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EVALUATING TUBERCULOSIS (TB) KNOWLEDGE, ATTITUDE, AND PRACTICES AMONG STAFF AT RURAL HEALTH CENTERS (RHCs), ISLAMABAD

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ABSTRACT

Tuberculosis is the leading infectious disease killer, with 9.4 million new cases and 1.7 million deaths annually and increasing drug-resistant TB cases. Pakistan ranks fifth in the world in terms of the prevalence of TB having 265 tuberculosis cases per 100,000 people, with 510,000 new cases and 15,000 drug-resistant cases annually. Rural Health Centers (RHCs) are crucial to the global fight against TB providing diagnosis and treatment at the primary level as rural areas have higher rates of TB. In rural Islamabad, TB treatment facilities are inadequate, and many medical staff lack the education and interpersonal skills essential for effective treatment. A structured questionnaire, modified from a study conducted in Southern Mozambique, was used to perform a cross-sectional survey. The survey was translated into Urdu and was directed at HCWs working at RHCs in Islamabad. The data was gathered from 112 participants and analyzed using SPSS software. Data of 92 HCWs was selected of which almost half had never received TB-specific training. A high degree of general TB knowledge was indicated by the average knowledge score of 15.35 out of 20. Nonetheless, notable deficiencies were detected in several domains. Most respondents recognized the significance of infection control and community participation, as evidenced by their high attitude scores. However, stigma around tuberculosis persisted as a significant problem. There were gaps in the practical understanding of TB treatment and follow-up, making the practice competency moderate. The study shows that while HCWs at RHCs in Islamabad possess a strong basic grasp of TB, there are notable gaps in their knowledge on diagnosis and treatment. Although there are many people who have positive attitudes about tuberculosis, stigma still exists. Enhancing practical skills is necessary, highlighting the need for focused training interventions and ongoing professional development. By filling in these gaps, the TB burden in Pakistan can be eventually decreased by improving TB management and control in rural areas.

1.INTRODUCTION

1.1 Background

TB is considered as a significant global health concern, with a high prevalence largely in developing countries. Pakistan being the fifth highest TB burden country faces a substantial public health challenge (1). Annually about 9.4 million people acquire TB globally and 1.7 million die due to the infection (2) and the burden of drug resistant TB has also increased between 2020-2021 (3). Total national burden of TB in Pakistan is 5.1 percent with an incidence of 265 per 100,000 population (4).Pakistan faces an estimated annual emergence of 510,000 new TB cases and 15,000 cases of drug-resistant TB.

Globally, Rural Health Centers (RHCs) are critical to TB elimination, providing essential services for detection and treatment. Integrating TB control into primary care is a key, and implementing

capacity building and quality programs are significantly improving TB care (5). One of the previous study shows that in rural Myanmar, there was a high TB infection rate (28.0%) among people aged 18-59 years. This group typically had a low economic status and limited education. Furthermore, many display a lack of knowledge and negative attitudes towards TB prevention and care (6). Moreover, in the rural communities, delays in accurate diagnosis and effective treatment escalate TB morbidity and mortality, increasing the spread of infection, and leading to the development of drug resistant TB strains (7).

In Pakistan, approximately 65% of the population resides in the rural areas where population is endangered to TB. Earlier studies have shown that TB treatment facilities, especially in rural areas, are inadequate, with problems in patient referral to DOTS facilities. Additionally, many health workers lack proper training and communication skills that are essential for the effective TB diagnosis, treatment, and patient compliance (8). The RHCs as primary healthcare facilities play a critical role in contributing largely to TB management. Studies show varying level of knowledge of HCWs in rural setting regarding TB. The KAP of HCWs regarding tuberculosis directly affects the prevention and control of the disease (9). Such studies assist in the identification of deficiencies in the efficacy of treatment provision. The current situation in rural Pakistan is not meeting the standards resulting in high TB burden (10).

1.2 Problem Statement

In Pakistan, TB represents a significant public health concern, particularly in rural areas where the disease is more prevalent and treatment options are limited. The HCWs in these settings frequently lack the current knowledge and practical skills necessary for effective TB management. This is because they have restricted access to ongoing professional development and utilize outdated educational materials. Furthermore, the widespread stigma attached to TB further impedes early diagnosis and treatment adherence.

