CORRELATION OF COMMUNITY PHARMACIST KNOWLEDGE, ATTITUDES, AND PRACTICES IN THE DETECTION OF TUBERCULOSIS CASES IN WEST JAVA PROVINCE

Cut Ainul Mardhiyyah[1,2,3*], Ahmad Azrul Zuniarto[1,4], Alfitia Dwi Amanatin[1], Hardi Ryansyah[1], Vonny Antonia[1]

[1] Faculty of Pharmacy, Universitas Yayasan Pendidikan Imam Bonjol Majalengka, Cirebon 45135, Indonesia
[2] Department of Pharmacology and Clinical Pharmacy, Faculty of Pharmacy, Universitas Padjadjaran, Sumedang 45363, Indonesia
[3] Doctoral Program of Pharmaceutical Science, Faculty of Pharmacy, Universitas Padjadjaran, Sumedang 45363, Indonesia
[4] Doctoral Program of Pharmaceutical Science, Faculty of Pharmacy, Universitas Ahmad Dahlan, Yogyakarta 55166, Indonesia
*Email Corresponding: cutainul88@gmail.com

ABSTRACT

Tuberculosis (TB) control is hampered by suboptimal case detection and treatment delays. Pharmacies are reported as a first-aid treatment for patients with TB. Therefore, researchers analyzed knowledge, attitudes, and practices (KAP) regarding TB case detection among community pharmacists, aiming to find innovative strategies to involve community pharmacists in TB case detection. The research aims to determine the level of knowledge, attitudes, and practices, and the relationship between knowledge and attitude, knowledge-practice, and attitude-practice of community pharmacists in detecting tuberculosis cases in West Java Province. This research uses a *descriptive observational method* with 419 pharmacists who practice pharmacies. The results showed that pharmacists had a sufficient level of knowledge (14.94 ± 1.99), an adequate level of attitude (63.58 ± 9.12), and a sufficient level of practice (20.58 ± 8.55) regarding TB case detection. There is a very low relationship between knowledge and attitude (*p-value* $0.024<0.05$), knowledge and practice (*p-value* $0.018>0.05$), and attitude and practice (*p-value* $0.000< 0.05$). This study concluded that community pharmacists in West Java Province have sufficient knowledge, attitudes, and practices in detecting TB cases, but the level of relationship between knowledge attitude and detecting TB cases, and the level of association between knowledge attitude and knowledge practice was very low, while the relationship between attitude practice was low.

Keywords: Pharmacist, Knowledge, Practice, Attitude, Tuberculosis

INTRODUCTION

Tuberculosis (TB) is an infectious disease caused by the acid-resistant bacterium *Mycobacteria Tuberculosis* (MTb). WHO estimates that the incidence of TB worldwide is around 10.6 million cases in countries around the world (World Health Organization, 2023). According to the 2022 World TB Report, Indonesia is ranked 2nd in the world after India, with approximately 969, 000 TB infections (World Health Organization, 2023). The number of pulmonary TB cases detected and reported was only 443,235 cases. The death rate from TB in Indonesia is approximately 150, 000 (Pasaribu et al., 2023).Click or tap here to enter text.

The prevalence of TB cases reported and treated in Indonesia is still far from the *Treatment Coverage target*; therefore, this is a major problem that must be resolved immediately. In Indonesia, in 2022, there are still many unconfirmed cases, namely 54.3% of the total 969,000 cases. Only 443,235 cases of TB were identified. There is a need to increase preventive efforts to increase case detection, considering the high number of TB cases and the large number of cases that have not yet been detected and treated (World Health Organization, 2022).

The Public Private Mix (PPM) program TB level district/city is an organized effort to build collaborative networking between the service government and private TB healthcare in TB control. The involvement of community pharmacists in the program Rahayu et al. (2022) *Public Private Mix* (PPM) in handling TB can be said not yet to be maximum because part big is limited to drug provision. The long duration of anti-tuberculosis treatment clearly requires the involvement of pharmacists from the stage of drug administration and use of medication and monitoring, including *home care pharmacies* (Yasin et al., 2016).Click or tap here to enter text.

