

Brief Report**Knowledge and practice of poultry handling and living environments of rural residents in China**Ruoyan Gai¹, Xingzhou Wang², Yufei Zhang², Lingzhong Xu^{2,*}¹ Department of Health Policy & Planning, Graduate School of Medicine, the University of Tokyo, Tokyo, Japan;² Institute of Social Medicine and Health Service Management, School of Public Health, Shandong University, Jinan, China.**Summary**

In China, most human cases of avian influenza affected rural residents and were reported to involve contact or intake of sick poultry, suggesting risks relevant to being a rural resident increase the possibility of exposure to the fatal virus. In this study, we investigated the living environments in rural areas and rural residents' knowledge, attitudes, and practices regarding poultry handling and avian influenza in Shandong Province, Anhui Province and the Inner Mongolia Autonomous Region. We thus hope to provide evidence on the risk of exposure to sick poultry and on the effects of health education for rural residents.

Keywords: Rural resident, Avian influenza, Living environment, Health education

Introduction

According to situation assessment by the World Health Organization (WHO), all of the prerequisites for the start of a human influenza pandemic have been met save one: the establishment of efficient human-to-human transmission (1). The possibility that the virus will mutate into a new form communicable among humans increases as the geographical range of the infection expands and the number of people both near the disease and who have contracted the disease increases. Since 2003, outbreaks of highly pathogenic avian influenza A (H5N1) virus with sporadic transmission from birds to human worldwide have heightened concern regarding a potential pandemic. In China, like other Asian countries such as Indonesia, Thailand, and Cambodia, most reported patients and victims were rural residents and had contact with poultry, suggesting risks relevant to being a rural resident increase the possibility of exposure to the fatal virus. Many studies have confirmed that H5N1 infection has been associated with exposure to infected poultry (2-5). Until now, however, no systematic study sought to understand the knowledge and practices of rural residents regarding

poultry handling and precautions against infection, the implementation of local surveillance systems, and the effects of health education and interventions such as vaccination of poultry. All of this information is urgently needed for policymakers to prepare for a potential pandemic. The objective of this study was to assess living environments in rural areas and rural residents' knowledge, attitudes, and practices regarding poultry handling and avian influenza.

Methods

This is a cross-sectional study conducted from September 2007 to January 2008 in Shandong Province, Anhui Province, and the Inner Mongolia Autonomous Region with an eye toward geographical diversity and feasibility. The latter two areas had experienced avian influenza and cases of human infection before. The target population was rural residents ages 18 and over who were selected by multi-stage sampling. First, 1 district was randomly selected from each area. Three counties were selected from each district, and then 1 village was selected from each county. In the 9 selected villages, all residents were interviewed, providing a total of 1,379 participants (Table 1), using a semi-structured questionnaire designed to collect information on their demographic characteristics, living environment, poultry handling practices, frequency of trips to the poultry market, attitudes regarding a potential pandemic, and knowledge of

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Table 1. Demographic characteristics of participants

Demographic characteristics		<i>n</i> = 1,379	(%)
Age		47.3	(± 17.6)
Location	Shandong	399	(28.9)
	Anhui	491	(35.6)
	Inner Mongolia	489	(35.5)
Gender	Male	662	(48.0)
	Female	717	(52.0)
Marital status	Single	180	(13.1)
	Married	1,199	(86.9)
Education	Middle school and below	1,258	(91.2)
	Above middle school	121	(8.8)
Occupation	Farmer	1,027	(74.5)
	Other	352	(25.5)
Annual income of household (RMB)	< 5,000	224	(16.2)
	5,000 - 9,999	486	(35.2)
	10,000 - 14,999	227	(16.5)
	15,000 - 19,999	187	(13.6)
	20,000 - 24,999	65	(4.7)
	≥ 25,000	190	(13.8)
Participant in community-based medical insurance scheme	Yes	1,322	(95.9)
	No	57	(4.1)
Poultry feeder	Yes	312	(22.6)
	No	1,067	(77.4)

