ABSTRACT

Turkey is a newly introduced poultry species in Bangladesh. Its popularity is increasing gradually because of gamey flavor of meat with lower fat content. So, it may have high potential for production and marketing in Bangladesh. However, there is scanty study conducted previously regarding turkey production in Bangladesh. Therefore, Present study was done to know the rearing system, management practice, problems and prospects of turkey farming in Bangladesh. The observation was taken of status of farmers, source of technical support, the turkey flock size (according to age variation), feed intake, housing system, feeding system, floor space , feeder space, waterer space, turkey marketing age, weight, price of turkey. Most of the turkey farmer rear turkey in small scale semi-intensive system (50%) was generally practiced by the rural farmers. They have very little idea about breed and variety of turkey and prevention of diseases of turkey. But farmer have very little knowledge about turkey management procedure. There is no specific feeding standard for turkey. Farmers used to feed their turkey according to broiler and layer feeding manual. So, research needed to improve the status of turkey.

INTRODUCTION

Bangladesh is a small country with a large population about 160 million (BBS, 2019).Traditional backyard poultry keeping has been practiced in this country since time of immemorial. Besbes (2009) reported that the worldwide poultry sector consists of chickens (63%), ducks (11%), geese (9%), turkeys (5%), pigeons (3%) and guinea fowls (3%). As an agriculture-based developing country like Bangladesh has approximately 304.17 million poultry (DLS, 2019).The majority of these poultry are indigenous chickens and ducks (DLS, 2016). Diseases and predators are main factor for loss of productive performance in poultry (Nakamura et al., 1990) due to higher nutritional demand and lower disease resistance, exotic purebreds did not perform satisfactory in scavenging system (Haque et al., 1999). Therefore, in addition to indigenous poultry, rural and semi-urban people required a suitable species of bird, which can be reared easily with little investment and play an important role to provide more economic return within a short time. Thus, it is crying need to search the alternative protein source to meet up the increasing demand of the Nation . In order to maximize food production and meet protein requirements in developing countries including Bangladesh , variable options need to be explored and evaluated (Owen et al., 2008). Turkey (*Meleagris Gallopavo*) is a large gallinaceous bird of the family Meleagridae that is native of North America, domesticated in Europe and are now important source of food in many parts of the world. They have been considered as traditional thanks giving and Christmas fare since the Pilgrims hunted wild turkeys to decorate their tables on the first Thanks giving Day (Moreki et al., 2015). Male domestic turkey has referred to as tom, the female are called hens and chicks are referred to as poult. Domestic turkey is a popular form of poultry. Turkey occupies an important position next to chicken,duck & production turkey is also a promising branch of poultry with great potentials because its large body size fast growth rate, high fecundity and excellent meat quality which is found to be of higher percentage protein than the carcass of chicken. Turkey production is an important and highly profitable agricultural industry with a rising to global demand for its products and they are adaptable to wide range of climatic conditions (Yakubu et al., 2013). Moreover, the turkey has high dressing percentage that could amount to 87% of slaughter weight (Turkey management guide, 2012). Turkey bird has a promising potential to be an alternative to livestock in meat production. This may be due to its higher rate of carcass yield under intensive system of management (Nixey, 1986). Turkey is an excellent insect forager and most crops that are troubled by insect population including vegetables are candidates for

insect control by turkeys. Turkey thrives better under arid conditions, tolerates heat better, ranges farther and has higher quality meat (Yakubu et al.,2013). Despite its huge potential over other poultry species, turkey production has not been fully exploited in Bangladesh. In fact, turkey is a newly introduced poultry species in Bangladesh. It was first brought to Bangladesh as part of an exotic hobby. Till now most of the farmers are rearing turkey as an ornamental bird with a limited extent. Most of the farmers are rearing turkey without having prior experience. Mainly interested farmers started turkey farming by importing day-old turkey chicks (poults) from neighboring country, India (Assaduzzaman et al., 2017). It was still not so popular in Bangladesh because poultry or chicken market is already established. Many people do not know about the quality of turkey meat. Its popularity is increasing gradually because of gamey flavor of meat with lower fat content. It becomes a ray of hope for poultry farmers, who have been battling losses due to increasing prices of chicken and their feed in recent times. Now several poultry farmers are taking initiative to set up new turkey farms. So, it may have high potential for production and marketing in Bangladesh. Turkey farming is suitable for small and marginal farmers as it can be easily grown in free range or under semi-intensive system with less investment for shelter, equipment and management as well as less risk of diseases. The expenditure on turkey farming is very low. Farming system is similar to other poultry farming like chickens, ducks, etc. It can be easily started by hatching eggs or by raising young poults. They can be grown and home processed without the use of expensive equipment, or they may be sold to live markets or to neighbors. The birds eat grass, vegetables and chicken feed (Grimes et al., 2007). Moreover, diseases are also rare in turkeys. It is essential to obtain stock from a known disease free source. The care and management of turkey flocks depend on ager, location, season, facilities, health and many other factors (Moreki et al., 2015). Turkey meat consumption is more negligible than total annual chicken meat consumption. Continued research is necessary to provide additional information about the needs and preferences of turkey along with exploring alternative and innovative practices. Considering these facts the present study is designed with following objectives:

- To investigate the present status and production system of turkey farming in Bangladesh.
- To identify the problems and prospects of turkey production in Bangladesh.