Pharmacies are potential facilities that can help detect patients with TB. Studies in countries with a high burden of TB show that most TB patients initially visit pharmacies to receive first-aid medication. However, inappropriate management of patients with TB in pharmacies can lead to delayed diagnosis and inappropriate treatment. Inappropriate management of patients with TB in pharmacies may be caused by the low KAP of community pharmacists regarding TB. This information indicates that TB services in pharmacies are needed to improve TB screening practices and refer patients with suspected TB to health facilities to support TB case detection (Pradipta et al., 2022).

Based on research conducted on the knowledge, attitudes, and practices of community pharmacists in detecting TB cases in environments with a high burden of tuberculosis, it can be concluded that approximately 70% of the participants had correct knowledge about TB, while 70.5% answered incorrectly. Most pharmacy workers believed they had a role (75.1%) and ability (64.4%) to detect TB patients in their pharmacies. However, only a small percentage routinely practice TB case detection (2%), provide advice to patients suspected of having TB (6.6%), and communicate with TB health service providers (1.8%). Researchers have identified that TB education programs are important for improving pharmaceutical personnel's knowledge, attitudes, and practices regarding TB case detection (Pradipta et al., 2022).

Thus, there are limited or no systematic guidelines regarding the involvement of community pharmacists in TB case detection, including in the West Java Province area. As a basis for creating these guidelines, research is needed to analyze the current situation and determining factors of TB case detection practices in community pharmacists. Therefore, researchers conducted *descriptive observational research* to analyze the characteristics of respondents, knowledge, attitudes, and practices of community pharmacists in pharmacies regarding TB case detection in the West Java Province region. To the best of our knowledge, this is the first study conducted in the West Java Province region and will be very useful in developing innovative strategies to increase TB case detection in the West Java Province region and other areas with a high TB burden.

RESEARCH METHODS
Research design

This research is descriptive and observational *with* a *cross-sectional approach and* carries out observations or measurements of variables carried out at the same time in 9 cities and 18 regencies in West Java Province (Adiputra et al., 2021). The total population comprises 8,584 pharmacists working in pharmacies (PD IAI West Java, 2023). The data used are primary data obtained from the results of questionnaires filled out by pharmacists working in pharmacies in the West Java Province region.

In Indonesia, pharmacies are community pharmacies that are managed by private parties. These pharmacies can be network or independent pharmacies. According to national

regulations, a pharmacy is a facility in which pharmacists carry out pharmaceutical practices in the community. Therefore, pharmacies must be under the authority of pharmacists with a professional degree in pharmacy and a pharmaceutical license from the Ministry of Health of the Republic of Indonesia (Pradipta et al., 2022).

Research Instrument

This research used a survey method that uses a questionnaire as a research instrument to collect data. The research instrument contains *an informed consent* form to become a research respondent, a respondent characteristics form, a knowledge questionnaire, an attitude questionnaire, and a practice questionnaire. The questionnaire used in this research has been tested for validity and reliability by the Faculty of Pharmacy, Padjadjaran University No: 000408154.

The respondent characteristic domain consisted of age, gender, marital status, professional background, education level, place of work, work experience, average working hours per week, type of pharmacy (network/independent), number of pharmacies to work in, presence of practising doctors in pharmacies, provision of drug consultation services, and experience in TB training.

Knowledge questions about TB are related to TB detection activities, namely TB pathogens, transmission, symptoms, population at risk, diagnosis, and treatment. The attitude domain is defined as beliefs about the role of the profession, abilities, and consequences of TB case detection activities, and defines TB case detection practices as screening for signs and symptoms of TB, communicating with TB health workers, and referring suspected TB patients to health facilities for further examination. in the last 6 months.

