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Backyard Chicken Production Skills of Rural Women in Yucatán, México

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Authors' contributions

This work was carried out in collaboration between all authors. Author OMSE designed the study, wrote the protocol and supervised the work. Authors LSF and JFJTA carried out all practical work and performed the statistical analysis. Author OMSE managed the analysis of the study. Authors LSF and JFJTA wrote the first draft of the manuscript. Author OMSE managed the literature searches and edited the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Aims: The study was conducted to identify the skills level of backyard chicken production practices used by rural women in Yucatan, Mexico.
Study Design: A questionnaire was used to collect data from the chicken owners, the dependent variable in this study was the skills level of chicken production practices.
Place and Duration of Study: 204 women raising backyard chickens were drawn in the four selected villages in the Peninsula of Yucatán, between May and August 2013.
Methodology: A structured questionnaires were designed to measure the skills level of women regarding their chicken production practices (feeding, housing, health care, management and purpose of production). This approach was analytical study among the studied villages.
Results: The results showed that the majority of the respondents (76%) had medium and low skill levels regarding production practices, meanwhile, a small proportion of women can be categorized

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in the high skill level (24%). There were no significant differences (*P* = .59) for production practices among the villages. Findings also showed that low economical sources, high feed cost, diseases, unavailability of training programs, unawareness by ethno-veterinary treatments, insufficient of technologies /inputs and extension services, in that order, were the most severe constraints affecting production practices.
Conclusion: The study concluded the medium skills level of backyard chicken production practices for rural women in the selected villages.

Keywords: Production practices; backyard chicken; rural women; skills level.

1. INTRODUCTION

Backyard livestock production is one of the most important activities that are carried out by the rural communities of the state of Yucatán [1]. Up to 85% of the rural house owners raise animals [2]. Of these around 90% rear backyard chicken and keep between 8 to 20 birds per family [3]. Some of this production can make an important contribution to improve household food security. Furthermore, it contributes towards providing additional income to families from the sale of chicken products to help with the hard economic situation. It is not the major economic activity in most cases; however, it contributes towards poverty reduction in villages of developing countries [4].

In the state of Yucatán this type of chicken production suffers from the constraints where mortality rates for this species is usually high and the causes are diseases (particularly Respiratory disease), insufficient of feeding, adverse climatic circumstances and lack of housing systems. In addition to this situation, there are low skill levels of health care delivery, nutrition, management and marketing practices of chickens. The rural areas are normally unable to fully harness their abundant backyard production resources (Honhold et al., unpublished report) [5].

In order to sustain the interest of backyard chicken production practices, effective research and agricultural extension services are necessary to ensure meaningful impact on poultry productivity and women's standard of living. In spite of this, research in this field is scare, little efforts have been exerted to improve the production practices of backyard chickens owners and their contribution to household economies, in addition to the scarcity of agricultural extension services in Mexico [6,7], however, this field has to get more attention to improve chicken production through planning extension educational programs for providing rural women with the required skills and understanding of these chicken production practices. This may empower the rural women to be more self-sustainable, improve productivity and raise the living standards of rural communities who are the beneficiaries of the service [8].

It is, however, recognized that socio-economic variables such as gender, age, educational status, accessibility of extension services, training programs and veterinary services are crucial in optimizing the utilization of village chickens [9]. There are little studies that describe the influence of socio-economic variables on production practices and constraints that face the backyard chicken owners [10]. In this context the objective of the current study was to describe the skills level of backyard chicken production among rural women, identify the main limiting socio-economic variables affecting the skills level of backyard chicken production practices and constraints faced by the backyard chicken owners.

2. MATERIALS AND METHODS

2.1 Study Area

The Peninsula of Yucatán is located in southeast of Mexico between 18° and 21°30' of northern latitude [11], the communities of the state of Yucatan are distributed into 106 municipalities [12]. The Central zone, where there is intensive animal production systems mainly pig and poultry production; the Eastern zone where cattle production is the main activity and the Southern zone where crops like sugar cane, maize and citruses are produced [13]. Villages were purposively selected according to some characteristics which are their geographical location in the state of Yucatan, the ownership of backyard chicken farming and the confidence with respondents resulted from previous studies and projects which facilitate data collection and participation in the study. The selected villages

had more than 300 inhabitants and less than 3,000 inhabitants [14]. The present study was conducted in four selected villages which were Chacsinkin in Chacsinkin municipality in the south of Yucatán, which locate about 111 kilometers from the capital of Yucatán (Merida). Cuauhtémoc in Izamal municipality in the east of Yucatán that locate approximately 71 kilometers from Merida, Eknakan and Chunkanan in Cuzama municipality in the center of Yucatán, which distance approximately 36 and 43 kilometers, respectively from Merida.

