



## Original Article



# A Research on Healthcare Professionals' Stigma Towards Tuberculosis Patients

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## Abstract

**OBJECTIVE:** Strong collaboration between healthcare professionals and patients is necessary for the control of tuberculosis (TB), a potentially fatal and contagious disease without treatment. Our research aims to evaluate whether healthcare professionals have stigmatizing attitudes and behaviours toward TB patients.

**MATERIAL AND METHODS:** A web-based survey of 19 questions covering clinical situations was designed. A total of 528 healthcare professionals working in different healthcare institutions across the country participated in the survey. Stigma scores were recorded on a 5-point Likert response scale ranging from -2 to +2: the extreme points were 'strongly disagree' and 'strongly agree'.

**RESULTS:** The highest stigma scores were observed in non-physician auxiliary healthcare personnel groups such as medical secretaries, social workers, dietitians, pharmacists, midwives, nurses, and nurse assistants, while the lowest scores were detected in specialist physicians and academic physicians. In demographic analyses, it was observed that healthcare workers (HCWs) who more often encounter TB cases have higher stigma scores. In addition, when evaluated according to the type of institution they work in, it was found that stigma levels were higher in pharmacies, clinics, individual medical practices, private and independent healthcare institutions, and workplaces.

**CONCLUSION:** This study can contribute to reducing the stigma levels of HCWs towards TB patients with effective training programs and appropriate health policies, thus improving the health services provided to patients.

**KEYWORDS:** Tuberculosis, stigmatization, healthcare workers, health policies

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## INTRODUCTION

Tuberculosis (TB) control continues to maintain its importance in the 21<sup>st</sup> century. Some of the reasons behind this are the increasing global climate crisis, the effects of regional conflicts and wars, mass human migrations, and disrupted TB control mechanisms during the Coronavirus disease-2019 (COVID-19) pandemic. Immigrants and refugees are more likely to disrupt TB treatments and accelerate the spread of TB in societies.<sup>1-4</sup> At this point, the attitudes and behaviours of healthcare professionals towards TB cases gain importance. Studies showed that, 80% of TB cases in various societies were subjected to stigma. It has been demonstrated that TB cases who encounter stigma tend to exhibit behaviours that will disrupt TB control and to avoid seeking medical help. Their compliance with TB treatment decreases.<sup>5,6</sup> This has led the World Health Organization to emphasize that TB stigma is a major obstacle to ending TB by 2050 and that all forms of discrimination in health should be eliminated.<sup>7</sup>

Due to professional ethics, it is more difficult to reveal the stigmatising attitudes and behaviours of health professionals towards TB cases, than to investigate society-based stigma. In addition, the negative attitudes of health professionals towards TB cases have a more negative effect on TB patients than the stigmatising attitudes of society.<sup>8,9</sup> In this context, we aimed to elucidate the attitudes and behaviours of health professionals towards TB patients and to reveal the reasons for stigma, if any.

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## MATERIAL AND METHODS

### Ethics Approval

The survey was conducted between March and June 2024. All procedures adhered to the ethical standards of the responsible institutional and national committees on human experimentation, as well as the Helsinki Declaration of 1975, revised in 2008. Ethics committee approval was granted by University of Health Sciences Türkiye, Gazi Yaşargil Training and Research Hospital (protocol number: 920, date: 05.11.2021), and informed consent was obtained from all participants. The participants' identities were kept confidential, and the data obtained were used only within the scope of this research.

### Research Design

This study involved 528 healthcare workers (HCWs) from various provinces and hospitals. A 19-question survey, designed based on clinical situations observed by the researchers in the work environment, was used to measure the participants' attitudes towards TB cases. Participants shared their opinions on TB-related clinical and work environments using a 5-point Likert scale. Only question 18 used a 3-point Likert-type scale with the options 'Yes,' 'No,' and 'No idea,' allowing participants to express opinions reflecting on their entire professional life. Responses were scored between "strongly disagree" and "strongly agree", with a stigma score of -2 and +2 at the extremes. Participants' demographic information such as age, gender, education level, specialty, institution type, and the number of patients seen annually was recorded (Table 1).

