Avian Influenza Knowledge among Medical Students, Iran

To the Editor: Avian influenza is an infectious disease caused by type A strains of influenza virus (1). Since January 2004, Thailand and several other Southeast Asian countries have experienced outbreaks of avian influenza in poultry, and >100 million poultry have been culled or have died (www.who.int/csr/disease/avian_influenza/en). The prevalence of severe and fatal cases involving bird-to-human transmission is increasing (2). Experts fear that the avian influenza virus now circulating in Asia will mutate into a highly infectious strain and pass not only from animals to humans, but also among humans, which would lead to a pandemic (3).

During a pandemic, public health agencies and medical students will play critical roles in controlling the spread of disease (4). Therefore, medical school curricula should include specific courses in the epidemiology of avian influenza to ensure that all medical students and health care professionals will have the knowledge needed to confront a potential pandemic. In Iran, medical education comprises basic sciences (first to third year), externship (fourth to fifth year, preclinical education), and internship (sixth to seventh year). Medical students study virology during the second year of medical school. Thereafter, no additional coursework in virology is offered. Because several cases of avian influenza have been found in adjacent countries such as Turkey and Iraq, we anticipate that the virus will spread to Iran. Therefore, we designed a study to assess the knowledge of a group of Iranian medical students regarding avian influenza and to delineate the potential source of their knowledge.

The study population comprised second- and third-year medical students at the Faculty of Medicine, Tabriz University of Medical Sciences, in May 2006. We used a self-administered questionnaire that was based on information obtained from a review of the literature on avian influenza. This questionnaire (Table) comprised 3 sections: 1) demographic information, including age and sex of participants (2 items); 2) avian influenza–related questions covering general information, history, modes of transmission, clinical symptoms, and prevention (18 items); and 3) a multiple-choice question regarding the students’ source of information about avian influenza (1 item). (As shown, the questionnaire used the common parlance “bird flu” for avian influenza.) Possible responses for section 2 included “yes,” “no,” and “I don’t know.” The knowledge score was calculated by giving +1 for a correct answer, –1 for an incorrect answer, and zero for “I don’t know” responses. A total of 18 points could be achieved if all questions in section 2 were correctly answered. Higher scores indicated a greater level of knowledge. We invited 2 epidemiologists and 1 statistician to qualify and examine the questions.

Table. Respondents’ knowledge of avian influenza (n = 234), Iran, May 2006

<table>
<thead>
<tr>
<th>Questions</th>
<th>Correct answer</th>
<th>% Yes</th>
<th>% No</th>
<th>% Don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>History</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. The first case of human infection with bird flu virus occurred in Hong Kong in 1997.</td>
<td>Yes</td>
<td>27.7</td>
<td>3.2</td>
<td>69.1</td>
</tr>
<tr>
<td>2. Most fatal cases of bird flu have been reported in Vietnam.</td>
<td>Yes</td>
<td>28</td>
<td>2.2</td>
<td>69.9</td>
</tr>
<tr>
<td>General information</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Influenza virus occurs naturally among wild birds.</td>
<td>Yes</td>
<td>14.3</td>
<td>63.7</td>
<td>22</td>
</tr>
<tr>
<td>4. Bird flu may be transmitted into other mammals such as horses and pigs.</td>
<td>Yes</td>
<td>25.3</td>
<td>19.8</td>
<td>54.9</td>
</tr>
<tr>
<td>Transmission</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Transmission of the disease from person to person is possible.</td>
<td>Yes</td>
<td>47.3</td>
<td>19.8</td>
<td>33</td>
</tr>
<tr>
<td>6. Main modes of transmission are through saliva and nasal secretions.</td>
<td>Yes</td>
<td>54.2</td>
<td>13.5</td>
<td>32.3</td>
</tr>
<tr>
<td>7. Bird flu virus can be transmitted into persons through the alimentary tract.</td>
<td>No</td>
<td>74.2</td>
<td>15.7</td>
<td>10.1</td>
</tr>
<tr>
<td>8. Bird flu is transmitted into humans through handling and cleaning of contaminated game.</td>
<td>Yes</td>
<td>41.3</td>
<td>37</td>
<td>21.7</td>
</tr>
<tr>
<td>9. The consumption of contaminated chicken as broiler would have the risk of affliction.</td>
<td>Yes</td>
<td>72.2</td>
<td>21.1</td>
<td>6.7</td>
</tr>
<tr>
<td>10. Cooking eggs as soft-boiled eliminates the virus.</td>
<td>No</td>
<td>19.1</td>
<td>68.5</td>
<td>12.4</td>
</tr>
<tr>
<td>Diagnosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. A laboratory test is needed to confirm bird flu in humans.</td>
<td>Yes</td>
<td>10</td>
<td>83</td>
<td>7</td>
</tr>
<tr>
<td>Clinical presentations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Respiratory tract is the main infected system in the body.</td>
<td>Yes</td>
<td>59.8</td>
<td>9.2</td>
<td>31</td>
</tr>
<tr>
<td>13. The incubation period of bird flu is 1–7 days.</td>
<td>Yes</td>
<td>13.6</td>
<td>2.3</td>
<td>84.1</td>
</tr>
<tr>
<td>14. Symptoms of bird flu in humans are similar to seasonal influenza.</td>
<td>Yes</td>
<td>20</td>
<td>11</td>
<td>69</td>
</tr>
<tr>
<td>15. Bleeding from the nose and bleeding from the gums are early symptoms of bird flu.</td>
<td>Yes</td>
<td>2</td>
<td>13</td>
<td>85</td>
</tr>
<tr>
<td>16. Bloody diarrhea (dysestery) is one of the manifestations of bird flu.</td>
<td>No</td>
<td>30.8</td>
<td>8.8</td>
<td>60.4</td>
</tr>
<tr>
<td>Prevention</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Bird flu is a preventable infection.</td>
<td>Yes</td>
<td>86</td>
<td>4.3</td>
<td>9.7</td>
</tr>
<tr>
<td>18. There is a vaccine to protect humans from bird flu virus.</td>
<td>No</td>
<td>20.9</td>
<td>37.4</td>
<td>41.8</td>
</tr>
</tbody>
</table>
sent in mean ± standard deviation or percentage when appropriate. Statisti-
cal analysis was performed by SPSS Windows version 12.0 (SPSS Inc.,
Chicago, IL, USA) using the \( \chi^2 \) test; p value was set at 0.05.