The current level of TB KAP among HCWs in RHCs at Islamabad is not well documented, creating a significant gap in knowledge that this study aims to address. RHCs are of critical importance as they are the primary points of contact for TB patients. The management of tuberculosis in rural Islamabad is further complicated by socioeconomic and physical impediments, including restricted transportation, poor literacy rates, and financial limitations. It is of the utmost importance to enhance tuberculosis management and control by addressing these deficiencies.

1.3 Research Gap

This study addresses critical gaps in TB management among HCWs at RHCs in Islamabad. It aims to assess the depth of knowledge regarding TB diagnosis, treatment, and management, as well as explore the attitudes of medical staff towards TB as a public health concern, including their perceptions of their roles in TB care. Additionally, the study examines the current practices used for diagnosing, treating, and preventing TB, identifying both effective methods and areas needing improvement. By filling these gaps, the research seeks to enhance TB management and outcomes in the region.

1.4 Objectives

To evaluate the knowledge, attitudes and practices of RHC healthcare staff towards tuberculosis as a health issue and make recommendations based on the research to enhance TB control initiatives at RHC level.

1.5 Significance of the Research

This study supports the increasing focus on evaluating TB knowledge to enhance TB training and management in RHCs. Incompetence and a significant shortage of health staff in rural regions are particularly hurting emerging country rural districts. The cornerstone of a country's health industry is its primary healthcare system. In country like Pakistan, the expansion of primary healthcare is essential because a sizable portion of population lives in rural areas. Effective measures to close knowledge and skill gaps among RHC staff can be implemented by identifying these gaps. Enhancing the KAP of HCWs at RHCs in Islamabad about tuberculosis is the main goal of the research. Moreover, by identifying areas for staff training and practice can aid in combating

Anti-Microbial Resistance (AMR) in perspective to TB burden.

2.RESEARCH METHODOLOGY

2.1 Operational Definition:

2.1.1 Knowledge

In evaluating the knowledge score, each correct answer was assigned a value of "2," while incorrect answers received a value of "0". Good knowledge level was defined as achieving a score of 60% or above, while the ones scoring below were categorized as indicating poor knowledge.

2.1.2 Attitude

For attitude-related questions, a rating of 5 to 1 was allotted based on the selected Likert scale response for each question. A positive attitude was defined as achieving a score of 60% or above, while scores below 60% indicated negative attitude towards TB.

2.1.3 Practices

For practices, each correct practice was assigned two points. A favorable practice level was defined as achieving 60% score or above, while scores below were categorized as indicating unfavorable practice.

2.2 Research Design

The quantitative method is used in the study that adopts the cross-sectional quantitative study design. The effectiveness of KAP among healthcare professionals in RHCs and BHUs in Islamabad is evaluated using this methodology.

2.3 Methods and Tools of Data Collection

HCWs were the target audience. Based on a recent study "Knowledge, attitudes and practices regarding tuberculosis care among health workers in Southern Mozambique" (11), the questionnaire was intended to assess the KAP of healthcare professionals regarding TB. The tool was translated from English to Urdu and pretested in a pilot study.

2.4 Universe

The study's universe consists of RHCs and BHUs in Islamabad. Chosen facilities were RHC Sihala, RHC Bhara Kau, and RHC Tarlai.

2.5 Population frame

The participants of this research were the HCWs working in the RHCs of Islamabad.

2.6 Sample Size and Methodology

The sampling strategy employed in this investigation was random sampling strategy. The sample size is determined with a 95% confidence level using Slovin's algorithm. Using the formula, we were able to obtain a sample size of 112.

2.6 Data Collection and Analysis:

The Statistical Package for Social Sciences (SPSS) 27 version was used to analyze the data. The respondents' KAP scores and demographic information were compiled using descriptive statistics.

2.7 Ethical consideration:

Participation in this study was completely voluntary and anonymous. Each subject gave informed consent prior to participating in the study.

