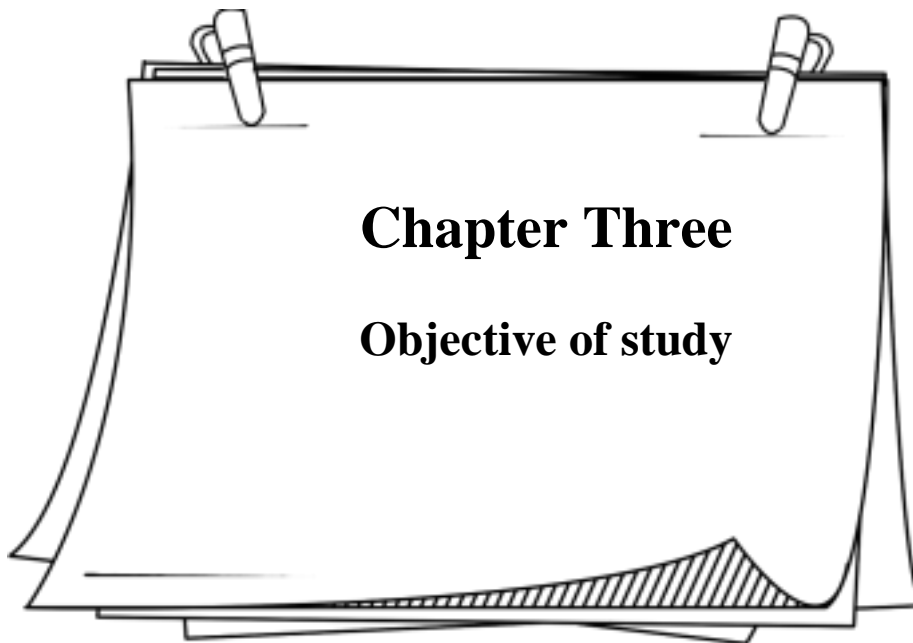


2. Literature review

If insufficient infection control measures are done, Tuberculosis are constantly vulnerable to infectious diseases. Transmission in a student setting can happen through the air, blood, saliva, or insufficient equipment sterilization. Students do not adhere to the same infection control standards despite numerous standardized processes. Our goal was to evaluate students' knowledge, attitudes, and practices related to infection prevention (Girotra et al., 2021).

Bangladesh has experienced tuberculosis outbreaks more frequently than other regions of the world in recent years, endangering the health of students and their families. This comprehensive review sought to comprehend the epidemiological traits of tuberculosis (TB) epidemics and examine the causes of TB outbreaks in bangladesh (Bao et al., 2019).

In particular, cross-sectional studies of college students' knowledge, attitudes and practices (KAP) in regard to TB have attracted substantial attention. To support procedures involving expert consultation, pre-testing, reliability, and validity testing, few measuring tools have been developed. Following the stages for developing a scale, our study created the university Students' TB Knowledge Attitudes and Practices Questionnaire (Rana et al., 2015).



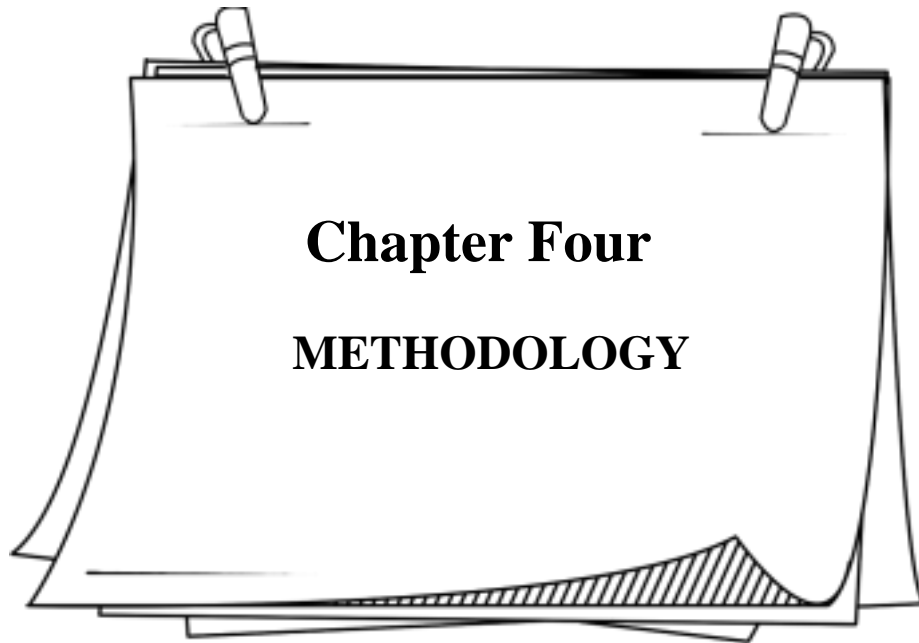
3. Objective of the study

General objective:

The purpose of this study is to investigate the Knowledge, attitude and practice concerning for Tuberculosis among students at Daffodil International University.

Specific objective:

1. To Identifying the maximum number Tuberculosis patient.
2. To boost them taking vaccine to newborn babies and other children.
3. To increase awareness of the society.
4. To find out the common cause of Tuberculosis.
5. To raise student's knowledge of Tuberculosis prevention.
6. To identifying The KAP phase also assisted root causes of Tuberculosis.



4. METHODOLOGY

Type of study

It was a descriptive cross-sectional study. The results of this study focus on determining the level of knowledge, attitude, and behavior related to tuberculosis infections among university students.

Place of the study

Students at universities serve as both the study group and the targeted group. So, Daffodil International University (Ashulia) served as the site of the study.

Selection of the study place

The following criteria were used to choose the study location.

- Feasible to study.
- Easy to approach.
- Young generation.

Exclusion criteria

Due to reluctance, some pupils were hesitant to express their opinions about the TB sickness.

Inclusion criteria

Students who have preconceived notions about the TB condition voluntarily participated in this study.

Sampling Technique

Because university students made up the study's population. So, using a single open-ended and closed-ended questionnaire for every respondent, we gathered information from 100 university students at Daffodil International University.

Period of study:

This particular study was carried out for just one month, from February 10 to March 10, 2023.

Sample size:

About 100 college students from Daffodil International University made up the sample.

Selection criteria:

Undergraduate and graduate students who were running.

Data collection instrument

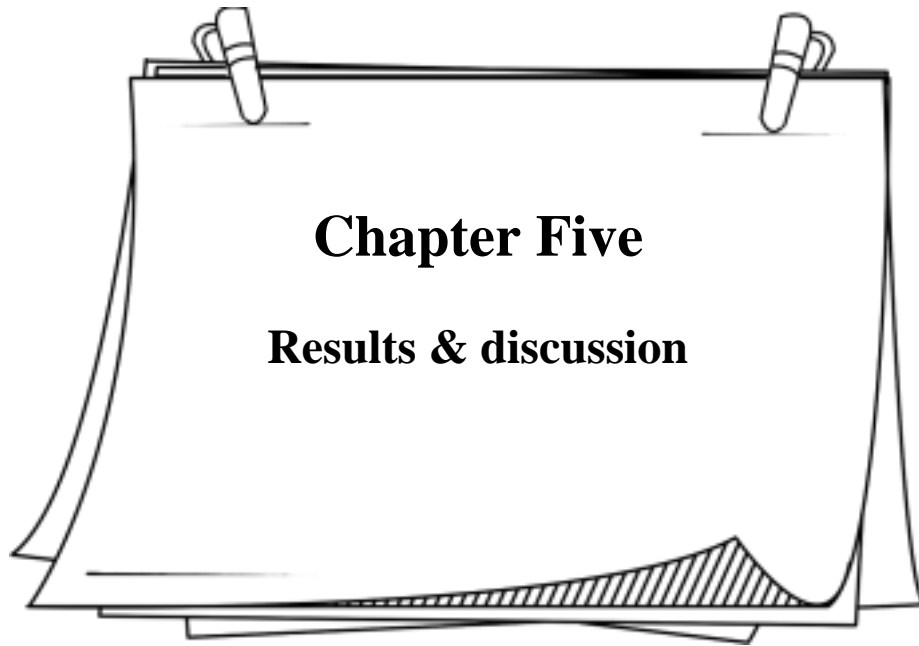
Both an open-ended and a closed-ended questionnaire were prepared as part of a structured interview schedule. On the basis of the aims, knowledge, attitude, and practice pertaining, the questionnaire was created. The questionnaire was quite straightforward and simple to comprehend.

Procedure of data collection

In order for the respondents to grasp the goals and objectives of the study, a self-introduction session was organized prior to data collection to explain the purpose of data collection and ask for oral agreement. With the help of open-ended and closed-ended questions from the respondents, data were gathered via face-to-face interactions and an online Google form. For a single respondent, one questionnaire is used. The interviewer fills up the questionnaire after receiving the respondents' responses to the questions.

Data processing and analysis

The proper titles and sections were used to assemble the questions on a Google Form. As a result, an automatic summary that is both logical and helpful has been produced. Graphs, percentages, and associations between the knowledge attitude and behaviors and the various components were used to present the findings.



5. Results & discussion.

5.1 Socio-demographic characteristics of the study respondents

Respondent distribution according to socio-demographic characteristics is shown in Table 1.

