Global Veterinaria 18 (3): 197-202, 2017
ISSN 1992-6197

DOI: 10.5829/idosi.gv.2017.197.202

Knowledge, Attitude and Practices (KAPS) of Veterinarians and Farmers Regarding Brucellosis with Assessment of the Current National Control Program in Egypt

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Abstract: Developing countries are suffering from many diseases with negative economic and public impact such as brucellosis. The current study aimed to assess the relationship between KAPs of veterinarians and farmers and the performance of the national brucellosis control program on brucellosis distribution among different ruminant species. A total of 1420 serum samples from different ruminant species was collected by the local veterinary directorate at Kafrelsheikh governorate. These samples were routinely collected through the national control program and out of them, 146 animals serum samples were collected up on notification of either human or animal cases. These samples were tested in series with both RBPT and CFT. On the other hand, the knowledge, attitude and practices (KAPS) of veterinarians and farmers regarding brucellosis were examined through structured questionnaires distributed to them. Results showed that the prevalence of brucellosis through the national control program was estimated at 1.3%by RBPT and o.86% by CFT. Results of KAPs showed that there is a lack of knowledge of brucellosis among farmers and this is responsible for practicing high risk behaviors which help in disease transmission among human and animals. On the other hand, there is an agreement between farmers and veterinarian on the idea of revising the current program to be more feasible and more profitable.

Key words: Veterinarians · Farmers · Brucellosis · Current national control program · Egypt

INTRODUCTION

Brucellosis remains one of the most important contagious bacterial diseases affecting humans and animals and World Health Organization (WHO) considered it as a neglected zoonosis [1,2]. Developing countries which depend on animal production as a main source of income are suffering more economic and public health consequences than the developed countries.

In Egypt, brucellosis is endemic among animals with a high seroprevalence (around 15 %) and the infection is mostly caused by *B. melitensis* [3, 4]. National control program against brucellosis was launched in 1985 and it was revised many times with some changes introduced on it [3]. The main elements of such program are to test all of ruminants over 6 months ages every year with the slaughtering of seropositive animals and compensation of the owners [3]. Additionally, application of voluntary vaccination of female calves < 6 months age with *B. abortus* S19 and quarantine on infected farms till become free of the disease. Finally, animals in contact with the suspected human cases upon notification from Ministry of health are also examined against brucellosis.

A previous assessment of this program has been carried out by Hegazy *et al.* [4] who declared the inability of the current program to achieve its goals in minimizing the disease prevalence among ruminants at the current level of application. In the current study, one of its main objectives was to assess this program by first, describing the characteristics of the serological examination being carried out on different animal species at Kafrelsheikh governorate and its effects on the overall success of this program. Risk factors for spread of the brucellosis from one herd or area to another are several; movement of an infected animals into a non-infected susceptible herd, keeping or pasturing different herd animals together, gathering more than one animal species at household level and unhygienic environment around aborted animals [5,6,7]. Therefore, the second objective of this study was to estimate the degree of knowledge, attitude and

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practices of farmers and shepherds to fill the data gaps of brucellosis transmission and control in Egypt. Third, study the role of KAPs of the farmers and veterinarians - for the first time in Egypt up to our knowledge- on the success or failure of such program.

MATERIAL AND METHODS

Blood Samples Collection: A total of 1420 blood samples were collected from cattle, buffaloes, sheep and goats from different areas at Kafrelsheikh governorate (Disuq, Qillin, Motabas, El-Hamool, Sidi salem and Kafrelsheikh), these animals were grouped into two categories according to the purpose of study:(i) Animals routinely examined in the national survey program, which were tested serologically against *Brucella* spp. infection. The seropositive animals were slaughtered and farmers were compensated and (ii) Animals that were notified to be infected with brucellosis or owned to a farmer with human brucellosis.

Blood was collected by jugular vein puncture in sterile Wassermann's tubes and left at room temperature for 1-2 hours then placed in refrigerator overnight. The clear serum was collected aseptically by using Pasteur pipette, some samples were clarified by centrifugation at 3000 rpm for 10 minute. Unless the samples were to be immediately used, they were stored at -20 °C in deep freezer. All samples were tested primary by using Rose Bengal plate test Antigen (RBPT) [8], then confirmed by using Complement fixation test (CFT) [8] at the National Institute of Animal Health Research, Dokki, Cairo, Egypt.

Questionnaires: We had developed two structured questionnaires which were written in English. The aim of these questionnaires was to collect data on knowledge, attitudes and practices among veterinarians, farmers and shepherds in Kafrelsheikh governorate. The first questionnaire was for veterinarians who were classified into two groups: a) veterinarians of the national project for controlling of brucellosis. This group was also subdivided into veterinarians who put the plans for the project application (Planners) and those who perform the sampling themselves (Appliers). b) veterinarians who did not work in the project but were closely contact with group a. This questionnaire was designed for gathering data on the knowledge of brucellosis, the practices with infected animals and vaccine and the attitude on the importance of the disease.

