



Insights Into Native Chicken Farmers: Understanding Knowledge, Attitudes, and Practices on Disease and Health Management in Selected Regions of Bangladesh

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Abstract

NATIVE chicken rearing is common in household women all over Bangladesh. Disease is a major problem that reduces production, increases mortality and decreases farmers' profitability. The research aimed at finding farmers' perception of the incidence of disease, health approaches and biosecurity management in raising native chicken reared in semi intensive system in Bangladesh. We randomly selected 260 farmers from eight districts of Bangladesh. Data collected through a pre-designed questionnaire through direct interviews with respondents and keen observation at the household level. Newcastle disease, either solely or in combination, was the most commonly faced issue among farmers. Most farmers (66.95%) reported that diseases affected their chickens at an early age, particularly during the chick stage. Only 23.1% and 23.8% of farmers engaged in vaccination and deworming measures. On a positive note, most farmers (70.4%) reported regular cleaning of their poultry houses and only a small percentage (5.4%) used disinfectants during cleaning. Additionally, a significant proportion (41.9%) of farmers practiced the isolation of sick birds in separate sheds. However, 76.2% mortality occurred in chick and 50.4% of farmer throw their dead bird in field. A considerable percentage of farmers (28.1%) did not seek treatment facilities for their poultry. However, a minority (22.7%) utilized veterinary hospitals to treat their Native chickens. The study underscores the need for improved disease management practices, including increased vaccination coverage and access to veterinary services. It also highlights the importance of promoting biosecurity measures and proper hygiene practices to mitigate disease transmission and reduce mortality rates in native chicken farming.

Keywords: Native chicken, disease, vaccination, deworming and biosecurity

Introduction

Homestead chicken dominates Bangladesh's poultry production landscape [1]. Bangladesh's poultry industry boasts native chickens that serve as linchpins in fulfilling the country's meat demand, ensuring sufficiency and robustness in supply (production 87.10 lakh MT vs demand 76.08 lakh MT) and surplus of eggs (production of 2337.63 crores vs. demand of 1806.48 crores) [2]. Native chicken rearing is a vital income-generating avenue for rural women, landless poor and marginal farmers [1]. Typically, women are actively involved in village chicken production alongside their household duties, eliminating the need for additional external labor. It is possible to benefit from producing native chickens if they are raised correctly [3].

The use of native chicken in the tropics varies from region to region and from community to community within a region [4]. Despite its pivotal role, poultry production in rural areas grapples with a multitude of challenges, including housing, feeding, disease management, and inadequate infrastructure. Additionally, rural farmers often lack comprehensive knowledge on various aspects of poultry production, such as feed quality and disease prevention techniques. In Bangladesh, farmers face a wide range of poultry diseases like Infectious Bursal Disease (IBD), Chronic Respiratory Disease (CRD), Mycoplasmosis, Newcastle Disease (ND), Aspergillosis, Salmonellosis, Coccidiosis, Fowl Cholera, Infectious Bronchitis etc. that reduce the optimal production of the flock [5]. Poultry diseases are the major constraints for developing the poultry industry [6].

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(Received 02 September 2024, accepted 27 October 2024)

DOI: 10.21608/EJVS.2024.303412.2352

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The prevalence of diseases in a particular area depends on various factors like geo-climatic conditions, management practices, immunization status, social awareness etc. [5]. A huge knowledge gap present on management and biosecurity practices among backyard chicken farmers [7]. Various barriers hinder the development of native chicken farming in Bangladesh, warranting a comprehensive assessment of disease prevalence, health management practices, and implementing disease control strategies among farmers. The study assesses farmers' knowledge, attitudes, and practices regarding poultry diseases and health management. By evaluating their understanding and attitudes toward disease prevention and treatment, the research can identify barriers to adopting best practices, such as reliance on traditional methods.

This insight is crucial for addressing gaps between knowledge and implementation, improving farm productivity, and reducing mortality rates. In Bangladesh, where poultry diseases cause significant economic losses, the study can guide more effective policies and targeted interventions, particularly for small-scale farmers, filling a research gap in this area.