HCWs were recruited through a web-based approach. Invitations to participate in the survey were distributed via email and WhatsApp by the researchers, targeting healthcare professionals across various institutions in the country. Participation was voluntary, and all responses were anonymized to ensure confidentiality.

### Study Participants

Participants were healthcare professionals from public, university, and private institutions, and individual healthcare facilities. They included midwives, nurses, nursing assistants, general practitioners (GPs), residents, specialist physicians, academic physicians, pharmacists, dietitians, dentists, laboratory technicians, social workers, and medical secretaries.

#### Main Points

- Healthcare workers' (HCWs) stigma levels towards tuberculosis (TB) patients were found to be high, especially among non-physician auxiliary health personnel and nurses.
- HCWs who encounter TB cases more frequently have higher stigma scores.
- Stigmatized attitudes towards TB patients were found to be higher among private and individual medical practitioners.

### Data Collection and Processing Methods

Responses were scored from -2 to +2 stigma points, ranging from 'strongly disagree' to 'strongly agree'. The frequency of the responses in each question was multiplied by the coefficient of that response according to the Likert scale, and the weighted frequency (WF) of the questions was calculated. Then, the WF values were divided by the total number of participants and the Weighted Frequency Index (WFI) was obtained for each question. Since some WFI values were outside -1 and +1, WFI values were normalised by dividing them by the highest

**Table 1.** Survey statements

<b>S1</b>	If I had to examine a patient with tuberculosis, I would be putting my health at risk.
<b>S2</b>	After examining tuberculosis patients, I pay more attention than usual to hand disinfection.
<b>S3</b>	I unconsciously show bias against tuberculosis patients because they can infect me.
<b>S4</b>	In some cases, tuberculosis patients may try to infect healthcare workers deliberately, though this is not representative of all cases.
<b>S5</b>	Even though tuberculosis cases concern my specialty, I immediately refer them to the tuberculosis centre.
<b>S6</b>	Patients with tuberculosis are contagious even if they use a surgical mask.
<b>S7</b>	DOT is ineffective in controlling tuberculosis.
<b>S8</b>	Treatment of tuberculosis patients should be carried out only by pulmonologists.
<b>S9</b>	The entire treatment process of tuberculosis patients should be completed in 'Sanatorium Type' hospitals.
<b>S10</b>	Tuberculosis patients must first complete tuberculosis treatment before addressing health problems.
<b>S11</b>	In the centre where I work, tuberculosis patients cannot be hospitalised and treated because of their comorbidities.
<b>S12</b>	I feel pressure from the management of the institution where I work to refer tuberculosis patients to tuberculosis dispensaries or sanatoriums.
<b>S13</b>	Tuberculosis patients should benefit from private health services, for a fee.
<b>S14</b>	Physicians should pay attention to the socio-economic problems of tuberculosis patients.
<b>S15</b>	As a healthcare worker, if I were diagnosed with tuberculosis one day, I would not want other healthcare professionals to know about this. I am worried about not being able to receive qualified health care for my health problems at the health institution I apply to.
<b>S16</b>	I am uncomfortable interacting with tuberculosis patients in my work unit.
<b>S17</b>	I prefer to communicate with the relatives of tuberculosis patients rather than with the patients themselves.
<b>S18</b>	In the past, I treated a patient differently from usual when I knew he had tuberculosis.
<b>S19</b>	Healthcare professionals often stigmatise tuberculosis patients.

This table lists the statements used in the survey to assess attitudes and perceptions towards tuberculosis patients. Each statement reflects a different aspect of how healthcare professionals may view or interact with individuals diagnosed with tuberculosis.

DOT: Directly Observed Treatment

absolute value of WFI in our data set, thus obtaining the Normalized Weighted Frequency Index (NWFI) ranging from -1 to +1 (Table 2). WF and NWFI were calculated to assess stigma scores. These indices were determined by multiplying the frequency of each response by its corresponding stigma coefficient, summing the results, and then averaging them. The formulas and detailed calculations are provided in Appendix 1.