3.RESULTS

Based on the sample size, 112 people were reached for the study; 13 of them declined to take part, and 7 of the responses were excluded due to their incompleteness. Hence, 92 responses were included. 52.2% of the respondents were men, and 47.8% were women. The most common profession noted was, Lady Health Workers (LHWs) (17.4%) and lab technicians (14.1%). A significant portion of HCWs (31.5%) had less than one year of experience working with TB patients, while 29.3% had more than 10 years of expertise. Only 5.4% of respondents had received TB-specific training in the previous six months, while 52.2% said they never had it.

3.1 Demographics:

The respondents' age distribution was concentrated in the age categories of 23–32 and 33–42, which together accounted for 35.9% of the sample. The age group of 43–52 made up 19.6%, and the age groups of 53–62 and 63–68 made up 5.4% and 3.3%, respectively. The gender distribution of the participants was 52.2% male and 47.8% female.

The distribution of educational attainment demonstrated that the majority (33.7%) had completed their bachelor's degree, followed by

secondary school education (23.9%), professional technical training (15.2%), and degrees above the bachelor's level (22.8%). A mere 2.2% had obtained a matriculation certificate. The respondents were employed by a variety of BHUs and RHCs. The respondents occupied a diverse range of roles, including laboratory technicians (14.1%), doctors (9.8%), LHWs (17.4%), and various administrative and medical positions.

With regard to the respondents' length of service, a considerable proportion had been in their current position for a considerable period of time. A total of 35.9% had been employed at their respective health centres for a period of one to five years, while 33.7% had been in their roles for a decade or more. The individuals' experience in treating TB was found to vary considerably. Specifically, 31.5% had less than a year's worth of experience, 29.3% had more than ten years', and 18.5% had no experience at all.

A significant discrepancy in the availability of continuing education and preparedness was identified, with the majority of respondents (94.6%) having not received any training in the previous six months, despite 47.8% having received TB-specific training.

Table 3.1.1:

Demographic of healthcare workers at Rural Health Centers and Basic Health Units in Islamabad

SNO	Demographics	Frequency	Percentage
1	What is your age?		
	23-32	33	35.90%
	33-42	33	35.90%
	43-52	18	19.60%
	53-62	5	5.40%
	63-68	3	3.30%
2	What is your gender?		
	Male	48	52.20%
	Female	44	47.80%
3	What is your highest level of educational attainment?		
	Secondary School	22	23.90%
	Professional Technical training	14	15.20%
	Matric	2	2.20%
	Bachelors	31	33.70%
	Above Bachelors	21	22.80%
4	In which health center do you currently work?		
	BHUs	57	62%
	RHCs	35	38%
5	What is your profession within said health center?		
	Technicians	20	20%
	Nurses/LHV/LHW	36	36%
	Consultant	8	8%
	Others	34	34%

6	How long have you worked within said health center?		
	Less than 1 year	20	21.70%
	1-5 years	33	35.90%
	5-10 years	8	8.70%
	More than 10 years	31	33.70%
7	How long have you cared for patients with tuberculosis or presumptive cases of tuberculosis?		
	Less than 1 year	29	31.50%
	1-5 years	11	12.00%
	5-10 years	8	8.70%
	More than 10 years	27	29.30%
	Never	17	18.50%
8	Have you ever received tuberculosis-specific training?		
	No	48	52.20%
	Yes	44	47.80%
9	In the past 6 months have you received any tuberculosis-specific training?		
	No	87	94.60%
	Yes	5	5.40%

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	No	48	52.20%
	Yes	44	47.80%
9	In the past 6 months have you received any tuberculosis-specific training?		
	No	87	94.60%
	Yes	5	5.40%

3.2 Knowledge:

With an average knowledge score of 15.35 (SD = 3.26) out of 20 points, the respondents had a relatively good level of TB knowledge. With 85.9% correctly identifying Mycobacterium tuberculosis as the causative agent and 94.6% properly identifying droplet spread as the route of infection, knowledge of TB cause, transmission, and symptoms was strong. Nonetheless, gaps in the understanding of the most effective diagnostic methods and treatment plans were noted. 64.1% of respondents were aware of the length of first-line treatment, however only 67.4% thought sputum microscopy was the best diagnostic tool. Figure 3.2.3 shows HCWs tuberculosis knowledge. The difference is striking: 84% of respondents had poor knowledge and 16% had strong knowledge.