Material and Methods

Data collection

The study was undertaken to investigate the prevalence of different diseases, seasonal outbreaks, immunization, deworming, and biosecurity measures in selected areas of Bangladesh. A semi-structured questionnaire was employed, and data were gathered from eight upazilas: Pabna Sadar, Rangpur Sadar, Sonagazi, Nakla, Najirpur, Bauphal, Joypurhat Sadar, and Jamalganj, representing Rangpur, Feni, Sherpur, Pirojpur, Patuakhali, Joypurhat, and Sunamgonj districts, respectively. Primary data obtained through direct questioning of selected farmers using a standardized questionnaire. Thirty farmers were interviewed from each upazila, except Bauphal, where fifty farmers were interviewed, totalling 260 households surveyed through field surveys comprising direct observation and farmer face to face interviews. The survey conducted by starting from the beginning of the village and selecting households randomly, which had at least five or more chickens. The livestock service providers were asked how many households in the village kept backyard chickens and were given a random number of households from which to select. Only the randomly selected households subsequently visited. Disease names were recorded based on the symptoms described by the farmers, and data were verified through crosschecking. Secondary data were collected from various sources including books, theses, reports, journals, official records, and statistical yearbooks of Bangladesh. Straightforward questions utilized to extract information.

Data Management and analysis

Data from each of collector were gathered and cleaned in Microsoft Excel 2010, followed by coding and recoding of the data for further analysis. The cleaned data input into SPSS for further analysis. Descriptive analysis was conducted to summarize the demographic data and distribution of different disease, biosecurity and management practices data from the native chicken farmers of the study area. Column graphs, pie charts, and other graphical presentations were used to represent the results.

Results and Discussion

Farmer's response to the occurrence of different diseases in native chicken farm

The highest disease incidence among farmers was observed in Newcastle disease and fowl pox, affecting 26.9% of farms. In comparison, the lowest occurrence was noted in Newcastle disease combined with brooder pneumonia and fowl pox at 1.5% annually. Furthermore, 21.2% of farmers reported facing a combination of Newcastle disease, fowl cholera, and fowl pox as the second most prevalent set of diseases on their farms. This aligns closely with findings from previous studies: [8] reported Newcastle disease outbreaks in 84.5% of farms, followed by fowl pox at 7.0%, and other diseases at 8.5%. [9] highlighted Newcastle disease as the most prevalent, followed by fowl pox, coccidiosis, respiratory issues, and miscellaneous diseases. [10] indicated disease outbreaks in native chicken, with Newcastle disease at 34.35%, fowl cholera at 9.85%, and other diseases at 28.22%. [11] found Newcastle disease to be predominant (42%), followed by fowl pox (4.5%) in rural villages of Bangladesh. [12] stated outbreaks per household, with Newcastle disease at 51%, fowl pox at 27%, and fowl cholera at 13%, with mortality ranging from 10% to 37% and averaging at 27.82%. [7] identified Newcastle disease as the most frequent (49%), followed by coccidiosis (30%), fowl cholera (12%), and fowl pox (9%). [5] reported infectious bursal disease at 24.96%, chronic respiratory disease/mycoplasmosis at 9.87%, Newcastle disease at 8.92%, coccidiosis at 7.32%, fowl cholera at 0.24%, and infectious bronchitis at 0.24% in Narsingdi district. Newcastle disease is highlighted as a primary challenge in backyard chicken farming, with outbreaks potentially resulting in 100% mortality noted by [13] and [14]. [15] Reported various diseases causing chicken mortality, with Newcastle disease at 38.89% and fowl cholera at 32.29%. Native chickens are pathogens' reservoirs and pose a risk for the commercial poultry farms in the region stated by [16]. From the feedback provided by farmers, it was discovered that the highest number of farmers, reaching 66.95%, faced disease incidence during the chick stage (0-5 weeks). Additionally, 13.1% of respondents experienced disease solely in the chick and grower (6-20 weeks) stages, while 12.7%

encountered it exclusively in the grower stage. Moreover, 3.5% of farmers reported disease occurrences in both chick and adult stages (>20 weeks), whereas 2.3% faced issues in both grower and adult stages. Finally, only 1.55% of respondents dealt with disease outbreaks solely in the adult stage. In chicks disease outbreaks were higher due to lower immunity rates and poor management of chick. The highest rate of disease incidence, accounting for 81.2% of farms, was observed during the winter season, contrasting with a minimal occurrence of 0.4% during the summer season. Additionally, 9.20% of farmers encountered disease prevalence exclusively during the summer and winter, while 6.2% experienced it during both winter and rainy seasons.

