QRCBN 62-6861-1753-250
https://proceeding.unnes.ac.id/icohespe

COMMUNITY BASED APPROACH DEVELOPMENT FOR AVIAN INFLUENZA PREVENTION IN SEMARANG CITY

Agus Nurrohman[1], *Oktia Woro Kasmini* Handayani[2], *Widya Hary* Cahyati[2], *Sri Ratna* Rahayu[2]
[1]Doctoral Program in Public Health, Faculty of Medicine, Semarang State University, Central Java, Indonesia
[2]Public Health Departement, Faculty of Medicine, Semarang State University
Cooresponding author: agusnurrohman@gmail.com

Abstract. Avian influenza (AI) remains a persistent public health concern in Indonesia due to its zoonotic potential and recurrent outbreaks among poultry and humans. Household-scale poultry farmers are particularly vulnerable, necessitating effective community-based prevention strategies. This study aimed to develop and evaluate a community-based intervention model for avian influenza prevention. A Research and Development (R&D) approach was applied through five stages: preliminary exploration, model design, expert validation, pilot testing, and effectiveness evaluation. Ninety household poultry farmers in Gunungpati District, Semarang City, Central Java, participated in the study. Data were collected using questionnaires, interviews, observations, and expert assessments. Paired test results showed a significant increase in knowledge, attitudes, practices, self-efficacy, and health commitment in the intervention group ($p < 0.05$), while no significant changes were observed in the control group. These findings suggest that community-based interventions are particularly effective in promoting practical behavioral change rather than immediately altering attitudes or long-term commitment. In conclusion, the proposed community-based model demonstrates potential as an effective strategy for avian influenza prevention among small-scale poultry farmers. Further adaptation and multisectoral collaboration are recommended to enhance community resilience against zoonotic threats.
Keywords: knowledge, attitudes, practices, self efficacy, health commitment, avian influenza.

1 Introduction

Emerging infectious diseases (EIDs) remain a major threat to global health security, as they have the potential to trigger outbreaks with high mortality and significant economic losses. The impact is particularly severe in developing countries with limited resources and weaker public health systems. In the past two decades, the world has faced several global health crises caused by new viral infections such as SARS, MERS, Ebola, and COVID-19, underscoring the urgent need for effective preparedness and prevention strategies.[1]

Avian influenza (AI), caused by Influenza A subtypes (HxNy), is a zoonotic disease primarily infecting poultry but occasionally transmitted to humans through direct or indirect contact with infected birds. Although human-to-human transmission remains rare, the virus continues to mutate, posing risks ranging from mild to fatal illness and potential pandemic threats.[2] Indonesia has borne one of the world's highest burdens, reporting 200 confirmed human cases with 168 deaths (CFR 84%) between 2005 and 2023, alongside persistent outbreaks in poultry populations.[3]

Evidence shows that community-based approaches are crucial for avian influenza prevention and control. Active community participation not only enhances early detection and reporting but also strengthens local ownership and compliance with preventive practices.[4,5]

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Cross-sectoral collaboration and participatory surveillance have proven effective in Indonesia, linking farmers with veterinary and health services, while reinforcing collective responsibility in disease prevention.[6,7]

Therefore, developing a sustainable community-based prevention model is essential to address avian influenza risks in Indonesia. Such a model should integrate knowledge, attitudes, practices, self-efficacy, and health commitment, enabling communities to adopt effective preventive behaviors while supporting broader national and global disease control efforts.

The introduction should provide background that puts the manuscript into context and allows readers outside the field to understand the purpose and significance of the study. It should define the problem addressed and explain why it is important.

2 Methods

This study employed a Research and Development (R&D) design to develop and produce a practical and effective model for the prevention and response to avian influenza. The R&D process adopted the ADDIE model approach, which consists of the stages of Analysis, Design, Development, Implementation, and Evaluation. In addition, a quantitative approach using a quasi-experimental method was applied. The research design utilized a one-group pretest–posttest with control group design, in which measurements were conducted before and after the intervention. The study aimed to analyze the effectiveness of implementing a community-based model in preventing avian influenza.

2.1 Sampling

A total of 90 respondents were involved, consisting of 45 participants in the intervention group and 45 in the control group. Samples were selected using simple random sampling. Eligible participants included small-scale poultry keepers, household poultry keepers, and songbird owners. Individuals not meeting the inclusion criteria were excluded from the study.

2.2 Ethics, consent and permissions

This study was conducted following ethical guidelines for research involving human participants. Written informed consent was obtained from all participants prior to their inclusion in the study. Participants were informed about the study objectives, procedures, potential risks, and benefits, and their right to withdraw at any time without any consequences. All data were treated confidentially, and anonymity was ensured throughout the research process.