Table 3.2.1:

Knowledge of healthcare workers at Rural Health Centers and Basic Health Unit in Islamabad

SNO	Knowledge	Frequency	Percentage
1	What is the causative agent of tuberculosis?		
	Mycobacterium tuberculosis	79	85.90%
	Mycobacterium avium	4	4.30%
	Mycobacterium pneumoniae	7	7.60%
	Mycobacterium leprae	2	2.20%
2	How does tuberculosis spread?		
	Sexually	1	1.10%
	By droplet spread	87	94.60%
	By direct contact	2	2.20%
	By sharing needles	2	2.20%
3	Have you received training on the Tuberculosis Infection Control Plan content?		
	No	50	54.30%
	Yes	42	45.70%
4	What is the most common symptom of pulmonary tuberculosis?		
	Hemoptysis	1	1.10%
	Persistent and high fever	9	9.80%
	Loss of weight	20	21.70%
	Persistent cough	62	67.40%

5	What is the best diagnostic tool for tuberculosis?		
	Blood culture	4	4.30%
	Skin test	2	2.20%
	Sputum microscopy	62	67.40%
	Culture	24	26.10%
6	Is tuberculosis a curable disease?		
	No	1	1.10%
	Yes	91	98.90%
7	How long is the first line treatment of pulmonary tuberculosis?		
	2 months	17	18.50%
	6 months	59	64.10%
	9 months	15	16.30%
	12 months	1	1.10%
8	How many drugs are used in the first line treatment of tuberculosis?		
	2	19	20.70%
	3	12	13.00%
	4	61	66.30%
9	What is multi-drug resistant tuberculosis?		
	Tuberculosis that is resistant to Isoniazid and Rifampicin	55	59.80%
	Tuberculosis that is resistant to any one tuberculosis medication	16	17.40%
	Tuberculosis that is resistant to all tuberculosis medications	13	14.10%
	Tuberculosis that is resistant to Pyrazinamide and Ethambutol	4	4.30%
	5	4	4.30%

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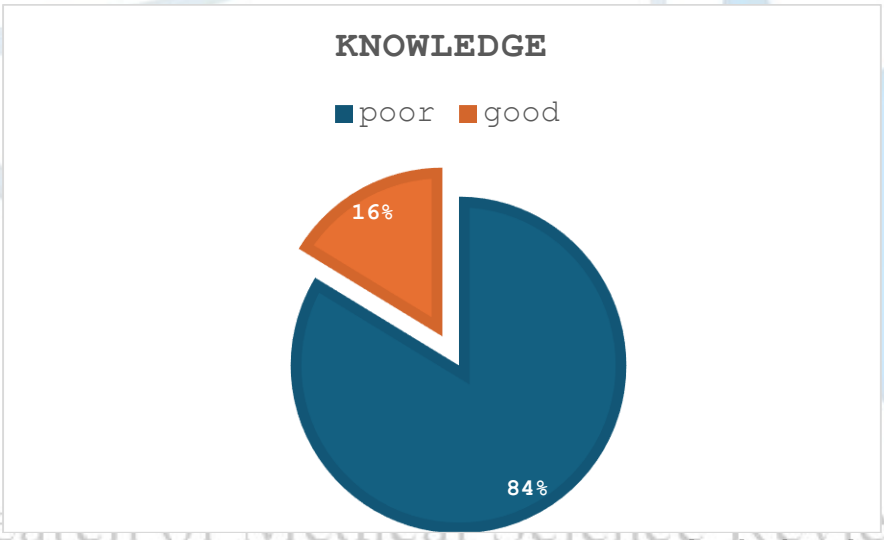
10	When is the best time for BCG vaccination?		
	At birth	84	91.30%
	At 2 months	2	2.20%
	At 6 months	6	6.50%

Table 3.2.2
Mean and standard deviation of knowledge score

Score	Mean	SD
Knowledge score	0.7717	0.42201

Figure 3.2.3
Percentage of healthcare workers at Rural Health Centers and Basic Health Unit in poor and good knowledge category



3.3 Attitude:
The attitude ratings showed a generally optimistic view of tuberculosis control and prevention. Most respondents (95.6%) and (92.4%) concurred on the significance of infection control measures and community engagement. However, opinions on the stigma associated with tuberculosis and the level of public awareness in Islamabad varied noticeably. Figure 3.3.3 shows HCWs attitudes. Only 20% of respondents have positive attitudes towards TB patients and care, whereas 80% have negative attitudes.

