Int J Public Health (2011) 56:163–168
DOI 10.1007/s00038-010-0131-x

ORIGINAL ARTICLE

Knowledge and anticipated attitudes of the community about bird flu outbreak in Turkey, 2007–2008: a survey-based descriptive study

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Received: 14 May 2009 / Revised: 9 November 2009 / Accepted: 15 February 2010 / Published online: 9 March 2010

Abstract
Objective To determine factors associated with knowledge and anticipated attitudes to a foreseen avian influenza outbreak in a high-risk population from a Turkish remote region.
Methods A random, cross-sectional face-to-face survey of 1,046 Turkish adults.
Results The proportion of participants concerned about contracting the virus was significantly lower amongst the less educated and rural located respondents. Significantly more rural than urban located participants declared not complying with quarantine policies and not handing out their poultry in case of an influenza outbreak. Factors associated with protective behaviours were higher level of education, urban location, not performing backyard farming of poultry, and preferring ready-to-eat products.
Conclusions Preparedness against bird flu endemic in remote regions could be hindered by factors, such as low levels of education and economic dependence on small-scale backyard farming. The baseline data collected in this survey will be useful in monitoring changes over time in the population's perceptions of threat, and its attitude towards compliance with specific public health recommendations.

Keywords Bird flu · Endemic · Knowledge · Health behaviour · Remote

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Introduction

The H5N1 strain of the avian influenza virus has caused 240 human deaths in central and Southeast Asia, the Middle East, and Africa (Sanco 2009). Four of these deaths occurred in Turkey in 2006. Out of the 12 confirmed human cases in Turkey, eight patients were followed in Van and they had prior contacts with diseased birds on the backyard farm.

The local Administration of Agriculture initially decided to enforce animal quarantine. The transport of poultry was prohibited in the region followed by a regional culling of these poultry. Although reimbursement was paid, people resisted giving up their animals, which demonstrated their dependence on these livestock as a source of food and income. Public distrust in official organizations, which originated from previous interventions, also seemed to play a role, as well as the lack of adequate records of culled poultry, which resulted in compensation errors (Sarikaya and Erbaydar 2007). The outbreak was completely terminated after the culling of over one million chickens, 300,000 of which were from the Van region.

Although currently incapable of sustained human-to-human transmission, H5N1 represents a serious pandemic threat due to the risk of a mutation or reassortment generating a virus with increased transmissibility. If such a strain emerges, and if this is not controlled at source (Ferguson et al. 2005; Longini et al. 2005), a pandemic is likely to result. The risk that a pandemic virus will emerge depends on opportunities for human exposure to infections (WHO 2005).

Because of H5N1s ability to cross the species barrier to infect humans, which can lead to severe disease, the control of infection in live poultry is the most important line of

defence (Shortridge et al. 2000; Horimoto and Kawaoka 2001; Osterhaus et al. 2002).

Effective containment strategies aimed at reducing population contact rates are only possible through cooperation of the community. On the other hand, this is related with the knowledge and risk perception of the community. Trust in governmental institutions and social, cultural and economic factors all play a great role in determining behaviours in responding to risk-related issues. This study was designed to determine knowledge, attitudes and practices of inhabitants of an area at high risk for bird flu disease. We investigated the prevalence of self-reported preventive behaviours in response to an anticipated local outbreak of the avian influenza and the factors associated with these behaviours.

Methods

Population

We conducted a survey targeted to resemble the general population in Van, Turkey from September 2007 to 2008. The sample size was calculated with an estimated rate of 50% prevalence of awareness concerning avian flu and alpha error 0.05 (95% confidence interval). The province of Van is located at the east of Turkey and consists of one centre and eleven peripheral districts. It has 979,671 inhabitants [511,678 (52.2%) urban and 467,993 (47.8%) rural] according to the 2007 population census and the number of adults (>18 years) was 472,293. Primary health-care system in Turkey is based on the population size with primary health-care centres (PHCCs) serving to 5,000–35,000 inhabitants depending on rural or urban location. Midwifes at the PHCCs are responsible for the list of the population they serve through home visits and prepare household determination files which are updated every year. They are responsible for neighbourhoods with approximately 2,000–3,000 inhabitants. In Van, there are 18 PHCCs in the centre district and 17 in the peripheral districts. We included 1,046 participants in total (>18 years old) by a modified multi-stage cluster sampling method.