There were a total of 100 respondents that took part in this poll individually. Most of them are in the 18 to 20 age range. Very few people in this age range were 21 to 25. There were 51% men and 49% women. They all have different professions. 33% of people live in their own homes, while 67% rent. Their educational level is likewise on par. Only 2% of people were married, leaving about 98% single. The majority of students are enrolled in the pharmacy department.

Table: 01 Socio-demographic characteristic of the study respondents (N = 100).

Age(year)	18-20	84
	21-25	16
Gender	Male	51
	Female	49
Marital status	Unmarried	98
	Married	02
Housing type	Own	33
	Rented	67

Department	Pharmacy	45
	NFE	09
	CSE	18
	EEE	03
	TE	03
	THM	02
	English	12
	Software	03
	Journalism	02
	CIS	02
	BBA	01

5.2 Knowledge of Respondents' Towards Tuberculosis disease:

Table 2 summarizes the correct knowledge of Tuberculosis on signs and symptoms, its transmission and the practices that can contribute to the spread with the illness cough, sneezes . The majority of the 100 respondents correctly perceived that cough more than 3 weeks (85%), weight loss (57%) and loss of appetite (55%), Night sweats (37%) are main signs and symptoms of Tuberculosis. In 94% think it is a bacterial disease and 84% respond people can infected more than once. Tuberculosis is an infectious disease correctly responded 85% and 91% correctly responded all age group can be affected. Most of the student think (77%) Tuberculosis is a life threatening disease if not diagnosed. Here highly mentionable that most of the respondents don't know that treatment available for Tuberculosis. Only 27% responded correctly of this question.

Table: 02 Knowledge of Respondents' Towards Tuberculosis disease.

Sl. No.	Knowledge	Yes(%)	NO(%)
01	Tuberculosis is spread by Mycobacterium tuberculosis-	99	01
02	Tuberculosis is a bacterial disease-	94	06
03	Tuberculosis outbreak only happens during winter season-	33	67
04	A person can get Tuberculosis more than once-	84	16
05	Tuberculosis is an infectious disease-	85	15
06	Tuberculosis affects all age groups-	91	09
07	Symptoms of Tuberculosis include	Cough Weight loss Loss of appetite Night sweats	85 57 55 37
08	No treatment available for Tuberculosis-	37	63
09	Tuberculosis is a life threatening disease if not diagnosed-	77	23
10	Infected by Tuberculosis before-	22	78

5.3 Attitude of Respondents' Towards Tuberculosis disease:

Table 03 shows the attitudes of respondent towards Tuberculosis disease. The majority of respondent's positive attitude about the major health problem in bangladesh , its treatment and its prevention. In this study 92% students gave correct response the patient must minimize if have proper knowledge.60% student agree If a friend got tuberculosis visit him only 26% Disagree and 14% don't know. In this study vital issue high risk of tuberculosis 44% Agree and 31% Disagree ,25% don't know . Most of the students (81%) think, vaccinations decrease number of patient and 71% think Everybody has the probability to be infected by Tuberculosis. All of the student (96%) think If have Tuberculosis symptoms, will quickly see a doctor. Interestingly When found Tuberculosis reaction were Fear(56%),Surprise (36%),Sadness(42%) and only (3%) Feel shame.

Table: 03. Attitude of Respondents' Towards Tuberculosis.

Sl. No.	Knowledge	Agree N (%)	Disagree N(%)	I don't know
01	Tuberculosis is major health problem in Bangladesh	62%	26%	12%
02	If people have proper knowledge of tuberculosis, the patient must minimize.	92%	6%	02%
03	If a friend of yours got Tuberculosis disease, would you visit him/her?	60%	26%	14%

04	Do you consider yourself at risk of getting Tuberculosis disease?	44%	31%	25%	
05	Intake BCG vaccine can decreases number of Tuberculosis patient	81%	01%	18%	
06	Everybody has the probability to be infected by Tuberculosis-	74%	18%	08%	
07	If I have Tuberculosis symptoms, I will quickly see a doctor-	96%	03%	01%	
08	What would be your reaction if you found out that you have Tuberculosis	Fear	Surprise	Shame	Sadness
		56%	36%	03%	42%

5.4 Good practices of respondent Tuberculosis Disease.

Table 04 summarizes good preventive practices against Tuberculosis. (83%) Responed correctly always cover your mouth with a tissue someone beside you cough or sneeze. Most of the student (79%) think meet Tuberculosis patients without protection. Only (14%) did not maintain safe distance when visit any Tuberculosis patient. Here the alarming issue Approximately (81%) wrong responed take food in the same plate Infected TB patient. Most of the student (85%) think misuse of medicine, it can be further infected. (87%) think fresh environment can decrease the probability of infected tuberculosis.

Table: 04 Practice concerning Tuberculosis.

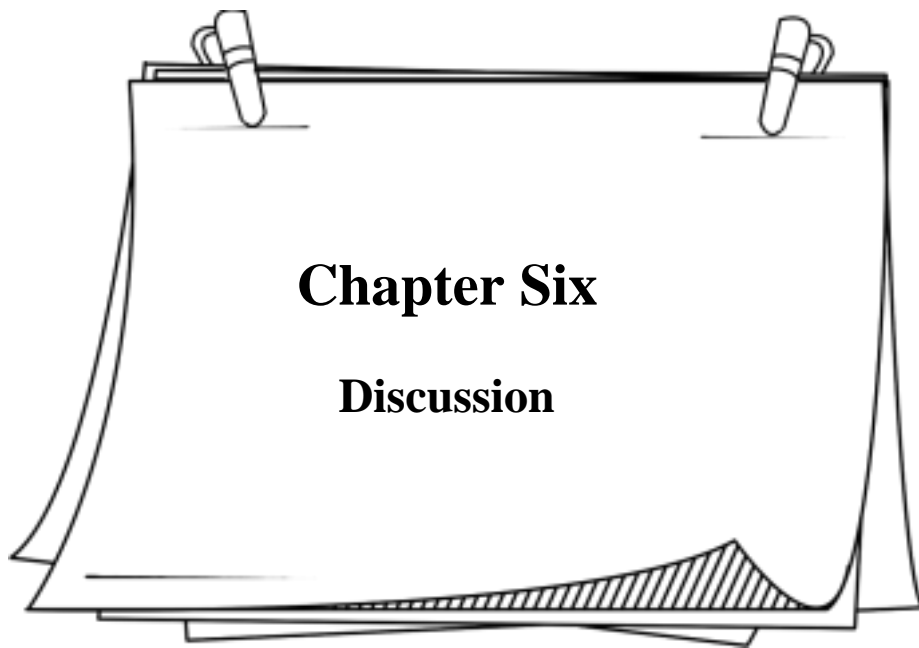
Sl. No.	Knowledge	Yes(%)	NO(%)
01	Do you always cover your mouth with a tissue someone beside you cough or sneeze?	83%	17%
02	Do you meet Tuberculosis patients without protection?	79%	21%
03	Do you maintain safe distance when visit any Tuberculosis patient?	86%	14%
04	Do you take food in the same plate used by a Tuberculosis patient?	81%	19%
05	Do you smoke?	87%	13%
06	Do work in fresh environment?	87%	13%
07	Do you live with Tuberculosis patient longer period of time?	85%	15%
08	Misuse of medicine, it can be further infected?	85%	15%

5.5 Source of information on Tuberculosis:

The sources of information about tuberculosis are listed in Table 05. Television is the 69% source of information on tuberculosis among the 100 respondents. The majority of them use social media, and 64% of them acquire their information about tuberculosis from tuberculosis. Health professionals (51%) and radio (29%) are both comparably medium sources for information on tuberculosis.

Table 05. Source of Information on Tuberculosis.

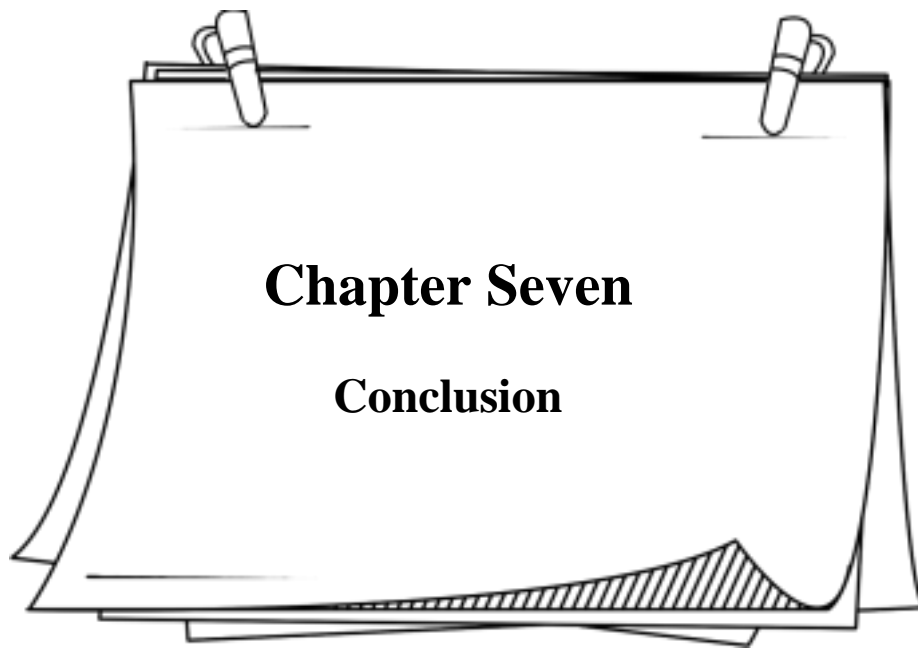
Sl No.	Knowledge	Yes(%)	No(%)
01	Television	69%	21%
02	Newspapers/magazines	55%	45%
03	Radio	29%	71%
04	Social media (Facebook)	64%	46%
05	Health Professional	51%	49%