Furthermore, 3.10% of farmers reported disease prevalence solely during the rainy season. This finding was in agreement with [17] who found the highest prevalence of the diseases during the winter but did not match with [5] state that poultry diseases are prevalent mostly in the rainy season (47.09%), followed by summer (27.53%) and the least in the winter season 25.38% matched with [18] and [19] who found the highest occurrence of the disease during the rainy season.

Health management and biosecurity security application in Native chick

Vaccination, Deworming and anti-parasitic Practices of Native Chicken

Only 23.1% and 23.8% of farmers practiced vaccination and deworming of their Native chickens. Most of the farmers got the vaccine and anthelmintic facility from the market followed by a veterinary hospital. The maximum 14.2% of farmers followed vaccination and deworming of Native chickens at 3-month intervals but 5% followed at 6 months, 3.10% at 1 year and 1.50% farmers vaccinated their Native chicken at > 1-year intervals. Moreover, 4.60 % of farmers practiced deworming at 6 month and 1-year intervals with 0.40% following deworming at 9 months interval. This study was similar to [20] who reported that regular vaccination in Sylhet and Chapainababgonj 20.60% and 11.20% respectively and regular deworming in Sylhet and Chapainababgonj 20.60% and 13.10% respectively. According to [8], only 4.5% of farmers practice vaccination, while deworming of poultry is neglected by 100.0% of farmers. [10] found that poultry vaccination is conducted by only 8.82% of farmers. In contrast, [21] reported a higher vaccination rate of 58.67% among farmers, with 15.33% practicing deworming. [22] Indicated that approximately 27.08% of farmers utilize vaccines, while 38.54% employ traditional and modern deworming drugs. [11] Noted that approximately 13.42% of farmers attempt to adhere to vaccination schedules. Biosecurity, vaccination, medication, and proper

management are important to prevent and control diseases in poultry [4]. In Ethiopia, [23] reported that approximately 36.87% of respondents utilized deworming (anti-ectoparasites). Meanwhile, [24] discovered that in the Bhandra district of Maharashtra, India, 49.6% of farmers engaged in anti-ectoparasite practices for native poultry-rearing. The availability of vaccine in root level is also a challenging issue and most of the farmers 54.2% rely on Market followed by veterinary hospital 41.6% for purchasing vaccine.

Bio-security management of Native chicken

According to the survey data, 70.4% shown in Table 2 of farmers clean their poultry houses regularly and rest without any schedule. The highest number of respondents (86.5%) favors using a broom for cleaning. Additionally, a small percentage choose for cleaning with water (4.2%), cleaning with disinfectant (5.8%), or using other materials (3.5%). It's noted that farmers typically initiate disease control measures upon observing symptoms in their flocks. Regular cleaning of excreta from Native chicken houses was practiced by 61.5% of farmers and the rest cleaned excreta irregularly. A notable proportion (32.7%) utilizes nonspecific methods, suggesting a range of practices beyond defined categories. Additionally, a portion (16.2%) opts to keep the excreta outside or throw it away, while others store it in a pit (10.0%). A smaller percentage (6.5%) reuses the manure as fertilizer, demonstrating an environmentally conscious practice. [25] found a similar practice in that 25%, 62.5% and 12.5% of respondents throw away the excrement, sell or used it as fertilizer respectively. [4] described that one of the most important positive characteristics of native chickens is their hardiness, which is the ability to tolerate harsh environmental conditions and poor husbandry practices without much loss in production. In the realm of sick bird management practices among farmers, the data reveals a range of strategies employed. Notably, a significant portion (41.9%) choose to separate sick birds, while others opt to keep them in the same shed (20.0%) or choose the route of slaughter (34.6%). A small minority prefer selling the sick birds (2.30%), while a few respondents (1.20%) utilize other, unspecified methods. [7] stated that 33.63% of farmers slaughtered and consumed sick chickens, while a limited number of households 4.42% sold sick chickens to the local market or neighbors, and an even smaller percentage 3.54% did nothing about the sick birds. These findings shed light on the diverse approaches taken by farmers in managing sick birds. The mortality rate among poultry, as reported by farmers, varies significantly across different stages of development. A considerable majority (76.2%) of respondents reported the highest mortality rate among chicks, indicating vulnerability during this early stage. In contrast, mortality rates decrease as the bird's progress, with 18.5% reported for growers