Questions regarding respondent characteristics were evaluated using a combination of closed and open-ended questions. Knowledge was measured using a *Guttman scale* with 'true' and 'false' answer options. A five-point Likert scale was used to measure attitudes and practices. The scale for attitude included the options 'strongly agree,' 'agree, ' 'undecided, ' 'disagree,' and 'strongly disagree.' As for practice, the scales used were 'very often', 'often', 'sometimes', 'rarely', and 'never'.

To obtain a clear definition, the researcher defined 'very often' as practising at least weekly; 'often' as practising at least once a month; 'sometimes' as practising at least once in 2-4 months; 'rarely' as practising once in 5-6 months; and 'never' as never practising in the last 6 months.

Knowledge was measured to assess the extent to which respondents understood information related to tuberculosis (TB), including an understanding of the TB pathogen, modes of transmission, symptoms, populations at risk, methods of diagnosis, and treatment. Attitude measures respondents' beliefs and opinions regarding their role in TB case detection, including their beliefs about their abilities and the impact of TB case-detection activities. Practices refer to the frequency and consistency of actions taken by respondents in TB detection and treatment activities, including how often they screen, communicate with TB health workers, and refer patients with suspected TB for further examination.

Respondents and Data Collection

Researchers included respondents with educational backgrounds as pharmacists, masters, and doctorates, who worked as pharmacists in charge or assisting pharmacists in the pharmacy, and who had a minimum of 6 months of work experience in the pharmacy. This 6-month experience was chosen to ensure that the study captured TB case detection activities within the last 6 months. Researchers excluded participants who worked outside the pharmacy (for example, in community health centers or hospitals) or who did not meet the requirements according to national regulations.

This study used the sample size estimator from *Raosoft* online to determine the minimum sample size. The determination was made by considering a *margin of error* of 5%, confidence level of 95%, and response distribution of 50%, the researchers identified a total of 368 pharmacists as the minimum sample size in this study. The number of respondents in each region was determined by calculating the percentage of the pharmacist population in each city and district to the total population and then allocating the sample size according to

that percentage. Thus, regions with a larger pharmacist population will have a larger number of respondents and vice versa.

The research procedures included (1) a Preliminary Study to obtain population numbers. (2) Preparation of Research Instruments. Researchers prepared questionnaires for the characteristic variables and levels of KAP. (3) Ethical feasibility test by KEPK Faculty of Pharmacy UYM. (4) Permission for distributing questionnaires was submitted to PD IAI West Java. (5) Data Collection. Data collection was carried out by administering *online questionnaires* via the social media *Instagram* PD IAI West Java and the PC IAI West Java Region *WhatsApp group to pharmacists working in the West Java Province Regional Pharmacy.*

Data analysis

Data analysis in the study using descriptive analysis was used to determine the percentage of respondents' characteristics, the level of knowledge of community pharmacists, the level of attitude of community pharmacists and the level of practice of community pharmacists in detecting TB cases and *Spearman's Rank analysis* was used to determine the relationship between knowledge-attitude, knowledge-practice, and attitude-practice of community pharmacists. The analysis was performed using SPSS version 21.

RESULTS AND DISCUSSION

This study received ethical approval with no. 036/KEPK/EC/XI/2023. A total of 63 questionnaire items (18 respondent characteristics, 18 knowledge levels, 18 attitudes, and 9 practice items) were tested for validity and reliability by Kausar et al., 2023 Faculty of Pharmacy, Padjadjaran University No: 000408154. The questionnaire was distributed online *to* pharmacists working in pharmacies in the West Java Province region, consisting of 9 cities and 18 districts.