06. Discussion:

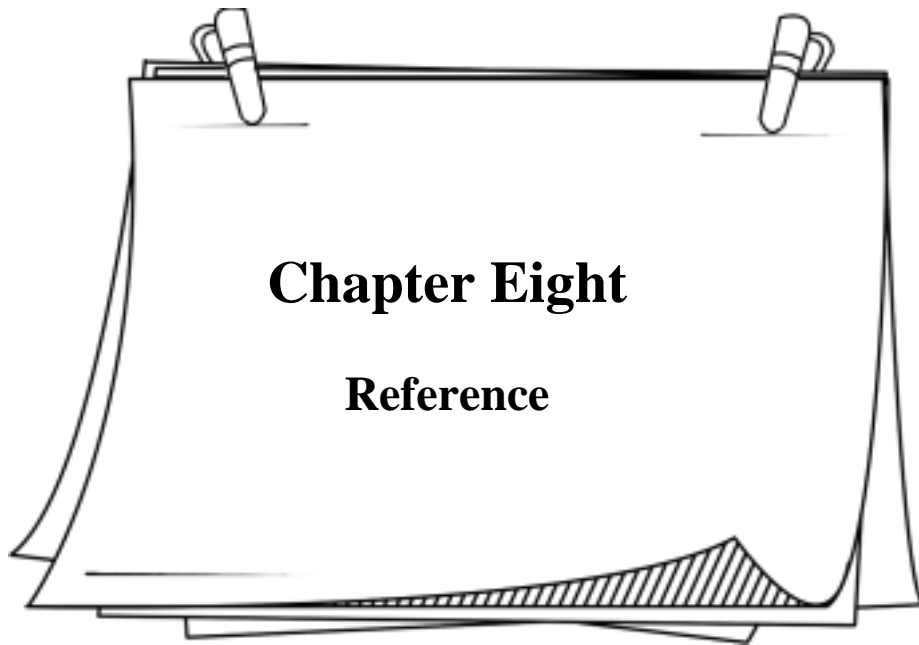
As the second leading cause of death worldwide, tuberculosis (TB) is a major public health issue in Bangladesh (Rana et al., 2015). 2014 saw an increase in the frequency of tuberculosis outbreaks in Bangladesh. The KAPs of at-risk populations with regard to tuberculosis among university students are described in the current study. KAP surveys are crucial for developing efficient, evidence-based preventative and control measures by improving ineffective KAPs. As far as we are aware, this is the first study on the KAPs of Daffodil University students on tuberculosis. About 35% of the students in this study did not know when tuberculosis outbreaks occurred. The most concerning problem was that 37% of respondents said there was no treatment for tuberculosis.

Tuberculosis is a communicable disease. So if we prevented this disease must be maintained distance when sneeze or cough. Most of the patient infected through the air of sneeze or cough. Where we live in work or living purposes maintain fresh environment. That also can prevent infectious disease. In this study, the media (including television, social networking sites, past illnesses, news publications, radio, and health staff) was the most prevalent source of knowledge about tuberculosis. This illustrates how the general populace has been affected by government-sponsored public education efforts. The public has been made more aware by the media, especially television and social networking sites. This was comparable to reports of research conducted in Saudi Arabia (Almalki et al., 2022). The dynamism of the interactions between the factors we examined was not taken into account because our research was cross-sectional. Our sample size is small, so it's possible that it doesn't accurately represent the overall population. It is noteworthy that despite these limitations, the current findings highlight the need for more in-depth research by highlighting the gaps in the KAPs addressing Tuberculosis.



07.Conclusions:

The current research indicates that very few Daffodil International University students had tuberculosis. Among the participants, only one in five students had tuberculosis. Our study conducted random basis . The current study's objective was to evaluate university students' TB knowledge, attitude and practice concerning. The current study showed that university students' general understanding of tuberculosis (TB) was poor. Therefore, a health education program is required to increase university students' knowledge of TB. Recent graduates may find it simpler to overcome obstacles and have healthier lives as a result.



Reference:

(Researchgate, 2023). Classification-of-antitubercular-drugs. researchgate.net.

(Stoptb, 2020). Tuberculosis situation. Stoptb.

Acharya B, Acharya A, Gautam S, Ghimire SP, Mishra G, Parajuli N, Sapkota B.

Advances in diagnosis of Tuberculosis: an update into molecular diagnosis of Mycobacterium tuberculosis. Mol Biol Rep. 2020 May;47(5):4065-4075. doi: 10.1007/s11033-020-05413-7. Epub 2020 Apr 4. PMID: 32248381.

Almalki ME, Almuqati FS, Alasmari R, Enani MJ, Bahwirith AA, Alloqmani AA,

Alqurashi A, Hassan-Hussein A. A Cross-Sectional Study of Tuberculosis Knowledge, Attitude, and Practice Among the General Population in the Western Region of Saudi Arabia. Cureus. 2022 Oct 6;14(10):e29987. doi: 10.7759/cureus.29987. PMID: 36381904; PMCID: PMC9642831.

Bao, H., Liu, K., Wu, Z., Wang, X., Chai, C., He, T., ... & Jiang, J. (2019).

Tuberculosis outbreaks among students in mainland China: a systematic review and meta-analysis. BMC Infectious Diseases, 19, 1-12.

Barberis, I., Bragazzi, N. L., Galluzzo, L., & Martini, M. (2017). The history of

tuberculosis: from the first historical records to the isolation of Koch's bacillus. Journal of preventive medicine and hygiene, 58(1), E9.

- Cambau, E., & Drancourt, M. (2014). Steps towards the discovery of *Mycobacterium tuberculosis* by Robert Koch, 1882. *Clinical Microbiology and Infection*, 20(3), 196-201.
- Chowdhury, A. M. R., Chowdhury, S., Islam, M. N., Islam, A., & Vaughan, J. P. (1997). Control of tuberculosis by community health workers in Bangladesh. *The Lancet*, 350(9072), 169-172.
- Crofton, J., & Mitchison, D. A. (1948). Streptomycin resistance in pulmonary tuberculosis. *British medical journal*, 2(4588), 1009.
- Donoghue, H. D. (2016). Paleomicrobiology of human tuberculosis. *Microbiology Spectrum*, 4(4), 4-4.
- Ernst JD. The immunological life cycle of tuberculosis. *Nat Rev Immunol*. 2012 Jul 13;12(8):581-91. doi: 10.1038/nri3259. PMID: 22790178.
- Ernst, J. D. (2012). The immunological life cycle of tuberculosis. *Nature Reviews Immunology*, 12(8), 581-591.
- Fanning, A. (1999). Tuberculosis: 1. Introduction. *Cmaj*, 160(6), 837-839.
- Floyd K, Glaziou P, Zumla A, Raviglione M. The global tuberculosis epidemic and progress in care, prevention, and research: an overview in year 3 of the End TB era. *Lancet Respir Med*. 2018 Apr;6(4):299-314. doi: 10.1016/S2213-2600(18)30057-2. PMID: 29595511

García-Basteiro AL, Brew J, Williams B, Borgdorff M, Cobelens F. What is the true tuberculosis mortality burden? Differences in estimates by the World Health Organization and the Global Burden of Disease study. *Int J Epidemiol.* 2018 Oct 1;47(5):1549-1560. doi: 10.1093/ije/dyy144. PMID: 30010785.

Girotra, C., Acharya, S., Shetty, O., Savla, S., Punjani, M., & Shah, T. (2021). Assessment of knowledge, attitude and practice towards infection control among dental undergraduate students-A cross-sectional survey. *Journal of Indian Association of Public Health Dentistry*, 19(1), 65.

Halliday A, Masonou T, Tolosa-Wright M, Mandagere V, Lalvani A. Immunodiagnosis of active tuberculosis. *Expert Rev Respir Med.* 2019 Jun;13(6):521-532. doi: 10.1080/17476348.2019.1615888. Epub 2019 May 28. PMID: 31134820.

https://www.bing.com/search?pglt=43&q=Insights+into+the+pharmacokinetic+properties+of+antitubercular+drugs+-+Scientific+Figure+on+ResearchGate.+Available+from%3Ahttps%3A%2F%2Fwww.researchgate.net%2Ffigure%2FClassification-of-antitubercular-drugs-as-per-WHO-3_tbl1_301626886+%5Baccessed+30+Apr%2C+2023&cvid=14317fbc9d

3a4d6b82ad5f411163b313&aqs=edge.0.69i59.1343j0j1&FORM=ANNT
A1&PC=U531

https://www.stoptb.org/static_pages/BGD_Dashboard.html

Hu, Y. Q., Zhang, S., Zhao, F., Gao, C., Feng, L. S., Lv, Z. S., ... & Wu, X. (2017).

Isoniazid derivatives and their anti-tubercular activity. *European journal of medicinal chemistry*, 133, 255-267.

