Lack of optimum practice among health care workers regarding tuberculosis in Iran: A knowledge, attitude, and practice study

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Key Words:
Tuberculosis
Knowledge
Attitude
Practice
Health care worker
Iran

Background: Lack of knowledge toward tuberculosis (TB) among health care workers (HCWs) increases the risk of developing TB. The aim of this study was to assess the level of knowledge, attitude, and practice of HCWs in Iran.

Methods: We conducted a cross-sectional study in 50 universities of medical sciences throughout Iran. A questionnaire was developed to assess the knowledge, attitude, and practice of participants. The values of Cronbach’s coefficients for the knowledge and attitude questions were .76 and .75, respectively.

Results: The mean scores of knowledge, attitude, and practice among TB laboratory staff regarding TB was 82.6 (95% confidence interval [CI], 82.0-83.7), 87.6 (95% CI, 87.1-88.0), and 57.9 (95% CI, 56.9-58.9), respectively. The mean scores of knowledge, attitude, and practice among non-TB laboratory staff regarding TB was 69.5 (95% CI, 67.9-71.1), 50.7 (95% CI, 50.1-51.4), and 40.82 (95% CI, 38.2-43.4), respectively.

Conclusion: TB laboratory staff scored relatively well in knowledge and attitude of TB, but they scored lower in practice regarding TB. Non-TB laboratory staff had lower scores than TB laboratory staff in knowledge, attitude, and practice. There is a major gap between knowledge and attitude and practice in both groups. It is therefore essential to plan for the continuing in-service training of HCWs and public training of the general population regarding TB.

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Tuberculosis (TB), one of the world’s oldest diseases, is still one of the major killers among infectious diseases, and it is out of control in many parts of the world.1 The World Health Organization declared TB as a universal emergency in 1993.2 With the emergence and spread of multidrug resistance bacilli, it has been proposed that there will be the risk of the transformation of TB into an incurable disease.3 Recent evidence on drug resistance warns that multidrug resistant and extensive-drug resistant TB are rapidly increasing.4 It is estimated that in 2012, 8.6 million people fell ill with TB and 1.3 million died from TB. However, 95% of TB infection is believed to exist in an asymptomatic latent form, defined not by the identification of bacteria, but by a host immune response.5 Ninety-five percent of morbidity and 98% of deaths caused by TB occur in developing countries,6 and TB remains a major public health problem in Iran.7,8

TB is considered an occupational disease among health care workers (HCWs).9-12 Physicians, nurses in hospitals, and other HCWs, particularly TB laboratory staff, are at high risk for TB.11,13 The relative risk of TB infection in HCWs has been reported to be approximately 3 times higher than other groups in the community.14 The prevalence of latent TB among HCWs was reported
between 2% and 47% in Iran. Considering that HCWs, especially staff in TB laboratories, are at higher risk of latent and active TB compared with the general population, they should have appropriate knowledge, attitude, and practice (KAP) regarding transmission, prevention, and treatment of the disease.

Previous studies conducted in Iran indicate poor knowledge about TB among general physicians in the public and private health sectors, but no study to our knowledge has been conducted to evaluate KAP about TB in laboratory personnel.

Lack of knowledge of TB among HCWs may contribute to an increased risk of developing TB. Available evidence suggests that relatively simple interventions (eg, education and training of HCWs) might be effective in the prevention of TB among HCWs. Evaluating the KAP of TB in laboratory staff is essential to plan educational programs for HCWs, including TB laboratory staff, in Iran. The aim of this study was to assess the level of KAP of this group in Iran.

MATERIAL AND METHODS

Study design

This study was a nationwide cross-sectional study performed from October-December 2013 in 50 universities of medical sciences covering all provinces in Iran. After the sample size calculation we arrived at a sample of 1,016, with .05 error level. All staff (689 individuals) who were working in TB laboratories, including technical staff (experts, associated technicians, technicians) and nontechnical staff (service and administrative personnel of TB laboratory) were included in this study. Another group consisting of 327 participants (almost half of the TB laboratories’ personnel at each university, including administrative, finance, and service personnel) were also included in this study. We sent out 1,016 questionnaires and received 1,006 completed questionnaires returned; therefore, the response rate for both groups was 99.3%.

