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Causes, Economic Impact and Management of Dystocia in Dairy Cattle: A Review

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Abstract: Out of the common causes of reproductive health problem, dystocia is considered one of the top reproductive health problems of dairy cows. Exercise, genetics, calf birth weight, calf sex, nutrition, cow body weight at calving, gestation length, season and cow age at calving are the main predisposing factors. The maternal causes resul from comprised feto-maternal disproportion, improper cervical dilation and failure of uterine expulsive force, uterine torsion and hernia of gravid uterus and fetal causes such as fetal oversize, fetal mal-dispositions, twinning and fetal diseases. Dystocia has a chief economic impact on cow-calf producers. It has a direct negative impact on calves due to the death of calves and cows, losses production in both the cow and calf and delayed reproduction rates. Reduction in milk yield, increased cost of treatment and indirect costs, such as an increase in the risk of subsequent unfavorable health events and an increase in culling rate are another consequence of dystocia. The incidence of dystocia can be reduced by applying sound management of heifers and cows which includes avoiding confinement method, proper nutritional management of cows during pregnancy, removal of heifers with small pelvic areas and selecting sires for calving ease. Diagnostic management based on history, physical examination as well as vaginal and rectal specific examination and medical management by specific ecobolic drugs as a treatment and obstetrical approaches like forced extraction, mutation, fetotomy and cesarean section are the other ways for proper management of dystocia in dairy cattle.

Key words: Dystocia · Feto-Maternal Disproportion · Reproductive Health Problem

INTRODUCTION

Reproduction is mainly concerned with the economics of cattle production. The typical target of reproduction is to have a healthy calf every year [1]. Thus, of the most common causes of confusing reproductive disorders in dairy cows, the major problem affect production and productivity is dystocia [2, 3]. Dystocia is defined as difficult or abnormal labor or delivery in which heifers or cows are unable to calve without assistance when the first or the second stage of labor is prolonged [4-6]. The trait that measures the presence or absence of dystocia is called calving ease [7]. Some of the predisposing factors for dystocia are; nutrition, cow body weight (BW) at calving, gestation length, exercise, genetics, calf birth weight, calf sex, season and cow age. The specific causes are; maternal causes like; improper cervical dilation, failure of uterine expulsive forces (Uterine inertia) and neoplasm of vagina, vulva and uterus [8]. The fetal causes include fetal monsters, diseases and mal-dispositions. Hydrocephalus, ascites, anasarca and hydrothorax are the most common diseases of the fetus resulting in dystocia [9].

The diagnosis of dystocia is frequently based on high degree subjectivity; since there are situations that one person will consider being normal but another will consider difficult [10]. Although, difficult calving (DC) cannot be accurately predicted or eliminated, the effects can be reduced by improved management and skilled intervention when necessary [11]. Difficult calving, along with increased calves' mortality are the major source of economic losses for bovine breeders which results in reduced fertility [12] and reduced bovine productiivity [13-15]. Therefore, the objective of this review is spot light on the causes and the economic impact associated with dystocia in dairy cows and to highlight some management and control strategies and prevention of dystocia.

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Literature Review

Causes of Dystocia in Dairy Cattle: There are several risk factors and two specific causes associated with dystocia in a dairy cow which can result from both maternal and fetal causes [8].

Predisposing Factors for Dystocia

Calf Birth Weight and Genetics: Calf birth weight is the most important to predict dystocia and is a function of genetic and environmental factors [16]. It is highly determined by genetics and breed of sire; however, the maternal genetic influence should not be overlooked [1]. In Holsteins, increase in a calf birth weight will increase the possibility of dystocia. Generally, calf birth weight closely related to dystocia [17].

Steinbock *et al.* [18] estimated the heritability in Holsteins for the direct and maternal effect at first calving at 6.2% and 4.8%, respectively and at second calving at 0.4% and 0.2%, respectively. Beef cows experience significantly more dystocia than dairy cows. The pelvic width is influenced by breed, determined dystocia rate to a large extent. Hereford cows had the smallest pelvic height, width and area, whereas Braunvieh had the largest pelvic width and Charola is the largest pelvic height and area [19].