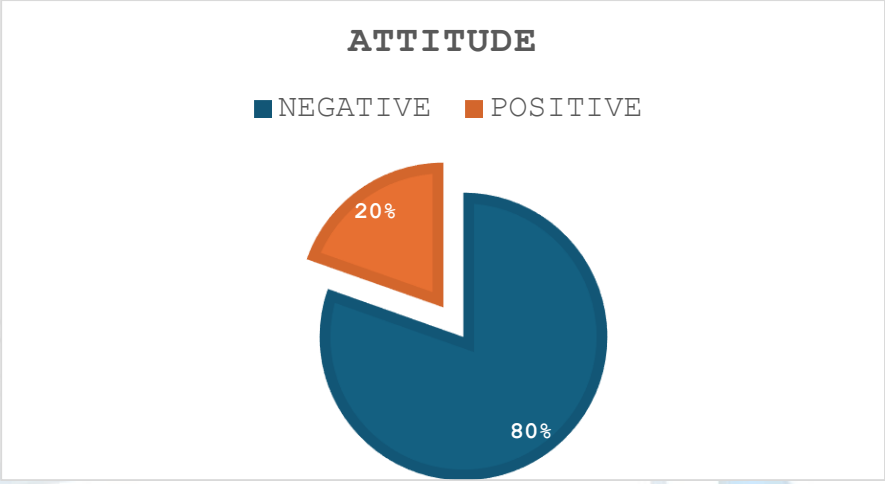
Table 3.3.1:
Attitude of healthcare workers at Rural Health Center and Basic Health Unit in Islamabad

SNO	Statement	Strongly Agree F (%)	Agree F (%)	Neutral F (%)	Disagree F (%)	Strongly Disagree F (%)
1	Finding every new case of tuberculosis is essential for control of the disease	60 (65.2%)	28 (30.4%)	1 (1.1%)	3 (3.3%)	0 (0.0%)
2	Community engagement is essential for the control of the disease	53 (57.6%)	35 (38.0%)	4 (4.3%)	0 (0.0%)	0 (0.0%)
4	Tuberculosis as a disease has more stigma associated with it than HIV	8 (8.7%)	20 (21.7%)	23 (25.0%)	33 (35.9%)	8 (8.7%)
5	Money spent on educating the general population in Islamabad is better than money spent on direct observed treatment	30 (32.6%)	43 (46.7%)	10 (10.9%)	8 (8.7%)	1 (1.1%)
6	Public awareness regarding tuberculosis in Islamabad as a health problem is adequate	14 (15.2%)	42 (45.7%)	23 (25.0%)	12 (13.0%)	1 (1.1%)
7	Multi-drug resistant tuberculosis is a problem in Islamabad	11 (12.0%)	43 (46.7%)	21 (22.8%)	15 (16.3%)	2 (2.2%)
8	First line therapies for tuberculosis are accepted by patients	19 (20.7%)	58 (63.0%)	7 (7.6%)	8 (8.7%)	0 (0.0%)
9	The laboratory service that your health center uses is adequate for the diagnosis of tuberculosis	13 (14.1%)	55 (59.8%)	6 (6.5%)	16 (17.4%)	2 (2.2%)
10	Teaching tuberculosis patients cough hygiene is not important	5 (5.4%)	4 (4.3%)	2 (2.2%)	41 (44.6%)	40 (43.5%)
11	Infection control is an important means to prevent contracting tuberculosis	48 (52.2%)	37 (40.2%)	4 (4.3%)	2 (2.2%)	1 (1.1%)

Table 3.3.2
Mean and standard deviation of attitude score

Score	Mean	SD
Attitudes score	0.9891	0.10426

Figure 3.3.3
Percentage of healthcare workers at Rural Health Centers and Basic Health Unit in Negative and Positive category



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3.4 Practices:
With an overall practice score of 0.54 (54.3%), modest practice competency was indicated. When patients had a chronic cough and other associated symptoms, 73.9% HCWs correctly diagnosed TB as the most likely cause. On the other hand, only 56.5% of respondents correctly identified the appropriate beginning treatment regimen, indicating a lack of substantial practical knowledge regarding TB therapy and follow-up. Figure 3.4.3 examines HCWs practices. It shows 64% of respondents fall into unfavorable practices and 36% in favorable.