and a mere 5.4% for adult chickens. These findings illuminate critical stages of vulnerability in poultry development and underscore the importance of targeted interventions and management practices to mitigate mortality rates and optimize poultry health and productivity. This study was closely similar to that of [26] who reported that the majority of rural women (71.25%) had chick mortality occurred in the first week. The management practice of deceased birds among poultry farmers is a crucial aspect of biosecurity and sanitation protocols. Analysis of surveyed practices reveals several methods used for this purpose. The predominant approach, adopted by 50.4% of respondents, involves the disposal of deceased birds by throwing them in fields. Additionally, a substantial proportion (41.9%) chooses to bury the deceased birds. A smaller percentage (7.30%) of respondents choose to dispose of deceased birds by throwing them into water bodies, while a minute fraction (0.40%) choose for burning as a disposal method. These findings indicate variations in disposal practices among poultry farmers and emphasize the need for further investigation into the factors influencing these choices and their potential implications for biosecurity and environmental health. The study revealed that the highest proportion of farmers, 28.1%, did not avail of any treatment facilities for their Native chickens. Interestingly, 22.7% of farmers sought treatment for their Native chickens at veterinary hospitals, while 22.3% relied on their knowledge for treatment. Furthermore, 20.8% of farmers sought treatment from local Quacks, while 6.20% obtained treatment from the nearest veterinary pharmacy. These findings are consistent with [1] who reported that 55% of farmers utilized services from veterinary hospitals, while 45% did not. Similarly, [22] noted that the majority of respondents (89.58%) did not receive extension services from health centers, with only 10.42% accessing this service. These findings resonate with [7] who observed that 45.43% of households treated sick chickens with medication obtained from local veterinary pharmacies.

Conclusion

The findings of this study underscore several critical issues in poultry farming that demand immediate attention. The high prevalence of Ranikhet/Newcastle disease, fowl cholera, and Fowl pox, particularly affecting vulnerable chicks, is alarming. Additionally, the observation that most

disease outbreaks occur during the winter season emphasizes the need for heightened vigilance and preventive measures during this time. The low rates of vaccination 23.1%, deworming 23.8%, and treatment among farmers highlight a significant gap in disease management practices and access to veterinary services. The practice of keeping sick birds in separate sheds was a positive step towards preventing disease transmission, but more farmers need to adopt this practice to have a meaningful impact. Furthermore, the high mortality rate among chicks and improper disposal of dead birds pose serious health and environmental risks. Addressing this gap through education, outreach, and improved access to veterinary care is crucial for mitigating disease spread and reducing mortality rates. Prioritizing the implementation of good hygiene practices, enhancing biosecurity measures, and increasing vaccination coverage is imperative for preventing and controlling infectious diseases in poultry farming. Collaborative efforts between farmers, veterinary services, and policymakers are essential to address these challenges effectively and safeguard the health and welfare of poultry populations.

Acknowledgments

The authors sincerely thank the farmers and responded for their support and guidance for data collection.

Funding statement

This study was funded by the revenue research grant from the Bangladesh Livestock Research Institute.

Declaration of Conflict of Interest

The authors have declared that no conflict of interest exists.

Authors' contributions

Author Md. Ashraful Islam wrote the manuscript. Authors Sydul Islam, and Sharmin Sultana helped in collect data, analyze and writing the manuscript. Author Dr. Razia Khatun provides support and guidelines for writing this article. All authors read and approved the final manuscript.

Ethical of approval

This research did not require ethical approval and an animal care and use certificate because no animals were involved in the study.