Calf Sex and Gestation Length: The majority of the increase in dystocia rate for male calves is attributable to higher BW and frequently also have longer gestational periods which leads to bigger or heavier calves [17, 5]. Gestation length is having an indirect effect on calving difficulty as an increase in gestation length is increasing the BW [20]. Both shortening and lengthening of gestation lengths are associated with increased risk of dystocia [21].

Cow Body Condition During Dry Period and at Calving: Over-conditioned cows have higher risks of dystocia and metabolic disorders during early lactation; whereas too thin heifers do not gain the appropriate body size at calving at the age of 24 months [22].

Nutrition and Cow Age at Calving: Nutritional effects may be mediated by affecting the BW of the calf or size of the heifer. When the dam is in poor condition, from being poorly fed, they deliver low viability calves, whilst overfed dams tend to deliver oversized or weighted calves. Both situations increase the risk of dystocia [23]. Under-nutrition at any stage can retard pelvic growth [24]. The age of cow during calving is directly related to its size which in turn influences the calf size. Hence, the risks of dystocia minimized by smaller cows tend to give birth to smaller calves [1]. Usually, younger cows have more DC, irrespective of the number of parturitions [25].

Climate/Season and Infection: Cold weather (air and wind chill temperatures of approximately -5 and -10°C, respectively) during the last trimester has been associated with increased thyroid hormone concentration, increased blood and nutrient flow to the uterus and increased gestation length and reduced plasma oestradiol concentrations leading to increased birth weight and dystocia [26]. More physical exercises and longer days are suggested factors for seasonal differences of dystocia [17].

Every type of infection or disease affects the pregnant uterus and its contents may cause abortion, uterine inertia, fetal death and occasionally septic metritis of pregnancy. The uterine wall may lose its ability to contract a condition resulting in incomplete dilation of the cervix and uterine inertia, in severe cause of infection of the uterus [27].

Exercise and Management: Pregnant animals which are not exercised and are kept in close confinement are more prone to difficulties such as torsion of the uterus and inertia than those kept under natural conditions, as on pasture [27]. Forced exercise consisting of walking one mile per day for four weeks prior to calving has been shown to improve the calving ease of closely confined dairy heifers. These, heifers showed improved calving ease score, reduced placenta retention time and fewer days open following calving [28].

Specific Causes of Dystocia: For use of formulating a clinical management plan for an individual animal, dystocia may originate from maternal causes or fetal causes [29].

Maternal Causes

Feto-Maternal Disproportion: In cattle, it has been expected that 46% of all cases of dystocia are caused by feto-maternal disproportion (FMD) [30]. Feto-maternal disproportion is not only a factor by itself but, a relationship between maternal and fetal factors and can be defined as an obstruction of calf expulsion created by the calf size or weight or pelvic proportions of the dam, that may have several factors in its origin [5, 31]. Feto-pelvic

disproportion is the situation most common in heifers where the fetus is of normal size for its breed but the maternal pelvis is of insufficient size or the fetus may be unusually large and cannot be delivered through a pelvic canal of normal size [27]. Foeto-pelvic incompatibility is largely influenced by the weight and morphology of the dam and the calf. These morphological factors are themselves dependent upon different variables including the age, breed and parity of the dam, twinning, the sex and weight of the calf, the sire and breed of the calf as well as the nutrition of the dam during gestation [5, 15, 19].

The magnitudes of the bony pelvis are too small to allow passage of the fetus when heifers being served at too young age. A small pelvis is a component in dystocia due to feto-pelvic disproportion and is exacerbated in cases where the fetus is larger than normal [32].