Islam, M. S., Sultana, R., Hasan, M. A., Horaira, M. A., & Islam, M. A. (2017).

Prevalence of Tuberculosis: Present Status and Overview of Its Control System in Bangladesh. *Int J Life Sci Scienti Res*, 3(6), 1471-1475.

Jain AK. Treatment of tuberculosis of the spine with neurologic complications. *Clin*

Orthop Relat Res. 2002 May;(398):75-84. doi: 10.1097/00003086-200205000-00011. PMID: 11964634.

Ketata W, Rekik WK, Ayadi H, Kammoun S. Les tuberculoses extrapulmonaires

[Extrapulmonary tuberculosis]. *Rev Pneumol Clin*. 2015 Apr-Jun;71(2-3):83-92. French. doi: 10.1016/j.pneumo.2014.04.001. Epub 2014 Aug 15.

PMID: 25131362

Kim, H. Y., Song, K. S., Goo, J. M., Lee, J. S., Lee, K. S., & Lim, T. H. (2001).

Thoracic sequelae and complications of tuberculosis. *Radiographics*, 21(4), 839-858.

Kochi, A. (1991). The global tuberculosis situation and the new control strategy of the World Health Organization. *Tubercle*, 72(1), 1-6.

Lee, N., & Nguyen, H. (2020). Ethambutol.

Madansein, R., Parida, S., Padayatchi, N., Singh, N., Master, I., Naidu, K., ... & Maeurer, M. (2015). Surgical treatment of complications of pulmonary tuberculosis, including drug-resistant tuberculosis. *International Journal of Infectious Diseases*, 32, 61-67.

Margarit A, Simó S, Rozas L, Deyà-Martínez À, Barrabeig I, Gené A, Fortuny C, Noguera-Julian A. Tuberculosis en el adolescente; reto y oportunidad de evitar el contagio a la comunidad [Adolescent tuberculosis; a challenge and opportunity to prevent community transmission]. *An Pediatr (Barc)*. 2017 Mar;86(3):110-114. Spanish. doi: 10.1016/j.anpedi.2016.03.009. Epub 2016 Apr 11. PMID: 27079844.

Muhumuza, J., Asiimwe, B. B., Kayes, S., Mugenyi, P., Whalen, C., Mugerwa, R. D., ... & Joloba, M. L. (2006). Introduction of an in-house PCR for routine identification of *M. tuberculosis* in a low-income country. *The International Journal of Tuberculosis and Lung Disease*, 10(11), 1262-1267.

Paton NI, Borand L, Benedicto J, Kyi MM, Mahmud AM, Norazmi MN, Sharma N, Chuchottaworn C, Huang YW, Kaswandani N, Le Van H, Lui GCY, Mao TE. Diagnosis and management of latent tuberculosis infection in

Asia: Review of current status and challenges. *Int J Infect Dis.* 2019 Oct;87:21-29. doi: 10.1016/j.ijid.2019.07.004. Epub 2019 Jul 10. PMID: 31301458.

Rana, M., Sayem, A., Karim, R., Islam, N., Islam, R., Zaman, T. K., & Hossain, G. (2015). Assessment of knowledge regarding tuberculosis among non-medical university students in Bangladesh: a cross-sectional study. *BMC public health*, 15(1), 1-7.

Riddell, R. W., Stewart, M., & Somner, A. R. (1960). Ethionamide. *British Medical Journal*, 2(5207), 1207.

Sia, I. G., & Wieland, M. L. (2011, April). Current concepts in the management of tuberculosis. In *Mayo Clinic Proceedings* (Vol. 86, No. 4, pp. 348-361). Elsevier

Skoura, E., Zumla, A., & Bomanji, J. (2015). Imaging in tuberculosis. *International Journal of Infectious Diseases*, 32, 87-93.

Skoura, E., Zumla, A., & Bomanji, J. (2015). Imaging in tuberculosis. *International Journal of Infectious Diseases*, 32, 87-93.

Sudre, P., Ten Dam, G., & Kochi, A. (1992). Tuberculosis: a global overview of the situation today. *Bulletin of the World Health Organization*, 70(2), 149.

Turnitin Originality Report

Processed on: 06-May-2023 09:50 +06

ID: 2085665193

Word Count: 5275

Submitted: 1

191-29-1550 By Shohel Miah

Similarity Index

23%

Similarity by Source

Internet Sources: 13%
Publications: 11%
Student Papers: 11%

2% match (student papers from 30-Nov-2022)

[Submitted to Coventry University on 2022-11-30](#)

2% match (Internet from 12-Jan-2023)

<https://www.science.gov/topicpages/k/knowledge+attitudes+practices>

1% match (Internet from 30-Nov-2019)

<https://www.ncbi.nlm.nih.gov/pubmed/31134820>

1% match (Internet from 04-Dec-2016)

<http://bmcinfectdis.biomedcentral.com/articles/10.1186/s12879-016-1895-2>

1% match (Internet from 08-Feb-2023)

https://www.researchgate.net/publication/319605494_1_H_-123-triazole-tethered_8-OMe_Ciprofloxacin_and_Isatin_Hybrids_Design_Synthesis_and_in_vitro_Anti-mycobacterial_Activities

1% match (student papers from 29-Sep-2022)

[Submitted to Southern New Hampshire University - Continuing Education on 2022-09-29](#)

1% match (Mira Holzheimer, Jeffrey Buter, Adriaan J. Minnaard. "Chemical Synthesis of Cell Wall Constituents of ", Chemical Reviews, 2021)

[Mira Holzheimer, Jeffrey Buter, Adriaan J. Minnaard. "Chemical Synthesis of Cell Wall Constituents of ", Chemical Reviews, 2021](#)

1% match (Internet from 25-Oct-2022)

<http://dspace.daffodilvarsity.edu.bd:8080/bitstream/handle/123456789/3457/P13520%20%2829%25%29.pdf?isAllowed=y&sequence=1>

1% match ("Tuberculosis", Springer Science and Business Media LLC, 2023)

["Tuberculosis", Springer Science and Business Media LLC, 2023](#)

1% match (student papers from 16-Feb-2023)

[Submitted to University of Sunderland on 2023-02-16](#)

1% match (Internet from 13-Dec-2021)

<https://www.jehp.net/browse.asp?date=0-2018>

1% match (Mahendra Shukla, Abhisheak Sharma, Swati Jaiswal, Jawahar Lal. "Insights into the pharmacokinetic properties of antitubercular drugs", Expert Opinion on Drug Metabolism & Toxicology, 2016)

[Mahendra Shukla, Abhisheak Sharma, Swati Jaiswal, Jawahar Lal. "Insights into the pharmacokinetic properties of antitubercular drugs", Expert Opinion on Drug Metabolism & Toxicology, 2016](#)

1% match (student papers from 29-Nov-2022)

[Submitted to University of Venda on 2022-11-29](#)

1% match (Yuan-Qiang Hu, Shu Zhang, Feng Zhao, Chuan Gao, Lian-Shun Feng, Zao-Sheng Lv, Zhi Xu, Xiang Wu. "Isoniazid derivatives and their anti-tubercular activity", European Journal of Medicinal Chemistry, 2017)

[Yuan-Qiang Hu, Shu Zhang, Feng Zhao, Chuan Gao, Lian-Shun Feng, Zao-Sheng Lv, Zhi Xu, Xiang Wu. "Isoniazid derivatives and their anti-tubercular activity", European Journal of Medicinal Chemistry, 2017](#)

1% match (Irene G. Sia, Mark L. Wieland. "Current Concepts in the Management of Tuberculosis", Mayo Clinic Proceedings, 2011)

[Irene G. Sia, Mark L. Wieland. "Current Concepts in the Management of Tuberculosis", Mayo Clinic Proceedings, 2011](#)

1% match (A. E. DeBarber, K. Mdluli, M. Bosman, L.-G. Bekker, C. E. Barry. "Ethionamide activation and sensitivity in multidrug-resistant Mycobacterium tuberculosis", Proceedings of the National Academy of Sciences, 2000)

[A. E. DeBarber, K. Mdluli, M. Bosman, L.-G. Bekker, C. E. Barry. "Ethionamide activation and sensitivity in multidrug-resistant Mycobacterium tuberculosis", Proceedings of the National Academy of Sciences, 2000](#)

1% match (student papers from 20-Jul-2020)

[Submitted to Ain Shams University on 2020-07-20](#)

< 1% match (Internet from 23-May-2011)

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC284433/>

< 1% match (Internet from 15-Aug-2019)

<https://www.ncbi.nlm.nih.gov/pubmed/30693307>

< 1% match (Internet from 24-Aug-2022)

<https://www.ncbi.nlm.nih.gov/books/NBK525174/>

< 1% match (Internet from 15-May-2013)
<http://www.ncbi.nlm.nih.gov/pubmed/22790178>

< 1% match (Internet from 27-Oct-2021)
<https://www.science.gov/topicpages/t/test+student+knowledge.html>

< 1% match (Internet from 11-Sep-2022)
https://www.researchgate.net/publication/359661332_Study_on_the_Influencing_Factors_of_Knowledge_Attitudes_and_Practice_About_Tuberc_Sectional_Study

< 1% match (Internet from 08-Feb-2023)
https://www.researchgate.net/publication/308083693_Role_of_real-time_PCR_for_detection_of_tuberculosis_and_drug_resistance_directly_from_clinical_samples

