Research Article

Prevalence of Gastro Intestinal Cestodes in Backyard Chickens in District Tando Allahyar, Sindh

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Abstract | In order to study the prevalence of gastrointestinal cestodes in backyard (Desi) chickens in district Tando Allahyar of Sindh province, the present study was intended during August to November 2012. A total of 90 samples were examined in randomly selected 18 villages of three Tehsils (Taluka) in district Tando Allahyar. The result showed that backyard chickens in district Tando Allahyar were severely infected by gastrointestinal cestodes. The Tehsil wise infection rate was found 66.6, 70 and 80%, in Tehsil Tando Allahyar, Chamber and Jhando Mari respectively. The overall prevalence of gastrointestinal cestodes recorded in district Tando Allahyar was 72.2%. Furthermore, five cestodes species were observed which include *Davainea proglottina* (10%), *Raillietina tetragona* (31.1%), *Raillietina cesticillus* (14.45%), *Choanotaenia infundibulum* (7.78%) and *Raillietina echinobothrida* (17.78%), while 18.89% of the birds were infected by more than one species of cestodes parasite. The current study revealed that backyard chicken maintained in district Tando Allahyar of Sindh province are at high risk of gastrointestinal cestode infection. Therefore, the situation calls for minimizing the risk of cestodes by giving emphasis on control of cestodes infection through adopting standard management, proper and balance feeding, limiting the contact of poultry with the intermediate hosts of parasites and proper use of anthelminthics to reduce the losses in term of low meat and egg production.

Keywords | Backyard chicken, Anthelminthics, Prevalence, Gastrointestinal cestodes, Tando Allahyar

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INTRODUCTION

The Poultry industry play an enormous role in economy of Pakistan. It is one of the vibrant segments of agriculture that contributes about 1.3 percent to national GDP (Gross Domestic Product), and its share in agriculture and livestock is 6.1% and 10.8%, respectively. Furthermore, about 28.0% of total meat produced in the country comes from Poultry (Pakistan Economic Survey, 2013-14). According to Pakistan Poultry Association survey, over 25,000 poultry farms are spread into rural areas across the country; producing 1,220 million kg of chicken meat and about 10,000 million eggs annually (Pakistan Poultry Association, 2014). Almost every family in the rural and every fifth family in the urban areas are concerned directly or indirectly with poultry in our country (Pakistan Economic Survey, 2013-14). As commercial poultry production is a key source of animal's proteins for human consumption; however, there is still a gap present between supply and demand of protein of animal origin. Therefore, along with modern management, feeding, marketing techniques and better health coverage, some suitable and efficient alternate sources of animal proteins are needed. In this respect backyard (Desi) poultry in rural areas seems to be one of the possible alternate sources to offload pressure on commercial poultry production system. In most of the developing countries including Pakistan about 80 to 90 % of the indigenous poultry genotypes are kept in villages

(Sonaiya and Swan, 2004).

Backyard poultry production is an important economic activity in about 80 % families of the country (Pakistan Economic Survey 2013-14). The contribution of rural poultry in total eggs and poultry meat production of the country has been estimated about 29.23 and 12.76 percent (Pakistan Economic Survey 2013-14). Unfortunately, backyard poultry in villages has not operated to its maximum potential due to lake of technical expertise and health coverage (Bhatti et al., 1991). In addition to many bacterial and viral diseases, the gastrointestinal cestodes parasitism is one of the major threats to rural poultry. The heavy infestation to parasitic eggs causing heavy economic losses in term of retarded growth, reduced weight gain and low production (Puttalakshmamma et al., 2008).