### Statistical Analysis

The collected data were analyzed using Statistical Package for the Social Sciences 20.0 statistical software. Descriptive statistics were calculated for demographic data, and Mann-Whitney U and Kruskal-Wallis tests were applied for group comparisons. In the analysis of stigma scores, inverse values were used to ensure that higher scores represented higher stigmatisation. Post-hoc analyses were performed by applying Mann-Whitney U tests between subgroups. The results were considered statistically significant when the *P* value was less than 0.05.

### RESULTS

A total of 528 participants were included in the study. The mean age of the participants was 42.75 years [standard deviation (SD):

9.681], and the ages ranged from 23 to 79. The age distribution was approximately normal, with a skewness value of 0.287 (SD: 0.106). 23.1% (n = 122) of the participants were under 35 years of age, 53.4% (n = 282) were between 35 and 49 years of age, and 23.5% (n = 124) were 50 years of age and older. The gender distribution was 44.3% (n = 234) male and 55.7% (n = 294) female. According to the level of education, 0.4% (n = 2) of the participants were high school graduates, 1.9% (n = 10) had an associate degree, 22.9% (n = 121) had a bachelor's degree, 50.8% (n = 268) had a master's degree, and 24.1% (n = 127) had a doctorate. In the distribution by type of healthcare professionals, 8.5% (n = 45) were midwives, nurses, and nurse assistants, 26.7% (n = 141) were other healthcare professionals, 9.7% (n = 51) were GPs, 10% (n = 53) were residents, 30.5% (n = 161) were specialist physicians, and 14.6% (n = 77) were academic physicians. In terms of branch distribution, 48.1% (n = 254) are chest diseases specialists, 13.1% (n = 69) are specialists in internal medicine and its subspecialties, 11.2% (n = 59) are GPs and dentists, 16.7% (n = 88) are non-physician health workers and 11% (n = 58) work in the surgical branch. In terms of distribution by health service level, 12.5% (n = 66) work in primary care, 18.9% (n = 100) in secondary care, and 68.6% (n = 362) in tertiary care (Table 3).

**Table 2.** Survey statements and responses with WF, WFI and NWFI

	-2 (n, %)	-1 (n, %)	0 (n, %)	+1 (n, %)	+2 (n, %)	WF	WFI	NWFI
<b>S1</b>	113 (8.4%)	135 (10.0%)	84 (6.2%)	121 (8.9%)	75 (5.5%)	-90	-0.170	-0.531
<b>S2</b>	204 (15.1%)	135 (10.0%)	51 (3.8%)	74 (5.5%)	64 (4.7%)	-341	-0.645	-1.000
<b>S3</b>	142 (10.5%)	131 (9.7%)	57 (4.2%)	87 (6.4%)	111 (8.2%)	-106	-0.200	-0.561
<b>S4</b>	60 (4.4%)	92 (6.8%)	57 (4.2%)	74 (5.5%)	245 (18.1%)	352	0.666	0.292
<b>S5</b>	150 (11.1%)	96 (7.1%)	63 (4.7%)	65 (4.8%)	154 (11.4%)	-23	-0.043	-0.406
<b>S6</b>	89 (6.6%)	111 (8.2%)	74 (5.5%)	119 (8.8%)	135 (10.0%)	100	0.189	-0.177
<b>S7</b>	11 (0.8%)	14 (1.0%)	76 (5.6%)	87 (6.4%)	340 (25.1%)	731	1.384	1.000
<b>S8</b>	64 (4.7%)	84 (6.2%)	44 (3.3%)	104 (7.7%)	232 (17.2%)	356	0.674	0.300
<b>S9</b>	110 (8.1%)	116 (8.6%)	59 (4.4%)	81 (6.0%)	162 (12.0%)	69	0.130	-0.235
<b>S10</b>	141 (10.4%)	121 (8.9%)	54 (4.0%)	73 (5.4%)	139 (10.3%)	-52	-0.098	-0.460
<b>S11</b>	95 (7.0%)	54 (4.0%)	113 (8.4%)	127 (9.4%)	138 (10.2%)	159	0.301	-0.067
<b>S12</b>	55 (4.1%)	89 (6.6%)	101 (7.5%)	92 (6.8%)	191 (14.1%)	275	0.520	0.149
<b>S13</b>	91 (6.7%)	70 (5.2%)	61 (4.5%)	70 (5.2%)	236 (17.5%)	290	0.549	0.177
<b>S14</b>	50 (3.7%)	82 (6.1%)	135 (10.0%)	124 (9.2%)	137 (10.1%)	216	0.409	0.039
<b>S15</b>	59 (4.4%)	109 (8.1%)	82 (6.1%)	104 (7.7%)	174 (12.9%)	225	0.426	0.055
<b>S16</b>	78 (5.8%)	121 (8.9%)	69 (5.1%)	107 (7.9%)	153 (11.3%)	136	0.257	-0.110
<b>S17</b>	111 (8.2%)	125 (9.2%)	87 (6.4%)	68 (5.0%)	137 (10.1%)	-5	-0.009	-0.373
<b>S18</b>	227 (16.8%)		109 (8.1%)		192 (14.2%)	-70	-0.132	-0.494
<b>S19</b>	50 (3.7%)	82 (6.1%)	139 (10.3%)	141 (10.4%)	116 (8.6%)	191	0.361	-0.007