< 1% match (student papers from 23-Jun-2019)
[Submitted to Southern New Hampshire University - Continuing Education on 2019-06-23](#)

< 1% match (Internet from 26-Oct-2022)
<http://dspace.daffodilvarsity.edu.bd:8080/bitstream/handle/20.500.11948/3450/P11169.pdf?isAllowed=y&sequence=2>

< 1% match (student papers from 12-Dec-2022)
[Submitted to Sheffield Hallam University on 2022-12-12](#)

< 1% match (student papers from 05-May-2023)
[Submitted to London Metropolitan University on 2023-05-05](#)

< 1% match (student papers from 17-Jan-2023)
[Submitted to University of Warwick on 2023-01-17](#)

< 1% match (Internet from 13-Dec-2022)
https://www.irjmets.com/uploadedfiles/paper/issue_12_december_2022/31890/final/fin_irjmets1670169021.pdf

< 1% match (Internet from 25-Jan-2022)
https://link.springer.com/article/10.1007/s11033-020-05413-7?code=77638b32-f8a8-462d-957e-f5295a7c8188&error=cookies_not_supported

< 1% match (Mohamed Ashraf Ali, Elumalai Manogaran, Jeyabalan Govindasamy, Velmurugan Sellappan, Suresh Pandian. "Bis dihydropyrimidine: synthesis and antimycobacterial activity", Journal of Enzyme Inhibition and Medicinal Chemistry, 2010)
[Mohamed Ashraf Ali, Elumalai Manogaran, Jeyabalan Govindasamy, Velmurugan Sellappan, Suresh Pandian. "Bis dihydropyrimidine: synthesis and antimycobacterial activity", Journal of Enzyme Inhibition and Medicinal Chemistry, 2010](#)

< 1% match ("The US-Japan Cooperative Medical Science Program Tuberculosis and Leprosy Panel's 35th Annual Research Conference, Yokohama, Japan: 19-1 July 2000", Tubercle and Lung Disease, 200012)
["The US-Japan Cooperative Medical Science Program Tuberculosis and Leprosy Panel's 35th Annual Research Conference, Yokohama, Japan: 19-1 July 2000", Tubercle and Lung Disease, 200012](#)

< 1% match (student papers from 09-Feb-2023)
[Submitted to University of Lincoln on 2023-02-09](#)

< 1% match (Internet from 14-Dec-2022)
<https://www.iiste.org/Journals/index.php/JHMN/article/download/52902/54670>

< 1% match (student papers from 09-Jan-2023)
[Submitted to University of Westminster on 2023-01-09](#)

< 1% match (Internet from 09-Sep-2017)
https://digital.lib.washington.edu/researchworks/bitstream/handle/1773/26750/Inoue_washington_0250E_13047.pdf?isAllowed=y&sequence=1

< 1% match (Internet from 27-Feb-2021)
<https://pubmed.ncbi.nlm.nih.gov/11452057/>

< 1% match ("Tubercular Drug Delivery Systems", Springer Science and Business Media LLC, 2023)
["Tubercular Drug Delivery Systems", Springer Science and Business Media LLC, 2023](#)

< 1% match (Internet from 18-Jan-2023)
<https://worldwidescience.org/topicpages/m/measure%2Bstudent%2Bknowledge.html>

A Survey On Knowledge, Attitudes and Practices concerning Tuberculosis disease among the student in Daffodil International University. Project Report [This report presented in partial fulfilment of the requirements for the degree of Bachelor Pharmacy Submitted To: The Department of pharmacy Faculty of Allied Health Science Daffodil International University Submitted By: ID:191-29-1550 Department of Pharmacy Faculty of Allied Health Sciences Daffodil International University. Date of submission: April,2023](#) INDEX Chapter 01 02 03 04 05 06 07 07 Lesson Topic Introduction 1.1 Discovery of tuberculosis Bacteria 1.2 The phases of TB immunological life cycle 1.3 Tuberculosis Diagnosis and Management 1.4 1.5 1.6 1.7 Global status of tuberculosis: Tuberculosis status in Bangladesh Complications of Tuberculosis Antitubercular Drugs Literature review Objective of the study Method & materials 4.1 Type of study 4.2 Sampling Technique 4.3 Procedure of data collection 4.4 Data processing and analysis Result & discussion 5.1 Socio-demographic study 5.2 Knowledge of Tuberculosis disease 5.3 Attitude of Respondents' Towards Tuberculosis 5.4 Good practices of Tuberculosis 5.5 Source of information TB Discussion Conclusion Reference Page No 01-09 3 3-4 4-5 5-6 6 7 8-9 10-11 12-13 14-16 15 15-16 16 16 17-24 18-19 19-20 21-22 22-23 23-24 25-26 27-28 29-35 Abstract [BACKGROUND: Mycobacterium tuberculosis, a type of bacteria that most frequently affects the lungs, is the cause of tuberculosis \(TB\). About 190,000 new cases of tuberculosis \(TB\) and 80,000 deaths among](#)