Fig. 1. Data collection area (8 District)

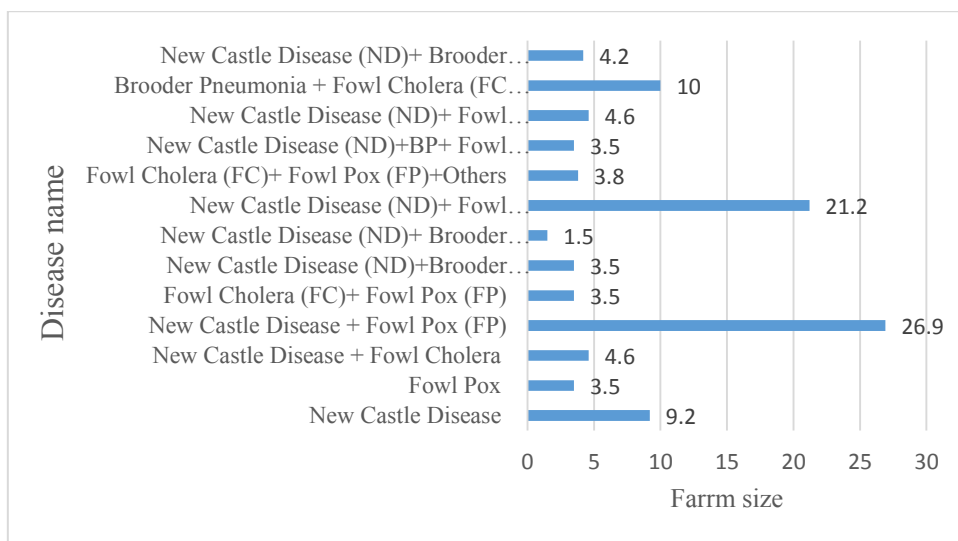


Fig. 2. Farmer's response on outbreaks of different diseases in native chicken farms in the selected areas.

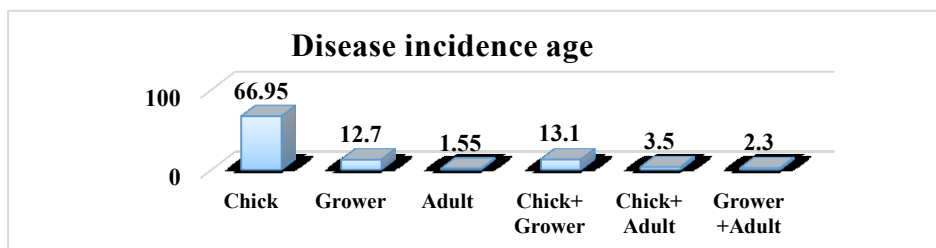


Fig. 3. Farmers response on age of disease outbreak

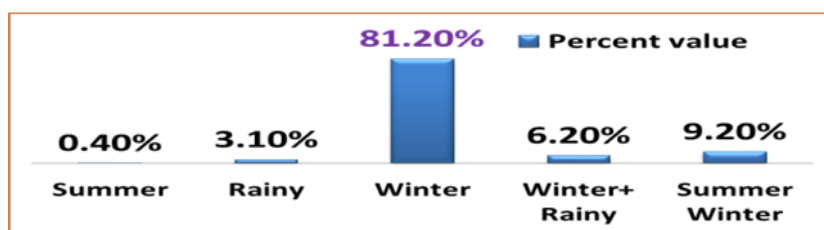


Fig. 4. Farmer's response on Season of disease outbreak

TABLE 1. Vaccination, Deworming and anti-parasitic measurement practices of Native chicken farmers

Vaccination interval	Percent (n=260)	Deworming interval	Percent (n=260)	Source of Anthelmintic and vaccine	Percent (n=260)	Parasitic Management	Percent (n=260)
3 month	14.2 (37)	3 month	14.2 (37)	Vet. hospital	41.6 (108)	Parasitic infestation at brooding	41.5 (108)
6 month	5.0 (13)	6 month	4.6 (12)	Market	54.2 (141)	Parasitic measure taken	25.0 (65)
9 month	-	9 month	0.4 (1)	Company	0.8 (2)	Bath with Disinfectant	17.3 (45)
1 year	3.1 (8)	1 year	4.6 (12)	Agent	3.5 (9)	Separate from other chicken	7.7 (20)
>1 year	1.5 (2)	-	-	-	-		
Total Vaccination	23.1 (60)	Total Deworming	23.8 (62)	-	-		