This study was approved by the Board of Ethics Committee at the Pasteur Institute of Iran. All participants enrolled voluntarily into the study and gave written, informed consent.

Developing the questionnaire

A researcher-designed questionnaire was developed according to the related scientific literature and was based on expert opinion. A panel of experts in the fields of epidemiology and microbiology along with experts at the Iranian national TB office at the Center of Disease Control and Prevention at the Ministry of Health evaluated the validity of the questionnaire. The reliability of the questionnaire was assessed by conducting a pilot study on 30 people, including TB laboratory (n = 15) and administrative staff (n = 15), at the Pasteur Institute of Iran. The mean age ± SD of participants in the pilot study was 43.3 ± 8.3 years. The values of the Cronbach’s coefficients for the knowledge and attitude questions were .76 and .75, respectively.

In the designed questionnaire, 44 questions were generated for addressing KAP among TB laboratory staff and 19 questions were generated for addressing KAP of non-TB laboratory staff regarding TB.

Because of different levels of education and responsibilities among the technical TB laboratory staff (experts, associated technicians, technicians) and nontechnical TB laboratory staff (service personnel, administrative staff), different types of practice questions for each group were designed. The TB laboratory staff questionnaire consisted of 4 sections as follows: (1) demographic variables (eg, age, sex, marital status, education level, job, responsibilities, history of work in a TB laboratory); (2) 11 three-choice questions related to knowledge regarding TB (true, false, I do not know), with a total score between 0 and 22; (3) 11 three-choice questions related to attitude toward TB (agree, no opinion, disagree), with a total score between 11 and 33; and (4) 17 questions related to the practice of TB among technical staff, with a total score between 0 and 34, and 15 questions related to practice of TB in service personnel and administrative laboratory staff, with a total score between 0 and 30. Six practice questions were related only to technical staff, and 4 questions were related only to service personnel and administrative laboratory staff. Twelve questions related to practice were asked to both mentioned groups in TB laboratories.

The non-TB laboratory staff’s questionnaire also consisted of the following 4 sections: (1) demographic variables (same as the TB laboratory staff); (2) 11 three-choice questions related to knowledge of TB (true, false, I do not know), with a total score between 0 and 22; (3) 5 three-choice questions related to attitude toward TB (agree, no opinion, disagree), with a total score between 5 and 18; and (4) 3 questions related to practice of TB, with a total score between 0 and 5. Participants’ scores of knowledge and attitude were calculated by totaling the assigned scores of all questions out of 100.

Statistical analysis

All analyses were conducted at the 5% significance level (P < .05) using Stata 11 (StataCorp, College Station, TX). Analysis of variance was used to compare the mean scores of KAP through the subgroups. The Scheffe test was used for post hoc analysis. A linear regression model was used to estimate the effect of knowledge and attitude on good practice regarding TB.

RESULTS

In this study we assessed the KAP of 689 TB laboratory staff and 317 non-TB laboratory staff (including administrative, finance, and services staff). The mean age of TB laboratory staff and non-TB laboratory staff was 38.06 ± 0.30 and 37.31 ± 0.41 years, respectively. Of the participants, 469 (68.7%) of TB laboratory staff and 227 (71.6%) of non-TB laboratory staff were men. The demographic characteristics of the 2 groups, including age, sex, education, and marital status, were not statistically different.

KAP were related to the demographic characteristics of the TB laboratory staff, but there was no statistically significant association between KAP and the demographic characteristics of non-TB laboratory staff (P > 0.05) (Table 1).

Knowledge of TB laboratory staff

Mean scores of knowledge regarding prevention of TB were 84.6 in women and 82.0 in men (P = .01). The knowledge was deferent among age groups (P = .001), and it was higher in the 32-41.9 years age group compared with the 42-51.9 years age group (P = .003). Marital status was not related to knowledge score (P = .13).

Education level was related to knowledge score (P = .001). The minimum score of knowledge belonged to elementary education, and the maximum score was related to the Masters of Science group had a higher knowledge score than the group with a diploma and lower level of education (P = .001). The Bachelor of Science group had a higher score than the group with a diploma and lower level of education (P = .001). The Masters of Science group had a higher knowledge score than the associate and lower degree groups (P < .001).