In the first stage, we created a cumulative list of neighbourhoods including all districts and chose 34 of them randomly (census blocks). In the second stage, we selected 32 households randomly from these neighbourhoods. In total, 16 out of 35 PHCCs and 34 out of 328 neighbourhoods were selected. We used random number tables based on varying household sizes to select respondents. Persons from the same households were not included. We obtained verbal informed consent from the respondents and ethics approval was obtained from the Local Ethics Committee of the Research and Education Hospital, University of Yuzuncu Yil.

Questionnaire

A statistician and family physician examined the draft questionnaire and then pilot tested it with respondents. To determine face validity, all interviewers completed the questionnaire with 20 inhabitants twice, with no significant differences in the answers. Interviewers gave additional information on respondents' reactions to certain questions, which were reworked, and the instrument was redesigned as necessary to obtain satisfactory responses.

The first part of the questionnaire consisted of six items concerning demographic information including age, educational level, household income, location, practices of poultry farming, and preferences of poultry consumption. In the second part, seven questions assessed knowledge about avian influenza, risk perception, agreement in vaccination, willingness to pay for a medication or vaccine against bird flu and compliance with official regulations. The third part assessed preventive behaviours in case of an outbreak.

The response choices for all knowledge questions were given on a 3-point Likert-type scale using "yes,", "no,", "do not know/not certain." Answer options for the modes of transmission, precaution, and risk perception were "strongly agree,", "agree,", "disagree," and "strongly disagree," and "not certain." Response categories were dichotomized into indicators of "agree (agree/strongly agree)" and "disagree (disagree/strongly disagree/not certain)" and "yes" and "no/not certain".

We used the term "serious influenza outbreak" because we thought that many respondents might not be familiar with the term "pandemic".

Interviews were conducted using family physician residents who spoke also Kurdish.

All interviewers were included in the questionnaire pilot testing and all participated in a short course addressing efforts on the standardization of Turkish–Kurdish translation of the questions. The interviewers were familiar with the regulations of PHCC. Student's t test was used for quantitative analyses and χ^2 test for the internal validity of the questionnaire correlation analysis. Statistical significance was set at $P = 0.05$ and NCSS 2007 and PASS 2008 Statistical Software (UT, USA) were used for data analyses.

Results

A total of 1,046 people participated in the study consisting of 479 (45.8%) men and 567 (54.2%) women with a

median age of 40 years (SD 13.9, range 18–69 years). Educational level was low in general with 89.2% women having left school in the primary years. The proportion of households with a monthly income of more than the minimum wage (Turkey 2007) was 34.9% (365). Local poultry farming (i.e., chicken, goose, duck, pigeon, turkey and swans) in the backyard was present in 694 (66.3%) households, with chicken being the majority in 612 (88.2%) households. Consumption of poultry from local backyard chicken farms by onsite slaughter was reported by 477 (45.6%) participants. Participants demographic and practices data are shown in Table 1.

Educational level, income and location were demographic factors statistically associated with anticipated health-related behavioural responses in case of a serious outbreak in Van. Knowledge about avian influenza was lacking amongst the less educated and rural located respondents. Respondents who had finished primary school or with higher educational level displayed higher knowledge about animal-to-human transmission than less educated participants. Higher education was also related with higher proportions of readiness to get vaccinated and to pay for medications or vaccines. The proportion of participants concerned about contracting the virus was significantly lower amongst the less educated and rural located people. Significantly more respondents with lower income and rural location declared not to consider complying with quarantine policies and not to hand out their poultry in case of an influenza outbreak. Protective behaviours, such as face mask use, increased hand washing, avoiding contact with poultry and eggs were significantly associated with education and location, but not income (Table 2).