[Bangladeshis occur annually. Despite their being good treatments for the condition, nine individuals still pass away from it every hour. One of the deadliest infectious illnesses, tuberculosis \(TB\), continues to claim millions of lives each year throughout the world.](#) Method: [A community-based cross-sectional survey was done among 100 individuals'](#) student of Daffodil International university during January to March 2023. Information regarding knowledge, attitude, source of information [and practice toward Tuberculosis were](#) composed [using a structured questionnaire. Adequacy of knowledge, attitude was summarized as proportion with 95% confidence interval.](#) RESULTS: 100 people were interviewed, including 51 men and 49 women, with a mean age between 18 and 20 years, and 16% between 21 and 25 years. 84% of respondents said TB is an infectious disease. Cough was named as a symptom by 85% of respondents, 81% thought the BCG vaccine reduced patient numbers, 33% thought tuberculosis occurs more frequently in the winter. Regarding Bangladesh's major health problem, 62% of respondents were favorable. The majority learned about it through television, social networking sites, radio, and newspaper. CONCLUSION: The current study discovered that the awareness regarding Tuberculosis and bacterial infection control measures was satisfactory to an extent. [Hence, large-scale information, education, and communication campaigns need to be done at frequent intervals for population.](#) Keywords: Awareness, Tuberculosis, Communicable disease. I Chapter One Introduction 1. Introduction: The etiological agent of [tuberculosis \(TB\), the most common infectious cause of death](#), is Mycobacterium tuberculosis (Fanning, 1999). Around [3.3 million new active smear-positive cases were](#) identified in 1995. These cases were added to [an estimated 4 million previous cases, which](#) resulted in approximately 2-3 million deaths (Sudre & Kochi, 1992). [The prevalence of Mycobacterium tuberculosis infection is about one third of the global population.](#) Between [2.5 and 3.2 million](#) instances [were reported year](#) on average over [the past ten years](#). In 1990, 2.6 to 2.9 million people died from tuberculosis worldwide, with an estimated 8 million new cases (Chowdhury et al., 1997). I. [Nine more thanas were added in phase two \(1992- 1994\), and eight more thanas were added in phase three \(1995\). An 8-month oral regimen was the treatment plan starting in 1995](#) (Barberis et al., 2017). As extrapulmonary types of tuberculosis become more prevalent, there is a resurgence in interest in them. Pleura and lymph nodes are the two extrapulmonary organs that are most frequently found. Their diagnosis, which [is based on clinical, radiological, bacteriological, and histological findings](#), is frequently challenging (Skoura et al., 2015). Teenagers may exhibit adult-type pulmonary [tuberculosis \(TB\), which](#) carries [a high risk of](#) spreading to [close friends and family members and](#) includes upper lobe cavity illness and smear-positive sputum (Ketata et al., 2015). To lessen the toll of suffering and monetary loss brought on by this long-standing disease, adequate control methods in a more localized setting and ongoing activity evaluation are required (Margarit et al., 2017). To assess the use of a [PCR-based assay for the detection of the Mycobacterium tuberculosis complex \(MTC\)](#) in clinical settings (Muhumuza et al., 2006). [Improved diagnostic tests for active tuberculosis \(TB\)](#) are needed [to provide](#) prompt and effective treatment, provide high sensitivity for all patients, and shorten the time to diagnosis. While measuring [M.tb-specific immune responses is](#) frequently [used](#) to detect [infection in the absence of TB 2 symptoms](#) (also known as [latent TB infection](#)), immunodiagnosics are not [currently](#) used to treat active TB disease (Halliday et al., 2019). 1.1 Discovery of tuberculosis Bacteria: Paleomicrobiology has identified the tuberculosis agent in thousands of years old animal and human skeletons (Donoghue, 2016). [Robert Koch, a well-known scientist, succeeded in isolating the tubercle bacillus and revealed this amazing discovery to the Association of Physiology in Berlin on March 24, 1882](#) (Barberis et al., 2017). Figure 1. shows a 1.5 cm right lower lobe nodule that is moderately 18F-FDG avid (SUVmax 2). Cancer and TB are among the possible diagnoses for this lesion (Skoura et al., 2015). 1.2 The phases of Tuberculosis immunological life cycle (Ernst, 2012). Mycobacterium tuberculosis immune responses are only partially efficient; they typically cause the bacteria to go dormant but infrequently result in their complete elimination. Sadly, M. tuberculosis may be brought back from its latent state, and this is the main method of transmission. A thorough understanding [of the processes or correlates of immunity to M. tuberculosis infection](#), as well as the reasons why immunization fails to eliminate the pathogen, has not yet been obtained from studies in animal models or humans. It is believed that this thesis [would offer a foundation for research to comprehend immunity to M. tuberculosis and to direct the development of a tuberculosis vaccine](#) (Ernst, 2012). Figure 2. Tuberculosis immunological life cycle. 1.3 Tuberculosis Diagnosis and Management Clinical, [immunological, microscopy, radiography, and bacterial culture are](#) frequently [used techniques for TB screening and diagnosis](#). Also, to diagnose and define TB, new developments in molecular diagnostic techniques, such as [MTBDRplus, loop-mediated isothermal amplification \(LAMP\), line probe assay \(LPA\), GeneXpert, and whole genome sequencing \(WGS\), have been](#) used (Acharya et al., 2020). Outpatient care is routinely used to treat active TB. To plan visits and increase adherence, [patients with active TB should be managed in](#) cooperation [with regional public health offices and TB control](#) organizations. [Patients with active TB should wear a basic surgical mask when they are](#) outside or around other individuals (Sia & Wieland, 2011). 1. 4 Global status of tuberculosis The leading infectious cause of death [worldwide is tuberculosis, and drug-resistant strains of the illness pose a serious threat to the security of global health](#). On March 24, 2018, World Tuberculosis Day, [we provide an up-to-date review of the situation with the tuberculosis epidemic](#), suggested [diagnostics, medication treatments, and vaccines, progress in care delivery and prevention, progress in research and development, and](#) steps that need [to](#) be taken to speed up progress (Kochi, 1991) . One [third of the world's population](#), or around 1,700 million individuals, currently have or have had Mycobacterium TB infections. The overall prevalence of infection is comparable between industrialized and developing countries. Yet, 75% of infected people live in underdeveloped nations and 80% of infected people in industrialized countries are under the age of 50 (Floyd et al., 2018). [The prevalence of Mycobacterium tuberculosis infection is about one third of the global population. An average of 2.5 to 3.2 million cases were reported year worldwide during the past ten years, with population growth offsetting a recent little decline in notification rates.](#) In [the world, 8 million people were thought to have tuberculosis in 1990, and 2.6 to 2.9 million](#) perished [from it](#) (Islam et al., 2017). 1.5 Tuberculosis status [in Bangladesh The WHO Global TB Report](#) states [In 2016, Bangladesh was one of the world's 30 countries with the highest TB burden, and the disease claims 73, 000 lives there each year. Moreover, the prevalence of Multi Drug Resistant Tuberculosis \(MDR-TB\), which has become a serious issue for disease prevention, is rising](#) (Paton et al., 2019). Table 1: Tuberculosis status in Different Years (Stoptb, 2020): Year People developing TB On Treatment 2010 326,000 153,892 2011 330,000 154,358 2012 334,000 168,683 2013 338,000 184,506 2014 342,000 191,166 2015 346,000 206,000 2016 349,000 222,248 2017 353,000 242,639 2018 357,000 267,143 2019 361,000 291,595 2020 366,000 295,225 In comparison to GBD's estimate of 1 322 916 deaths, WHO's estimate of 1 768 482 deaths related to TB was 445 566 deaths lower, or 29% of the average of the two figures. Bangladesh (49 863) is one of the nations with the highest absolute disparities in death rates (García-Basteiro et al., 2018). 1.6 Complications of Tuberculosis: 1. Neurologic Complication: The most feared consequence of spinal TB is neurologic problems. Patients who experience paraplegia while their spinal tuberculosis is still active need active treatment and have a better prognosis than those who experience paraplegia years after the initial illness has healed. Early identification and rapid treatment can prevent neurologic dysfunctions related to active TB of the spine. Surgery should be performed while the disease is still active in order to reduce kyphosis in patients with TB of the spine who are expected to develop a severe kyphosis (60°) after finishing treatment (Jain, 2002). 2. Drug resistant: The emergence of drug-resistant TB (DR-TB), the fight [against TB and the](#) advancements [made in TB treatment over the past several decades](#) are in danger of failing. Patients with DR-TB who show poor results in antibiotic treatment regimens or who require lengthy treatment with second-line medicines or injectable medications are increasingly being considered for lung resection as a treatment option, there is no way to remove this part from our stakes (Madansein et al., 2015). 3. Thoracic sequelae: Tuberculosis can affect the lungs and extrapulmonary organs, depending on the virulence of the bacterium and the host's resistance. Whether a patient receives treatment or not, several [sequelae and difficulties can](#) develop [in the pulmonary and extrapulmonary regions of the thorax](#). These can be follow as Airway lesions include bronchiectasis, tracheobronchial stenosis, and broncholithiasis; [parenchymal lesions](#) include [tuberculoma, thin-walled cavity, cicatrization, end-stage lung destruction, aspergilloma, and bronchogenic carcinoma](#); and [vascular lesions](#) include [pulmonary or bronchial arteritis and thrombosis, bronchial artery](#) (Kim et al., 2001). 1.7 Table 2: Antitubercular Drugs (Researchgate, 2023). [Group Drugs First-line oral anti-TB agents Isoniazid, Rifampicin, Ethambutol, Pyrazinamide Injectable anti-TB agents Streptomycin, Amikacin Fluoroquinolones Moxifloxacin, Ofloxacin Oral second-line](#)