This shows the frequencies (n) and percentages (%) of responses to survey statements, along with the WF and WFI. Responses are given on a scale from -2 (strongly disagree) to +2 (strongly agree). The WF is calculated by multiplying the frequency of each response by its corresponding weight on the Likert scale and summing these products. The WFI is obtained by dividing the WF by the number of participants. The NWFI scales the WFI values to a range between -1 and +1.

WF: Weighted Frequency, WFI: Weighted Frequency Index, NWFI: Normalized Weighted Frequency Index

**Table 3.** Summary of non-parametric test results for demographic variables

Variable	Group	N	Mean rank	Test statistic	P
Gender	Male	234	271.32	32567.000 (MWU)	0.324
	Female	293	258.15		
Age groups	<35	122	285.95	3.939 (KW)	0.140
	35-49	281	261.41		
	50+	124	248.29		
Degree	High school	2	279.25	6.637 (KW)	0.156
	Associate degree	9	266.56		
	Licence	121	294.30		
	Postgraduate	268	251.65		
HCWs type	Doctorate	127	260.76	168.902 (KW)	0.001<
	Midwife and nurse	45	242.00		
	General practitioner	51	266.58		
	Residant	53	284.16		
	Specialist physician	161	206.18		
Branches	Academic physician	77	148.70	8.500 (KW)	0.075
	Other HCWs	140	392.41		
	GPs and dentists	59	260.44		
	Internal medicine and sub-branches	69	229.60		
	Pulmonologist	254	270.51		
HC step	Surgery	58	238.60	2.889 (KW)	0.236
	Non-physician HCWs	87	291.63		
	First step	66	283.98		
Institution type	Second step	100	278.13	120.515 (KW)	0.001<
	Third step	361	256.43		
	Public institution	257	202.36		
	University institution	118	290.81		
Case numbers/year	Private institution	59	263.81	43.399 (KW)	0.001<
	Other	93	400.45		
	1-30 cases	285	250.70		
	31-100 cases	29	371.29		
	More than 100 cases	26	410.25		
	None	186	245.79		

Significant differences were found in the variables of type of HCWs, type of institution and annual number of cases ( $P < 0.05$ ). No significant difference was found in other variables.

HCWs: healthcare workers

According to the type of institution, 48.9% ( $n = 258$ ) of the participants work in a state institution, 22.3% ( $n = 118$ ) in a university institution, 11.2% ( $n = 59$ ) in a private institution, and 17.6% ( $n = 93$ ) in other institutions or individually. In the distribution according to the number of cases seen annually, 54.1% ( $n = 285$ ) see 1-30 cases, 5.5% ( $n = 29$ ) see 31-100 cases, 4.9% ( $n = 26$ ) see more than 100 cases, and 35.5% ( $n = 187$ ) do not see any cases.

Non-parametric tests are conducted to examine the differences between demographic variables, including gender, age groups, education level, type of health worker, branches, health service level, type of institution, and annual number of cases.