The second questionnaire was developed for farmers and shepherds. The awareness of farmers and shepherds regarding brucellosis was investigated through the use of close questions. These questions were about all details of mixing the different species of animals with each other's, vaccination of animals & dealing with aborted animals and the efforts of official veterinary authorities for controlling brucellosis.

Data Management and Analyses: Collected data was stored in Microsoft excel 2007. The statistical analyses were carried out using built in Microsoft excel functions.

RESULTS

Results of Serological Examination: The results of serological examination of different ruminant species through the routine national control program had showed that 1.3% of the tested 1274 animals were seropositive to brucellosis for RBPT and 0.86% for CFT. The highest percent was in Sidi salem (1.7%), then Motobas (1.1%) and equal negative result in Disuq and Qillin (0%).

Table 1: Results of serological examination of different ruminants species through the national control program at Kafrelsheikh governorate.

			Number of positive reactors and percentage			
			RBPT		CFT	
District	Animal species	No. of animals	No	%	NO	%
Disuq	Cattle	30	0	0%	0	0%
	Buffaloes	15				
Sidi salim	Cattle	558	11	1.7%	5	0.79%
	Buffaloes	84				
Motobas	Cattle	520	6	1.1%	6	1.1%
	Buffaloes	18				
Qillin	Cattle	37	0	0%	0	0%
	Buffaloes	10				
	Goat	2				
Total		1274	17	1.3%	11	0.86%

Table 2: Results of serological examination of different ruminant species in areas of notification against brucellosis in Kafrelsheikh governorate

			Number of positive reactors and percentage			
District	Farm / flock	No. of Examined Animals	RBPT	%	CFT	%
Disuq	Farm1	47	24	51%	22	46.8%
El- Hamool	Farm2	30	6	20%	5	16.6%
Qillin	Flock1	8	4	50%	4	50%
	Flock2	53	25	47.1%	23	43.3%
KafrElsheikh	Flock3	8	5	62.5%	5	62.5%
Total		146	64	43.8%	59	40.4%

The result of serological examination of the flocks which were notified for either human cases or abortion among animals is shown in Table 2. The prevalence of brucellosis in the examined flocks was estimated by RBPT at 43.8%. The highest percentage of seropositive was in individual animals (62. 5%) followed by farm 1(51%), then flock 1(50%), then flock 2 (47.1%) and finally farm 2.

Results of Questionnaires

Farmers and Shepherds Questionnaire: A total of 69 animal's owners were interviewed; owners of individual animals (45), intensive farm owners (9) and shepherds (15).

Eight animal owners (11.5%) said that there is mixing between small ruminants and large ruminants in the same place. On the other hand, 61 (88.5%) said that there is no mixing between large and small ruminants.

Regarding introduction of new animals, 55 owners (79.7%) introduced animals through purchasing from markets, farmers and farms, while 14 owners (20.3%) didn't introduce animals.

All of owners didn't know anything about quarantine of purchased animals or of brucellosis seropositive animal. Also, they did not know for how long the infected animal should still in quarantine, number of tests which are carried out for the animals in quarantine, time elapsed between these tests and the actions which must be taken when positive reactor animal to brucellosis is diagnosed.

Brucellosis is not a well-known disease for all farmers and farm owners as 48 (69.5 %) only heard before about it and a proportion of (65%) don't know anything about the disease. On the other hand, all of the shepherds heard before about brucellosis and they thought that the signs of brucellosis among sheep are continuous fever then followed by abortion.

Regarding vaccination, all of owners confirmed that there was no vaccination against brucellosis at all, either official or private, so they aren't aware of vaccination process including age of vaccinated animals, type of vaccine, vaccine name and preservation of vaccine vials.

Most of owners (96%) confirmed that they will keep the aborted animals either being infected with brucellosis or not. On the other hand 4% said that they will sell such animals.

Most of owners (58%) confirmed that they did not call the veterinarian after the abortion, while (27.5%) call the veterinarian and (14.5%) said sometime they do. Most of them (74%) did not know if the veterinarians take samples from aborted animals or not, while (26%) confirmed that no samples were taken.

Questions on the discarding process of aborted materials, showed that (57.8%) of owners throw it in common water canals, (22.3%) leave it in the field of grazing, (13%) make burying for it, (3,5%) use it for dogs feeding, (1, 7%) make burning for it and (1,7%) throw it in rubbish. Most of them (76.7%) said that there is no disinfection after the abortion at all and (23.3%) make disinfection.