Incomplete Cervical Dilatation: Improper cervical dilation appears to be more frequent maternal cause of dystocia in cattle. It may occur both in the heifer and multiparous cows [33]. Enzymatic loosening of fibrous strands by elevated collagenase and the physical forces of the uterine contractions and fetal mass are considered to be responsible to effect sufficient dilatation of the cervix during parturition in the cow [34]. Cervical non- dilation can occur because of the failure of any of the mechanisms responsible for dilation or spasm of the cervical muscles and results in dystocia [8].

Uterine Inertia (Failure of the Expulsive Force): Uterine inertia is the situation in which cervix is fully dilated; however, uterine expulsive forces fail to deliver a fetus, primarily in older cows due of lack of contractions in the uterus [35]. Uterine inertia is classified conventionally into primary and secondary uterine inertia [27]. The most frequent cause of primary uterine inertia in dairy cows is considered to be hypocalcaemia, with the animal showing signs of milk fever as calving is about to begin. It is also due to excessive stretching and is common in multiple pregnancies in cattle and a defect in the myometrium that renders contraction impossible, hormonal defect and it may be also due to close confined cattle [29]. When the uterine musculature becomes fatigued subsequent to failure of delivery of a mal-disposed or oversized fetus or due to obstruction in the birth canal, then the condition is known as secondary uterine inertia [8].

According to Arthur *et al*. [35], the contractions in the uterus then stop or become weak and transient and secondary uterine inertia occurs due to exhaustion as a result of dystocia. According to Biggs and Osborne [36], a few of less common causes include inherited weakness of uterine muscle, toxic infections, myometrial degeneration, senility and nervousness.

Uterine Torsion: Uterine torsion during pregnancy [37] at parturition [38] or post-partum [39] is one of the complicated causes of maternal dystocia both in cows and buffaloes culminating in death of both the fetus and the dam if not treated early. This condition is relatively uncommon (Approximately 5% of dystocia, primarily in older cows) [40], but appears to be increasing in prevalence (10%) in veterinary-assisted dystocia. Torsion of uterus usually occurs in a pregnant uterine horn and is defined as the twisting of the uterus on its longitudinal axis [41]. As reported by Frazer *et al*. [40] during pregnancy, elongation of the broad ligaments is relatively small compared to massive elongation of the gravid uterine horn, which leads to the uterus curving around the point of attachment. As pregnancy advances, the gravid uterine horn extends away from its area of attachment and lies between the rumen, intestines and abdominal wall. Thus, a cow in late pregnancy (Third trimester) is predisposed to development of a uterine torsion whenever the prevailing conditions allow an increased uterine mobility. There exists a difference of opinion as to the frequent side of uterine torsion in cows. While Arthur *et al.* [35] and few other workers concluded that the side of torsion is generally left side in cows, a few reports [42, 43] and the authors are of the view that because of presence of rumen on the left side, the side of torsion should usually be the right side in cows. According to Nejash and Wahid [41], the exact etiology of uterine torsion is poorly understood.

Hernia of the Gravid Uterus: Hernia of the gravid uterus occurs occasionally in cows through a rupture of the abdominal floor. One of the advanced pregnancies, occurring beyond the seventh months in cows is an accident. It is probable that the majority of cases results from a severe blow on the abdominal wall though it may occur without traumatic influence; the abdominal musculature becoming in some way so weakened that it is unable to support the gravid uterus [33].

Fetal Causes: Generally speaking, the fetal origins of dystocia in cattle can be divided into those caused by excessive fetal size relative to the maternal pelvis (Feto-pelvic disproportion) and those caused by abnormalities of the fetus (Fetal monsters, fetal diseases and fetal mal disposition) [8].

Thus, for fetal origin of dystocia the abnormal 3P's (P1 = presentation, P2 = position and P3 = posture) are also important [27]. Abnormal fetal presentations at birth contribute to 1-5% of total dystocia cases [44, 45].

