

Short Report: Free-Ranging Chickens in Households in a Periurban Shantytown in Peru—Attitudes and Practices 10 Years after a Community-Based Intervention Project

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Abstract. Free-ranging chickens are often found in periurban communities in developing countries, and their feces can pose a significant public health sanitation problem. Corraling chickens raised in these periurban areas in chicken coops has been proposed previously as an intervention to address this problem. Aims of this study were to revisit households in a corraling intervention study conducted in 2000–2001 to compare poultry-raising practices and investigate current attitudes regarding the impact of raising chickens in a periurban environment. Sociobehavioral questionnaires were given sequentially to all study participants; 30 families (58%) ceased raising poultry of any kind, whereas 42 (81%) do not raise chickens in their home. This finding indicates a significant reduction in poultry-raising in our study population since 2000–2001, possibly because of acculturation and/or change in socioeconomic status. However, attitudes about corral use for raising poultry were overwhelmingly positive, and the most common reason cited was cleanliness of the home.

INTRODUCTION

Free-ranging chickens are often found in periurban communities in developing countries such as Peru, especially in homes of migrants from rural areas. Approximately two-thirds of rural poor households in developing countries raise livestock.¹ Some urban areas have shown a very high presence of livestock as well, especially in the most low-income communities.¹ Free-ranging chickens often carry pathogens, such as *Campylobacter* and *Salmonella*, and their feces can pose a significant public health sanitation problem.^{2–5} *Campylobacter jejuni* has been isolated from 50% of free-ranging domestic chickens and 88% of commercially sold chickens in studies done in pueblos jóvenes in Lima, Peru.⁶ *Campylobacter* is associated with 5–10% of pediatric diarrhea in Pampas de San Juan de Miraflores.⁷ Avian feces are considered the primary environmental source of *C. jejuni*, whereas other vectors, such as stored water, food, soil, and other animal feces, were deemed less influential.^{4,8}

Corraling or enclosing chickens raised in these periurban areas is a traditional practice that has been proposed previously as an intervention to address this problem.⁹ Our research team conducted an intervention–control study to evaluate the impact of corraling in this study site in 2000–2001.¹⁰ This study showed that households with corrals had lower fecal colonization with *C. jejuni* among children, but rates of *Campylobacter* diarrhea in these children were higher.

The objectives of this study were to 1) revisit households included in the corraling intervention study 10 years ago to compare poultry-raising practices in the community today with those practices documented previously; and 2) investigate attitudes regarding raising chickens in a periurban environment.

We hypothesized that corral use and chicken-rearing practices would be similar to previous accounts because of long-standing tradition passed down generationally and the perceived benefits of corraling chickens communicated by participants in previous studies.^{8,10}

METHODS

This study was active from May to August of 2011 and was based in Pampas de San Juan de Miraflores. Pampas de San Juan de Miraflores is a community of various shantytowns on the outskirts of Lima, Peru that has been a study site for numerous investigations of various diseases for over two decades. There has been consistent internal migration in Peru since the 1970s because of political violence in rural areas and the resulting displacement.^{11,12} Most of the migration has been to the capital city, Lima.^{13–15} Many of these migrants brought their rural customs and practices when relocating to urban communities, including keeping chickens in the home.⁸ Since 2000–2001, diarrhea rates in Pampas de San Juan have remained at similar levels based on data from a diarrhea cohort study from 2009 (Oberhelman RA, unpublished data).

Our study cohort consisted of participants from a 2000–2001 investigation by Oberhelman and others¹⁰ recruited from the same study population described by Harvey and others.⁸ All households raised poultry for the duration of the previous study. Two researchers visited these households with a PRISMA (Asociación Benéfica Proyectos en Informática, Salud, Medicina y Agricultura) field worker to recruit for enrollment in focus groups and complete a study questionnaire.