The knowledge score was related to the job group (P = .001). The service personnel group had a lower score of knowledge than the
### Table 1
Percent mean score of knowledge, attitude, and practice in TB laboratory staff and non-TB laboratory staff regarding TB by demographic variables using analysis of variance

<table>
<thead>
<tr>
<th>Variable Category</th>
<th>Knowledge</th>
<th>Attitude</th>
<th>Practice</th>
<th>Knowledge</th>
<th>Attitude</th>
<th>Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean (95% CI)</td>
<td>P value</td>
<td>Mean (95% CI)</td>
<td>P value</td>
<td>Mean (95% CI)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>220</td>
<td>84.6 (83.2-86.0)</td>
<td>.01</td>
<td>88.3 (87.5-89.0)</td>
<td>.02</td>
<td>58.3 (56.6-60.0)</td>
</tr>
<tr>
<td>Male</td>
<td>469</td>
<td>82.0 (80.9-83.1)</td>
<td></td>
<td>87.2 (86.7-87.7)</td>
<td></td>
<td>57.7 (55.8-59.5)</td>
</tr>
<tr>
<td>Age (y)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22-31.9</td>
<td>138</td>
<td>81.7 (79.7-83.7)</td>
<td>.001</td>
<td>86.9 (85.9-87.8)</td>
<td>.29</td>
<td>57.2 (55.1-59.5)</td>
</tr>
<tr>
<td>32-41.9</td>
<td>325</td>
<td>84.8 (83.6-86.0)</td>
<td></td>
<td>87.7 (87.0-88.3)</td>
<td></td>
<td>59.5 (58.1-60.9)</td>
</tr>
<tr>
<td>42-51.9</td>
<td>186</td>
<td>80.8 (79.1-82.6)</td>
<td></td>
<td>87.7 (86.9-88.5)</td>
<td></td>
<td>56.6 (54.7-58.5)</td>
</tr>
<tr>
<td>52+62</td>
<td>40</td>
<td>80.3 (76.4-84.1)</td>
<td></td>
<td>88.6 (87.2-90.1)</td>
<td></td>
<td>53.8 (49.9-57.7)</td>
</tr>
<tr>
<td>Marriage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>90</td>
<td>84.6 (82.6-86.6)</td>
<td>.13</td>
<td>88.1 (87.0-89.3)</td>
<td>.32</td>
<td>59.1 (56.5-58.8)</td>
</tr>
<tr>
<td>Married</td>
<td>599</td>
<td>82.6 (81.6-83.5)</td>
<td></td>
<td>87.5 (87.0-87.9)</td>
<td></td>
<td>57.7 (56.7-58.8)</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary</td>
<td>73</td>
<td>71.1 (68.6-73.7)</td>
<td>.001</td>
<td>86.0 (84.8-87.2)</td>
<td>.002</td>
<td>48.4 (45.6-51.3)</td>
</tr>
<tr>
<td>Intermediate</td>
<td>23</td>
<td>71.7 (66.2-77.3)</td>
<td></td>
<td>84.9 (82.2-87.5)</td>
<td></td>
<td>49.6 (45.2-54.0)</td>
</tr>
<tr>
<td>Diploma</td>
<td>95</td>
<td>76.5 (74.0-79.0)</td>
<td></td>
<td>86.7 (83.7-88.7)</td>
<td></td>
<td>50.7 (48.3-53.1)</td>
</tr>
<tr>
<td>Associate degree</td>
<td>256</td>
<td>85.0 (83.8-86.2)</td>
<td></td>
<td>88.0 (87.3-88.7)</td>
<td></td>
<td>60.2 (58.8-61.6)</td>
</tr>
<tr>
<td>Bachelor of Science</td>
<td>217</td>
<td>87.6 (86.4-88.7)</td>
<td></td>
<td>88.1 (87.7-88.8)</td>
<td></td>
<td>61.7 (60.2-63.3)</td>
</tr>
<tr>
<td>Masters of Science and higher</td>
<td>25</td>
<td>88.7 (85.1-92.3)</td>
<td></td>
<td>88.9 (86.7-91.0)</td>
<td></td>
<td>63.7 (58.0-69.4)</td>
</tr>
<tr>
<td>Job</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expert laboratory</td>
<td>221</td>
<td>87.8 (86.6-88.9)</td>
<td>.001</td>
<td>88.1 (87.4-88.8)</td>
<td>.001</td>
<td>62.3 (60.7-63.9)</td>
</tr>
<tr>
<td>Technician laboratory</td>
<td>268</td>
<td>85.2 (84.1-86.4)</td>
<td></td>
<td>88.0 (87.4-88.7)</td>
<td></td>
<td>60.7 (59.3-62.0)</td>
</tr>
<tr>
<td>Technician laboratory*</td>
<td>29</td>
<td>81.2 (77.5-84.9)</td>
<td></td>
<td>88.7 (86.9-90.5)</td>
<td></td>
<td>60.8 (57.6-64.1)</td>
</tr>
<tr>
<td>Service personnel laboratory</td>
<td>128</td>
<td>72.4 (70.5-74.3)</td>
<td></td>
<td>85.7 (84.9-86.5)</td>
<td></td>
<td>47.6 (45.9-49.2)</td>
</tr>
<tr>
<td>Administrative laboratory staff</td>
<td>13</td>
<td>80.4 (74.7-86.2)</td>
<td></td>
<td>88.1 (84.9-92.2)</td>
<td></td>
<td>45.6 (35.7-55.6)</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Finance staff</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Services personnel</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