[anti-TB agents Ethionamide, Cycloserine](#) Agent [with unclear role in treatment of drug resistant TB](#) Linezolid [Isoniazid Isoniazid \(INH\)](#), a crucial [frontline anti-TB](#) medicine, has been used [to treat TB infection for more than 60 years and](#) is [one of the most](#) successful medications available. Unfortunately, [due to](#) widespread [long-term use](#) and [even abuse](#), bacterial strains that are resistant to INH are increasing in number. It has been hypothesized that adding [lipophilic moieties to the INH structure](#) may [improve the drug's ability to penetrate bacterial cells](#) and combat tuberculosis. [INH derivatives with higher lipophilicity are](#) therefore becoming [one of the most](#) promising [anti-TB](#) drugs. In fact, [the INH derivative LL-3858 is](#) currently [in the first phases of a phase II clinical trial for the treatment of TB and may](#) receive approval soon (Hu et al., 2017). Ethambutol Ethambutol, rifampicin, isoniazid, and pyrazinamide are among the earliest treatments for tuberculosis (TB). Ethambutol is regarded as a bacteriostatic medication because it prevents the bacilli from reproducing by interfering with the formation of arabinogalactan in the cell wall (Lee & Nguyen, 2020). A crucial element [of second-line therapy for the treatment of multidrug-resistant tuberculosis](#) is ethionamide (ETA). Streptomycin: The first antibiotic used in tuberculosis prevention campaigns, streptomycin, interferes with ribosome-level protein production. This study demonstrates that some clinical isolates of Mycobacterium TB exhibit streptomycin resistance due to [base substitutions at position 904 in the 16S rRNA](#) or [missense mutations in the rpsL gene, which encodes ribosomal protein S12](#) (Crofton & Mitchison, 1948). Ethionamide: A crucial element [of second-line therapy for the treatment of multidrug-resistant tuberculosis](#) is ethionamide (ETA). We have shown [that ETA is activated by S-oxidation prior to engaging with its cellular target](#) by synthesizing radiolabeled ETA and studying drug metabolites produced by entire Mycobacterium tuberculosis (MTb) cells (Riddell et al., 1960). Chapter Two Literature review If insufficient infection control measures are done, Tuberculosis are constantly vulnerable to infectious diseases. Transmission in a student setting can happen through the air, blood, saliva, or insufficient equipment sterilization. Students do not adhere to the same infection control standards despite numerous standardized processes. Our goal [was to evaluate students' knowledge, attitudes, and practices](#) related to [infection](#) prevention (Girotra et al., 2021). Bangladesh has experienced tuberculosis outbreaks more frequently than other regions of the world in recent years, endangering the health of [students and their families](#). This comprehensive [review](#) sought [to comprehend the epidemiological traits of tuberculosis \(TB\) epidemics and examine the causes of TB outbreaks in](#) bangladesh (Bao et al., 2019). [In particular, cross-sectional studies of college students' knowledge, attitudes and practices \(KAP\) in regard to TB have attracted substantial attention](#). To support procedures involving [expert consultation, pre-testing, reliability, and validity testing](#), few measuring tools have been developed. Following the stages for developing a scale, [our study](#) created [the university Students' TB Knowledge Attitudes and Practices Questionnaire](#) (Rana et al., 2015). Chapter Three Objective of study 3. Objective [of the study](#) General objective: [The purpose of this study is to](#) investigate [the Knowledge, attitude and practice](#) concerning [for](#) Tuberculosis among students at Daffodil International University. Specific objective: 1. To Identifying the maximum number Tuberculosis patient. 2. To boost them taking vaccine to newborn babies and other children. 3. To increase awareness of the society. 4. To find out the common cause of Tuberculosis. 5. To raise student's knowledge of Tuberculosis prevention. 6. To identifying The KAP phase also assisted root causes of Tuberculosis. Chapter Four METHODOLOGY 4. METHODOLOGY Type of study It was a descriptive cross-sectional study. The results of this study focus on determining the level [of knowledge, attitude, and](#) behavior [related to](#) tuberculosis infections [among university students](#). Place of the [study](#) Students at universities serve as both the study group and the targeted group. So, Daffodil International University (Ashulia) served as the site of the study. Selection of the study place The following criteria were used to choose the study location. • Feasible to study. • Easy to approach. • Young generation. Exclusion criteria Due to reluctance, some pupils were hesitant to express their opinions about the TB sickness. Inclusion criteria Students who have preconceived notions about the TB condition voluntarily participated in this study. Sampling Technique Because university students made up the study's population. So, using a single open-ended and closed-ended questionnaire for every respondent, we gathered information from 100 university students at Daffodil International University. Period of study: This particular study was carried out for just one month, from February 10 to March 10, 2023. Sample size: About 100 college students from Daffodil International University made up the sample. Selection criteria: Undergraduate and graduate students who were running. Data collection instrument Both an open-ended and a closed-ended questionnaire were prepared as part of a structured interview schedule. On the basis of the aims, knowledge, attitude, and practice pertaining, the questionnaire was created. The questionnaire was quite straightforward and simple to comprehend. Procedure of data collection In order for the respondents to grasp the goals and objectives of the study, a self- introduction session was organized prior to data collection to explain the purpose of data collection and ask for oral agreement. With the help of [open-ended and closed-ended questions](#) from [the](#) respondents, data [were](#) gathered via face-to-face interactions and an online Google form. For a single respondent, one questionnaire is used. The interviewer fills up the questionnaire after receiving the respondents' responses to the questions. Data processing and analysis The proper titles and sections were used to assemble the questions on a Google Form. As a result, an automatic summary that is both logical and helpful has been produced. Graphs, percentages, and associations between the knowledge attitude and behaviors and the various components were used to present the findings. Chapter Five Results & discussion 5. Results & discussion. 5.1 [Socio-demographic characteristics of the study respondents](#) [Respondent distribution according to socio-demographic characteristics is shown in Table 1](#). There were a total of 100 respondents that took part in this poll individually. Most of them are in the 18 to 20 age range. Very few people in this age range were 21 to 25. There were 51% men and 49% women. They all have different professions. 33% of people live in their own homes, while 67% rent. Their educational level is likewise on par. Only 2% of people were married, leaving about 98% single. The majority of students are enrolled in the pharmacy department. Table: 01 Socio-demographic characteristic of the study respondents (N = 100). Age(year) 18-20 21-25 84 16 Gender Male Female 51 49 Marital status Unmarried Married 98 02 Housing type Own Rented 33 67 Department Pharmacy NFE CSE EEE TE THM English Software Journalism CIS BBA 45 09 18 03 03 02 12 03 02 02 01 5.2 Knowledge of Respondents' Towards Tuberculosis disease: [Table 2 summarizes the correct knowledge of Tuberculosis on signs and symptoms, its transmission and the practices that can contribute to the spread](#) with the illness cough, sneezes . [The majority of the 100 respondents correctly perceived that](#) cough more than 3 weeks (85%), weight loss (57%) and loss of appetite (55%), Night sweats (37%) are main signs and symptoms of Tuberculosis. In 94% think it is a bacterial disease and 84% respond people can infected more than once. Tuberculosis is an infectious disease correctly responded 85% and 91% correctly responded all age group can be affected. Most of the student think (77%) Tuberculosis is a life threatening disease if not diagnosed. Here highly mentionable that most of the respondents don't know that treatment available for Tuberculosis. Only 27% responded correctly of this question. Table: 02 Knowledge of Respondents' Towards Tuberculosis disease. Sl. No. Knowledge Yes(%) NO(%) 01 Tuberculosis is spread by Mycobacterium tuberculosis- 99 01 02 Tuberculosis is a bacterial disease- 94 06 03 Tuberculosis outbreak only happens during winter season- 33 67 04 A person can get Tuberculosis more than once- 84 16 05 Tuberculosis is an infectious disease- 85 15 06 Tuberculosis affects all age groups- 91 09 07 Symptoms of Tuberculosis include Cough Weight loss Loss of appetite Night sweats 85 57 55 37 08 No treatment available for Tuberculosis- 37 63 09 Tuberculosis is a life threatening disease if not diagnosed- 77 23 10 Infected by Tuberculosis before- 22 78 5.3 Attitude of Respondents' Towards Tuberculosis disease: Table 03 [shows the attitudes of respondent towards](#) Tuberculosis disease. [The majority of](#) respondent's positive attitude about the major health problem in bangladesh , its treatment and its prevention. In this study 92% students gave correct response the patient must minimize if have proper knowledge.60% student agree If a friend got tuberculosis visit him only 26% Disagree and 14% don't know. In this study vital issue high risk of tuberculosis 44% Agree and 31% Disagree ,25% don't know . Most of the students (81%) think, vaccinations decrease number of patient and 71% think Everybody has the probability to be infected by Tuberculosis. All of the student (96%) think If have Tuberculosis symptoms, will quickly see a doctor. Interestingly When found Tuberculosis reaction were Fear(56%),Surprise (36%),Sadness(42%) and only (3%) Feel shame. Table: 03. Attitude of Respondents' Towards Tuberculosis. Sl. No. Knowledge Agree N (%) Disagree N(%) I don't know 01 Tuberculosis is major health problem in Bangladesh 62% 26% 12% 02 If people have proper knowledge of tuberculosis, the patient must minimize. 92% 6% 02% 03 If a friend of yours got Tuberculosis disease, would you visit him/her? 60% 26% 14% 04 Do you

consider yourself at risk of getting Tuberculosis disease? 44% 31% 25% 05 Intake BCG vaccine can decrease number of Tuberculosis patient 81% 01% 18% 06 Everybody has the probability to be infected by Tuberculosis- 74% 18% 08% 07 If I have Tuberculosis symptoms, I will quickly see a doctor- 96% 03% 01% 08 What would be your reaction if you Fear Surprise Shame found out that you have Tuberculosis 56% 36% 03% Sadness 42% 5.4 Good practices of respondent Tuberculosis Disease. Table 04 summarizes good preventive practices against Tuberculosis. (83%) Responded correctly [always cover your mouth with a tissue](#) someone beside you [cough or sneeze](#). Most of the student (79%) think meet Tuberculosis patients without protection. Only (14%) did not maintain safe distance when visit any Tuberculosis patient. Here the alarming issue Approximately (81%) wrong responded take food in the same plate Infected TB patient. Most of the student (85%) think misuse of medicine, it can be further infected. (87%) think fresh environment can decrease the probability of infected tuberculosis. Table: 04 Practice concerning Tuberculosis. Sl. No. Knowledge Yes(%) NO(%) 01 Do you [always cover your mouth with a tissue](#) someone beside you [cough or sneeze](#)? 83% 17% 02 Do you meet Tuberculosis patients without protection? 79% 21% 03 Do you maintain safe distance when visit any Tuberculosis patient? 86% 14% 04 Do you take food in the same plate used by a Tuberculosis patient? 81% 19% 05 Do you smoke? 87% 13% 06 Do work in fresh environment? 87% 13% 07 Do you live with Tuberculosis patient longer period of time? 85% 15% 08 Misuse of medicine, it can be further infected? 85% 15%

5.5 Source of information on Tuberculosis: The sources of information about tuberculosis are listed in Table 05. Television is the 69% source of information on tuberculosis among the 100 respondents. The majority of them use social media, and 64% of them acquire their information about tuberculosis from tuberculosis. Health professionals (51%) and radio (29%) are both comparably medium sources for information on tuberculosis. Table 05. Source of Information on Tuberculosis. Sl No. Knowledge Yes(%) No(%) 01 Television 69% 21% 02 Newspapers/magazines 55% 45% 03 Radio 29% 71% 04 Social media (Facebook) 64% 46% 05 Health Professional 51% 49%