Management practices in Turkey:

Production of turkey in Bangladesh:

Turkeys are not classified into breed, however three standard varieties are available, like Broad-breasted bronze turkey, Broad breasted white turkey, Royal palm. The farmers generally collected turkey chicks, poult from NGOs by paying about tk. 500/ piece.

The turkey start lay from the 30th week of age and its production period is about 24 weeks from the point of lay. Under proper feeding and artificial lightening management turkey hens lay 60-100 eggs annually. Nearly 70 percent of the eggs laid in the afternoon. Turkeys can be reared in both close and open houses in deep litter management system. However, litter should be raked at frequent intervals to prevent caking. The incubation period of turkey's egg is 28 days. Eggs can be hatched by natural or electric incubator. Naturally turkeys are good brooders and the broody hen can hatch 10-15 numbers of eggs and the hatchability of turkey's egg is about 60-80% hatchability. Turkey can be fed both mash and pellet feed and they are good scavenger. Turkeys should provided with a constant and clean water supply at all times. Some farmers provided more number of drinkers during summer. Sources of water was tape water, tube well water. The floor space, feeder and waterer space requirement according to age of turkey's is presented in Table 1.

Table 1. Floor, feeder and drinker space requirement according to age of turkeys

Age	Floor space(sq.ft)	Feeder space(cm) (linear feeder)	Dinker Space(cm) (linear feeder)
0-4 weeks	1.25	2.5	1.5
5-16 weeks	2.5	5.0	2.5
16-19 weeks	4.0	6.5	2.5
Turkey breeder	5.0	7.5	2.5

A scenario of weekly feed intake and body weight of turkey is given in Table 2. Turkey can fed both roughage and concentrate and they are good scavengers. During day time they eat green grasses in the grass field. They can take up to 50% green grass of their total requirement.

Table 2: Weekly body weight and feed consumption of turkey poultry

Age	Total feed consumption(kg)	Average body wt(kg)
	Male Female	Male Female
Up to 4 weeks	0.95 - 0.81	0.72 - 0.63
Up to 8 weeks	3.99 - 3.49	2.36 - 1.90
Up to 12 weeks	11.34 - 9.25	4.72 - 3.85
Up to 16 weeks	19.86 - 15.69	7.26 - 5.53
Up to 20 weeks	28.26 - 23.21	9.62 - 6.75

Mating behavior of tom is known as Strut, wherein it spreads the wings and makes a peculiar sound frequently. In natural mating, the male: female ratio is of 1:5. On average 40-50 poults is expected from each breeder hen. Toms are rarely used for mating after first year due to reduced fertility. There is a tendency in toms to develop affinity towards a particular female, therefore it needs to change the toms for every 15 days. Artificial insemination (AI) is not practiced in Bangladesh. The common vaccination schedule that are used by the farmers are as in Table 3.

Table 3: Vaccination Schedule for Turkeys

Age of Administration	Name of disease	Name of vaccine	Route
Day old	ND	ND B1 Strain	Eye drop
4-5 weeks	Fowl pox	Fowl Pox	Drinking water
6 weeks	ND	ND (R 2B)	Drinking water
8 10 weeks	Cholera	Cholera vaccine	Drinking water

Problems of turkey farming in Bangladesh

Low fertility, hatchability and use of turkey reproduction technology: It was found that none of the farmers in Bangladesh used AI technique and even they had not heard about it earlier regarding turkey breeding. In fact, adult body weight of tom is more and they are unable to mate naturally because of their heavy weight and AI has become necessary. Optimum male and female ratio and good mating between tom and hen is necessary to achieve good fertility and hatchability.

Low marketing facilities*:* There is absence of well-organized market for turkey and its products. No structured market value chain has been identified yet in Bangladesh. Farmers buy and sell turkey mainly through personal communication, Internet services (bikroy.com, Facebook etc.) and at the market of ornamental birds. It is found that sale of turkeys were more during Christmas and festive period than other periods of the year. Although, turkey meat is being sold in department stores in capital city Dhaka, a large numbers of consumers were not habituated of taking turkey meat.