No significant difference was found between genders (male and female) ( $P = 0.324$ ). There was no significant difference between age groups (<35, 35-49, 50+), ( $P = 0.140$ ). There was also no significant difference in the analyses conducted according to education levels (high school, associate degree, undergraduate degree, graduate degree, doctorate) ( $P = 0.156$ ). Significant differences were found between types of HCWs ( $P < 0.001$ ). The highest stigma score was found in the "other HCWs" group (mean rank 392.41), which included social workers, medical automation personnel, dietitians, and other non-physician HCWs. Similarly, significant differences were found between types of institutions ( $P < 0.001$ ). "Other institutions" (mean rank 400.45), which included individual medical practice centres,

dental clinics, pharmacies and similar institutions, stood out as the group with the highest stigma score.

Significant differences in annual case numbers were also observed ( $P < 0.001$ ). Those with more than 100 cases (mean rank 410.25) had the highest stigma scores. No significant differences were found among other demographic variables. These results highlight the variability in stigma levels across specific demographic groups and institution types, and they suggest the need for targeted interventions to address stigma in particular groups.

### Stigma Scores by Type of Healthcare Professionals

Nurses had significantly higher stigma scores compared to other healthcare professionals ( $P < 0.001$ ) and academicians ( $P < 0.001$ ). Other healthcare professionals had substantially higher stigma scores compared to GPs ( $P < 0.001$ ), residents ( $P < 0.001$ ), specialist doctors ( $P < 0.001$ ), and academicians ( $P < 0.001$ ). In addition, GPs had higher stigma scores compared to specialist doctors ( $P = 0.026$ ) and academicians ( $P < 0.001$ ), and residents had higher stigma scores compared to specialist doctors ( $P < 0.001$ ) and academicians ( $P < 0.001$ ). Specialist doctors also had significantly higher stigma scores compared to academics ( $P < 0.001$ ). There was no significant difference between nurses and GPs ( $P = 0.458$ ), nurses and residents ( $P = 0.124$ ), nurses and specialist doctors ( $P = 0.079$ ), and GPs and residents ( $P = 0.605$ ) (Table 4).

In summary, the highest stigma scores were observed among non-physician "Other Healthcare Professionals" (mean

rank 392.41), including social workers, medical automation personnel, and dietitians. In contrast, the lowest stigma scores were observed among specialist doctors (mean rank 206.18) and academic doctors (mean rank 148.70).

The ranking by type of healthcare professionals from high to low stigma score was as follows:

- Other HCWs (392.41)
- Resident (284.16)
- GP (266.58)
- Nurse (242.00)
- Specialist (206.18)
- Academic (148.70)

### Stigma Scores by Institution Type

The post-hoc analyses revealed significant differences in stigma scores between various types of institutions. Notably, public institutions showed significant differences when compared to university institutions ( $P < 0.001$ ), private institutions ( $P = 0.002$ ), and other institutions ( $P < 0.001$ ). Similarly, university and private institutions exhibited significant differences when compared to other institutions ( $P < 0.001$ ). However, no significant difference was found between university institutions and private institutions ( $P = 0.210$ ) (Table 5).

**Table 4.** Post-hoc analysis results comparison of stigma scores among various HCW groups

Group 1	Group 2	Mean rank (group 1)	Mean rank (group 2)	MWU	Z	P
Nurse	Other HCWs	47.27	107.70	1092.000	-6.592	0.001<
Nurse	GP	46.26	50.48	1046.500	-0.742	0.458
Nurse	Residant	44.71	53.57	977.000	-1.537	0.124
Nurse	Specialist	117.30	99.64	3001.500	-1.758	0.079
Nurse	Academician	78.47	51.58	969.000	-4.053	0.001<
Other HCWs	GP	107.15	65.40	2009.500	-4.621	0.001<
Other HCWs	Residant	108.56	66.45	2091.000	-4.679	0.001<
Other HCWs	Specialist	209.13	100.45	3132.000	-10.810	0.001<
Other HCWs	Academician	141.87	49.23	788.000	-10.404	0.001<
GP	Residant	50.94	54.00	1272.000	-0.517	0.605
GP	Specialist	123.20	101.21	3254.000	-2.231	0.026
GP	Academician	80.56	53.86	1144.500	-3.988	0.001<
Residant	Specialist	132.31	99.33	2951.500	-3.365	0.001
Residant	Academician	85.83	51.51	963.000	-5.107	0.001<
Residant	Academician	129.54	98.51	4582.500	-3.254	0.001

In the ranking of stigma scores, the group with the highest stigma score was other HCWs with 392.41 points, and the group with the lowest stigma score was Academics with 148.70 points. These rankings reflect significant differences between the groups, with a  $P$  value  $< 0.05$ .