2.2 Selection of Respondents

A total number of 204 women raising backyard chickens were drawn in the four selected villages; where Eknakan and Chunkanan were considered as one group due to the low number of backyard chicken owners in these villages. The numbers of the surveyed women were: 100 covering the main streets in Chacsinkin, 53 representing all backyard chicken owners in Eknakan-Chunkanan and 51 representing all backyard chicken owners in Cuauhtémoc; based on their willingness to participate in the study.

2.3 Instrument and Measurement of Variables

Structured questionnaires were used to collect data from the chicken owners. The first part of the questionnaire was designed to measure some socio-economic characteristics of respondents. The second part of the questionnaire was designed to measure the skills level of women on their chicken production practices (feeding, housing, health care, management and purpose of production) through 21 questions that were incorporated to study the skills level of backyard chicken owners. The third section considered information on the constraints militating against chicken productivity. The dependent variable in this study was the skills level of chicken production practices that could be divided into five practices which are:

1. Feed and feeding: This practice was measured by giving one score for appropriate answer and zero for inappropriate answer in respect of feeding practice's questions. Regarding the feed ingredients, one score was given for each type of feedstuff used; considering the diet has to contain ingredients having carbohydrates, fat, protein, minerals or vitamins as main sources of them.
2. Housing system: it was aimed at identify practices and systems used in the house; by giving the usage of these practices a numerical value ranging from 0 to 1, where 0 means not used and 1 means used.
3. Preventive health procedures: which were used to prevent and control diseases/parasites, this practice was measured by giving the usage of each procedure a numerical value ranging from 0 to 2, where the number 0 means not used, 1 sometimes, 2 regularly; that were assigned using the Likert scale which described by Parveen [15].
4. Management practices: that was assigned by the same previous scale.
5. Purpose of production: it was measured by giving one score for each purpose of chicken raising (home consumption, reproduction or marketing).

Finally the overall score per respondent was calculated by summing all the five practices' values; the maximum theoretical score per respondent was thirty nine while the minimum was zero. The respondents were grouped into three levels (low, medium and high) of skill levels using the mean and standard deviation [16,17].

2.4 Data Collection

Data were collected using a structured questionnaire. This approach was an analytical study to collect primary data by individual face to face meetings; also personal observations were made at the housing facilities and appearance of the birds.

2.5 Data Analysis

The data were analyzed using Statistical Package of Social Science SPSS version 15.0, 20 (SPSS, Inc., Chicago IL). Descriptive statistics such as frequency distribution, percentages, mean and standard deviation were used for categorization and description of the variables. Pearson Product Moment Correlation analysis was carried out to measure the correlations between the skill level of backyard chicken production practices as dependent variable and each of age, family size, monthly income, years of experience, visits to urban areas, hours of labor and production rate as quantitative independent variables. Additionally, Chi-square test was used to compare the differences between the dependent variable and both of nominal and ordinal variables of respondents

(e.g. occupation of wife and husband as well as respondent education). Also, a comparison was made using Chi-square test to detect the respondents' skills level differences of backyard chicken production practices among the studied villages.