2.3 Study instrument

The study employed a structured questionnaire comprising 62 items, designed to assess knowledge, attitudes, practices, self-efficacy, health commitment, and preventive efforts related to avian influenza.

2.4 Data analysis

Data were collected at two points, before and after the intervention. To assess changes in outcomes, data were analyzed using parametric statistical tests, specifically the Paired t-

test, to determine significant differences in knowledge, attitudes, practices, self-efficacy, and health commitment.
This study received approval from the Health Research Ethics Committee of the Faculty of Medicine, Semarang State University with a certificate number 1035/KEPK/FK/KLE/2025.

3 Results And Discussion

3.1 The participants

The majority of respondents in both the intervention and control groups were female (>50%). A small proportion had not completed primary school (2.2%). In terms of education, most respondents in the intervention group had completed junior high school (40%), while in the control group the majority had completed senior high school (37.8%). Regarding occupation, most respondents in the intervention group were self-employed (40%), whereas in the control group the largest proportion were unemployed/housewives (28.9%).

Poultry ownership was generally small-scale, with 82.2% of respondents in both groups raising fewer than 50 birds. Most respondents did not raise other animals besides poultry (62.2% in the intervention group and 80% in the control group). In terms of income, the majority of respondents in both groups reported earnings above the regional minimum wage (73.3% in the intervention group and 62.2% in the control group).

Table 1. Respondents' characteristics (N = 90)

Characteristics	Intervention		Control	
	N=45	%	N=45	%
Gender				
Male	15	33,3	18	40
Female	30	66,7	27	60
Education				
Did not complete primary school	1	2,2	1	2,2
Primary school	1	2,2	11	24,2
Junior high school	18	40	12	26,7
Senior high school	13	28,9	17	37,8
Higher education	12	26,7	4	8,9
Occupation				
Civil servant / Military / Police	8	17,8	4	8,9
Private employee	7	15,6	8	17,8
Self-employed	18	40	11	24,4
Laborer	1	2,2	8	17,8
Unemployed / Housewife	10	22,2	13	28,9
Poultry farmer	1	2,2	1	2,2
Number of poultry kept				
None	7	15,6	8	17,8
<50 bird	37	82,2	37	82,2
50-100 bird	1	2,2	0	0
Other animals kept				
None	28	62,2	36	80
Cat	12	26,7	4	8,9
Songbird	2	4,4	1	2,2
Fish	1	2,2	2	4,4
Goat	2	4,4	2	4,4

Characteristics	Intervention		Control	
	N=45	%	N=45	%
Income				
Below min wage	12	26,7	17	37,8
Above min wage	33	73,3	28	62,2

3.2 Bivariate Analysis

The bivariate analysis showed that knowledge and attitude were not significantly associated with avian influenza prevention ($p = 0.794$ and $p = 0.593$, respectively). In contrast, practice, self-efficacy, and health commitment demonstrated significant associations with preventive behavior ($p < 0.05$). Respondents with good practice had 9.33 times higher odds of engaging in avian influenza prevention compared to those with poor practice (OR = 9.333; 95% CI: 1.593–54.672). Similarly, respondents with high self-efficacy were more likely to implement preventive measures (OR = 16.545; 95% CI: 1.814–150.930). Furthermore, those with high health commitment had 8.61 times greater odds of practicing avian influenza prevention than respondents with low health commitment (OR = 8.611; 95% CI: 1.609–46.073).

Table 2. Bivariate Analysis of Factors Associated with Avian Influenza Prevention

Variable	Intervention		Control		*p* value	OR (95% CI)
	N=45	%	N=45	%		
Knowledge					0,794	2,250 (0,243-20,837)
Good	29	64,4	14	31,1		
Poor	16	35,6	31	68,9		
Attitude					0,593	2,083 (0,443-9,790)
Positive	33	73,3	29	64,4		
Negative	12	26,7	16	35,6		
Practice					0,019	9,333 (1,593-54,672)
Good	30	66,7	28	62,2		
Poor	15	33,3	17	37,8		
Self-efficacy					0,009	16,545 (1,814-150,930)
High	27	60,0	22	48,9		
Low	18	40,0	23	51,1		
Health commitment					0,021	8,611 (1,609-46,073)
High	34	75,6	22	48,9		
Low	11	24,4	23	51,1		

3.3 Multivariate Analysis

Multivariate logistic regression indicated that practice, self-efficacy, and health commitment remained significant predictors of avian influenza prevention ($p < 0.05$). Among these, self-efficacy was identified as the most influential factor ($p = 0.013$), with Exp(B) = 93.971 (95% CI: 2.648–333.000) and B = 4.543. These findings suggest that individuals with higher self-efficacy are substantially more likely to engage in preventive practices against avian influenza compared to those with lower self-efficacy.