HCWs: healthcare workers, GPs: general practitioners



The order of highest to lowest stigma scores was as follows:

- Other institutions (average rank 273.30)
- University institutions (average rank 228.96)
- Private institutions (average rank 190.93)
- Public institutions (average rank 169.19)

These findings underscore variability in stigma levels and highlight the need for tailored interventions. Notably, public sector workers demonstrated lower stigma scores (202.36), while private or individual HCWs exhibited the highest stigma scores (400.45) (KW: 120.515,  $P < 0.001$ ).

### Stigma Scores According to Annual Number of Cases

The analysis of stigma scores according to the annual number of cases revealed significant differences. Specifically, significant

differences were found among the following groups: 1-30 cases and 31-100 cases ( $P < 0.001$ ), 1-30 cases and 100+ cases ( $P < 0.001$ ), 31-100 cases and no cases ( $P < 0.001$ ), and 100+ cases and no cases ( $P < 0.001$ ). However, no significant difference was found between the groups with 1-30 cases and no cases ( $P = 0.838$ ) and the groups with 31-100 cases and 100+ cases ( $P = 0.251$ ). These results indicate that the number of annual cases has a significant impact on stigma levels. HCWs who handle more cases have higher stigma scores (410.25), while those who handle no cases have lower stigma scores (245.79), (KW: 43.399,  $P < 0.001$ ) (Table 6).

### Most and Least Stigmatizing Expressions

The study identified the highest and lowest stigmatizing expressions based on NWFI values (Table 7).

**Table 5.** Post-hoc analysis results-institution type

Group 1	Group 2	Mean rank (group 1)	Mean rank (group 2)	MWU	Z	P
Public	University	169.19	228.96	10329.500	-4.960	0.001<
Public	Private	151.05	190.93	5668.000	-3.025	0.002
Public	Other	140.11	273.30	2855.500	-10.882	0.001<
University	Private	92.42	82.17	3078.000	-1.255	0.210
University	Other	88.43	128.29	3414.000	-4.711	0.001<
Private	Other	50.71	92.86	1222.000	-5.757	0.001<

There were significant differences among public, university, private, and other institutions ( $P < 0.05$ ). The highest stigma scores were recorded as other institutions (273.30), university institutions (228.96), private institutions (190.93), and public institutions (169.19), respectively

**Table 6.** Post-hoc analysis results-case number/year

Group 1	Group 2	Mean rank (group 1)	Mean rank (group 2)	MWU	Z	P
1-30	31-100	151.15	219.90	2323.000	-3.886	0.001<
1-30	100 +	148.51	238.06	1571.500	-4.862	0.001<
1-30	None	237.04	234.41	26209.500	-0.205	0.838
31-100	100 +	25.66	30.62	309.000	-1.148	0.251
31-100	None	155.74	100.56	1312.500	-4.445	0.001<
100 +	None	168.58	97.82	804.000	-5.511	0.001<

There were significant differences between 1-30 cases and 31-100 cases ( $P < 0.001$ ), 1-30 cases and 100+ cases ( $P < 0.001$ ), 31-100 cases and no cases ( $P < 0.001$ ), and 100+ cases and no cases ( $P < 0.001$ ). However, there was no significant difference between the 1-30 cases and no cases ( $P = 0.838$ ) and between the 31-100 cases and 100+ cases ( $P = 0.251$ ) groups