The findings suggested associations between backyard farming and onsite slaughter of poultry with socioeconomic variables. Risk perception was significantly lower amongst the backyard farmers who preferred to consume poultry from their own backyards. In addition, backyard farming and onsite slaughtering was strongly associated with the lack of enthusiasm for protective measures (Table 3).

Table 1 Background characteristics and practices of the respondents ($n = 1{,}046$) to a survey about avian influenza in Van province, Turkey, 2007–2008

	Women ($n = 567$)	Men ($n = 479$)	All ($n = 1{,}046$)
Mean age, years (SD)	40.4 ± 14.4	38.9 ± 13.3	39.7 ± 13.9
Educational level			
<5 years (primary school)	89.2	73.1	81.8
≥5 years (high school or higher)	10.8	26.9	18.2
Household income per month			
Less than minimum wage[a]	60.8	70.1	65.1
More than minimum wage	39.2	29.9	34.9
Location			
Urban	30.7	58.7	43.5
Rural	69.3	41.3	56.5
Backyard farming			
Yes	76.5	54.3	66.3
No	23.5	45.7	33.7
Preference of poultry consumption			
Ready-to-eat convenience products	38.1	57.3	40.8
Onsite slaughter at home from the backyard	61.9	42.7	45.6
Mixed consumption	16.2	10.4	13.6

[a] Minimum wage Turkey 2007

Discussion

The results of this study indicate that the majority of the Turkish public in Van do not consider avian influenza to be a major health threat. It appears that it would be a mistake to expect them to adopt preventive behavioural responses, even in the case of influenza pandemic. This is especially prevailing amongst backyard farmers who prefer onsite slaughter of poultry for self-consume.

Several factors were significantly associated with behavioural responses during an anticipated outbreak. These included educational level, income and location. A low level of education and income were prevalent conditions in the studied population. The majority of the respondents attended school for <5 years and had a monthly income that was lower than the national minimum wage. The analysis of our data revealed that a lower income, but not a lower education level, was associated with higher perceived susceptibility. This contradicts the results of a study from Italy where lower levels of education attainment were associated with higher risk perception that resulted in anticipation of complying with hygiene practices to avoid the spread of disease (Di Giuseppe et al. 2008). In our study, respondents with a low level of education were more likely to oppose official quarantine policies and culling workers during an outbreak. A similar trend in behaviours was observed in this group concerning health-related behavioural responses. The majority of the less educated respondents declared not to accept a vaccination for influenza, even if it was given for free.

Traditional family-based, very small-scale poultry farming, together with stockbreeding in this region is the largest food and income resource. The majority of our respondents owned backyard poultries and preferred onsite slaughter of poultry and consumption of eggs from the

Table 2 Avian influenza knowledge, risk perception, compliance with official recommendations and anticipated preventive measures and associated factors, Van province, Turkey, 2007–2008