Table 3. Multivariate Analysis

Variable	B	*p*	Exp (B)	CI (95%)
Practice	3,520	0,020	33,799	1,754-651,28
Self-efficacy	4,543	0,013	93,971	2,648-3,33
Health commitment	3,116	0,035	22,547	1,240-409,859
Constant	-18,343	0,03	0,000	-

3.4 Paired Analysis (Intervention Group)

From the paired analysis revealed a significant improvement in all measured variables following the intervention. There were statistically significant increases in participants' knowledge, attitude, practice, self-efficacy, and health commitment ($p < 0.001$). These findings indicate that the community-based intervention effectively enhanced the participants' understanding, behavior, and commitment to avian influenza prevention.

Table 4. Paired Test Results of Knowledge, Attitude, Practice, Self-Efficacy, and Health Commitment in the Intervention Group (Pretest–Posttest, n=45)

Variable	Pretest - Posttest Mean ± SD	*p*
Knowledge	-13,711 ± 2,546	0,000
Attitude	-10,400 ± 2,320	0,000
Practice	-8,644 ± 2,069	0,000
Self-efficacy	-3,489 ± 2,030	0,000
Health commitment	-4,089 ± 1,964	0,000

3.5 Paired Analysis (Control Group)

From the paired analysis was conducted to determine changes in knowledge, attitude, practice, self-efficacy, and health commitment among participants in the control group. As presented in Table 5, the results showed no statistically significant differences between pretest and posttest scores across all variables ($p > 0.05$).

Table 5. Paired Test Results of Knowledge, Attitude, Practice, Self-Efficacy, and Health Commitment in the Control Group (Pretest–Posttest, n=45)

Variable	Pretest - Posttest Mean ± SD	*p*
Knowledge	-0,22 ±0,452	0,743
Attitude	-0,67 ± 1,074	0,679
Practice	-0,44 ± 0,208	0,160
Self-efficacy	-0,44 ± 0,208	0,160
Health commitment	-0,44 ± 0,367	0,420

3.6 Independent Analysis (Intervention and Control Group)

From independent t-test was conducted to compare post-intervention scores of knowledge, attitude, practice, self-efficacy, and health commitment between the intervention and control groups. As shown in Table 6, all variables demonstrated statistically significant differences ($p < 0.001$).

Table 6. Independent T-Test Intervention and Control Groups

Variable	Intervensi – Kontrol		*p*
	Mean	SD	
Knowledge	14,20 – 0,51	2,510 – 1,036	0,000
Attitude	20,83 – 0,49	2,146 – 1,290	0,000
Practice	9,64 – 1,04	2,101 – 1,186	0,000
Self-efficacy	3,71 – 0,27	2,160 – 0,863	0,000
Health commitment	4,62 – 0,58	2,114 – 0,965	0,000

3.7 Discussion

3.7.1 The Effect of Education on Knowledge, Attitude, Practice, Self-Efficacy, and Health Commitment in the Prevention of Avian Influenza

This study demonstrated that educational interventions significantly improved participants' knowledge, attitude, practice, self-efficacy, and health commitment regarding avian influenza prevention ($p < 0.001$ for all variables). These findings confirm the crucial role of health education as a behavioral determinant in community-based prevention programs.

Increased knowledge after the intervention suggests that structured and participatory learning enhances understanding of avian influenza transmission and preventive actions. Consistent with Jiang et al., and WHO, education enables individuals to make informed health decisions and fosters sustained behavioral change. Knowledge also indirectly influences preventive behaviors through attitude, highlighting the mediating role of cognitive perception and risk awareness in shaping public response to zoonotic threats.[8,9]

Improvement in attitude and practice reflects a shift in risk perception and personal responsibility for disease prevention. This aligns with findings by Sarker, who reported that educational campaigns strengthened self-protection behaviors among poultry workers through enhanced risk assessment and adoption of protective measures.[10] Behavioral improvement in this study indicates that education not only increased awareness but also translated knowledge into preventive actions, such as safer poultry handling and early reporting of poultry deaths.[11]

The enhancement of self-efficacy underscores the empowerment effect of education, consistent with Protection Motivation Theory.[12] Higher self-efficacy enables individuals to believe in their capacity to perform health-protective behaviors, which is vital for sustainable disease control. Similarly, Mohebi et al. (2018) demonstrated that interventions promoting self-efficacy and supportive norms effectively improve health-promoting lifestyles.[13]

Significant gains in health commitment further indicate that education fosters not only individual knowledge but also a sense of social responsibility toward community health. This finding aligns with Jadgal et al., and Ab Rahman et al., emphasizing that health commitment serves as a bridge between awareness and consistent preventive action.[14,15]

Overall, the present study reinforces that a community-based educational approach is a powerful tool in zoonotic disease prevention. By integrating participatory learning, social support, and empowerment principles, such interventions can build long-term community resilience and reduce the risk of avian influenza transmission at the human–animal interface.