3. RESULTS AND DISCUSSION

3.1 Socio-economic Characteristics of Backyard Chicken Owners

The socioeconomic characteristics of backyard chicken owners and their households are presented in Table 1. A large proportion of the respondents fell in the age group of 20-54 years in Chacsinkin (71%), Eknakan-Chunkanan (68%) and Cuauhtemoc (63%). The mean of age was 41.54±12.8 years old; ranging from 20-82 years. It could be inferred from this result that there is a high percentage of young and middle age (under 54 years) among the backyard chicken keepers in the villages. This result is similar to the finding of Canul et al. [18] who mentioned that in central and southern of Yucatan 86.5% of poultry owners' women, aged less than 53 years. This age distribution among the respondents suggests high level of vitality for agricultural activities and play central role in productive enterprises [19]. In case of educational level, the highest percentage of respondents that had primary education (60.4%) was in Eknakan-Chunkanan, followed by Chacsinkin and Cuauhtémoc (57.0% and 53.0%, respectively). The results show that the educational level of chicken owners were low in the study areas, similar findings were reported by Mafimisebi et al. [20] in Southwest Nigeria. Most of the respondents were housewives across all villages. This result agrees with Camacho et al. [21] who found that majority of women are housewives in some rural communities in Mexico.

Agricultural work was the unique occupation for most of respondents' husbands (81.00%) in Chacsinkin compared to 60.7% in Cuauhtémoc, in the same context Cuanalo et al. [22] stated that agricultural work is a traditional profession in Chacsinkin and Cuauhtémoc, while 68.0% had other occupations in Eknakan-Chunkanan such as trading, hand-crafts, tourism and as employees, this could be due to those villages been closer to Merida than the others, additionally, these villages have cenotes that are used for eco-tourism and most males at least in Chunkanan work taking tourist in their horse carts to visit these cenotes. The average family size was 6±1.4 members in Eknakan-Chunkanan, followed by 6.3±1.1 and 5.2±2.19 members in Cuauhtémoc and Chacsinkin, respectively, with a range from 2 to 13 family members (including husband, wife, children and dependents) in all villages. The results also showed that the average family income in Chacsinkin was 1730.9±1000.5 Mexican pesos (MXN) per month ranging from 300 to 5000 (MXN), it was 2163.5±1351.5 (MXN) for Eknakan-Chunkanan varied from 300 to 6000 (the average family income in Eknakan was 2286.42 MXN, whereas in Chunkanan was 2032.52 MXN), while it was 1709±869.6 (MXN) ranging from 700 to 4000 for Cuauhtémoc. In this regard, Canul et al. [18] found that 86% of respondents have an additional source of income as a result of backyard chicken rearing in some rural communities of Yucatan. Regarding visits to urban areas, the respondents in Chacsinkin visit urban areas 2±1.2 times monthly with a range between 0 to 6 times, it was 2.5±3.3 times in Eknakan-Chunkanan with a range between 0 to 12 times, however respondents in Cuauhtémoc go to urban areas just 1.4±1.5 times with a range of 0 to 6 times. The visits of urban areas help the rural women for acquiring the knowledge and skills through the communication with other sources, this result agrees with the finding of Gutierrez-Ruiz et al. [23] who reported that 23.2% of respondents have access to veterinary services through consultations in veterinary pharmacies located in the center of the city of Merida. Majority of the respondents did not receive any training program for chicken production practices; hence this implies the need of training programs about these production practices. In terms of hours of labor with chickens per day, data showed that most of the respondents work only from 1-2 hours with their chickens in the study areas. Most of the respondents (64.0%) had medium and high chicken farming experience, with an average of 18.5±12.69 and ranged from 1-58 years in Chacsinkin; around half of respondents (49.0%) had medium experience with 23±18.2 and range 1-60 years in Eknakan-Chunkanan, while 82.4% in Cuauhtémoc had medium and high experience with 20.2±14.6 and range from 1-50 years. This shows that the respondents have medium experience and knowledge of poultry farming and production techniques, similar findings were reported by Apantaku [24] who found in Nigeria that most of the respondents (64%) have more than 10 years of poultry farming experience, with an average of 14.6 years. Most of the respondents (78%) had low and medium egg

production rate of chickens with 36.2±27.15% in Chacksinkin (number of eggs proportioned to total hen number), then 46±35.2% and 35.6±30% in Eknakan-Chunkanan and Cuauhtémoc, respectively and ranging from 0-80% in all villages.