Respondent Characteristics

Researchers collected data from 419 more pharmacists than was determined as the minimum sample size. Researchers identified that the average gender is female (79.9%) because women are more interested in the Pharmacy major than men (Octavia, 2022), aged 26-35 years (62.5%), young pharmacists are more open and quickly accept technology such as social media, which is often a platform for distributing questionnaires and surveys Muflih et al., (2021), have less than 4 years of work experience (59.1%), which aligns with results age respondents where at the level This pharmacist new start enter the job market or has established career they Alone Candradewi et al., (2023), and average working hours of 26-45 hours per week (44.9%). The pharmacy locations were dominant in the Cirebon area (9.8%). Most participants had an educational level at the pharmacist's professional level (95.5%). Researchers found that only a small percentage of the respondents received drug consultation services at their pharmacies (14.8%). In terms of TB training, almost half of the participants have never attended TB training (41.8%). Therefore, every health worker should be given training or seminars related to TB disease and TB control so that they can carry out their role, especially in TB case detection, and the case detection rate of TB may continue to increase. The characteristics of the respondents can be seen in (Sumartini, 2014) Table I.

Table I. Respondent Characteristics

No	Characteristics	Amount %
Characteristics Sociodemography		
1	**Gender**	
	Man	84 (20.1)
	Woman	335 (79.9)
2	**Age**	
	<25 Years	18 (4.3)
	26-35 Years	262 (62.5)
	36-45 Years	101 (24.1)
	46-55 Years	26 (6.2)

	>56 Years	12 (2.9)
3	**Marital status**	
	Marry	114 (27.2)
	Not married yet	223 (53.2)
	Widow widower	82 (19.6)
4	**Last education**	
	Pharmacist	400 (95.5)
	Masters	18 (4.3)
	Doctor	1 (0.2)
5	**Pharmacy Location**	
	Bogor	28 (6.7)
	Sukabumi	7 (1.7)
	Cianjur	13 (3.1)
	Bandung	29 (6.9)
	Arrowroot	18 (4.3)
	Tasikmalaya	11 (2.6)
	Ciamis	11 (2.6)
	Pangandaran	4 (0.95)
	Brass	17 (4.1)
	Cirebon	41 (9.8)
	Majalengka	23 (5.5)
	Sumedang	11 (2.6)
	Indramayu	26 (6.2)
	Subang	1 (0.2)
	Purwakarta	3 (0.7)
	Karawang	22 (5.3)
	Bekasi	13 (3.1)
	West Bandung	12 (2.9)
	Bogor city	16 (3.8)
	Sukabumi City	9 (2.2)
	Bandung City	32 (7.6)
	Cirebon City	27 (6.4)
	Bekasi City	3 (0.7)
	Depok City	28 (6.7)
	Cimahi City	3 (0.7)
	Tasikmalaya City	11 (2.6)
Background Professional		
6	**Types of jobs in pharmacies**	
	Companion Pharmacist	43 (10.3)
	Responsible Pharmacist	376 (89.7)
7	**Length of time working in Pharmacy**	
	<4 Years	248 (59.1)
	4-8 Years	105 (25.1)
	>8 Years	66 (15.8)
8	**Average working hours in a pharmacy per week**	
	<25 Hours	172 (41.1)
	26-45 Hours	188 (44.9)
	46-65 Hours	51 (12.1)
	66-85 Hours	8 (1.9)
9	**Amount means pharmacy Place Work**	
	1 pharmacy	381 (90.9)
	2 pharmacies	35 (8.4)
	3 pharmacies	3 (0.7)

	More than 3 pharmacies	0
	Get drug information or consultation services	
10	Yes	62 (14.8)
	No	357 (85.2)

Characteristics Pharmacy		
11	**Type of Pharmacy**	
	Independent	360 (85.9)
	Networking	59 (14.1)
	There is a practice doctor at Pharmacy k	
12	Yes	149 (35.6)
	No	270 (64.4)

Characteristics TB related		
	Experience TB training	
	< 6 months Then	35 (8.3)
	6 months – 1 year Then	62 (14.8)
13	1-2 year Then	66 (15.8)
	> 2 years ago	81 (19.3)
	Never	175 (41.8)