Poor housing: Farmers did not know the scientifically accepted space requirement for rearing turkey. They gave space on the basis of assumption. Moreover, they were not aware of about using of suitable litter materials and their management. Many farmers did not take special care during extreme hot and cold situation which ultimately hampered the production performance of birds. Non availability of manufactured feeds and feeding standard Feeds for turkey are not manufactured by any feed mill in Bangladesh. So farmers fed their turkeys by their homemade feed as well as a mixture of homemade and broiler/layer feed. They did not know the scientific requirement of energy, protein and other nutrients for different categories of turkey. Although turkey is a good forager, some of the farmers did not know this fact so that they could not reduce feeding cost. Farmers did not have expertise to formulate balanced rations for turkey, thereby relying on rations originally formulated for layer and broiler chicken, with the assumption that chicken feed could bring same or better results. But proper nutrition is a basic prerequisite for successful poultry production to increase resistance to diseases and explore genetic potentiality.

Inadequate capacity building facilities**:** There is absence of opportunity for capacity building of turkey farmers in terms of receiving training, getting information, participating in workshop and seminar. As most of the concern stakeholders are not aware enough about turkey farming in Bangladesh, farmers are not getting required knowledge and skill. Therefore they are using traditional procedure for rearing turkey. But egg weight, fertility, hatchability and late embryonic mortality varied greatly between traditional and modern breeding management system (Lariviere et al., 2009).

Prospects of turkey farming in Bangladesh

Adapted to the climate of Bangladesh: Turkey is a unique bird which is suitable for rearing in hot humid climatic condition like in Bangladesh. But due to unknown reasons it has not been explored in Bangladesh and other developing countries. In fact, turkeys are adaptable to wide range of climatic conditions and can be raised successfully almost anywhere if they are well fed and protected against diseases and predators. The meat of turkey is considered by many as a luxury meat. Moreover, it has an aesthetic value due to their beauty (Ogundipe and Dafwang, 1980). For this reason turkey is becoming popular gradually in developing countries like Bangladesh.

Low disease prevalence*:* Turkey is more disease resistant in comparison to other poultry species like chicken, duck and quail. Mortality rate of turkey is very low in comparison to other poultry bird. Sampath (2012) reported that turkeys are resistant to Marek's and Infectious bronchitis and commonly encountered with other diseases like mycoplasmosis, fowl cholera, erysipelas and hemorrhagic enteritis. Farmers mostly do vaccination only for New Castle disease and Fowl cholera.

Low feeding cost: In fact, feed cost represents two thirds of the total costs in a poultry production system and consequently it would be valuable to identify animals that eat less but perform at the same level as their contemporaries. Turkeys are good foragers and it could reduce feeding cost. However, other poultry species such as geese and turkey can obtain added nutrients from forage because they are better able to digest fiber due to larger microbial population in their digestive tracts (Brad et al., 2010). On the other hand, Soliven (1984) reported that according to opinion of farmers of the Philippines, turkey rearing is profitable as long as the poults are properly fed and taken care of, and cost of production is cheap as almost 50% of the feed they eat is green vegetables and field grasses as supplement to commercial feeds.

Higher market demand*:* At present turkey market is limited to some particular customers as an ornamental bird as well as for meat purposes; and its price is higher than other poultry species. There are a good number of Christian people in Bangladesh who are fond of turkey meat in Christmas day. So there is a huge opportunity to expand turkey market in Bangladesh as well as in abroad.

Alternative source of income and protein**:** While broiler meat market is facing problems of higher diseases and lower taste, turkey meat could be an alternative for consumers. So it could be an effective alternative source of protein. Moreover, this bird is quite suitable for uplifting livelihoods of small and marginal farmers as it can be easily reared in free range and under both intensive and semi-intensive system with little investment for housing, equipment and management. It may create good opportunity for unemployed youths to start farming and earn income. Turkey bird has

a promising potential to be an alternative to livestock in meat production (Nixey, 1986). Moreover, the turkey has high dressing percentage that could amount to 87% of slaughter weight (Turkey management guide, 2012).

Opportunity to use artificial reproduction technique*:* As natural mating is not resulting fertile egg, so there is an opportunity to promote AI technique in turkey for the production of commercial hatching eggs. It will decrease cost for rearing more tom. It is reported that a well-developed pectoral muscle in turkeys, has prevented turkey toms to mate naturally (Etches, 1996), and making AI a necessity. Fertility could be improved in turkeys by using AI. In addition, efficiency of use of semen could be increased because each tom can produce enough sperm to inseminate approximately 30 hens (Childress, 2003).