The study questionnaire used was a sociobehavioral (Knowledge, Attitudes, and Practice [KAP]) survey, concentrating on questions and inquiries associated with raising poultry and corral use in the community. These surveys were designed to be in-depth, providing various options and allowing for multiple responses on the majority of questions. After improvement of the survey through focus groups, the surveys were administered to the study population. Results were analyzed after completion of all questionnaires at Universidad Peruana Cayetano Heredia with STATA 8.0. This study was approved by the Institutional Review Boards of Tulane University in New Orleans, LA, and Asociación Benéfica PRISMA in Lima, Peru.

RESULTS

Sixty-nine families, all from our prior study,¹⁰ were recruited at their households to complete KAP surveys. Of these 69 families,

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17 were not enrolled for reasons including moved out of Pampas de San Juan, inability to determine their correct address, and participant refusal. Families that changed residences but stayed within Pampas de San Juan were considered eligible for enrollment ($N = 3$) (Table 1). The range of age of 52 remaining respondents varied from 19 to 78 years, with a mean age of 44.2 years; 50 of the participants were female, whereas two were male (Table 1). The mean number of persons per household was 7.1.

Thirty families (57.7%) reported that they have ceased raising poultry of any kind (including chickens, ducks, hens, and roosters) in their home since data collection from the previous study (Table 2). Forty-two households (80.8%) currently do not raise chickens. Reasons cited by households that continue to raise poultry were raise to eat them (86.4%) and raise to get eggs (63.6%), whereas raise to sell them for money and raise to have them fight were rare, stated four and one time, respectively.

When asked if raising birds served a useful purpose, 37 families responded affirmatively (71.2%), whereas 15 families responded negatively. Those participants who responded affirmatively gave reasons, such as the ability to proportion food ($N = 33$), proportion eggs ($N = 23$), sell them to gain money ($N = 4$), and fight ($N = 1$). Reasons by 15 respondents who responded negatively included that birds transmit disease ($N = 6$), they demand work and cleaning ($N = 2$), there is no room to raise them ($N = 1$), and birds are dirty and noisy ($N = 1$).

Twenty-two families (42.3%) have corrals in their home, whereas 30 (57.7%) do not. However, this reduction is related to the reduction in raising poultry, and corrals were present in more households that raised poultry compared with households that did not ($P < 0.001$) (Table 2). Participants who owned corrals but not poultry stored other animals ($N = 3$) and other non-food-related items ($N = 4$) in the corrals. A total of 72.7% (16/22) (Table 2) of families that currently raise any type of bird (chickens, ducks, hens, and roosters) and 70% (7/10) (Table 2) of families that raise only chickens use corrals, indicating that, where poultry is raised, corrals are

TABLE 2
Raising poultry and corral use in Pampas ($N = 52$)

	n (%)	Corrals in household			P value
		Yes	No	Total	
Raise poultry					< 0.001
Yes	22 (42.3)	16 (72.7)	6 (27.3)	22 (42.3)	
No	30 (57.7)	6 (20)	24 (80)	30 (57.7)	
Total	52 (100)	22 (42.3)	30 (57.7)	52 (100)	
Raise chickens					0.075
Yes	10 (19.2)	7 (70)	3 (30)	10 (19.2)	
No	42 (80.8)	15 (35.7)	27 (64.3)	42 (80.8)	
Total	52 (100)	22 (42.3)	30 (57.7)	52 (100)	

often used. Attitudes about the use of corrals for raising poultry were overwhelmingly positive. When asked whether it was preferable to raise birds in corral or freely, 48 participants (92.3%) answered that they would prefer corral use. The most common reason cited for corral use was cleanliness of the home among both present users (10/13; 76.92%) and the entire cohort (38/52; 73.1%) (Table 3). The use of corrals for health reasons was the second highest response given by all participants ($N = 12$) (Table 3). Participants who owned birds but not corrals ($N = 8$) gave various reasons, including building cost ($N = 2$), corrals affect health ($N = 1$), and birds fight too much when in a corral ($N = 1$).