Fetal Oversize: Definitely in dairy cattle, the most common type of dystocia is oversized calves. In their order of importance, calf birth weight and maternal pelvic size are the two crucial determinants to cause dystocia, in which the calf birth weight especially in 2-year old first calving heifers, much affects the difficulty in calving [1]. As a researchers point out, the calf birth weight is the trait most highly associated with occurrence of dystocia, followed by sex of calf, pelvic area and gestation length and cow weight. The greater part of the rise in dystocia rate for male calves [17] is attributable to higher BW (1-3 kg). Berger *et al*. [25] for example, found higher dystocia rates for males across all birth weight ranges. Risk of dystocia in increased pure breeding with Holsteins compared to crossbreeding with some other dairy breeds as reported by Heins*et al*. [46] for Brown Swiss and Scandinavian Red sires.

Fetal Mal-Disposition: Abnormal fetal position most commonly presents as posterior mal-presentation, foreleg mal-posture, breech mal-presentation or cranial mal-posture, in that order. Position is the relationship between vertebral column of fetus with the four quadrants of pelvic inlet of the dam and it can be dorsal, ventral and lateral [30]. Fetal mal-position is the most common cause of dystocia in aged cattle but occurs at a low prevalence [47]. Abnormal foetal position is most influenced by multiple births which have a four-time higher risk [48], particularly if unilateral. The presentation is a relationship between the longitudinal axis of dam with the longitudinal axis of fetus and parts present towards birth canal [25]. As reported by Nix *et al.* [44] abnormal presentation accounted for only 1% of a total number of calving. However, amongst these cases 70% were posterior presentations, remaining part being head and leg deviations. Mal-presented calves have a two times higher risk of dystocia and five times higher risk of stillbirth [47]. Posture is a relationship between movable appendages of fetus with its own body. It signifies the relation of the extremities or the head, neck and limbs [49].[48 not found].

Most calves are presented with the front feet first and the nose resting on the front legs. Occasionally, the fetus will be backward, breech (Buttocks first), head to one side or the other, or have one or both front legs back or a knee bent. These abnormal presentations usually require some degree of assistance [50]. An extremely unusual mal-presentation in which the fetal body is found lying vertically across the pelvic inlet is the vertical presentation. In normal delivery, the calf is in a dorsal position with its spinal column beneath that of the dam [32].

Twinning: Overall, multiple calving is more difficult than single ones [51]. Cows with twins have a shorter gestation length and more dystocia. Twin dystocia is of three types: both fetuses present simultaneously and become impacted in the maternal pelvis, one fetus only is presented but cannot be born because of defective posture, position or presentation; posture is often most in the wrong, the lack of extension of limbs or head being due to insufficient uterine space, uterine inertia, defective uterine contractions are caused, either by the excessive fetal load, or by premature birth [30].The breeding efficiency of dairy and beef cows are also minimized by twins [52].

Fetal Diseases: Dystocia in cattle and distorted shape of the fetus can result from various diseases of the fetus. Dropsical conditions of fetus resulting in dystocia include hydrocephalus, ascites, hydrothorax and anasarca. Ascites is dropsy of the peritoneum [53]. Anasarca is general dropsy of tissues under the skin [54] whereas hydrothorax is the accumulation of fluid in the thoracic cavity. Hydrocephalus is accumulation of excessive fluid in dura-matter or ventricles of brain. Hydrocephalus is assumed to arise from disturbances in normal circulation of cerebrospinal fluid resulting from its altered production or absorption. Both ascetic and anasarcous fetuses have been reported to cause dystocia in cattle [55].

Economic Impact of Dystocia in Dairy Cattle: Many studies have demonstrated the adverse effect of dystocia on the survival, health and production of calves and dams [56, 57]. There are many consequences of dystocia and it will depend upon severity. Firstly, there are the financially unquantifiable effects on the welfare of dam and offspring. Secondly, there are the quantifiable financial consequences. In order of descending financial importance, dystocia in confinement systems impacts production (41% of costs), reduce fertility by (34%) and cow and calf morbidity and mortality (25%), excluding costs associated with increased culling, veterinary costs and other management costs [58]. Infertility problems in dairy herds affect profitability through additional expenditure and reduced income [59].