CI, confidence interval; NA, not applicable; TB, tuberculosis.
\*Technician laboratory staff with associate degree of education.
\textsuperscript{1}Technician laboratory staff with diploma degree of education.
other groups \((P < .001)\). The technician job group had a lower knowledge score than the Bachelor of Science group \((P = .02)\), but administrative laboratory staff did not differ compared with the other job groups \((P > .05)\).

**Attitude of the TB laboratory staff**

The attitude scores were 88.3 for men and 87.2 for women \((P = .02)\). There was no statistically significant relation between attitude score and age group \((P = .29)\) and marital status \((P = .31)\); however, attitude was related to education \((P = .002)\) and job group \((P = .001)\). Increased education level was related to a greater attitude score, but post hoc analysis did not show a significant difference in attitude score in education levels.

According to post hoc analysis, the service personnel group had a lower score of attitude than the expert laboratory \((P = .002)\) and technician laboratory \((P = .002)\) job groups. Other groups did not have any significant differences compared with each other.

**Practice of the TB laboratory staff**

The practice score was not related to sex \((P = .56)\) and marital status \((P = .33)\). This score was different among age groups \((P = .01)\), education levels \((P = .001)\), and job groups \((P = .001)\).

Individuals with a higher level of education, up to an associate degree, had higher practice scores. The group with an associate degree had a higher practice score than the group with a diploma and lower educational level \((P < .001)\). The Bachelor of Science degree group had a higher score in practice than the group with a diploma or lower educational level \((P < .001)\), but the scores were the same as the associate degree group \((P = .86)\). The practice score was higher in the Masters of Science group than in the group with a diploma or lower educational level \((P < .001)\). Again the difference was not statistically significant compared with the associate degree group \((P = .85)\) and Bachelor of Science degree group \((P = .99)\).

According to the job groups, service staff had a minimum practice score, and this score was lower than any other job group \((P < .001)\). The administrator group had a lower practice score than any other job group except service staff.

**Multivariate analysis**

TB laboratory staff’s knowledge was \(.37\) higher per 1-year increase in education \((P < .001)\). An increase in history of work did not have a significant effect on knowledge of TB laboratory staff \((P = .74)\). Among non-TB laboratory staff, education had a significant effect on knowledge; the knowledge of non-TB laboratory staff was \(.16\) higher per 1-year increase in education \((P = .004)\).

Positive practice toward TB in TB laboratory staff was \(.64\) higher with 1-unit increase in the score of knowledge \((P < .001)\). In non-TB laboratory staff, positive practice toward TB was \(.08\) higher per 1-unit increase in the score of knowledge \((P < .001)\), and it was \(.10\) higher per 1-unit increase in the score of attitude \((P = .040)\) (Table 2).