DISCUSSION

This study shows behavioral changes since 2000–2001 to raising poultry in this cohort. Rates of raising domestic poultry have significantly decreased in a participant cohort that was unanimously raising birds in 2000–2001. Reasons for the sharp reduction in Pampas de San Juan are not completely clear. Rationale given by respondents concerning the usefulness of poultry-raising was evident, because it assists in providing alimentation. Nevertheless, reasons given why poultry-raising is not useful varied among participants, and responses ranged from health concerns and cleanliness to limited space in the household.

However, several trends are evident that may explain these results. In 2003, participants recounted that raising poultry was part of their culture and family tradition.⁸ One possible explanation for the decline is that domestic poultry-raising occurred primarily among recent migrants from rural areas, and acculturation has limited this practice. Acculturation has been shown to influence other behavior changes in Pampas de San Juan, such as food consumption and prevalence of obesity.¹⁶

Another explanation for this change is the increase in socioeconomic status that occurs in changing from rural to urban residence. This change has been documented in various studies of migrants in Peru.¹⁴ In Peru and Latin America, socioeconomic status is lowest among rural compared with urban residents.^{14,17} The increased economic status of these residents could affect their need or decision to keep poultry in the household.¹

Reasons for owning corrals varied. Although many opinions were similar to those opinions given 12 years ago, some differed. One notable difference is the perception of health impact in participant reasoning for constructing corrals (Table 3). This reason was the second most commonly cited in this study, whereas it was hardly mentioned ($N = 2$) in the study by Harvey and others.⁸ Cleanliness of the household was given

TABLE 1
Demographic information ($N = 52$)

Characteristic	n	Percentage
Sex		
Male	2	3.8
Female	50	96.2
Age in years (mean = 44.2 years)		
18–30	7	13.5
31–40	14	26.9
41–50	18	34.6
51–60	8	17.3
61+	4	7.7
Responsible for cleaning the home		
Yes	47	90.4
No	5	9.6
Persons in household (mean = 7.2)		
3–5	17	32.7
6–8	22	42.3
9–12	11	21.2
13+	2	3.8
Years in residence (mean = 22.2 years)		
0–10	3	5.8
11–20	17	32.7
21–30	25	48.0
31+	7	13.5

TABLE 3
Reasons for corral use

Ref. 8 (N = 43)	No. of times mentioned*	This study (N = 52)	No. of times mentioned*
Keep birds from being stolen	17	Keep the house cleaner	38
Do not dirty the house	12	Health/evade diseases	12
Do not get lost/escape/fly away	10	Security (avoid robbery/loss of birds)	10
Separate one species from another	8	Find birds easily	6
Separate chicks/ducklings from adults	7	Easier than cleaning feces	3
Keep them from making children sick	2	Birds get more nutrients in the corrals	2

*Multiple responses permitted.

high priority in both studies. This response was the most frequent response in this study and the second most frequent response in the work by Harvey and others.⁸ This congruency is likely because most participants were primarily responsible for cleaning and organizing the home. Theft of poultry, the most prevalent response in the work by Harvey and others,⁸ was the third most common response in our study.⁸ This result indicates less concern in this area, a possible reflection of increased socioeconomic status.

There were several limitations to this study. KAP surveys may be subject to social desirability bias in participant responses.^{18,19} In addition, the exact number of participants from the work by Oberhelman and others¹⁰ was not identical to the present study. Our research team was not attempting to reproduce the previous study. However, it is important to note that the households used in the current study were all used in the study by Oberhelman and others¹⁰ and solely revisited to examine poultry-raising practices and usage.

Raising poultry has reduced significantly among this study population in the past 12 years. Health impacts in regards to *C. jejuni* infection and disease should be investigated to see if reductions have occurred. Acculturation and change in socioeconomic status in Pampas de San Juan are likely causes for this behavior change.

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