**Table 7.** Most and least stigmatize statements with NWFI

Most stigmatize statements	NWFI	Least stigmatize statements	NWFI
After examining tuberculosis patients, I pay more attention than usual to hand disinfection.	-1.000	DOT is ineffective in controlling tuberculosis.	1.000
I unconsciously discriminate against tuberculosis patients because they can infect me.	-0.561	Treatment of tuberculosis patients should be carried out only by chest doctors.	0.300
If I had to examine a patient with tuberculosis, I would be putting my health at risk.	-0.531	Tuberculosis patients deliberately try to infect healthcare workers.	0.292
In the past, I treated a patient differently than usual when I knew he had tuberculosis.	-0.494	Tuberculosis patients should benefit from private health services for a fee.	0.177
Tuberculosis patients must first complete tuberculosis treatment to diagnose and treat other health problems.	-0.460	I feel pressure from the management of the institution where I work to refer tuberculosis patients to tuberculosis dispensaries or sanatorium-type hospitals.	0.149
Even though the health problems of tuberculosis cases concern my branch, I immediately refer the cases to the tuberculosis centre.	-0.406	As a healthcare worker, if I were diagnosed with tuberculosis one day, I would not want healthcare professionals to know about this. Because I am worried about not being able to receive qualified health care for my health problems at the health institution I apply to.	0.055
I prefer to communicate with the relatives of tuberculosis patients rather than with them.	-0.373	Physicians should pay attention to the socio-economic problems of tuberculosis patients.	0.039
The entire treatment process of tuberculosis patients should be completed in 'Sanatorium Type' hospitals.	-0.235		
Patients with tuberculosis are contagious even if they use a surgical mask.	-0.177		
I am uncomfortable encountering tuberculosis patients in my work unit.	-0.110		
In the centre where I work, tuberculosis patients cannot be hospitalised and treated due to their comorbidities.	-0.067		
Healthcare professionals stigmatise tuberculosis cases.	-0.007		

The highest and lowest stigmatizing expressions were determined according to NWFI values. According to NWFI values, the most stigmatizing expressions were determined as S2, S3, S1, S18, S10, S5, S17, S9, S6, S16, S11, and S19, respectively. The expression with the lowest NWFI value was S2, and the value was -1.000. DOT: Directly Observed Treatment, NWFI: Normalized Weighted Frequency Index

## DISCUSSION

Higher levels of stigmatisation were observed among non-physician health personnel, including social workers, medical automation personnel, laboratory technicians, and dietitians, as well as in workplaces such as individual medical offices, dental clinics, and pharmacies. Increased stigma levels were associated with a higher number of cases. In contrast, lower stigma scores were found among academicians and specialist physicians and in public or state institutions.

Similar findings were obtained in a study by Sima et al.<sup>9</sup> on 108 health workers in rural Ethiopia. The study assessed healthcare professionals' knowledge, attitudes, and stigmatizing behaviors regarding TB, indicating that a lack of knowledge and negative attitudes could negatively impact the quality of TB care. In a survey by Shrestha et al.<sup>10</sup> on 190 HCWs in Nepal, TB infection control knowledge, attitudes, and practices were assessed. The study found that while HCWs generally had a positive attitude towards TB, there were significant knowledge and practice gaps, particularly among non-medical personnel. It is expected that stigmatising attitudes and behaviours in non-physician auxiliary healthcare personnel will decrease with increasing levels of education and knowledge about the disease. Frequent and intensive patient contact among healthcare personnel

working as midwives, nurses, and nursing assistants may explain their stigmatising attitudes and behaviors.

The stigma hindrance to TB patients' access to healthcare is well-documented. Chen et al.<sup>4</sup> noted that TB-related stigma often leads patients to neglect other health needs, thereby restricting access to general healthcare services. Bresenham et al.<sup>5</sup> highlighted that such stigma during TB care processes results in exclusion from essential medical services. This perpetuates health inequities and conflicts with the ethical principles of healthcare provision. Nyblade et al.<sup>8</sup> emphasized the discriminatory impact of stigmatizing attitudes on treatment processes, underscoring the need for interventions and awareness programs to address these challenges.<sup>6,12</sup>