Community Pharmacist Knowledge of TB

Researchers found that most questions related to TB knowledge were answered correctly by respondents. However, less than 70% of respondents gave correct answers regarding the signs and symptoms of TB, risk factors for TB, and TB treatment. Respondents answered incorrectly about risk factors related to people with a history of asthma more prone to contracting TB disease (80%). As much as 36.8% of the respondents did not know that diabetes mellitus is a risk factor for TB. In addition, despite having a background as a pharmacist, they were not familiar with TB treatment for drug-sensitive TB or how to take the drugs, either with or without food. The percentage of participants who answered correctly about the first-line regimen for drug-sensitive TB in the intensive treatment phase was 78.3%, in the continuation treatment phase was 68.3%, and regarding the use of first-line OAT drugs that are better taken on an empty stomach was only 38.9%. The proportion of correct answers to questions on TB knowledge is presented in Table II.

Table II. Knowledge questions about TB

No	Draft	Items	Answer Correct (%)
1	Causes of TB	Tuberculosis (TB) is a disease caused by viruses	79.5
2	Place infection	Tuberculosis not only attacks lungs, but also can attack: eyes, ears, bones, joints as well as other organs.	87.4
3	TB transmission	Tuberculosis can be infectious from people infected with pulmonary TB to other people passing by air through splash small or *droplet nucleus* when the person coughing, sneezing, or talking.	100
		Spark small can stay in the air for longer time in a room with minimal ventilation so that an increase risk happens TB transmission	93
4	Signs & symptoms of TB	Cough > 2 weeks is one of the signs and symptoms common pulmonary TB active	82.6
		People with pulmonary TB active, can experience cough phlegmy mixed blood	95.5
		Other possible symptoms detected in pulmonary TB patients	100

5	TB risk factors	People who have Diabetes Mellitus has more risk big For suffering from pulmonary TB	63.2
		People who are HIV positive more prone to caught TB disease	95
		Children not enough from 5 years as well as elderly own more risk big For contracting pulmonary TB	91.2
		People who have history disease asthma more prone to caught TB disease	20
6	TB diagnosis	sputum BTA microscopic test is necessary For support enforcement diagnosis of pulmonary TB	97.1
		Diagnostic methods For identifying *Mycobacterium tuberculosis* recommended by WHO	91.6
7	TB treatment	Following This is a line anti-tuberculosis drug (OAT) regimen first INTENSIVE PHASE for mature	78.3
		Following This is a line anti-tuberculosis drug (OAT) regimen first ADVANCED PHASE for mature	68.3
		A combination of Anti-Tuberculosis Drugs (OAT) is best drunk quick after Eat	61.1
8	Effect Besides OAT	Following This is the effect side of Isoniazid	95.5
		Following This is the effect side from Rifampicin	95.7

Table III. Community Pharmacist Knowledge Level

No	% Score	Number of Respondents	Category
1	$X \geq 16.93$	47	Good
2	$14.94 \leq X \leq 16.93$	278	Enough
3	$X < 12.95$	94	Bad
	Total	419	
	Average		**14.94**
	Category		**Enough**

Based on the table above, the results of this study obtained an average of 14.94, indicating that the majority of respondents had sufficient knowledge about TB. In terms of knowledge about TB, respondents showed a high understanding of several topics, such as TB transmission, signs and symptoms, diagnosis, and side effects of OAT. However, pharmacists need to strengthen their knowledge about TB risk factors and treatment because the value of this knowledge is relatively low. Inadequate TB knowledge was also reported in a private retail survey in Tanzania, which showed that participants did not fully understand TB symptoms and TB risk factors (Rutta et al., 2014). Good knowledge was associated with respondents who had a pharmacist's background. These findings highlight the importance of providing knowledge about TB to pharmaceutical personnel, because they also play a role as front guards in the pharmaceutical field. In Indonesia, pharmaceutical services are not integrated into TB programs, and there is a lack of collaboration between the government, the private sector, and community pharmacists. This has the potential to limit the role of community pharmacists in the national TB education program (Pradipta et al., 2022).