Direct Losses: Dystocia is a significant factor which has a direct negative impact on calves (e.g., prolonged hypoxia, significant acidosis, vigor, increased stillborn calves, etc.) and dams (e.g., trauma, paresis, metritis, etc. This is due to the death of calves and cows, losses production in both the cow and calf and delayed reproduction rates. Difficult births increase direct costs of the herd (Veterinary fees, calf or cow death or both and extra farmer- labor) [60]. Short to the medium-term mortality rate in calves increased, due to reducing in colostral immunoglobulin intake. What is more, the forces exerted on the fetus during delivery may cause cardiopulmonary malfunction [13].

Poor Survival in the Lactation: In most severe cases of dystocia, death usually takes place within 48hrs in cows [61]. Also sometimes, cattle experienced dystocia, are more likely to die or be culled in early lactation and over the lactating period [62].

Milk Production: Dystocia is implicated with a number of studies as a contributing factor to reduce milk yield [15, 51]. Reduction in milk yield in the first trimester of lactation in cows with dystocia may be associated with trauma in parturition and increased risk of postpartum complications as well as factors like hormonal changes and reduced appetite [57].

Indirect Losses: The prolonged parturition resulted in a slightly delayed onset of estrus post-calving, slightly more services or conception and reduced subsequent conception rate in dairy animals. Dystocia increases indirect costs, such as an increase in the risk of subsequent unfavorable health events, an increase in culling rate and a reduction in yield [60]. Bovine dystocia is associated with a higher incidence of retained fetal-membranes, uterine disease (Endometritis, metritis, pyometra and uterine rupture) and peri-parturient hypocalcaemia in the cows [63].

Lengthened Labour, Uterine Health and Fertility: In contrast to normal cows, cow experience dystocia display longer first estrus, first service, service period, day's open and calving interval. Postpartum diseases like metritis, retained placenta and milk fever are mostly suffer cows experiencing difficulty at birth [64]. This could be explained by the possibility of microbial contamination during assistance combined with a depressed immune status during the peri-partum period [65]. Immunodeficiency is probably enhanced in dystocial cows as a consequence of the increased duration of labor and the subsequent higher cortisol levels [66]. Furthermore, Gaafar *et al*. [51] have proved that the incidence of dystocia resulted in a significant reduction in conception rate, as compared with normal cows. Totally poorer fertility is one economic impact of dystocia in dairy cow [7].

Feed Intake and Metabolic Dysfunction: Cows experienced dystocia is showing altered feeding behavior starting from three days prior to calving and standing behavior beginning 12 hours before calving compared to cows that calve without assistance [67]. Cattle that had experienced dystocia exposed to decrease DMI during the period of lactating in the months of postpartum [68] as compared to cows that calved normally, but this is not seen in the first two days postpartum. Then, the small amount of milk production, the greater losses in weight and body condition score found in dystocial cows during their subsequent lactation [69].

The experience of dystocia in Holstein Friesian dairy cows is also associated with hematological changes at delivery relating to hepatic function. For example, dystocial Holstein heifers had higher cortisol, cholesterol glucose, high density lipoprotein, triglycerides and creatinine and vitamin A levels than eutocial animals [66].

Management of Dystocia in Dairy Cattle: Overall elimination of dystocia from the herd may be difficult for the dairy producer, but they can reduce its occurrence by implementing appropriate management of their heifers and cows. Internationally, management systems of dairy cows are different between pasture only, pasture and confinement and confinement only; these systems vary in the genotype of the animals, their diet, their environment and their management, of all which can have significant impact on the risk of dystocia [70]. Regarding the possible differences between management systems, health and welfare, including calving performance, tend to be better in pasture compared to a confinement system. Through exercise there is increment of pregnant animal's body tone, strength and resistance and results in stronger labor contractions, less fatigue, shorter duration of parturition, less uterine inertia and prompt recovery [27]. The cows that become excessive in body condition or excessive weight loss during the last trimester of pregnancy are prone to dystocia. Beef cows experience significantly more dystocia than dairy cows because of high fat accumulation in their birth canal which makes parturition more difficult, leading to fatigue of the musculature of the

uterus [19]. However, assistance is greater in heifers and fewer in cows. Good supervision is dependent upon monitoring calving, particularly stage two and intervening if and where necessary, while avoiding excessive direct supervision [5].