The gastrointestinal cestodes parasites causes decrease in egg production, diarrhea, obstruction of intestine, morbidity, significant hemoglobin depression and high mortality rate in backyard chicken (Katoch et al., 2012; Magwisha et al., 2002). Due to lack of proper housing system in rural areas backyard poultry are more prone to eggs of parasite and there is high mortality in these birds as compared to those who are provided proper shelter and immunization (Farooq et al., 2002). Insects also, play a significant role in causing cestodes infection in poultry specially Raillietina tetragona infection, as Desi birds are more prone to insects therefore, they suffer more as compared to those who are reared in controlled environment (Mohammed et al., 1988). Furthermore, the indigenous backyard (Desi) poultry in villages are kept with the use of no or few anti-helminthes and vaccination leading to low meat and eggs production. Keeping in view the importance of gastrointestinal cestodes parasites in backyard chicken the present study was intended in district Tando Allahyar of Sindh province, Pakistan to record the prevalence rate and to identify the cestodes species existing in the area.

MATERIAL AND METHOD

Experimental Design

For the present study, a total of 90 adult backyard chickens of both sexes were collected from randomly selected 18 villages i.e., five chickens per village in district Tando Allahyar of Sindh province from August to November 2012. Visits to different villages were made to collect the samples. The live birds from each village were randomly selected and brought to the laboratory of Department of Veterinary Parasitology, Faculty of Animal Husbandry and Veterinary Sciences, Sindh Agriculture University, Tandojam.

Gross Examination of the Gastrointestinal Tract for Presence of Cestodes

Humane slaughtering of birds was carried out, after that the birds were dipped in water to avoid feathers sheading. Both the femurs were dislocated and abdominal cavity was exposed through incision at peritoneum with scalpel. The gastrointestinal tracts were excised and then transferred to Petri dish. For detailed examination and identification of cestodes parasite a longitudinal section from duodenum to cloaca including cecum was made very carefully; and any cestode parasite detected were removed with the help of tissue forceps, counted and washed in normal saline. After washing the cestodes were preserved in a glass bottle containing 10% formalin as per procedure followed by Dar and Tanveer (2013).

Identification of Cestode Parasite

For identification of cestodes the permanent mounts on the glass slides were made, by extending the cestodes in warm water through vigorous shaking for 20 seconds. The water temperature was fixed according to size of cestodes i.e., 65˚C for less than 3 inches long, 70˚C for medium sized and 75˚C to 80˚C for large sized cestodes parasite. Fixation was done with 10% formalin. After that dehydration was carried out with different concentrations of alcohol (70%, 80%, 90% and 100% (absolute) for two hours in each. Then stained in hematoxylin and cleared with xylene (Cable-Raymond, 1963). After this the parasites were mounted on glass slides and a drop of Canada balsam was applied and covered with cover slip. Various parts of cestodes were examined under stereo microscope using 40X and 100X Objectives. Different species of cestodes were identified according to their morphological characteristics such as head (scolex), neck, body (strobilus), segments (proglottids), reproductive organs and suckers (Soulsby and Helminthes, 1986).

Statistical Analysis

The data collected were processed through descriptive statistics using SPSS 16. (SPSS 2006, USA).

RESULTS

The data collected on prevalence of cestodes parasites in backyard chicken in district Tando Allahyar is illustrated in Table 1-5. The data presented in Table 1 shows the prevalence of cestodes in backyard chicken in various villages of Tehsil Tando Allahyar. It was cleared that a total of 30 birds were examined in which 20 birds (66.6%) were positive for cestodes. The numbers of cestodes in birds in Tehsil Tando Allahyar were ranged from 3 ± 0.40 to 3.66 ± 0.88, with an average of 3.25 ± 1.19 cestodes per bird. The prevalence was more in Dangano Buzdar, Gul Mahmond Lashari, and Rajo Khan Lashari (80%), while lowest at Meto Khaskheli (40%). Out of 30 samples examined from various villages in Tehsil Chamber, 21 birds (70%) were positive for cestodes infection, ranging from 1.6 ± 0.66 to 3.4 ± 0 .51 with an average of 2.42 ± 1.82 cestodes per bird.