All of owners said that there was no testing for brucellosis at all either official or private (except in cases of notification), accordingly they did not know how many times per year the sampling occur and what are the actions taken by the veterinary authorities when positive case is diagnosed.

All the owners of notified cases confirmed that the compensation value from authorities does not equal the actual price of the animal.

Regarding the infection of animals with brucellosis, most of owners (78%) said that they do not see any apparently problems on infected animals with brucellosis and they can sell them if they are sure that they are infected with it.

The animal's owners suggest the followings for successful disease control measures, increasing the value of compensation, free and good vaccination and more efforts from authorities for controlling the disease and spreading the awareness and culture between them for increasing the trust in the efficacy of the project.

Veterinarians Questionnaire: A total of 60 veterinarians worked at official veterinary authorities were interviewed; 4 of them worked at national project for controlling of brucellosis as planners all over the governorate at the veterinary directorate and (27) worked as appliers at the same project, while (29) did not work in the project but closely contact and aware of brucellosis due to the nature of their jobs as official veterinarians. The questionnaires results included are as follows:

The Planners' Veterinarians: All of the veterinarians who work as planners at national project confirmed that the official veterinary authorities routinely collect blood samples for testing against brucellosis and this is mostly done concurrently with the testing against T.B. This is carried out twice a year in official governmental stations of production in the governorate.

They also confirmed that, the maximum percentage of tested animals does not exceed 15% of the total population, also it is not important if the animals were vaccinated before testing or not and they said that all ages are tested.

Most of transferred samples from the sampling site to the lab are not iced and the percentage of valid samples is 80%.

All veterinarians confirmed that the samples are taken from sporadic cases and farms and from both large and small ruminants. The nature of their work at veterinary directorate -where the screening test of brucellosis (RBPT) is performed- make them aware of all details of testing. They confirmed that the confirmatory test (CFT) is performed at the National Institute of Animal Health Research Lab in Cairo and the same sample is used for the both tests; RBPT and CFT. They confirmed that, the time elapsed between the two tests ranged from days to weeks.

Regarding the actions taken by veterinary authorities when a positive case of brucellosis is detected, all of them said that just affirm on the owner for not selling the infected animals.

All of the veterinarians confirmed that the positive animals are quarantined for 63 days where three tests are carried out between each test and the other (21) days and the animals are not released from the quarantine till three successful negative tests occur.

Regarding the vaccination of the animals, all of them confirmed that large ruminants only are being vaccinated against brucellosis (cattle and buffaloes) and this by using live vaccine (*B. abortus* S19) which is used only for heifers aged 3-8 months. All vials of vaccine are preserved at refrigerator and the manufacture and expire date are clearly written on the package. The total numbers of vials do not exceed (600) vials per year for all animals at the governorate, so the total number of the vaccinated animals do not exceed (5400) animals at all the governorate and this represent 9% from all animals nearly(young animals from 3-8months).

The veterinary authorities compensate the owners of the confirmed infected animals with brucellosis, the value of compensation varies according to age and breed of the animal. The value of compensation is not necessary equals the price of the animal. The process of paying of compensation is simple as they said and this takes one week.

The response of owners to the national project ranged from low to medium and this is due to the low value of compensation and insufficient culture.

The financial factor and the availability of money have more effect on the successfulness of the project, accordingly the project is not successful at the current status as all the veterinarians confirmed.

All the veterinarians confirmed that the brucellosis is an important and dangerous disease, so authorities must not save efforts for another disease and the disease ranged from second to third according it's importance between the following diseases which included; Influenza, Hepatitis, T.B, Typhoid and cancer.

The Appliers' Veterinarians: Half of the veterinarians (50%) said that the veterinary authorities collect blood samples for testing against brucellosis routinely. While the other (50%) confirmed the opposite.

The maximum percentage of tested animals do not exceed 10% per year, also it is not important if the animals were vaccinated before testing or not and all ages are tested as they mentioned.

The veterinarians mentioned that the reasons that make all animals are not tested are the bad distribution of animals in far areas especially sheep which are moving all of time, low efforts from authorities, insufficient culture and the owners lack of collaboration.

All of veterinarians confirmed that the samples are transferred iced from sampling site to the lab, but most of them (70.3%) confirmed that the samples are taken from sporadic cases only, while (85%) confirmed that the tested animals are large ruminants only (cattle and buffaloes).

Most of veterinarians (72%) do not know anything about the tests which are performed for brucellosis where they are performed at veterinary directorate only.

Most of them (81%) confirmed that the positive animals are not quarantined.