Treatment

Medical Management: When the problem of dystocia is suspected the use of the following specific ecobolic drugs is ideal: oxytocin, calcium or glucose therapy. To treat uterine torsion, antibiotic and non-steroidal anti-inflammatory drugs are provided [71]. Prostaglandin F2 alpha and its analogs are recommended to induce uterine contractions which may be useful for expulsion of uterine contents [72].A prolonged dystocia due to fetal ascites in across bred cow is successfully managed with antibiotics, anti-inflammatory and supportive therapy following manual puncturing of fetal abdominal cavity. For the deficiency of estrogeninjection of estrogens like estradiol-valerate (20 - 30 mg, im) can be helpful [73].

Obstetrical Operations to Relieve Dystocia: Obstetrical operations are one that has principal purpose to deliver a viable fetus and to prevent injury to the dam. There are four major classifications [33].

Manual Traction (Forced Extraction): Forced extraction of calf should be performed only when presentation in dorsal position and extended posture is the most normal situation at calving, which means that the calf appears with the forelegs first, followed by the head and then the rest of the body and the hind limbs at the end. This is usually the first approach in a simple FMD case if the wideness of the birth canal is sufficient [74]. Such a force may be developed by cords, hooks and forceps. Whatever the traction source used, it is always important to use ample lubrication [75].

Mutation: Mutation is operations performed to return a fetus to a normal presentation, position and posture by repulsion, rotation, version and adjustment or extension of the extremities [27].

Fetotomy: Fetotomy performed on the fetus for the purpose of reducing its size by either its division or the removal of certain of its parts [33]. Fetotomyshould be considered only when the fetus is known to be died. By using the instrument called embryotome or fetotome, the fetus in anterior presentation first remove the head, then the foreleg and also remove the thorax and finally division of the pelvis [32].

The advantages of fetotomy: it avoids the major abdominal surgery of caesarean section, less assistance required than caesarean section, shorter recovery time/less aftercare and less cost [76] and it's disadvantages are: it may be dangerous, causing injuries or lacerations to the uterus or birth canal by instruments or sharp edges of bone; and also it may take a long time causing exhausting of both the dam and the operator [77].

Hysterectomy or Caesarian Section (CS): The cesarean operation is less exhausting, speedier and safer than fetotomy and the most routine obstetric procedure in cattle practice which has high maternal and fetal survival rate [30]. Indications: immaturity of the heifer, fracture of the pelvis and tumors of the vagina, cervix or uterus, incomplete dilation of the birth canal, irreducible uterine torsion [78] rupture of the uterine wall before calving, relative fetal oversize and deformities of the calf [79]. As Bicalho *et al*. [80] and Schultz [81] stated, the goal is to limit the contamination of the abdominal cavity with uterine contents, especially when the calf is dead, since this contamination greatly increases the risk of peritonitis and limits the cow's productivity and chances of survival. The choice depends on the surgeons' preference, behavior of the animal, as well as available facilities. In a cow capable of tolerating surgery while standing, the left paralumbar fossa or flank approach is the standard technique [82]. In general the more prolonged the dystocia, the poorer the prognosis [77].