Table 1. Socio - economic characteristics of backyard chicken owners in four rural communities in the state of Yucatan, Mexico (N = 204)

Households	Villages					
	Chacsinkin (n=100)		Eknakan and Chunkanan(n=53)		Cuauhtémoc (n=51)	
	No.	(%)	No.	(%)	No.	(%)
Age (yrs.)						
Youth (20-28)	34	34.0	20	37.7	14	27.4
Middle- age (29-54)	37	37.0	16	30.2	18	35.3
Elder (55-82)	29	29.0	17	32.1	19	37.3
Education						
Illiterate	24	24.0	9	17.0	10	19.5
Read and write	5	5.0	2	3.8	2	4.0
Primary (1-6 grades)	57	57.0	32	60.4	27	53.0
Secondary (7-9 grades)	11	11.0	8	15.0	12	23.5
Preparatory (10-12 grades)	3	3.0	2	3.8	0	0.00
Occupation						
Housewife	83	83.0	42	79.2	45	88.2
Agricultural work	3	3.0	0	0.0	0	0.00
Non- agricultural work	14	14.0	11	20.8	6	11.8
Husband occupation						
Agricultural work	81	81.0	11	20.7	31	60.7
Non- agricultural work	16	16.0	36	68.0	18	35.3
Don´t work	3	3.0	6	11.3	2	4.0
Family size						
Small	20	20.0	9	17.0	10	19.6
Medium	54	54.0	37	69.8	34	66.7
Large	26	26.0	7	13.2	7	13.8
Monthly income						
Limited	61	61.0	18	34.0	15	29.4
Medium	15	15.0	27	51.0	27	53.0
Unlimited	24	24.0	8	15.0	9	17.6
Visits to urban areas or surrounding villages						
Limited	43	43.0	33	62.2	25	49.0
Unlimited	49	49.0	10	18.9	12	23.5
Do not visit	8	8.0	10	18.9	14	27.5
Training programs						
Yes	14	14.0	14	26.4	7	13.7
No	86	86.0	39	73.6	44	86.3
Hours of labor/day						
1-2	85	85.0	33	62.3	47	92.2
3-7	15	15.0	20	37.7	4	7.8
Years of experience (yrs.)						
Low	36	36.0	16	30.2	9	17.6
Medium	41	41.0	26	49.0	21	41.2
High	23	23.0	11	20.8	21	41.2
Production rate						
Low rate	39	39.0	18	34.0	18	35.3
Medium rate	39	39.0	20	37.7	16	31.4
High rate	22	22.0	15	28.3	17	33.3

Source: Field survey, 2013

3.2 Levels of Skills of Backyard Chicken Rearing Practices

Majority of the respondents were classified as medium level of skills about backyard chicken production practices in the studied villages that had a score ranges from17-38 practice in Cuauhtémoc, followed by 15-36 practice in Eknakan-Chunkanan, then 15-35 practice in Chacsinkin. There were no significant differences among the studied villages regarding the skills level about backyard chicken practices (*P* =.59) as shown in Table 2. This could be due to low level of education for participants, their medium level of chicken production knowledge, less utilization of information sources, low income level, insufficiency of extension services for respondents in the studied areas. Similar constrains were reported by Nimje et al. [25] Ahire et al. [26] and Sasidhar et al. [27] in some rural areas in India. These constrains may be similar in all the state of Yucatan. The latter imply that backyard production systems of the rural women in the studied villages in the Mayan region could be a like to other backyard production systems in Yucatán. Thus, the similarity in the technology level used and the similarity in the constraints recorded in previous studies in different decades [28,29,7,6] reported that the production system has maintained its features because very little foreign inputs have been included. These results reflect that all these backyard producers have obtained their technology from local producers who also learnt from other producers in the Mayan region.

3.2.1 Feed and feeding

It was evident from the data presented in Table 3 that majority of respondents kept their chickens outside all day long in their backyard, with the aim of finding their own feed. Besides the scavenging, it was notice that 33.5%, 23.5% and 20% of backyard chicken owners in Eknakan-Chunkanan, Cuauhtémoc and Chacsinkin, respectively, provided a balanced diet to their flock which contain source of carbohydrates, fat, protein, minerals and vitamins. The most common feeds across villages were maize, commercial feed, grasses and forages, in that order; Cuanalo et al. [22] and Ramirez González [7] reported that the main source of staple food for the rural people and their poultry is maize. Additionally, a small percentage of backyard chicken owners in the studied areas provide their chickens with feed supplementations. The obtained results of common feeds are in accordance with the findings of Gutierrez-Ruiz et al. [30] and Gutiérrez-Triay et al. [29] who reported that in the most studied communities of Yucatan State, the main ingredient feed for poultry are corn which is provided along with any of their products as dough and tortillas, also, feeding the birds is based on commercial feed mixed with kitchen leftovers.