Table 1: Prevalence of gastrointestinal cestodes in backyard chicken in Tehsil Tando Allahyar

Name of village	No. of birds examined	Positive	No. of parasite detected	No. of parasite per bird (Mean±S. E)	Prevalence (%)
Dangano Buzdar	05	4	13	3.25 ± 0.62	80
Khair Muhammad Jarwar	05	3	11	3.66 ± 0.88	60
Gul Mahmond Lashari	05	4	14	3.5 ± 0.64	80
Rajo Khan Lashari	05	4	12	3.0 ± 0.40	80
Meto Khaskheli	05	2	6	3.0 ±1.00	40
Pak Singar	05	3	9	3.0 ± 0.57	60
Total	30	20	65	3.25 ± 1.19	66.6

Table 2: Prevalence of gastrointestinal cestodes in backyard chicken in Tehsil Chamber

Name of village	No. of birds examined	Positive	No. of parasite detected	No. of parasite per bird (Mean±S. E)	Prevalence (%)
Nasir Khan Mandwan	05	5	17	3.4 ± 0.51	100
Muhammad Hasan Dal	05	4	8	2.0 ± .70	80
Maindad Rindh	05	2	5	2.5 ±1.50	40
Mank Langwani	05	4	7	1.7 ± 0.47	80
Jafar Khan	05	3	5	1.6 ± 0.66	60
Total	30	21	51	2.42 ± 1.82	70

Table 3: Prevalence of gastrointestinal cestodes in backyard chicken in Tehsil Jhando Mari

Name of village	No. of birds examined	Positive	No. of parasite detected	No. of parasite per bird (Mean±S. E)	Prevalence (%)
Ghulam Hussain Londh	05	3	9	3.0 ± 0.57	60
Baher Merjat	05	4	8	2.0 ± 0.40	80
Dolat Merjat	05	5	12	2.4 ± 0.51	100
Allah Rakhyo Pathan	05	4	10	2.5 ± 0.64	80
Yar Muhammad Dars	05	3	11	3.66 ± 0.88	60
Umer Sandh	05	5	13	2.60 ± 0.51	100
Total	30	24	63	2.69 ± 0.58	80

Table 4: Overall prevalence of gastrointestinal cestodes in backyard chicken in district Tando Allahyar

Name of tehsil	No. of birds examined	No. of birds Infected	Percentage
Tando Allahyar	30	20	66.66
Chamber	30	21	70.00
Jhando Mari	30	24	80.00
Total	90	65	72.21

Table 5: Percentage of different cestode species identified from backyard chicken

Name of cestode species	No. of host infected	Percentage
Raillietina tetragona	28	31.11
Raillietina cesticiullus	13	14.45
Choanotaenia infundibulum	7	7.78
Davainea proglottina	9	10.00
Raillietina echinobothrida	16	17.78
Mixed infection	17	18.89

It was determined that prevalence was more in Nasir Khan Mandwan (100%), followed by Muhammad Hasan Dal and Mank Langwani (80%), Saeed Khan Laghari (60%), Jafar Khan (60%), while lowest at Miandad Rindh which was 40% (Table 2). At Tehsil Jhando Mari 24 out of 30 birds were +ve for cestodes parasite, within the range of 2 ± 0.40 to 3.66 ± 0.88, and average of 2.69 ± 0.58 cestodes per bird; village wise prevalence rate in JhandoMari was highest in Dolat Mer Jat and Umar Sandh (100%) while, lowest at Ghulam Hussain Londh and Yar Muhammad Darss (60%; Table 3). The Tehsil wise prevalence rate of gastrointestinal cestodes parasite was more at Tehsil Jhando Mari (80%) Followed by Chamber (70%), while lowest at Tando Allahyar which was 66.66% (Table 4). The overall prevalence of cestodes in Desi chicken in district Tando Allahyar was 72.2%. During the detailed examination of

the samples, a total of five cestodes species were found. These include *Raillietina tetragona* (31.5%), *Davainea proglottina* (10.00%), *Raillietina cesticiullus* (14.45%), *Choanotaenia infundibulum* (7.78%) and *Raillietina echinobothrida* (17.78 %). It was observed that 18.89% of the chicken hosts were infested with mixed cestodes parasite (Table 5).