3.7.2 Correlation of Knowledge, Attitude, Practice, Self-Efficacy, and Health Commitment in the Control Group

The analysis of the control group revealed significant correlations among several key variables. Knowledge was positively correlated with self-efficacy ($r = 0.255$, $p = 0.015$), indicating that higher levels of knowledge were associated with greater confidence in performing preventive behaviors. Similarly, attitude showed a significant positive correlation with self-efficacy ($r = 0.255$, $p = 0.015$), suggesting that participants with more favorable attitudes toward preventive measures were more likely to believe in their ability to implement these behaviors effectively.

Interestingly, a significant negative correlation was observed between self-efficacy and health commitment ($r = -0.537$, $p = 0.000$), indicating that higher self-efficacy was associated with lower health commitment in the control group. This finding may reflect contextual or motivational factors, such as lack of structured guidance or reinforcement in the absence of a targeted intervention.

These results are consistent with Alsulami et al. (2025), who reported that nurses with higher knowledge of infection control and positive attitudes toward established protocols tend to demonstrate greater adherence, a relationship further reinforced by self-efficacy. Confidence in one's ability enhances understanding of specific procedures, strengthens positive beliefs about the importance of protocols, and ultimately promotes higher compliance and commitment.[16]

Similarly, Wang et al. (2023) emphasized the critical role of self-efficacy, showing that a combination of high knowledge, positive attitudes, and strong self-efficacy significantly improves health-related quality of life, as observed in oral health practices among Chinese university students.[17]

Moreover, Elhadi et al. (2021) demonstrated that knowledge is strongly associated with attitudes and preventive practices in the context of COVID-19 in Libya. Acceptance and adherence to vaccination programs were also influenced by individuals' knowledge and attitudes, highlighting the interplay of cognitive and affective factors in shaping health behaviors.[18] Overall, these findings suggest that even in the absence of a formal educational intervention, knowledge and attitude contribute to self-efficacy, which in turn can influence health-related behaviors and commitment. However, the negative correlation between self-efficacy and health commitment in this context underscores the potential need for structured interventions to align confidence with sustained health engagement.

3.7.3 Multivariate Analysis

Multivariate analysis revealed that self-efficacy ($p = 0.013$), practice ($p = 0.02$), and health commitment ($p = 0.035$) significantly predicted avian influenza preventive behaviors. Self-efficacy was the strongest predictor (B = 4.543, Exp(B) = 93.971, 95% CI: 2.648–3.33), underscoring its critical role in guiding preventive actions. These findings align with prior studies showing that targeted education and risk communication interventions enhance knowledge, attitudes, and compliance with preventive measures in both community and professional settings.[19,20,21]

The results highlight the importance of theory-driven, community-based educational strategies for effective zoonotic disease prevention.

3.7.4 Implementation Outcomes of the KONMABUR Model

The KONMABUR model effectively enhanced knowledge, attitude, practice, self-efficacy, and health commitment in avian influenza prevention. Increased knowledge positively influenced attitudes and practices, while also strengthening self-efficacy and commitment, demonstrating that education can translate into sustainable preventive behaviors.

These findings are supported by global evidence showing that self-efficacy mediates the relationship between health literacy and health outcomes, and that educational interventions improve both knowledge and behavior in diverse contexts, including oral hygiene and vaccination uptake.[22,23,24]

4 Conclusion

The KONMABUR model intervention significantly improved knowledge, attitude, practice, self-efficacy, and health commitment related to avian influenza prevention ($p < 0.05$). The intervention group demonstrated measurable gains across all variables, whereas the control group showed no significant changes. These results indicate that structured, theory-based educational interventions can effectively enhance community awareness, foster positive attitudes, and promote practical preventive behaviors. The use of an educational module as a learning and information delivery tool proved particularly effective in encouraging safe poultry handling practices. KONMABUR model represents a promising approach for sustaining long-term community engagement in zoonotic disease prevention.

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