All veterinarians confirmed that, only the large ruminants are vaccinated by the live vaccine (S19) which is used only for heifers from 3-8 months. All vials of vaccine are preserved at refrigerator and the manufacture and expiry date are clearly written on the package. The total numbers of vials do not exceed (10) vials per year for each unit which include six villages at least. All of them also confirmed that the vaccinated animals are not retested for evaluating the vaccine.

All the veterinarians confirmed that the veterinary authorities compensate the owners of the infected animals with brucellosis but a proportion of (57%) said that the value of compensation is fixed, while (80%) confirmed that the value not equal to the price of animals.

Most of them (77%) confirmed that the response of owners to the national project is low, while (23%) said medium and this is due to low compensation, insufficient culture and lack of trust.

Most of them (84%) confirmed that, the financial factor and the availability of resources affect extensively on the successfulness of the project, accordingly the project is not successful at the current status, also due to low efforts from authorities.

Most of them (76%) confirmed that brucellosis is an important zoonotic infectious disease, so authorities must not save efforts for another disease, while (24%) said that high money is paid with no results and the disease spread, so their view that authorities must save the efforts for another disease such as FMD and Influenza.

The Contact Veterinarians: The nature of work of this group as they did not work before at the national project for controlling of brucellosis made them are not able to answer for most questions (some of them did not answer any question), also most of them did not know the basic information about brucellosis such as the name of screening and confirmatory tests, the name of the vaccine, the type of vaccine (live or killed) and the age of vaccinated animals.

DISCUSSION

Brucellosis is an endemic disease in Egypt with drastic economic consequences on the national income. The current study was carried out to describe the current status of the disease among different ruminant species at Kafrelsheikh governorate and assess the national activities for disease control. Results obtained in this study showed that the routine serological testing showed that the prevalence of brucellosis in the study area is very low; 1.3% by RBPT, this is in contrary of what found in other different recent studies which were estimated 12.2% and 17.95% [9,10]. There are many reasons for such lower estimate of disease prevalence in Egypt. The official control program does not seek random sampling which prevents this program of draw actual picture of disease status in the region. Also, not more than 15% of the population tested every year as indicated in the veterinarian's questionnaire and this leave the chance of infection to spread more from the infected animals which are not examined in the national program. The problem of this finding is that, the national authorities have no accurate figures on disease prevalence and off course this will not give them an accurate picture of success or failure of official control program.

On the other hand, the results of serological testing in notification cases was found very high; 43.8%. The reasons of this high figure may be attribute to the inability of national program to reach all of infect premises through the routine national program. Also, the free movement of animal, keeping of aborted animals and lack of hygienic measures taken by animal owners as indicated in the results of questionnaire may be responsible for that high prevalence.

The veterinarians confirmed that, the current national program is unable to control the disease because of the lack of appropriate amount of fund for slaughtering of seropositive animals. This will be responsible for more collaboration of the farmers. All of veterinarians also declared the importance of control of brucellosis as it is important disease. This study showed the importance of revising the current national control program- such as mass vaccination- to be able to minimize the disease prevalence under the available resources and to be of the level of collaboration of farmers and vets.

Up to our knowledge, this is the first study that measures the KAPs of veterinarians. The results showed the lack of knowledge on brucellosis among veterinarians who are not working in national control program. This finding is of great importance as these veterinarians have to be the source of information to farmers at their places on such important diseases. For the appliers' veterinarians, they confirmed the difficulty in logistics of application of the current program and it is important to revise such program.

The results of animal owners' questionnaire showed the lack of knowledge among farmers on brucellosis and this is in contrary of what was reported [11]. Such difference may be attributed to small scale of the other

study as it was carried out in one village. This highlights the importance of educational campaigns to be a part of the control program.

High risk factors such as introduction of animals from markets without quarantine and mixing of different species of animals are practiced on wide scale and this is one reason for transmission of infection from species to the other [12].

Veterinarians and animals' owners confirmed that the vaccination is not practiced at a wide scale without specific reason and they confirmed that when there is a vaccine, it is all times S19. Despite the presence of S19 vaccine, the total number of vaccinated animal with it is very low. On the other hand, there is no vaccine for lambs and kids was reported to be used in spite of being *B. melitensis* the most predominant strain in different animal species in Egypt. This low coverage of vaccine in cattle and absence of vaccine to small ruminants is a major obstacle in assessment of efficacy of vaccination in control of brucellosis in Egypt. France has recently got rid of *B. melitensis* in small ruminant population using Rev1 vaccine only [13]. We think that vaccination should be considered as an effective program to the current test and slaughter policy.

CONCLUSIONS

In conclusion, the current study declared that, the current national control program has to be revised to be able to effectively diminish the prevalence of brucellosis in Egypt. Veterinarians and animals' owners lack the required information on disease surveillance and control that may be considered as an obstacle in the success of the national control program.

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