Availability of educated farmers**:** Most of the surveyed farmers are comparatively educated and they were self-starter. So there is huge possibility to develop turkey entrepreneurs in Bangladesh. They will be able to receive technical knowhow on selection, brooding, breeding, feeding, housing etc. on turkey rearing easily.

DISCUSSION

Turkey farming is a new farming concept in Bangladesh and still under fancier level of growing in Bangladesh, to draw the attention of rural folk as a new species of poultry. But there is a big opportunity to increase production of meat because from turkeys to meet up increasing demand of consumers of Bangladesh. Turkey meat is still now beyond the reach of general people to buy, because of higher price. Despite this, demand for turkey rearing is increasing amongst the farmers under small scale as a new stock of poultry species. The reason for this is that, the interest of general people is always higher for a new thing as a source of pleasure. Most of the farmers were dependent on NGO's compared to government livestock offices for technical support. Most of the farmers received primary training on turkey rearing. Average flock size of turkey was small because of newness of the enterprise. Some farmers are raising turkeys with other domestic fowl like chicken and duck in semi-intensive system. For proper growth and management of turkey, good housing is important. Both intensive and semi-intensive systems are suitable for raising the turkey. Turkey housing design has similarity with chicken house. As turkeys are big sized poultry, so, case rearing is not suitable for them. Farmers uses sand (25%), rice husk (50%), saw dust (25%) etc. as litter material and farmers follow deep litter system for raising turkey. Most of the farmers fed both homemade and commercial broiler and layer feed for feeding turkey. In case of homemade feed, they used a mixture of maize, wheat, broken rice and vegetables like cabbage, water spinach (Ipomoea aquatic) and grass. In natural mating the male: female ratio is 1: 5 for turkeys. On average 40-50 poults is expected from each breeder hen. Toms are rarely used for mating after first year due to reduced fertility. There is a tendency in toms to develop affinity towards a particular hen. The mating ratio found in the present study was higher than the ratio of 1: 2.75 reported by Yakubuet al. (2013) for turkey raised by local farmers at Nassarawa state in Nigeria. Brooding of poults occur from one day- old to 6 weeks of age. Prevalence of turkey disease was comparatively low. Most prevalent diseases are New castle Disease (75%), Fowl pox (20%) and respiratory disease (5%). The study revealed that price of adult turkey and poults were higher in Bangladesh in comparison to international market. The main reasons are that turkey subsector is still at the beginning stage in Bangladesh and in most cases turkeys were sold for ornamental purposes while some buyer bought also turkeys for farming as well as consumption purposes. Selection and price of turkey depends on appearance, color, size and weight However, there is absence of structured market for turkey in Bangladesh. Weight of available adult tom, hen and egg in Bangladesh were comparatively lower than that of developed countries (Asaduzzaman et al., 2017). This might be because of lighter varieties of turkey reared by the farmers of Bangladesh.

CONCLUSION

Turkey production is still at primitive stage in Bangladesh which is characterized by poor housing, feeding, breeding and healthcare practices as well as inadequate availability of scientific information, technical services, credit facilities, training and marketing opportunities. So, to improve the efficient turkey production, vigorous public extension service, training program, opening avenues for research on turkey and identifying marketing strategies, are crucially needed in Bangladesh. Turkey farming can be a great opportunity for the youth for income generation and self-employment.

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ACKNOWLEDGEMENTS

The author wishes to acknowledge the immeasurable grace and profound kindness of Almighty "ALLAH" the supreme authority and supreme ruler of universe, who empowers the author to complete the production report successfully.

The author gratefully expresses first and foremost his heartiest appreciation, deepest sense of gratitude and best regards to Dr. Md. Kabirul Islam Khan, Professor, Dept. of Genetics and Animal Breeding, Chittagong Veterinary and Animal Sciences University, for his advice, Constant valuable suggestions and instructions.

The author wishes to give special thanks to Prof. Abdul Ahad, Dean, Faculty Of Veterinary Medicine and Prof. Dr. A. K. M. Saifuddin, Directors Of External Affairs

The author expresses his thankfulness to the other teachers, seniors of Masters, well-wishers for their co-operation and instructive suggestions. Last but not least, the author is profoundly grateful to his parents for their endless sympathies, sacrifices and prayers.

The author,
September, 2020

BIOGRAPHY

Myself, Selim Mia, Son of Md Bakul Mia and Rahima Begum. I was Born in 15 February, 1996. I started going to school when I was 6 years old. I have completed my primary education from Harishangan Govt. Primary School in 2006.From Harishangan High School I have completed my secondary education in 2012 and Higher Secondary education from Panchkandi College in 2014, Monohordi, Dhaka. At present I am continuing my education as an Intern Doctor under Faculty of Veterinary Medicine, Chattogram Veterinary And Animal Sciences University. I have deep interest to work in the field of wildlife in future.