Table 3.4.1:
Practices of healthcare workers at Rural Health Centers and Basic Health Unit in Islamabad

SNO	Practices	Frequency	Percentage
1	What is the most likely differential diagnosis and what one diagnostic test would you do to exclude your most likely differential diagnosis?		
	Influenza - Rapid influenza diagnostic test (RIDT)	13	14.10%
	Pneumonia - Chest X-ray	9	9.80%
	Tuberculosis - Sputum sample	68	73.90%
	Asthma - Pulmonary function tests (PFTs)	2	2.20%
2	What drug(s) would you use and for how long would you use them in the initial phase of tuberculosis treatment?		
	Pyrazinamide, Isoniazid, Rifampicin, and Ethambutol, for 2 months	52	56.50%
	Pyrazinamide, Isoniazid, Rifampicin, and Ethambutol, for 4 months	23	25.00%
	Rifampicin and Ethambutol, for 4 months	7	7.60%
	Isoniazid and Pyrazinamide, for 6 months	6	6.50%
	Other	4	4.30%
3	What drug(s) would you use and for how long would you use them in the continuation phase of tuberculosis treatment?		
	Isoniazid and Rifampicin, for 2 months	20	21.70%

	Isoniazid and Rifampicin, for 4 months	44	47.80%
	Ethambutol and Pyrazinamide, for 6 months	22	23.90%
	Streptomycin and Ethionamide, for 8 months	6	6.50%
4	What would you do if you have a patient that grows a positive sputum sample following four months of treatment?		
	Start new first line treatment	46	50.00%
	Continue since last intake	25	27.20%
	I do not know	18	19.60%
	Others	3	3.30%
5	What should you do if your patient has yellowish skin after three weeks of treatment?		
	Consider this as a potential side effect of drug therapy	23	25.00%
	Stop treatment	4	4.30%
	Evaluate level of liver enzymes if possible	22	23.90%
	All the above are correct	39	42.40%
	Other	4	4.30%

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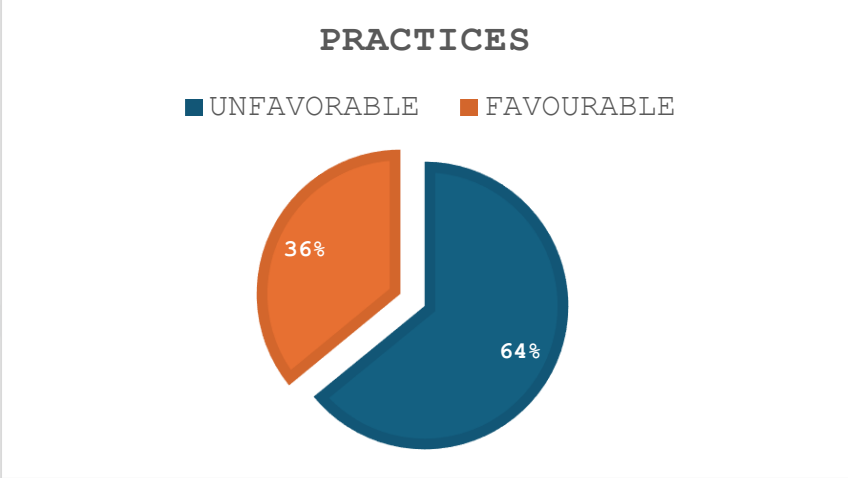
Table 3.4.2
Mean and standard deviation of practice score

Score	Mean	SD
Practices score	0.5435	0.50084

Figure 3.4.3
Percentage of healthcare workers at Rural Health Centers and Basic Health Unit in favorable and unfavorable category



4. DISCUSSION AND CONCLUSION

4.1 Discussion

This study identifies a few crucial areas where TB management at RHCs in Islamabad must be improved. The main conclusions are that: a) HCWs have a good general understanding of TB but there are notable gaps in their knowledge of specific diagnosis and treatment; b) attitudes towards TB control and prevention are mostly negative, and stigma is attached to the illness; and c) practice competencies require improvement, especially in the areas of patient management and TB treatment.