	Education level			Monthly income			Location		
	<5 years Col%	≥5 years Col%	*P*	<Min. wage Col%	≥Min. wage Col%	*P*	Rural Col%	Urban Col%	*P*
Animal-to-human transmission is possible									
Yes	34.2	91.6	0.000	43.9	46.0	0.51	28.4	65.7	0.000
No/not certain	65.8	8.4		56.1	54.0		71.6	34.3	
Effective drugs currently available									
Yes	23.1	44.2	0.000	21.3	37.5	0.000	21.7	33.8	0.000
No/not certain	76.9	55.8		78.7	62.5		78.3	66.2	
Worry about oneself/family members contracting the virus									
Yes	30.6	66.3	0.000	41.1	29.6	0.000	25.7	51.9	0.000
No/not certain	69.4	33.7		58.9	70.4		74.3	48.1	
Would accept free of charge vaccination against bird flu									
Yes	26.5	68.9	0.000	35.2	32.3	0.34	19.8	53.0	0.000
No/not certain	73.5	31.1		64.8	67.7		80.2	47.0	
Would accept to pay a fee for a medication or possible vaccine									
Yes	37.1	64.2	0.000	44.8	37.0	0.01	34.0	52.5	0.000
No/not certain	62.9	35.8		55.2	63.0		66.0	47.5	
Would comply with any quarantine policies									
Yes	21.0	18.4	0.42	17.5	26.3	0.001	14.9	27.9	0.000
No/not certain	79.0	81.6		82.5	73.7		85.1	72.1	
Would hand out poultry to culling workers									
Yes, without any condition	33.2	71.1	0.000	40.2	39.7	0.000	16.2	71.0	0.000
No	29.1	8.9		29.5	17.8		35.4	12.5	
Yes, in case of a compensation	37.7	20.0		30.2	42.5		48.4	16.5	
Face mask use in public venues									
Agree/strongly agree	48.0	70.5	0.000	51.8	52.6	0.81	40.1	67.7	0.000
Increased frequency of hand washing									
Agree/strongly agree	75.8	82.6	0.043	77.7	75.9	0.51	72.1	83.5	0.000
Avoidance of contact with poultry									
Agree/strongly agree	29.1	61.1	0.000	34.2	36.2	0.53	17.4	57.6	0.000
Avoidance of contact with eggs									
Agree/strongly agree	27.0	52.1	0.000	31.1	32.3	0.69	16.4	51.2	0.000

same source. The public in the Van region was initially unwilling to hand over their animals, although declarations were alarming during the outbreak in 2006 (Sarikaya and Erbaydar 2007), and this study shows that not much has changed since then. Rural location and lower income were associated with statistically significant lower compliance proportions. Although official quarantine policies are supportive to these group with economic dependence on backyard farming, as the case in other Asian countries (Parry 2005), traditional poultry practice, together with the low socioeconomic status of the people and the lack of health-care access in this region have been reported to be major risk factors for animal-to-animal and animal-to human transmission (Sarikaya and Erbaydar 2007). The majority of our population prefers to consume poultry meat and eggs from their garden, which means having close contact with poultry and avian influenza virus in case of an outbreak.

There was clearly a lower level of willingness to comply with preventive measures, such as washing hands more frequently, wearing a facemask, and avoiding consumption of poultry and eggs, even during a serious outbreak. These features were especially prominent between respondents with low education, low income and rural location who owned a backyard farm and preferred onsite slaughter of poultry.

These results are of clear concern because fatal human cases of avian influenza (H5N1) have resulted from contact

Table 3 Association of backyard farming and poultry consumption with risk perception and anticipated preventive measures, Van province, Turkey, 2007–2008

	Backyard farming			Poultry consumption		
	Yes	No	*P*	Onsite slaughter	Ready-to-eat	*P*
Worry about oneself/family members contracting the virus						
Yes	25.9	59.1	0.000	24.7	53.2	0.000
No/not certain	74.1	40.9		75.3	46.8	
Face mask use in public venues						
Agree/strongly agree	37.9	80.1	0.000	38.8	69.6	0.000
Increased frequency of hand washing						
Agree/strongly agree	72.5	86.1	0.000	72.3	84.3	0.000
Avoidance of contact with poultry						
Agree/strongly agree	11.1	81.8	0.000	15.1	62.8	0.000
Avoidance of contact with eggs						
Agree/strongly agree	10.8	72.4	0.000	14.5	55.7	0.000

between humans and infected backyard poultry (Oner et al. 2006; Dinh et al. 2006), and risk to humans is related to the frequency of disease occurrence in the avian population (Mills et al. 2006). Gaps in knowledge about transmission and treatment were also evident in our study and resulted in anticipated risky behaviours during an outbreak. Another study about bird flu from Afghanistan reported that level of knowledge was far lower amongst persons with lower socioeconomic status (Leslie et al. 2008), and gaps in knowledge about avian influenza, especially about human-to-human transmission and prevention, have been reported in other studies, too (Abbate et al. 2006; Di Giuseppe et al. 2008).