DISCUSSION

The results of the present study showed a variable prevalence of cestodes parasite in backyard (Desi) chicken in district Tando Allahyar. It might be due the scavenging habit of the birds and changes in the environment in the study area. Furthermore, the findings of the current study coincides with those previously elucidated by Bano et al. (1989), they reported 75 percent cestodes infection causing huge economic losses in rural poultry. Anwar et al. (1989) also, recorded 74.6 percent prevalence of cestodes in indigenous chicken. Similarly; the results of the current investigations were in accordance with those of Jatoi et al. (2013). The researchers revealed 55 to 60.77 percent cestodes infection in Desi chicken in district Larkana of Sindh province. Berhanu et al. (2014) reported 84.8 to 89.9 percent prevalence of cestodes in scavenging chicken in and around Southern Ethiopia from October 2010 to April 2011 which are little bit higher than the results of the present study intended in district Tando Allahyar. Moreover, in accordance with the present survey Farooq et al. (2002) also collected 64% cestodes from Desi fowl. The prevalence of cestodes in the current study was higher than those reported by Medjouel et al. (2013), Hussen et al. (2012) and Shah et al. (1999). Similarly in comparison with the present investigations of Buriro et al. (1985) also, recorded only 34.1 percent cestodes infection in Desi chicken in Sindh. These differences in prevalence of cestodes might be due to variances in host type (breed), as it was well documented that different breeds have different susceptibility levels for infectious agents and immuno-physiological responses (Mangi et al., 2015). The high prevalence of gastrointestinal cestodes in backyard poultry in district Tando Allahyar could be due to independent feeding system with no feed restriction in free range areas, adaptation of poor management, farmer's unawareness about proper use of antihelminthics and great exposure of birds to parasitic eggs/ intermediate hosts, and/or infective stage of parasite. Environmental changes in rural areas are also, one of the important causes influencing variation in GIT cestodes parasite in Desi chicken. During detailed study of cestodes a total of five cestodes species were observed that include *D. proglottina, R. tetragona, R. cesticillus, C. infundibulum* and *R. echinobothrida*. These results corroborate with the findings of Zubeda et al. (2014), Hayat and Hayat (1983) and Lin and Li (1984). Similarly Jatoi et al. (2013) found *R. tetragona, R. cesticillus, and C. infundibulum*, while Jansen and Pandy (1989) also reported *R. tetragona*, and *R. cesticillus* in non-commercial free-ranged poultry flock. The present study also, showed heavy infection of Desi birds with *R. tetragona* which is similar with the findings of Fatihu et al. (1990), they expressed that domestic birds were infected exclusively with *R. tetragona*. In another study intended by Tuli (1989) found five cestode species in free range poultry including *R. tetragona, R. cesticillus, R. echinobothrida, Davainea proglottina* and *C. infundibulum*. The worker also, illustrated that *R. tetragona* was highly prevalent while *C. infundibulum* was less prevalent which is strongly in favor of the present study. The variation in the prevalence of infested species in backyard chicken may be due to different climate and availability of the intermediate host of parasite and certain host factors including immune response of the birds.

CONCLUSION

The results of the present study revealed that backyard chicken maintained in rural areas of district Tando Allahyar were exposed to very high prevalence and infection with multiple cestodes species. In comparison with other cestodes species *R. tetragona* was highly prevalent. Therefore, the emphasis should be given on control of cestodes parasite in backyard poultry by adopting standard management, proper and balance feeding, limiting the contact of poultry with the intermediate hosts of parasites and use of proper antihelminthics to reduce the losses in term of low meat and egg production.

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CONFLICT OF INTEREST

Authors declares no conflict of interests for the contents in the manuscript.

AUTHORS CONTRIBUTION

The authors Arsala Khan, Muhammad Shoaib, Alam Zeb, Mujib Ur Rahman, Sohail Khan are the main investigator and contributed equally in the research work. Dr. Bachal Bhutto was supervisor of the team. Imam Bakhsh Khetran

and Ali Raza Nizamani had revised the manuscript. Shah Fahad and Abrar Ahmad hepled in statistical analysis of this research work.

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