4.1.1 Knowledge:

Consistent with previous research conducted in comparable contexts, the overall knowledge ratings show that HCWs have a basic grasp of TB (12). Nonetheless, research conducted in various

low-resource contexts supports the gaps found in some areas, such as the most effective diagnosis techniques and treatment plans (13). Figure 3.2.3 reveals a significant discrepancy: 84% of the participants have inadequate knowledge, while only 16% have satisfactory knowledge. This substantial disparity suggests that while HCWs may have a foundational awareness of TB, they lack in-depth knowledge of specific diagnostic techniques and treatment protocols. The HCWs require more specialized training on the most recent testing and treatment methods.

4.1.2 Attitude:

Effective administration of tuberculosis control requires positive attitudes towards these efforts. Though the respondents' identification of the stigma surrounding TB is positive, the consensus about the significance of infection control and community engagement is concerning. Previous research has indicated that stigma is a major obstacle to tuberculosis control (14). Figure 3.3.3 illustrates that 80% of HCWs hold unfavorable views towards TB patients and the treatment provided, while only 20% display favorable views. This significant percentage of unfavorable attitudes can manifest in stigma, discrimination, reluctance to provide treatment, and a lack of empathy towards TB patients. Patients may be unwilling to seek care or report their symptoms because of this stigma, which can cause delays in diagnosis and treatment. Encouraging community involvement and education to combat stigma is crucial to enhancing TB results.

4.1.3 Practices:

The practice ratings point display the need for more in-depth instruction in the real world as well as frequent updates on TB care procedures. Previous study findings highlight the necessity of ongoing professional development that are consistent with the reported inadequacies in practical knowledge, particularly regarding the continuation phase of therapy and appropriate reactions to treatment side effects(15). Figure 3.4.3 shows that 64% of HCWs are involved in unfavorable practices, while only 36% adhere to favorable practices. Unfavorable practices may include improper medication dispensing, non-compliance with infection control standards, insufficient patient education, and poor adherence to diagnostic and treatment guidelines. This emphasizes how crucial practical skills and academic understanding are to the successful management of tuberculosis cases. Maintaining current practical skills is essential for HCWs to handle tuberculosis effectively.

4.2 Comparing with other studies

The results of this investigation are consistent with other studies of a similar nature carried out in rural areas of other nations. For example, a study carried out in rural Myanmar discovered that many HCWs had unfavorable attitudes and a lack of understanding about TB prevention and treatment, which had a detrimental effect on TB management (16) . Similarly, because of delayed diagnosis and treatment, the prevalence of TB is significantly greater in rural regions of China, where a sizable fraction of the population lives (17).

4.3 Conclusion

In terms of the management of TB, this study offers a comprehensive evaluation of the KAP of HCWs in RHCs in Islamabad. The findings indicate that while HCWs possess a satisfactory comprehension of TB, there are discernible deficiencies in specific domains, including treatment protocols and diagnostic techniques. It is evident that HCWs must participate in ongoing education and training programs to ensure that they remain up to date with the most recent TB management practices.

A positive attitude was evident with regard to tuberculosis control and prevention, with a notable emphasis on the significance of infection control methods and community involvement. Nevertheless, the persistence of stigma associated with tuberculosis underscores the necessity for targeted educational initiatives and community engagement programs to address and mitigate stigma.

Furthermore, the study revealed that HCWs demonstrated moderate proficiency in practice, particularly in patient management and tuberculosis treatment. This emphasis's the importance of providing HCWs with regular updates on TB management guidelines and improved hands-on training to guarantee that they can handle TB cases efficiently. It is also necessary to ensure that sufficient resources and support networks are provided in order to enhance the

effective implementation of TB management techniques.

The overall findings indicate the crucial role that targeted training interventions and ongoing professional development play in enhancing the efficiency of tuberculosis management at RHCs in Islamabad. It is possible for HCWs to manage TB more effectively by filling knowledge gaps, reducing stigma, and developing practical skills. This will ultimately contribute to a reduction in the TB burden in rural regions. TB is a disease that is widely spread, and good policies and training programs based on these insights can greatly improve HCWs ability to treat the disease more effectively.