**DISCUSSION**

Although the TB laboratory staff scored well in knowledge \((82.9% ± 0.44%)\) and attitude \((87.6% ± 0.21%)\), the score of practice toward TB was \(57.9% ± 0.49%\). In comparison with TB laboratory staff, non-TB laboratory staff scored lower in knowledge \((69.5% ± 0.81%)\), attitude \((50.7% ± 0.33%)\), and practice \((40.8% ± 1.32%)\) toward TB. It seems there is a gap between knowledge and practice regarding the decrease of risk of TB among laboratory staff and nonlaboratory staff. The findings of the current study are consistent with those of prior studies from other countries (eg, United States, Russia, South Africa) where several knowledge gaps regarding TB were observed.\(^{21,24,25}\)

Technical laboratory staff (experts, associated technicians, technicians) had a higher mean score in KAP than nontechnical staff (service personnel, administrative staff) in TB laboratories. The mean score of practice was especially contrasting more among technical and nontechnical TB laboratory staff. The lower KAP scores among nontechnical staff are dangerous for this group and may increase the risk of TB. A study in Iraq indicated that 95.5% of HCWs had good knowledge about TB; however, only 38.2% of HCWs had good practice regarding TB and handled suspected TB cases correctly.\(^{26}\)

Findings of the present study are consistent with that study.

The results of current study showed that the mean scores of knowledge \((P < .001)\), attitude \((P = .002)\), and practice \((P < .001)\) were significantly raised with an increase in the level of education among TB laboratory staff. Furthermore, mean scores of KAP for TB laboratory staff with a lower level of education were significantly lower than for staff with higher levels of education.

Mean scores of knowledge and practice for expert laboratory staff were more than other job control groups in TB laboratories. Mean scores of knowledge \((P < .001)\), attitude \((P < .001)\), and practice \((P < .001)\) for services staff in TB laboratories were lower than for other control groups in TB laboratories. These results are consistent with another study in Russia, where there was a significant difference in knowledge according to job category \((P < .001)\). Physicians scored significantly higher than nurses \((P = .01)\), laboratory staff \((P = .02)\), and support staff \((P < .001)\). Nurses and laboratory staff scores were significantly higher than those of support staff \((P < .001)\).\(^{21}\)

On the other hand, other studies indicated that TB is an occupational disease among HCWs (eg, physicians, nurses of hospitals, other HCWs) and particularly laboratory staff.\(^{10,11,13}\) These results emphasized that services staff in TB laboratories need more attention and more educational programs to decrease the risk of TB while working in TB laboratories.

A study in Northern Iran showed that the overall knowledge mean score among 80 medical students (interns) was 1.80 out of 5 (SD = 1.61). All interns in this study scored poorly in knowledge; none of them achieved a moderate or high score.\(^{27}\) Results of this study are inconsistent with results of the current study because the percent mean score of knowledge among laboratory staff was 82.9 regarding TB. This inconsistency may be caused by differences in the jobs of subjects in both studies. Another study in Yazd, Iran, among medical students reported the mean score of knowledge at 16.1 ± 2.06 and the attitude score at 36.08 ± 3.76; the levels of knowledge and attitude among students were moderate to high for most students. The practice score of these students was 22.8 ± 4.95, 11.9% of them scored poorly in practice.\(^{28}\) Levels of knowledge and attitude in this study are nearly consistent with results of our study.

In the present study only among TB laboratory staff, the mean score of practice was 57.9 ± 0.05.

Overall, results of our study and other studies in Iran and other countries\(^{21,11,17,18,28,29}\) emphasized the importance of knowledge of

<table>
<thead>
<tr>
<th>Group</th>
<th>Variable</th>
<th>Coefficient</th>
<th>SEM</th>
<th>95% CI</th>
<th>(P) Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB laboratory</td>
<td>Knowledge</td>
<td>0.64</td>
<td>0.08</td>
<td>0.46-0.77</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>staff</td>
<td>Attitude</td>
<td>0.20</td>
<td>0.11</td>
<td>-0.01 to 0.42</td>
<td>.061</td>
</tr>
<tr>
<td></td>
<td>Constant</td>
<td>6.73</td>
<td>2.15</td>
<td>0.53-12.92</td>
<td>.033</td>
</tr>
<tr>
<td>Non-TB labor-</td>
<td>Knowledge</td>
<td>0.05</td>
<td>0.02</td>
<td>0.04-0.124</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>oatory staff</td>
<td>Attitude</td>
<td>0.104</td>
<td>0.05</td>
<td>0.005-0.20</td>
<td>.040</td>
</tr>
<tr>
<td></td>
<td>Constant</td>
<td>-0.407</td>
<td>0.62</td>
<td>-1.52 to 0.80</td>
<td>.508</td>
</tr>
</tbody>
</table>