TABLE 2. Bio-security Management and Treatment Facilities of Native chicken

House cleaning Practices	Percent (n=260)	Excreta Management Method	Percent (n=260)	Sick bird management	Percent (n=260)	Mortality rate	Percent (n=260)
Regular house cleaning	70.4 (183)	Regular cleaning	61.5	Keep in the same shed	20.0 (52)	Chick	76.2 (198)
Cleaning with Water	4.2 (11)	Keep outside / throw away	16.2 (42)	Separate shed	41.9 (109)	Grower	18.5 (48)
Cleaning with Disinfectant	5.8 (15)	Store in pit	10.0 (26)	Sell	2.3 (6)	Adult	5.4 (14)
Cleaning with Broom	86.5 (225)	Use as fertilizer	6.5 (17)	Slaughter	34.6 (90)	-	-
Cleaning with other materials	3.5 (9)	Nonspecific Method	32.7 (85)	Others	1.2 (3)	-	-
Death bird management		Percent (n=260)		Treatment facilities		Percent (n=260)	
Throw in field		50.4 (131)		Veterinary Hospital		22.7 (59)	
Bury		41.9 (109)		Quack		20.8 (54)	
Burn		0.4 (1)		Farmers Own		22.3 (58)	
Throw in water		7.3 (19)		Veterinary Pharmacy		6.2 (16)	
-		-		No Treatment		28.1 (73)	

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نظرة ثاقبة إلى مربّي الدجاج الأصليين: فهم المعرفة والمواقف والممارسات المتعلقة بإدارة الصحة والأمراض في مناطق مختارة من بنغلاديش

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الملخص

تربية الدجاج في الأسر شائعة بين النساء في جميع أنحاء بنغلاديش. المرض مشكلة رئيسية تقلل الإنتاج وتزيد من الوفيات وتقلل من ربحية المزارعين. هدف البحث إلى معرفة تصور المزارعين لحدوث المرض، والنهج الصحية وإدارة الأمن الحيوي في تربية الدجاج الأصلي المربي في نظام شبه مكثف في بنغلاديش. لقد اخترنا عشوائياً 260 مزارعاً من ثماني مناطق في بنغلاديش. تم جمع البيانات من خلال استبيان مصمم مسبقاً من خلال المقابلات المباشرة مع المستجيبين والملاحظة الدقيقة على مستوى الأسرة. كان مرض نيوكاسل، إما بمفرده أو معاً، هو المشكلة الأكثر شيوعاً بين المزارعين. أفاد معظم المزارعين (66.95%) أن دجاجهم أصيب بالأمراض في سن مبكرة، وخاصة خلال مرحلة الكتاكيت. ولم يشارك سوى 23.1% و 23.8% من المزارعين في إجراءات التطعيم وإزالة الديدان. وعلى الجانب الإيجابي، أفاد معظم المزارعين (70.4%) بتنظيف حظائر الدواجن الخاصة بهم بانتظام واستخدمت نسبة صغيرة فقط (5.4%) المطهرات أثناء التنظيف. بالإضافة إلى ذلك، مارست نسبة كبيرة (41.9%) من المزارعين عزل الطيور المريضة في حظائر منفصلة. ومع ذلك، حدثت 76.2% من حالات النفوق بين الكتاكيت وألقي 50.4% من المزارعين طيورهم النافقة في الحقل. ولم تسع نسبة كبيرة من المزارعين (28.1%) إلى مرافق علاج لدواجنهم. ومع ذلك، استخدمت أقلية (22.7%) المستشفيات البيطرية لعلاج دجاجهم الأصلي. وتؤكد الدراسة على الحاجة إلى تحسين ممارسات إدارة الأمراض، بما في ذلك زيادة تغطية التطعيم والوصول إلى الخدمات البيطرية. كما يسلط الضوء على أهمية تعزيز تدابير الأمن الحيوي وممارسات النظافة السليمة للتخفيف من انتقال الأمراض وخفض معدلات الوفيات في تربية الدجاج المحلي.

الكلمات الدالة: الدجاج المحلي، المرض، التطعيم، إزالة الديدان والأمن الحيوي.