Analyses based on the type of institution revealed that healthcare professionals working in public institutions have lower stigmatization scores, while those in private medical practices (e.g., private clinics, independent pharmacies, and dental treatment centers) have higher stigmatization scores. The World Health Organization's 'Ethics Guidance for the Implementation of the End TB Strategy' offers several key recommendations for private healthcare institutions. These include encouraging private healthcare providers to integrate with national TB programs, adhere to standard treatment protocols, and

participate in public health reporting. Additionally, private institutions are advised to engage in TB awareness campaigns and support patient-centered approaches.<sup>11</sup> While there is a scarcity of studies in the literature that specifically examine the stigmatizing behaviors and attitudes of healthcare professionals towards certain disease groups, research on TB and human immunodeficiency virus-related stigma generally highlights that working in public institutions is linked to higher participation in in-service training, which in turn enhances awareness of specific disease groups.<sup>9,10,12</sup> The perception among healthcare professionals that the diagnosis and treatment of TB is primarily the responsibility of public healthcare providers may contribute to the stigmatizing attitudes and behaviors observed in individual and private healthcare settings. The NWFI rankings of responses to our survey questions support this notion. For example, in Question 10, participants believed that TB cases should complete their TB treatment before addressing other health issues (NWFI -0.460); in Question 5, participants showed a tendency to refer TB cases to specialized TB centers even when these cases fell within their own specialty and scope of work (NWFI -0.406); in Question 9, participants indicated that TB cases should complete the entire treatment process in sanatorium-type hospitals (NWFI -0.235); in Question 16, participants expressed discomfort with encountering TB cases in the workplace (NWFI -0.110); and, finally, in Question 11, participants mentioned challenges in admitting TB patients for treatment of comorbidities in the hospitals where they work (NWFI -0.067).

Analyses based on the annual number of cases show that HCWs who see more cases have higher stigmatization scores. Notably, HCWs who handle more than 100 cases per year have the highest stigmatization scores. This finding suggests that the stigmatizing behaviors of HCWs increase with their intense workload and frequent patient contact. Supporting this, survey responses indicated: in Question 2, the need for more disinfection than usual after encountering a TB case (NWFI -1.00) was identified as the highest stigmatizing attitude; in Question 3, the unconscious tendency to treat TB cases differently due to the risk of infection (NWFI -0.561); in Question 1, concerns about risking health while examining a TB patient (NWFI -0.531); and in Question 17, a preference for communicating with the relatives of TB patients rather than the patients themselves (NWFI -0.373). In Question 6, the belief that TB cases are contagious, even when using surgical masks, (NWFI -0.177) was also highlighted as a stigmatizing attitude. This aligns with findings from a study by Vigenschow et al.<sup>13</sup>, which examined knowledge, attitudes, and practices regarding TB among 103 HCWs in the Moyen-Ogooué region of Gabon. In their study, 72.8% of HCWs reported fearing TB infection, and 63.1% viewed TB as a stigmatizing disease. These results emphasize the importance of supporting and training HCWs in managing infectious diseases such as TB.

Due to the absence of studies in the literature investigating the stigma levels of healthcare professionals, a study design based on clinicians' observations was used instead of a standardized stigma scale.

## CONCLUSION

HCWs have exhibited stigmatizing attitudes and behaviors towards TB cases, primarily due to concerns about infection transmission, lack of awareness that TB can be diagnosed and treated in public institutions, and the increased caseload that elevates the risk of transmission. Enhancing the TB knowledge of HCWs through formal education and in-service training programs, along with implementing measures that prioritize employee health and reduce infection transmission, can help mitigate these stigmatizing attitudes and behaviors.

## Ethics

**Ethics Committee Approval:** The study protocol was approved by the University of Health Sciences Türkiye, Gazi Yaşargil Training and Research Hospital (protocol number: 920, date: 05.11.2021).

**Informed Consent:** Informed consent was obtained from all participants.

## Footnotes

### Authorship Contributions

Concept: M.S.B., Design: M.S.B., Data Collection or Processing: M.S.B., Analysis or Interpretation: M.S.B., Literature Search: M.S.B., B.Ç., Writing: B.Ç.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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**Click the link to access Appendix 1:** <https://l24.im/8L7eFU>

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