Table 2. Living environments

Living environments		<i>n</i> = 1,379	(%)
Contact with wild birds	Often	426	(30.9)
	Occasionally	388	(28.1)
	Never	565	(50.0)
Type of yard	Yard encircled by wall	714	(51.8)
	Yard semi-closed	182	(13.2)
	Yard open	450	(32.6)
	Other	33	(2.4)
Frequency house cleaned	Every week	677	(49.1)
	Every month	289	(21.0)
	Every 6 months	248	(18.0)
	Every year	162	(11.7)
	Not cleaned	3	(0.2)
Waste dumping in designated place	Yes	586	(42.5)
	No	793	(57.5)
Water supply	Yes	1,242	(90.1)
	No	137	(9.9)
Type of toilet	Flushing toilet	189	(13.7)
	Pit toilet	1,190	(86.3)
Separate chopping board	Yes	443	(32.1)
	No	936	(67.9)
Poultry kept in household	Yes	714	(51.8)
	No	665	(48.2)

avian influenza and disease prevention. Additionally, health officers from primary healthcare settings and the local Health Agency were interviewed to ascertain their understanding of policies and interventions including surveillance, vaccination of poultry, and economic compensation during the outbreak.

Results and Discussion

The living environments of the rural residents surveyed are summarized in Table 2. Half of the participants have contact with wild birds ("often" and "occasionally"). Nearly 50% have a semi-closed or open yard that poultry can pass in and out of. Interviews revealed that some participants brought a dead wild bird home and prepared it for food when they found it outside. Over 51% keep poultry in their households. Some of those respondents had special chicken coops and others did not; the latter instead had poultry that were bred in a common room, an extra room, or the toilet. In most households with poultry and even those with special coops, poultry dung was often seen in the yard, living room, toilet, and kitchen. Based on the interviews, 30 of 714 total participants reported the death of poultry in the previous two weeks. When their poultry died, most participants buried or burned them while others took inappropriate measures such as throwing them out with the trash or eating them. In terms of sanitary conditions, 57.5% of participants dumped waste near the house instead of at a designated place. Of the households surveyed, 9.9% did not have a water supply. As many as 86.3% of respondents use a pit toilet instead of a flushing toilet. Of respondents, 67.9% prepared raw poultry and cooked food on the same chopping board. According to self-reports by participants, the vaccination rate of poultry bred in their households was 100%. The average frequency of trips to the poultry market was once every 19 days.

Regarding rural residents' knowledge of avian influenza and disease prevention, 15 questions were designed based on education guidelines for human infection prevention (6), and 1 point was allotted for each correct answer. The score therefore ranged from 0 to 15. In this study, the minimum, mean, and maximum scores were 0, 4.5, and 11, respectively.

Residents from Shandong Province were found to have better knowledge related to avian influenza and disease prevention than residents of the other 2 areas; interviews with local health officers indicated that this can be attributed to the effects of health education activities. Moreover, respondents with less education, farmers, and those with annual income of less than 5,000 RMB (approximately 75,000 Japanese Yen) tended to have worse scores. Among factors significantly

associated with participants' correct answer rate were a separate chopping board for food preparation, influenza treatment, vaccination, interest in related information, eating habits, and attitudes regarding a potential pandemic. The main sources of related knowledge and information were TV and the Internet. Most participants were relatively interested in and concerned about a potential pandemic.

This study identified the frequent and inevitable contact between rural residents and poultry in living environments of rural residents. Sanitary conditions and especially waste disposal, toilets, and water supply must be improved. Some unsafe and inappropriate practices of poultry handling such as food preparation and handling of dead poultry still remain. The level of rural residents' knowledge of avian influenza and disease prevention in general was relatively low and was associated with regional differences, health behavior, and attitude, suggesting that health education for rural residents must be improved in the near future.

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