Community Pharmacists' Attitudes towards TB Case Detection

Most respondents believed that they had the role (82.5%) and ability (62.6%) to detect TB patients in their pharmacies. The majority of participants also felt guilty if they did not make an effort to detect TB patients (58.2%). On the other hand, 39.1% of the respondents believed that they had significant barriers to finding TB patients in their workplace. This shows that the majority of participants realized that they faced significant barriers in carrying out TB case detection in their pharmacies. The respondents' attitudes are presented in Table IV.

Table IV. Questions about attitudes toward detecting TB cases

No	Draft	Items	Strongly agree	Agree	Doubtful	Don't agree	Strongly Disagree
					%		
1	Role	I have a role in finding new TB cases in pharmacies I	25.5	57.0	11.7	5.3	0.5
2	Ability	I can screen signs and symptoms of TB patients suspected TB visit to the pharmacy I	14.6	48.0	23.9	12.9	0.7
3	Obstacle	I feel no significant obstacles to finding new TB cases in pharmacies I	8.1	31.0	38.7	20.5	1.7
4	Consequence	I feel guilty If No do an effort invention TB cases in pharmacies I	10.0	48.2	23.2	17.4	1.2

Attitude in Activities TB Case Detection

Table V. Community Pharmacist Attitude Level

No	% Score	Amount Respondent	Category
1	$X \geq 72.7$	37	Good
2	$54.46 \leq X \leq 72.7$	331	Enough
3	$X < 54.46$	51	Bad
	Total	419	
	Average		63.58
	Category		Enough

Based on the table above, it is known that the majority of pharmacists in West Java Province have a fair category attitude regarding their role, abilities, consequences and obstacles in detecting TB cases. This attitude can be the basis for identifying pharmacists who need increased understanding of or skills in managing TB. To improve the attitudes of pharmacists, they can carry out additional training on TB case detection. By strengthening their knowledge and skills in these areas, pharmacists can provide services to TB patients more effectively and improve their health outcomes. In addition, increasing awareness of the important role of pharmacists in TB management in the health community could be an important step.

Community Pharmacist Practices on TB Case Detection

This study shows that the majority of participants do not always practice TB case detection. Only a small proportion of respondents routinely carried out TB screening (1.7%), recommended suspected TB patients for further examination (8.4%), and communicated with TB health service providers to refer suspected TB patients (4.5%) every week for the last 6 months. Researchers have reported that more than 15% of participants had never detected TB cases in pharmacies in the last 6 months. The remainder stated that TBPD was performed every 2-6 months. TB case detection practices are listed in Table VI.

Table VI. Practice questions in TB case detection

No	Items	Very often	Often	Sometimes	Seldom	Never
				%		
1	How much often You do screening TB symptoms against visitors	1.7	8.4	27.0	34.6	28.4

No						
	suspected pharmacy have TB?					
2	How much often You give advice to visitors pharmacy suspected TB for check it out self to Public health center or means service health other ?	8.4	24.8	29.6	22.4	14.8
3	How much often You do communication to TB officers at community health centers / facilities health For refer patient suspected TB should be carried out more TB testing carry on ?	4.5	11.0	17.4	23.9	43.2

Description: Very often: at least weekly; frequently: at least monthly; occasionally: at least once in 2-4 months; infrequently: at least once in 5-6 months; never: never performed this activity in the last 6 months.

Table VII. Community Pharmacist Practice Levels

No	% Score	Amount Respondent	Category
1	$X \geq 29.14$	66	Good
2	$12.02 \leq X \leq 29.14$	282	Enough
3	$X < 12.02$	71	Bad
	Total	419	
	Average		**20.58**
	Category		**Enough**

Based on the above table, it can be seen that pharmacists have sufficient practice. Researchers found that the experience of attending TB training is important for increasing knowledge about TB, forming positive attitudes, and carrying out activities regarding TB case detection. This study emphasizes the importance of TB training in gaining knowledge about TB and positive attitudes. This knowledge and attitude can then drive TB case detection actions. This is in line with KAP theory, which states that human behavior change consists of three sequential processes, namely knowledge acquisition, attitude formation, and behavior formation (Fan et al., 2018)

Researchers have found that community pharmacies are potential facilities for increasing TB detection rates. This is because most community pharmacy officers already have basic knowledge and positive attitudes towards TB case detection. In addition, evidence shows that pharmacies are the main facility for finding first-aid drugs for patients with TB.

