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Buffalo and cows play an important role in maintaining a sustainable food production system in Egypt. Animal reproduction and production in Egypt are affected by several factors, including dealing with difficult situations in pregnancy, parturition, and postpartum problems in farm animals especially cattle and buffaloes (Megahed, 2018). The main problems faced by buffalo breeders in general and smallholder system breeders include poor reproductive efficiency and prolonged inter-calving intervals. All reproductive specialists know that there are many challenges to reproduction in farm animals.

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Buffalo and cows play an important role in maintaining a sustainable food production system in Egypt. Animal reproduction and production in Egypt are affected by several factors, including dealing with difficult situations in pregnancy, parturition, and postpartum problems in farm animals especially cattle and buffaloes (Megahed, 2018). The main problems faced by buffalo breeders in general and smallholder system breeders include poor reproductive efficiency and prolonged inter-calving intervals. All reproductive specialists know that there are many challenges to reproduction in farm animals.

Now, there are many challenges affecting animal fertility. Among these challenges are microbial infections that affect the animal during pregnancy, during or after parturition (Megahed, 2020). Under most smallholder production systems, the reproductive efficiency of buffalo is compromised by factors related to climate, management, nutrition, and intervention of the owner for cases of dystocia which lead to postpartum problems. The most important of these factors is how to deal with cases of dystocia in buffalo by the owner before calling to the veterinarian to solve the problem.

Dystocia is one of the most important obstetrical conditions, and requires immediate attention by the veterinarians, for calving difficulty causes severe economic losses to the owners. Regarding the owner's behavior in the situation, he was not aware of the changes that occur within the animal, whether in the reproductive system, birth canal, or the fetus as it passes into the birth canal that leads to dystocia. If dealing with the condition before or without the presence of the veterinarian leads to harmful consequences that affect the life of the fetus, it also increases the negative aspects of animal health, and sometimes affects the fertility postpartum (Megahed, 2016).

Generally, in the practical field, we notice that the negative behavior of the owner which not go to the veterinary clinic or calling to the veterinarians, unless he fails to deal with the case of dystocia and the animal suffers from health problems due to the owner's intervention without knowing how to intervene in this case. Megahed (2016) recorded that fetal dystocia was common in buffalo-cow comprising 60.957% of total cases presented, whereas maternal causes constituted 39.043 % of total cases. Also, he mentioned that the attribution of this high rate of fetal mal disposition due to the intervention of the owner's handling at the beginning of birth (i.e., at the beginning of the stage of opening the cervix). This interference leads to changes in the normal width, the position of the fetus in the position during parturition, which leads to a serious deterioration of the case of dystocia. Atashi, et al., (2012) recorded that dystocia significantly decreased lactation performance, so in any economic evaluation of dystocia, not only the lost calf, veterinary costs, the reduced survival, and the increased days open should be considered, but also the decreased lactation performance. Severe dystocia was associated with the deaths of the fetus and subsequent impact in reproductive performance.

Improving the productivity of buffalo requires an understanding of their potential and limitations under each breeding system, development of intervention strategies to improve deficiencies in

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management, nutrition, and healthcare, followed by the intelligent application of reproductive technologies that are sustainable with the resources available to buffalo breeders.

The present scientific study hypothesizes that when educating the owner about how to deal with dystocia before contacting the veterinarian, this leads to the ability of the veterinarian, to make a correct decision to deal with dystocia and the condition is still fresh, which leads to improving and reducing the damage that she caught the animal after dealing with dystocia.

The main objective of the study is to determine how the intervention of the owner in dystocia cases leads to the reproductive problems which occur during the postpartum period.