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4.4 Limitations

The data collected using a cross-sectional design is captured at a particular moment in time and might not accurately represent changes in KAP over time. Secondly, because HCWs may exaggerate their knowledge or practices, response bias may arise from the reliance on self-reported data.

4.5 Practice and Policy Implications

The study's conclusions have significant ramifications for practice and legislation. It is crucial to regularly train HCWs and provide them with updates on TB care procedures to improve their knowledge and practical abilities. Additionally, providing focused interventions to close knowledge gaps—specifically, regarding treatment regimens and diagnostic tools—can improve the efficacy of TB control initiatives in remote areas.

The findings of this study have significant implications for policymakers. Addressing the identified gaps in TB KAP among HCWs is crucial for improving TB management in Islamabad's RHCs. Policymakers should prioritize the development and implementation of comprehensive training programs focused on the latest TB diagnosis and treatment protocols.

Additionally, efforts to reduce TB-related stigma through community engagement and education campaigns are essential. Enhancing resource allocation and support for RHCs can ensure better adherence to standardized TB care practices, ultimately leading to improved patient outcomes and reduced transmission rates. These measures can significantly strengthen the overall TB control strategy in the region.

4.6 Recommendation

In order to address the knowledge gaps identified among HCWs at Islamabad's RHCs, it is essential to implement ongoing education and training initiatives. The objective of these workshops is to reinforce the awareness of HCWs regarding the transmission, diagnosis, and treatment procedures of TB. It is recommended that these workshops be made mandatory. It is necessary to provide targeted training in specific areas where misconceptions have been identified, such as the correct methods of transmitting TB and the primary objectives of the DOTS program.

To enhance engagement and retention, it is recommended that interactive learning resources, including case studies, role-playing games, and quizzes, be employed. To further enhance their learning experience, e-learning programs should be made available for them to access at any time that is convenient for them. Frequent knowledge assessments, such as recurring tests and hands-on assessments, will ensure that HCWs maintain a high standard of competency and identify areas that require improvement.

To enhance the efficacy of TB control initiatives, it is imperative to address the pervasive stigma surrounding TB in the community and among medical professionals. It is imperative to implement educational initiatives that challenge unfavorable stereotypes and emphasis the value of compassion and care for TB patients. Programs designed to empower HCWs to fulfil their vital role in managing tuberculosis and promoting community health can be expected to increase dedication and morale.

Furthermore, their motivation may be enhanced by the acknowledgement and appreciation of their contributions. It is recommended that health care workers be encouraged to interact with the community more frequently through meetings and health presentations. This may help to shift public perceptions and lessen the stigma associated with tuberculosis. Furthermore, providing HCWs with access to peer support groups and mental health resources will ensure that they feel supported in their roles and assist them in coping with the emotional strain of their work.

It is also recommended that clear Standard Operating Procedures (SOPs) for TB management be created and distributed to enhance the practical capabilities of HCWs. It is imperative that the SOPs include guidelines for patient education, counselling, and follow-up procedures. To ensure that these principles are adhered to and to identify areas where HCWs may require improvement, regular assessments of their procedures should be conducted. In order to facilitate the improvement of HCWs' practice competency, it is recommended that supervisors provide mentorship and constructive criticism.

It is of the utmost importance that HCWs have access to the necessary resources, including teaching materials, diagnostic tools, and transportation, in order to ensure the delivery of optimal care. The distribution of informational materials, such as flyers, posters, and online resources, can facilitate the education of patients. It is recommended that community-based interventions be strengthened in order to provide comprehensive care and support to TB patients. This could be achieved by initiating patient support groups in the area and integrating TB management with other community health initiatives.

The implementation of these suggestions will facilitate the enhancement of the competencies, attitudes, and knowledge of the medical personnel at Islamabad's RHCs, thereby benefiting the community's endeavors to manage and prevent tuberculosis. Ultimately, the comprehensive strategy will mitigate the impact of tuberculosis and enhance health outcomes for the affected communities.

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