Chapter Six Discussion 06. Discussion: As [the second leading cause of death](#) worldwide, tuberculosis (TB) is a [major public health issue in Bangladesh](#) (Rana et al., 2015). 2014 saw an increase in the frequency of tuberculosis outbreaks in Bangladesh. The KAPs of at-risk populations with regard to tuberculosis among university students are described in the current study. KAP surveys are crucial for developing efficient, evidence-based preventative and control measures by improving ineffective KAPs. As far as we are aware, this is the first study on the KAPs of Daffodil University students on tuberculosis. About 35% of the students in this study did not know when tuberculosis outbreaks occurred. The most concerning problem was that 37% of respondents said there was no treatment for tuberculosis. Tuberculosis is a communicable disease. So if we prevented this disease must be maintained distance when sneeze or cough. Most of the patient infected through the air of sneeze or cough. Where we live in work or living purposes maintain fresh environment .That also can prevent infectious disease. In this study, the media (including television, social networking sites, past illnesses, news publications, radio, and health staff) was the most prevalent source of knowledge about tuberculosis. This illustrates how the general populace has been affected by government-sponsored public education efforts. The public has been made more aware by the media, especially television and social networking sites. This was comparable to reports of research conducted in Saudi Arabia (Almalki et al., 2022). The dynamism of the interactions between the factors we examined was not taken into account because our research was cross-sectional. Our sample size is small, so it's possible that it doesn't accurately represent the overall population. It is noteworthy that despite these limitations, the current findings highlight the need for more in-depth research by highlighting the gaps in the KAPs addressing Tuberculosis. 26 Chapter Seven Conclusion 07. Conclusions: The current research indicates that very few Daffodil International University students had tuberculosis. Among the participants, only one in five students had tuberculosis. Our study conducted random basis . [The current study's](#) objective [was to evaluate](#) university students' TB [knowledge, attitude and practice](#) concerning. [The current study](#) showed that university students' general understanding of tuberculosis (TB) was poor. Therefore, a health education program is required to increase university students' knowledge of TB. Recent graduates may find it simpler to overcome obstacles and have healthier lives as a result. Chapter Eight Reference Reference: (Researchgate, 2023). Classification-of-antitubercular-drugs. researchgate.net. (Stoptb, 2020). Tuberculosis situation. Stoptb. Acharya B, Acharya A, Gautam S, Ghimire SP, Mishra G, Parajuli N, Sapkota B. Advances in diagnosis of Tuberculosis: an update into molecular diagnosis of Mycobacterium tuberculosis. Mol Biol Rep. 2020 May;47(5):4065- 4075. doi: 10.1007/s11033-020-05413-7. Epub 2020 Apr 4. PMID: 32248381. Almalki ME, Almuqati FS, Alasmari R, Enani MJ, Bahwirih AA, Alloqmani AA, Alqurashi A, Hassan-Hussein A. A Cross-Sectional Study of Tuberculosis Knowledge, Attitude, and Practice Among the General Population in the Western Region of Saudi Arabia. Cureus. 2022 Oct 6;14(10):e29987. doi: 10.7759/cureus.29987. PMID: 36381904; PMCID: PMC9642831. Bao, H., Liu, K., Wu, Z., Wang, X., Chai, C., He, T., ... & Jiang, J. (2019). Tuberculosis outbreaks among students in mainland China: a systematic review and meta-analysis. BMC Infectious Diseases, 19, 1-12. Barberis, I., Bragazzi, N. L., Galluzzo, L., & Martini, M. (2017). The history of tuberculosis: from the first historical records to the isolation of Koch's bacillus. Journal of preventive medicine and hygiene, 58(1), E9. Cambau, E., & Drancourt, M. (2014). Steps towards the discovery of Mycobacterium tuberculosis by Robert Koch, 1882. Clinical Microbiology and Infection, 20(3), 196-201. Chowdhury, A. M. R., Chowdhury, S., Islam, M. N., Islam, A., & Vaughan, J. P. (1997). Control of tuberculosis by community health workers in Bangladesh. The Lancet, 350(9072), 169-172. Crofton, J., & Mitchison, D. A. (1948). Streptomycin resistance in pulmonary tuberculosis. British medical journal, 2(4588), 1009. Donoghue, H. D. (2016). Paleomicrobiology of human tuberculosis. Microbiology Spectrum, 4(4), 4-4. Ernst JD. The immunological life cycle of tuberculosis. Nat Rev Immunol. 2012 Jul 13;12(8):581-91. doi: 10.1038/nri3259. PMID: 22790178. Ernst, J. D. (2012). The immunological life cycle of tuberculosis. Nature Reviews Immunology, 12(8), 581-591. Fanning, A. (1999). Tuberculosis: 1. Introduction. Cmaj, 160(6), 837-839. Floyd K, Glaziou P, Zumla A, Ravigione M. The global tuberculosis epidemic and progress in care, prevention, and research: an overview in year 3 of the End TB era. Lancet Respir Med. 2018 Apr;6(4):299-314. doi: 10.1016/S2213- 2600(18)30057-2. PMID: 29595511 Garcia-Basteiro AL, Brew J, Williams B, Borgdorff M, Cobelens F. What is the true tuberculosis mortality burden? Differences in estimates by the World Health Organization and the Global Burden of Disease study. Int J Epidemiol. 2018 Oct 1;47(5):1549-1560. doi: 10.1093/ije/dyy144. PMID: 30010785. Girotra, C., Acharya, S., Shetty, O., Savla, S., Punjani, M., & Shah, T. (2021). Assessment of knowledge, attitude and practice towards infection control among dental undergraduate students-A cross-sectional survey. Journal of Indian Association of Public Health Dentistry, 19(1), 65. Halliday A, Masonou T, Tolosa-Wright M, Mandagere V, Lalvani A. Immunodiagnosis of active tuberculosis. Expert Rev Respir Med. 2019 Jun;13(6):521-532. doi: 10.1080/17476348.2019.1615888. Epub 2019 May 28. PMID: 31134820. https://www.bing.com/search?pglt=43&q=Insights+into+the+pharmacokinetic+properties+of+antitubercular+drugs++Scientific+Figure+on+ResearchGate.+Available+from:https%3Fwww.researchgate.net/figure/Classification-of-antitubercular-drugs-as-per-WHO-3_tbl1_301626886+accessed+30+Apr,+2023&cid=14317fbc9d3a4d6b82ad5f411163b3138aqs=edge.0.69i59.1343j0j1&FORM=ANNTA1&PC=U531 https://www.stoptb.org/static_pages/BGD_Dashboard.html Hu, Y. Q., Zhang, S., Zhao, F., Gao, C., Feng, L. S., Lv, Z. S., ... & Wu, X. (2017). Isoniazid derivatives and their anti-tubercular activity. European journal of medicinal chemistry, 133, 255-267. Islam, M. S., Sultana, R., Hasan, M. A., Horaira, M. A., & Islam, M. A. (2017). Prevalence of Tuberculosis: Present Status and Overview of Its Control System in Bangladesh. Int J Life Sci Scienti Res, 3(6), 1471-1475. Jain AK. Treatment of tuberculosis of the spine with neurologic complications. Clin Orthop Relat Res. 2002 May;(398):75-84. doi: 10.1097/00003086- 200205000-00011. PMID: 11964634. Ketata W, Rekek WK, Ayadi H, Kammoun S. Les tuberculoses extrapulmonaires [Extrapulmonary tuberculosis]. Rev Pneumol Clin. 2015 Apr-Jun;71(2- 3):83-92. French. doi: 10.1016/j.pneumo.2014.04.001. Epub 2014 Aug 15. PMID: 25131362 Kim, H. Y., Song, K. S., Goo, J. M., Lee, J. S., Lee, K. S., & Lim, T. H. (2001). Thoracic sequelae and complications of tuberculosis. Radiographics, 21(4), 839-858. Kochi, A. (1991). The global tuberculosis situation and the new control strategy of the World Health Organization. Tubercle, 72(1), 1-6. Lee, N., & Nguyen, H. (2020). Ethambutol. Madansein, R., Parida, S., Padayatchi, N., Singh, N., Master, I., Naidu, K., ... & Maeurer, M. (2015). Surgical treatment of complications of pulmonary tuberculosis, including drug-resistant tuberculosis. International Journal of Infectious Diseases, 32, 61-67. Margarit A, Simó S, Rozas L, Devà-Martínez À, Barrabeig I, Gené A,

Fortuny C, Noguera-Julian A. Tuberculosis en el adolescente; reto y oportunidad de evitar el contagio a la comunidad [Adolescent tuberculosis; a challenge and opportunity to prevent community transmission]. *An Pediatr (Barc)*. 2017 Mar;86(3):110-114. Spanish. doi: 10.1016/j.anpedi.2016.03.009. Epub 2016 Apr 11. PMID: 27079844. Muhumuza, J., Asimwe, B. B., Kayes, S., Mugenyi, P., Whalen, C., Mugerwa, R. D., ... & Joloba, M. L. (2006). Introduction of an in-house PCR for routine identification of *M. tuberculosis* in a low-income country. *The International Journal of Tuberculosis and Lung Disease*, 10(11), 1262-1267. Paton NI, Borand L, Benedicto J, Kyi MM, Mahmud AM, Norazmi MN, Sharma N, Chuchottaworn C, Huang YW, Kaswandani N, Le Van H, Lui GCY, Mao TE. Diagnosis and management of latent tuberculosis infection in 34 Asia: Review of current status and challenges. *Int J Infect Dis*. 2019 Oct;87:21-29. doi: 10.1016/j.ijid.2019.07.004. Epub 2019 Jul 10. PMID: 31301458. Rana, M., Sayem, A., Karim, R., Islam, N., Islam, R., Zaman, T. K., & Hossain, G. (2015). Assessment of knowledge regarding tuberculosis among non-medical university students in Bangladesh: a cross-sectional study. *BMC public health*, 15(1), 1-7. Riddell, R. W., Stewart, M., & Somner, A. R. (1960). Ethionamide. *British Medical Journal*, 2(5207), 1207. Sia, I. G., & Wieland, M. L. (2011, April). Current concepts in the management of tuberculosis. In *Mayo Clinic Proceedings* (Vol. 86, No. 4, pp. 348-361). Elsevier Skoura, E., Zumla, A., & Bomanji, J. (2015). Imaging in tuberculosis. *International Journal of Infectious Diseases*, 32, 87-93. Skoura, E., Zumla, A., & Bomanji, J. (2015). Imaging in tuberculosis. *International Journal of Infectious Diseases*, 32, 87-93. Sudre, P., Ten Dam, G., & Kochi, A. (1992). Tuberculosis: a global overview of the situation today. *Bulletin of the World Health Organization*, 70(2), 149. 1 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 27 28 29 30 31 32 33 35