Our results leave room for further public health information campaign efforts, especially those that increase consumers' knowledge of consumption-related avian influenza risks. Parallel to the results reported from a study in Europe, which also included Turkey, people appear to have a limited understanding of how avian influenza in their region should influence their consumption patterns (Eurobarometer 2006). Similar to the finding in Afghanistan (Leslie et al. 2008) and the Lao People's Democratic Republic (Barennes et al. 2007), our study suggests that conventional education and behavioural change messages have a limited effect in populations with highest exposure.

Hard work to ensure that behavioural change messages are appropriate for lower socioeconomic groups is necessary, specifically by improving the knowledge of community leaders, planning messages in a suitable format for the poor and illiterate, and ensuring that the most accessible routes are used. Messages should carefully weigh the risk for human disease against potential dietary and economic consequences of high population concern.

Successfully promoting behavioural change is a long-lasting process and requires repeated reinforcement. The severity of avian influenza (H5N1) outbreaks requires intensive efforts to improve knowledge and to change behaviours amongst those most at risk in low-income countries.

Limitations of the study include a cross-sectional design that limits our ability to indicate a causal link between demographic information, knowledge, health-related attitudes and practices. Second, in a cross-sectional study, data collection is limited to a single time point. Therefore, changes over time cannot be assessed, and beliefs and behaviours of persons may change. Longitudinal studies comparing behaviours are needed. Additional limitation of the study includes the lack of statistical adjustment of data obtained with the multi-stage cluster sampling method. Whilst the results of this study may have meaningful regional policy implications, caution should be given when generalising the results of this study to other parts of the country. Cultural and economic factors (such as onsite slaughter) would also result in different prevalence of behavioural responses. Furthermore, educational level and location could be confounders regarding compliance with official regulations. People who own poultry are more reluctant to hand them out than those who do not own poultry, and owning poultry is associated with living in a rural area and having poorer educational status. In addition, the fact of excluding people with less than 5 years living in the area may underestimate the low compliance because displaced people or refugees may be a more vulnerable and hard to reach group regarding communication of preventive measures.

Despite these limitations, this study is one of the largest population-based studies in Eastern Turkey, regarding that telephone and postal surveys are not practical because of the high prevalence of illiteracy and the high proportion of Kurdish speakers and local differences in the Kurdish language. This study provides valuable data on health-related

behaviours and shows the strong association between socioeconomic factors and risky health behaviours. It also provides substantive evidence of the need to classify bird flu preparedness as a major public health problem. The main strengths of the study are that it is population based, the structured questionnaire was piloted, the households were randomly selected, the interviews were conducted face-to-face and the interviewers were qualified for a rural and remote region, speaking Kurdish and trained to elicit valid information.

In conclusion, the willingness to comply with specific health behaviours and trust in free of charge health services was generally low, which may be a consequence of previous administrative conflicts. The low level of education and economic dependence on limited resources has a negative impact on the community's perception of threat and compliance with official regulations.

Understanding the gaps in the public's knowledge about avian influenza risks and mode of transmission can guide future public health information campaigns on the issues that need more attention. A highly more informed general public is more likely to alter its food consumption behaviour and to take appropriate preventive actions. However, despite some human deaths, uneducated and poor people from a region at high risk for bird flu outbreaks continue to resist changing their attitudes regarding avian influenza threat. To achieve a break in this resistance, higher levels of education and living standards are necessary.

Acknowledgments We wish to thank to the Scientific Research Project Directorate at the University of Yuzuncu Yil for their support.

Conflict of interest statement We declare no conflict of interest.

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