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The strategic applied plan in this study includes the following:

1. Developing and changing the concept of veterinary students before graduating for their job description when dealing with cases in the animal clinic. This is done by developing the specification of an obstetrical course that is educated to students in the last two years before graduation. This requires improving the learning outcomes of the obstetric course by adding the teaching skill. This is done by acquiring students the skill of how to clarify and explain the causes of dystocia in a very simple manner and appropriate to the degree of the animal owner's culture in addition to how to provide first aid to the affected animal before contacting the veterinarian.
2. Designing an educational program to raise the awareness of animal owners, farm animal owners, and owners of small animal wealth through educational and training courses in dealing with difficulties related to animal fertility and problems of pregnancy and childbirth. This activity is carried out by defining a protocol with veterinary officials for each department in the governorate.
3. Designing a training program to raise awareness of the professional skills of veterinarians through training courses aimed at dealing with difficult cases professionally. This activity is carried out by setting a protocol with General Veterinarians Syndicate.
4. Create a communication protocol or a contact map with newly graduated veterinarians as well as actual veterinarians so that frequent cases in veterinary clinics are discussed in terms of degree and rates of recovery as well as rare cases.

Outcomes analysis and discussion

A retrospective study was done on buffaloes (n=210) presented at our Educational Veterinary Hospital, Faculty of Veterinary Medicine, Assiut University, Egypt during the four years from October 2016 to September 2019. The age of the animals ranged from 4 - 8 years. All the cases in the present study suffers from dystocia (according to the owner's complaint). In the fresh cases, treatment protocols firstly included allowing a finite amount of time for the animal to calve by itself, therapy to increase myometrial tone, and cervical dilatation, which includes supplementation of calcium, fluids, and oxytocin. The total cases were diagnosed depending on the case history and transvaginal examination. After determining the causes of dystocia, the selected proper method was done. The method adopted to correct the dystocia and fetal survival depends upon the time of presentation of the animal after the onset of the second stage of labor. The uncorrectable few cases of dystocia were treated by cesarean section. These cases are excluded from the number of buffaloes in this study. All cases were handled through using hands by force extraction after correction of abnormal presentation, position, the posture of the fetus to the normal as well as can be used other instruments such as obstetrical ropes or chains with lubricant materials. The parameters of reproductive performance which reflecting the subsequent postpartum risks from dystocia are:

1. The mortality rate of mother and calves
2. Calving to estrus period (45-60 days, and to 100 days)
3. Anestrus (more than 100 to 150 days)
4. Repeat breeding cases

The results of this study (after applying the strategic applied plan from 2016 to 2019, Table 1) are compared with the results of previous years from 2012 to 2015 at the same area and location (Table 2). As shown in Table 1, the mortality rate of the dam through the time of the study was smaller (0.476 %, 1/ 210) than that in the previous years which shown in Table 2 (1.404 %, 4/ 285), as well as 22.381% (n=47) and 49.123% (n=140) in the mortality rate of calves respectively. After applying the strategic applied plan, the fertility index (calving to fertile estrus) of the animals after handling of their dystocia were improved as high rate of calving to estrus after 45-60 days (77.034% vs 27.758%) and a lower rate of calving to estrus after >60 -100 days (1.435% vs 9.253%). Besides, the anestrus and repeat breeding of the animals after handling of their dystocia were lower (6.220% and 15.311%) than that in the previous years (24.199% and 39.597%).

Table (1): After protocol

Parameters of Reproductive performance	2016 (n= 45)	2017 (n= 50)	2018 (n= 60)	2019 (n= 55)	Total (n=210)
Mortality rate of mother	0.000% (n = 0)	0.000 % (n = 0)	1.667% (n = 1)	0.000 % (n = 0)	(1) 0.476 %
Mortality rate of calves	33.333% (n=10)	28.000% (n=14)	22.034% (n=13)	27.273% (n=10)	22.381% (n=47)
Calving to estrus period (45-60 days)	64.444% (n=29)	78.000% (n=39)	81.356% (n=48)	81.818% (n=45)	77.034% (n=161)
Calving to estrus period (>60 -100 days)	4.44% (n=2)	0.000% (n=0)	1.695% (n=1)	0.000% (n=0)	1.435% (n=3)
Anestrus (>100 to 150 days)	13.333% (n=6)	4.000% (n=2)	3.389% (n=2)	5.455% (n=3)	6.220% (n=13)
Repeat breeding cases	17.778% (n=8)	18.000% (n=9)	13.559% (n=8)	12.727% (n=7)	15.311% (n=32)