Two hundred thirty-four of 252 second- and third-year medical stu-
dents completed the questionnaire. The mean age of the respondents was 19
± 0.87 years (range 18–23). Twenty-nine percent (n = 68) of the students
were male and 71% (n = 166) were female.

The mean knowledge score was 4.76 of 18 (total of correct and in-
correct responses) (range –6 to 11). Second- and third-year students com-
parably responded to 16/18 questions (\( \chi^2 \) test). A list of questions and the
percentage of students’ responses are provided in the Table.

Most of the respondents (67.2%) indicated that mass media (radio,
television, and newspapers) was their major source of information about
avian influenza, followed by scientific books and journals (8.3%), the Inter-
net, (13%), and family and friends (10.4%). Only 1.1% of the medical
students mentioned “school educational materials” as the source of their
information.

Our study shows a relatively low level of knowledge of avian influenza
among a group of Iranian medical students. Surprisingly, mass media was
the main source of information in our study. Training health care profes-
sionals as well as medical students is of great importance in controlling in-
fected diseases. The findings of this study should be considered seriously
by local health centers and disease control agencies because preparing
health care professionals with sufficient knowledge is essential to con-
fronting a potential pandemic. We believe that the low level of knowledge
about avian influenza among these medical students is primarily a reflec-
tion of insufficient academic courses in the medical school curriculum.

We strongly recommend improving the quality of education on this topic
through access to textbooks, articles, seminars, and specific courses.

Kamyar Ghabili,*
Mohammadali M. Shojaa,*
and Pooya Kamran*

*Tabriz University of Medical Sciences,
Tabriz, Iran

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Address for correspondence: Kamyar Ghabili,
Tuberculosis and Lung Diseases Research
Center, Tabriz University of Medical Sciences,
Danesghah St, Tabriz, Iran; email: kghabili@gmail.com

Lorraine Strain of
Legionella pneumophila
Serogroup 1, France

To the Editor: Legionellosis is a pneumonia caused by inhalation of Le-
gionella spp. in aerosol water particles. Legionella pneumophila is responsible
for 890% of cases; serogroup 1 alone accounts for 85% of cases (1). Epi-
demiologic analyses based on pulsed-field gel electrophoresis (PFGE) and
sequence-based typing of clinical isolates of L. pneumophila serogroup
1 have detected sporadic, epidemic, and endemic strains (2). Most cases
are sporadic and are associated with strains that have not been identified. A
strain is considered endemic to an area when several isolates that have identi-
cal PFGE patterns and that cause several epidemiologically unrelated cases
of legionellosis are detected in that area. Since 1998, the most prevalent
strain endemic to France has been the Paris strain (3), which was responsible
for 12.2% of culture-confirmed cases of legionellosis from 1998 through
2002 (3). The Paris strain has also been detected in clinical samples from sev-
eral other European countries (Switz-
erland, Italy, Spain, and Sweden) and
in environmental samples (3,4).

We identified a new endemic clone of L. pneumophila serogroup
1, the Lorraine strain, and report its spread throughout France. The French
national reference center for Legionella collects all clinical isolates of
Legionella spp. as part of an epide-
miologic surveillance system. All L.
pneumophila serogroup 1 isolates are
typed by PFGE methods as described
(4). When necessary, sequence-based
typing (5,6) and monoclonal anti-
body–based (MAB) subgrouping are
also used (7).

From 1995 through 2006, the re-
ference center typed 1,768 clinical Le-
gionella isolates by means of PFGE. Most PFGE patterns were unique and
thus corresponded to sporadic cases. Another 145 (8.2%) patterns were
identical and corresponded to the end-
emic Paris strain. An identical PGFE
pattern was also found for 80 (4.5%)
isolates from epidemiologically un-
related patients; these isolates were
further characterized by sequence-
based typing and MAB subgrouping.
Sequence type was deduced for the following genes: flaA, pilE, asd, mip,
mompS, proA, and neuA (6). The se-
quence type was obtained for 78 of the
80 isolates and was 5, 10, 22, 15,
6, 2, 6. The sequence type of the re-
main ing 2 isolates differed from that
of the other 78 by 2 alleles (pilE and
proA) and was 5, 1, 22, 15, 6, 10, 6