3.2.2 Housing system

Nearly 57% of respondents in Cuauhtémoc, 56.0% in Chacsinkin and 49.0% in Eknakan-Chunkanan executed different housing systems of backyard chicken. Nearly 90% to 96% of respondents keep their chickens at night in traditional houses made by locally available material such as palm branches and wood. A few percentages of chicken owners provide litter material in chicken houses like wood shavings, straw and leave (Table 3). Similar finding was reported by Gutiérrez-Triay et al. [29] that 91.3% of families had poultry shelters with roof of no lasting materials (67.9%) or palm leaves (24.1%), ground floor (80.4%) and wire fences (63.6%). Gutierrez-Ruiz et al. [23] stated that the most common materials used for building chicken houses in the rural communities of Yucatan include carton sheets (59.6%), guano (23.3%), and sheet zinc (13.0%).

Table 2. Distribution of backyard chicken owners according to their skills level of production practices in four rural communities in the state of Yucatan, Mexico (N = 204)

Category	Chacsinkin (n=100)		Eknakan and Chunkanan (n=53)		Cuauhtémoc (n=51)		Overall		*P* –value
	No.	%	No.	%	No.	%	No.	%	
Low level	31	31.0	14	26.4	14	27.4	66	32.4	
Medium level	40	40.0	24	45.3	27	53.0	89	43.6	.59
High level	29	29.0	15	28.3	10	19.6	49	24.0	
Mean ± SD	23.0±4.28		26.4±4.54		27.2±4.39		24.9±4.77		

Source: Field survey, 2013

3.2.3 Purpose of production

From 98.0% to 100.0% of backyard chicken owners raise their birds for home consumption across all villages; this means that chicken is an important source of food for them. Eggs are rarely sold as most of them are left for hatching to increase flock size. Marketing of chickens is largely informal in the villages especially when there are surplus or in times of emergency. In this regard, Gutierrez-Ruiz et al. [23] reported that only 11% of respondents their production (birds and eggs) for home consumption, 28% their production for consumption, sale and incubation, whereas 59.5% their production for incubation and consumption and minority for other purposes in some rural communities of Yucatan State.

3.2.4 Preventive procedures for health care

About 43.0% of respondents had revising for signs of disease in Cuauhtémoc whereas 37.6% and 30.0% in Eknakan-Chunkanan and Chacsinkin, respectively make revising (Table 4). The treatments of diseases were reported from respondents; medicinal plants (65.0%) like *Leucaena leucocephala* and lemon, in addition to medical treatments through asking veterinarians (16%). This indicates unavailability of veterinary services in the studied villages. This result confirms the findings of Gutiérrez-Triay et al. [29] who mentioned that only 13.3% of the families vaccinated their birds and 49.1% used traditional remedies for treatment of the poultry. Additionally, Ramirez-Gonzalez et al. [31] and Gutierrez-Ruiz et al. [30] mentioned the use of "Huaxin" (*Leucaena leucocephala*) in treating sick poultry infected by fowl pox disease.

3.2.5 Management practices

The majority of respondents (90.0%) in Cuauhtémoc protect their birds from predators followed by 87.0% in Chacsinkin and 77.3% in Eknakan-Chunkanan, through providing a safe enclosure for chickens. As mentioned by Henning et al. [32] who found that management practices such as providing a safe housing for birds would help to reduce the losses due to predators. Although predators were reported as the most common cause of death, it should be considered that diseased and weakened chickens become an easy prey. Regarding the management of eggs, only 3.8% of respondents in Cuauhtémoc store the eggs in a well-ventilated place or refrigerator; this could be due to insufficient economic resources and low education level; they do not know that eggs keep better at lower temperatures.