Relationship between Level of Knowledge-Attitude, Knowledge-Practice, and Attitude-Practice of Community Pharmacists in Detecting TB Cases

The relationships between the level of knowledge and attitude, knowledge and practice, and attitude and practice were analyzed using *Spearman's rank correlation. The following are the results of Spearman's rank* correlation analysis:

Table VIII. Analysis of the Relationship between Knowledge-Attitude, Knowledge-Practice, and Attitude-Practice of Community Pharmacists in Case Detection in the West Java Province Region

Domain	P-value	Spearman Correlation	Connection
Knowledge-Attitude	0.024	0.110	Very low
Knowledge-Practice	0.018	0.116	Very low
Attitude-Practice	0,000	0.343	Low

The test results for the correlation using the *Spearman test* showed that the relationship between knowledge and attitude was very low because the *p-value was* 0.024

<0.05, and the correlation coefficient was 0.110. The research results align with theory regarding the relationship between knowledge and attitudes. Knowledge is one factor that influences the formation of a person's attitudes. Based on experience and research, people with good knowledge tend to have positive attitudes (Sutiningsih, 2021). Knowledge and practice had a very low relationship because the *p-value was* 0.018>0.05, and the correlation coefficient was 0.116. Knowledge plays an important role in determining a practice because it forms beliefs that influence an individual's perception of reality, provide a basis for decision-making, and determine a person's practice towards an object (Sutiningsih, 2021). There was a relationship between attitude and practice in the low category because the *p-value* was 0.000<0.05, and the correlation coefficient was 0.34. 3. Pharmacists with a positive attitude tend to be involved in TB case detection practices. This is in line with L. Green's theory, which states that knowledge, attitudes, beliefs, traditions, and other factors influence individual or community practices. In addition, the availability of facilities and attitudes and practices of health workers also play a role in supporting and strengthening the formation of health behavior (Sutiningsih, 2021).

The strength of this study lies in its broad scope, involving pharmacists from various cities and districts in West Java Province, so that the results can provide a representative picture of TB detection knowledge, attitudes, and practices in this region. In addition, the use of instruments that have been tested for validity and reliability ensures that the collected data are accurate and reliable. However, this study also has limitations, one of which is the cross-sectional research design that only captures data at one point in time; therefore, it cannot identify changes or developments in knowledge, attitudes, and practices over time. In addition, because the data were collected through an online questionnaire, there is an unavoidable possibility of respondent bias, such as limited access to technology or unwillingness to participate fully. Future research should consider longitudinal methods to overcome these limitations and provide deeper insights.

CONCLUSION

This study shows that most pharmacists in West Java Province have sufficient knowledge and attitudes regarding TB detection. However, this knowledge and attitude have not been fully reflected in the practice of TB case detection. Researchers have found that TB education programs are crucial for improving KAP among pharmaceutical personnel in TB case detection activities. By strengthening TB education programs and designing strategies that involve pharmacies on an ongoing basis, it is hoped that pharmacists can increase their contribution to efforts to detect and treat TB cases, thus supporting TB control programs in Indonesia as a whole.

ACKNOWLEDGMENT

REFERENCES

Adiputra, I. M. S., Trisnadewi, N. W., Oktaviani, N. P. W., & Munthe, S. A. (2021). *Health Research Methodology*.