Table (2): Before protocol

Parameters of Reproductive performance	2012 (n= 63)	2013 (n= 79)	2014 (n= 73)	2015 (n= 70)	Total (n=285)
Mortality rate of mother	1.587 % (n = 1)	2.532 % (n = 2)	1.369 % (n = 1)	1.587 % (n = 0)	(4) 1.404 %
Mortality rate of calves	39.683% (n=25)	53.165% (n=42)	53.45% (n=39)	48.571% (n=34)	49.123% (n=140)
Calving to estrus period (45-60 days)	25.806% (n=16)	25.974% (n=20)	27.778% (n=20)	31.429% (n=22)	27.758% (n=78)
Calving to estrus period (>60 -100 days)	9.677% (n=6)	10.389% (n=8)	6.944% (n=5)	10.000% (n=7)	9.253% (n=26)
Anestrus (>100 to 150 days)	29.032% (n=18)	20.779% (n=16)	16.667% (n=12)	31.49% (n=22)	24.199% (n=68)
Repeat breeding cases	35.484% (n=22)	42.857% (n=33)	48.611% (n=35)	28.571% (n=20)	39.597% (n=110)

Some researchers have recorded results of postpartum anestrus that may be like the results of this study (before applying the protocol). From these results, the incidence of anestrus has been reported between 9.18–82.50% (Kumar and Kumar, 1995; Tomar et al., 2002, Nanda et al., 2003; Prajapati et al., 2005; Khan et al., 2009; Kumar et al., 2013; Thakor and Patel, 2013).

Dystocia considers a very important possible risk factors which increasing the calving-fertile estrus period (days open) and affecting reproductive performance in dairy cows (Okawa, et al., 2019).

This report coincided with the obtained results where, the incidence of Calving to estrus period (>60-100 days) is 24.99% before the

implementation of the improvement protocol however, after applying the improvement protocol it became 6.22%. When we go to compare the results obtained during the period from 2012 to 2015 (before the implementation of the improvement protocol) and the period from 2016 to 2019 (after applying the improvement protocol), we find that the high rates of fetal and maternal mortality can be traced back to the intervention of the animal owner (at the beginning of the stage of opening the cervix or when there is an error in the presentation or position or posture of the fetus during parturition). According to the owner` beliefs, this intervention at the beginning of parturition help the cow from the hypothesis of fear of suffocation of the fetus. This intervention creates a high risk on postpartum fertility.

The interpretation for the obtained results and give a strategic advice

Dystocia is an unavoidable challenge in the livestock, particularly with primiparous female animals. Prevention and appropriate management will decrease cow and calf morbidity and mortality, which will improve the economic income of livestock industries. Early identification and proper intervention improve outcomes, and the use of correct decision of handling of dystocia will have positive returns (Funnell and Hilton, 2016).

After studying this phenomenon, it was necessary to devise a strategic plan to improve and mitigate the subsequent risks of dystocia in the Egyptian buffalo. This was accomplished after applying the optimization protocol in this study. It is evident from the results which presented in this study that there are few cases coming to the hospital with dystocia.

The interpretation and explanation for this are that the owner of the animal leaves the condition without intervention and consequently, the parturition process for the animal will be normal without changed to dystocia. This is because the veterinarian educates the owner or the outcome of the education. After all, entering the owner without knowledge leads to turning the case into dystocia.

Also, we conclude from this study that

1. The dangers resulting from dystocia are significantly reduced and the interpretation for this is that all cases that come to the hospital are without intervention of the owner with them and therefore it is easy to work with them by the veterinarian, which leads to a reduction or stops the dangers that occur postpartum.
2. And, that the veterinarian deals with the case with scientific skills trained on it and has acquired it during education in college which qualifies the veterinarian to solve any problem during handling of any case of dystocia without subsequent risk.
3. Training through educational program for owners and breeders is very important and has a positive effect on rates of dystocia as well as postpartum fertility indicators in buffaloes. This program includes:
    - Information on the method of normal parturition.
    - How to deal with a case of dystocia.
    - The need to call the veterinarian in cases of dystocia without interference in these cases.

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