Table 3. Frequency of the backyard chicken production practices among owners in four rural communities in the state of Yucatan, Mexico (N = 204)

Practices	Chacsinkin (n=100)		Eknakan and Chunkanan (n=53)		Cuauhtémoc (n=51)	
	F	%	F	%	F	%
Feed and feeding						
Providing a balanced diet	20	20.0	18	33.5	12	23.5
Presenting feed in containers	52	52.0	49	92.4	43	84.3
Providing clean water	98	98.0	49	92.4	50	98.0
Providing feed supplementations	4	4.0	4	7.5	9	17.6
Availability of scavenging	90	90.0	45	84.9	41	80.4
Average	52.8	52.8	33	62.2	31	60.7
Housing system						
Providing night shelter	96	96.0	51	96.2	46	90.2
Provision of nests in chicken house	61	61.0	23	43.3	21	41.1
Litter material provide	9	9.0	4	7.5	15	29.4
Average	56.0	56.0	26	49.0	29	56.8
Purpose of production						
Home consumption	100	100.0	52	98.0	50	98.0
Reproduction	91	91.0	34	64.1	40	78.4
Marketing	21	21.0	16	30.1	15	29.4
Average	70.6	70.6	34	64.1	35	68.6

Source: Field survey, 2013; F: Frequency

Table 4. Frequency of the backyard chicken production practices amongst owners in four rural communities of the state of Yucatan, Mexico (N = 204)

Practices	Chacsinkin (n=100)				Eknakan and Chunkanan Regularly (n=53)				Cuauhtémoc (n=51)			
	Regularly		Sometimes		Regularly		Sometimes		Regularly		Sometimes	
	F	%	F	%	F	%	F	%	F	%	F	%
Health care												
Keep the chickens' area clean	30	30.0	31	31.0	27	50.9	10	18.8	25	49.0	10	19.6
Revise of disease signs	9	9.0	21	21.0	8	15.0	12	22.6	9	17.6	13	25.4
Keep the chickens in small flocks	11	11.0	25	25.0	6	11.3	14	26.4	8	7.8	9	17.6
Isolate new or sick chickens	6	6.0	19	19.0	5	9.4	10	18.8	4	3.9	11	21.5
Burn dead chickens or bury them deep	19	19.0	20	20.0	16	30.1	7	13.2	12	17.6	8	15.6
Avoiding wet litter in the chicken house	3	3.0	5	5.0	1	1.8	1	1.8	6	11.7	8	15.6
Keep chickens off from rain	45	45.0	31	31.0	21	39.6	20	37.7	25	49.0	16	31.3
Management practices												
Incubation of chicks naturally	22	22.0	10	10.0	12	22.6	5	9.4	17	33.3	3	5.8
Collecting of eggs daily	45	45.0	43	43.0	25	47.1	16	30.1	30	58.8	15	29.4
Changing the litter material of the nest	12	12.0	11	11.0	7	13.2	5	9.4	12	23.5	8	15.6
Storage of eggs in a well-ventilated place or refrigerator	29	29.0	9	9.0	17	32.0	13	24.5	1	1.9	1	1.9
Care from predators	48	48.0	39	39.0	28	52.8	13	24.5	31	60.7	15	29.4

Source: Field survey, 2013; F: Frequency

3.3 Constraints Encountered in Chicken Production

Table 5 shows that 150 of the overall backyard chicken owners (73.5%) reported that low income sources was the most important constraint, while 138 of the chicken owners (67.6%) facing the problem of high feed cost which affects feed and feeding production practices as providing a balanced diet and feed supplementations. Infectious diseases was a constraint mentioned by 113 chicken owners (55.4%); this result is similar by the finding of Mapiye and Sibanda [33] and Henning et al. [32] who reported that in a twelve month period, diseases accounted for 30% of the deaths reported causes. Also, the findings of Ramirez González [7] and Honhold et al. (unpublished report) reported that diseases especially, fowl pox and respiratory problems were identified as diseases probably involved in causing deaths of chickens in the rural communities of Yucatan. Unavailability of training programs and unawareness of ethno-veterinary treatments were recognized as constrains by 110 of backyard chicken owners (54.0%). This shows the need for such training programs to improve backyard chicken production practices for households. Moreover 106 (52.0%) and 103 (50.5%) of respondents indicated that insufficient technologies/inputs and extension services respectively, were considered as constraints to their chicken production practices. This could explain the medium skills level of chicken production practices observed in the present study. These findings agree with Ogunwale et al. [34] who reported that contact with extension agents and the use of various recommendations had positive impact on the chicken production practices.