Candradewi, S. F., Putri, W. N., & Adiningsih, J. Y. (2023). Level of Knowledge, Perception and Attitude of Pharmacists in Pharmacies Regarding Covid-19 in Yogyakarta City. *Udayana Pharmaceutical Journal*, *43*. https://doi.org/10.24843/jfu.2022.v11.i02.p02

Fan, Y., Zhang, S., Li, Y., Li, Y., Zhang, T., Liu, W., & Jiang, H. (2018). Development and psychometric testing of the Knowledge, Attitudes and Practices (KAP) questionnaire among student Tuberculosis (TB) Patients (STBP-KAPQ) in China. *BMC Infectious Diseases*, *18*(1). https://doi.org/10.1186/s12879-018-3122-9

Muflih, S. M., Al-Azzam, S., Abuhammad, S., Jaradat, S. K., Karasneh, R., & Shawaqfeh, M. S. (2021). Pharmacists' experience, competence and perception of telepharmacy technology in response to COVID-19. *International Journal of Clinical Practice*,

75(7). https://doi.org/10.1111/ijcp.14209

Octavia, M. (2022). The Relationship of Knowledge Level to Attitudes and Behaviors Regarding Halal Pharmaceutical Products in Pharmacists in Yogyakarta City Pharmacies. *Open Journal Systems STF Muhammadiyah Cirebon*, *7*(3).

Pasaribu, R., Ahmad, Z., Andriani, L., Sudarto, S., Rasyid, A., Fathurrachman, A., & Setyorini, D. I. (2023). Actions to empower and educate tuberculosis cadres in the detection of tuberculosis cases, as well as early detection of hypertension and diabetes mellitus in Palembang. *Journal of Community Service: Humanity and Medicine*, *4*(1), 34–43. https://doi.org/10.32539/hummed.v4i1.106

PD IAI West Java. (2023). *Number of Pharmacists Working in Pharmacies in the West Java Region*.

Pradipta, I. S., Idrus, L. R., Probandari, A., Puspitasari, I. M., Santoso, P., Alffenaar, J. W. C., & Hak, E. (2022). Barriers to Optimal Tuberculosis Treatment Services at Community Health Centers: A Qualitative Study From a High Prevalent Tuberculosis Country. *Frontiers in Pharmacology*, *13*. https://doi.org/10.3389/fphar.2022.857783

Rahayu, S. R., Azam, M., Indrawati, F., Affandi, M. D., Merzistya, A. N. A., Wandastuti, A. D., Isbandi, I., Laila, A. K., & Aulia, A. (2022). Public Private Mix (PPM) Program for Tuberculosis in Health Facilities in Semarang City. *Public Health Bookchapter, State University of Semarang*, *1*. https://doi.org/10.15294/km.v1i1.69

Rutta, E., Tarimo, A., Delmotte, E., James, I., Mwakisu, S., Kasembe, D., Konduri, N., Silumbe, R., Kakanda, K., & Valimba, R. (2014). Understanding private retail drug outlet dispenser knowledge and practices in tuberculosis care in Tanzania. *International Journal of Tuberculosis and Lung Disease*, *18*(9), 1108–1113. https://doi.org/10.5588/ijtld.14.0020

Sumartini, N. P. (2014). Strengthening the Role of Health Cadres in the Discovery of BTA-Positive Tuberculosis (TB) Cases through Education with the Theory Of Planned Behavior (TPB) Approach. *Journal of Prima Health*, *8*(1), 1246–1263.

Sutiningsih, D. (2021). The Relationship between Knowledge Level and Attitude towards COVID-19 Prevention Practices in the Internet User Community in Semarang City. *Journal of Community Health Epidemiology*, *6*(2), 300–306.

World Health Organization. (2022). *Global Tuberculosis Report 2022*.

World Health Organization. (2023). *Global Tuberculosis Report 2023*.

Yasin, N. M., Wahyono, D., Riyanto, B. S., & Pusitasari, I. (2016). Pharmacist Friend Model: An Alternative Pharmacist Intervention Model for Tuberculosis Patients. *Journal of Pharmaceutical Management and Services*, *6*(3), 229–242.