\(CI\), confidence interval; TB, tuberculosis.
HCWs, especially TB laboratory staff, physicians, nurses, and medical sciences students, regarding the decrease of risk of TB as an occupational disease among these groups.

Among non-TB laboratory staff the percent mean score of KAP was lower for people with lower levels of education. However, none of the differences in percent of mean scores was significant. Administrative staff had a higher mean score of KAP than finance and service personnel; however, this difference was not significant. The reason for this difference may be related to the level of education because service personnel had lower education levels than other job groups.

A study in Tehran showed that 95% of medical students had poor levels of knowledge regarding signs and symptoms of TB, whereas 32% had moderate and 9% had high levels of knowledge regarding TB. Also, 51% of them had poor knowledge about TB transmission, whereas 41% had moderate and 8% had high levels of knowledge. Concerning the prevention of TB, poor, moderate, and high knowledge levels were seen in 57%, 40%, and 3%, respectively.30 Results of the present study are, however, inconsistent with the later study. The reason for this inconsistency lies in educational, age, and job differences. Albeit the non-TB laboratory staff in our study are HCWs, they are administrative, finance, and services staff who worked in health centers of universities of medical sciences. Therefore, work setting may influence knowledge of these staff members. Nevertheless, knowledge among the general population toward prevention of TB must be improved. Health authorities must plan educational programs for the general population.

In a study conducted in Iraq among HCWs, good knowledge about TB was significantly associated with age and job duration31; whereas in our study knowledge was not associated with age (P = .19) and job duration (P = .74); however, it was associated with education (P < .001). These results may indicate that work-related retraining programs about TB in Iran are not sufficient among TB laboratory staff. If these retraining programs for TB lab staff were sufficient and effective, we expect to observe an increase in the knowledge of staff about TB.

Results of linear regression analysis show that with an increase in knowledge and attitude scores, the practice score will increase among both job groups (TB laboratory staff, nonlaboratory staff). These results emphasize the importance of in-service training programs for HCWs, especially TB laboratory staff, because the training programs can lead to positive attitude, and positive attitude can lead to positive practice regarding prevention of TB.

The strength of this study was the assessment of KAP of almost all the TB laboratories’ personnel in 50 universities of medical sciences in Iran; therefore, results of this study may be strong evidence for the planning of needed educational programs for this group.

A limitation of this study may be in the selection of non-laboratory staff. We selected nonlaboratory staff from non-HCWs (eg, administrative, financial, and service personnel in health centers of universities of medical sciences); therefore, this group may not be representative of the general population of Iran.

CONCLUSION

According to results of this study, we concluded that although TB laboratory staff had a relatively good score in knowledge and attitude regarding TB, they had a lower score in practice about TB. It is therefore essential for Iran’s health system to plan for the continuous and improving in-service training of health staff. TB awareness among TB laboratory personnel can be indicative of being in touch with a TB-related environment, which has led to further understanding and awareness of this disease.

Nonlaboratory staff had a lower score in KAP than TB laboratory staff. This result showed that there is a major gap between knowledge and attitude and practice in both groups. Non-TB laboratory staff and the general population have a lower risk of TB than HCWs, but considering that TB is endemic in Iran, planning for training interventions is necessary for the general population. Because the KAP of TB and non-TB laboratory staff were associated with an increase in education, this issue should be addressed in the planning of training interventions.

Acknowledgment

We thank all experts of TB in all universities of medical sciences throughout Iran and the experts of TB in the TB office at the Center for Disease Control and Prevention at the Ministry of Health. We also thank all the experts in the Department of Epidemiology at Pasteur Institute of Iran.

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