3.4 The Correlations between the Quantitative Characteristics of Rural Women and their Production Practices

Table 6 shows the correlations between respondents' characteristics and the skills level of backyard chicken production practices. Data showed that the skills level of respondents in Chacsinkin and Eknakan-Chunkanan was positively and significantly correlated with production rate and visiting urban areas or surrounding villages. This implies that the higher degree of openness to the surrounding cities helps for acquiring more knowledge and skills of production practices through the communication with other sources, in this regard that would help for better diseases control of chicken through the veterinary centers available in the neighboring villages and cities like Peto village and Merida city; due to the scarcity of veterinary services in the studied villages, as nearly 60 of owners in Chacsinkin and 33 of respondents in Eknakan-Chunkanan suffer from unavailability of veterinary services, This result agrees with the finding of Gutierrez-Ruiz et al. [23]. Additionally, there is positively and significantly correlation (P = .02) between family size and the skills level of production practices in Chacsinkin;

Table 5. Constraints of backyard chicken keeper concerning production practices in four rural communities in the state of Yucatan, Mexico (N = 204)

Constraints	Not severe	Partially severe	Severe	Order rank
	Frequency			
Diseases	51	40	113	3rd
Feed and grazing land shortages	86	67	51	11th
Inadequate water supply	143	52	9	13th
Bad weather conditions	53	81	70	9th
Unavailability veterinary services	64	64	76	8th
Drought	70	65	69	10th
Predators	47	63	94	7th
Insufficient technologies /inputs	50	48	106	5th
Insufficient extension services	72	29	103	6th
Unavailability training programs.	38	46	110	4th
Low income sources	17	37	150	1st
Marketing problems	100	62	42	12th
High feed cost	32	34	138	2nd
The need of ethno- veterinary awareness	32	62	110	4th

Source: Field survey, 2013

Table 6. The correlations between skills level of backyard chicken production practices and some socio-economic characteristics of the respondents using the Pearson Product Moment Correlation (PPMC) test (N = 204)

Characteristics (X-variables)	Skills level of backyard chicken production practices					
	Chacsinkin (n=100)		Eknakan and Chunkanan (n=53)		Cuauhtémoc (n=51)	
	(r)	(*P* –value)	(r)	(*P* –value)	(r)	(*P* –value)
Production rate	0.307*	.04	0.309*	.02	-0.014	.92
Visits to urban areas	0.282*	.04	0.353**	.009	-0.197	.17
Family size	0.274*	.02	-0.004	.98	-0.219	.12

*(r) = Correlation coefficient. * r is significant at (P < .05) level,** r is significant at (P < .01) level*

this could be explained as the high number of family members leads to exchange more experience of chicken production practices amongst the family members, as the family is considered an important source of information acquisition about chicken production practices for rural women as mentioned by Okwu and Daudu [35]. On the other hand there is no significant correlation between the skills level of backyard chicken production practices and such variables of respondent's age, monthly income, years of experience in raising chicken and hours of labor with chickens in the study areas.

3.5 The Relationships between Backyard Chicken Production Practices and Some Qualitative Characteristics of the Respondents

The results revealed that there are not any significant difference between the skills level of backyard chicken production practices and variables such as wife education (*P* = .40, .39, .39), wife occupation (*P* = .65, .23, .82) and husband occupation (*P* = .07, .90, .54) in Chacsinkin, Eknakan-Chunkananand Cuauhtémoc, respectively. This is an indication that these variables had no impact on women skills of various chicken production practices.

4. CONCLUSION AND RECOMMENDATIONS

This study highlighted the medium skills level of respondents about different backyard chicken production practices in all the studied villages regardless of their geographical location in the state of Yucatan. The study also identified the most constraints impeding backyard chicken production improvement in the studied areas to include high feed cost, diseases, unavailability of training programs, insufficiency of technologies /inputs and extension services. Based on the findings of this study it is recommended that the improvement of backyard chicken production require providing the rural women with training programs, extension services and veterinary services in order to overcome the main constraints affecting their production practices, which can improve the managerial skills of backyard chicken production for rural women in the studied communities.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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