Preventive and Control Measures of Dystocia in Dairy Cows: In line to prevent and treat dystocia one must be familiar with history of previous occurrences of difficulty calving for each animal, such as any previous zoonotic diseases which caused an early abortion and current gestation length and the length of time that the animal has been in labors. As with all diseases and disorders, veterinarians should be endeavoring to prevent and reduce the incidence of dystocia [10]. New calving heifers should be allowed longer time period to give birth. Heifers should have to reach at least a mature body condition (60 to 65%) at breeding [5]. Early intervention minimizes the effects of dystocia on calves. Producers must be well trained to intervene appropriately in dystocia and recognize when to call the veterinarian [19, 71]. The use of tested sires for their ease of calving (calves with low birth weight estimated breeding values especially for first-calf heifers, is an essential management tool to prevent dystocic births [83].

Feto-maternal disproportion is one of the major contributors to dystocia and this can be prevented with proper reproductive management. Those heifers with a small pelvic area before the breeding season may then be culled or selectively mated to easy calving bulls. Cows and heifers should be fed (Appropriate nutrition) to give birth in suitable body condition neither being thin nor fat because fat cows tend to experience more calving problems. Maintenance of calcium homeostasis throughout transition is imperative for uterine health [84].

Not all dystocia can be prevented, but early intervention is chief in ensuring a live birth. In general, according to Johanson and Berger [17] prevalence and effects of dystocia can be lowered in one of the following three ways:

- Pre-breeding management: by selecting sires for calving ease and dams for adequate pelvic size (Selection of the dam has never been done in the dairy industry), breed heifers of recommended height and weight and provide optimal nutrition during pregnancy.
- Calving time: ensure that calving areas are comfortable and as stress free as possible and provide assistance when needed using proper techniques and procedures.
- Neonatal assistance: to provide maternal and additional care as needed to stimulate respiration to maintain body temperature (Thermoregulation) and increase blood volume via colostrums.

Status of Dystocia in Ethiopia: For several years, Ethiopia is known for its estimated high livestock population, being the first in Africa and tenth in the world [85]. Despite the country has a huge number of cattle, productivity is low due to constraints of disease, nutrition, poor management and poor performance of endogenous breed. These constraints result from poor reproductive performance of dairy cattle and lower economic profit from the sector [86]. Ethiopia also has widespread reproductive problems of dairy cows. In the country, dairy cattle are kept under diverse production systems [41, 87]. The differences in management (Production) systems and environmental conditions under which cattle are maintained could considerably influence the incidence of reproductive health problems. The considerable economic losses due to reproductive problems have been indicated in dairy industry and are the main causes of poor productive performance of smallholder dairy farms [88].

Numerous researchers have reported the prevalence of dystocia in dairy cow from different area of Ethiopia and most of the reported prevalence of in dairy cows ranges from 2.9 to 11.6%. The lowest prevalence (2.9%) was reported from Central Ethiopia, Bishoftu by Hadush *et al*. [89]. The highest prevalence (11.6%) was reported from Mekelle by Mekonnin *et al*. [90] and Micheal [91] also reported 9.7% from Awassa and Haile *et al*. [92] reported 5.9% from Hosanna.

CONCLUSION AND RECOMMENDATIONS

Dystocia is the leading reproductive problem in dairy production. It has been caused by diverse predisposing factors and specific causes known as maternal and fetal causes. Dystocia has a key economic significance and a major problem in the dairy industry. It has negative impacts on the dairy farm, the cow and its calf. However, there has been less consideration given to the effects of a dystocial birth on the surviving calf. The incidence of dystocia is common in first-calf heifers, primiparous and larger breeds of both cattle production, but generally, it is more common in beef than dairy cattle. The use of proven sires identified for their calving ease at the time of artificial insemination has the potential to considerably reduce dystocia. Pregnant animals not exercised and are kept in close confinement are more prone to difficulties such as torsion of the uterus and inertia than those kept in the extensive system. Diagnosis and treatment of dystocia require the good knowledge of normal parturition and constitute a large and important part of the science of obstetrics. Early intervention and maintenance of appropriate nutritional program also reduce the effect of dystocia.

Therefore, based on the above conclusion the following recommendations are forwarded:

- Public awareness is imperative with reference to predisposing factors and causes to reduce the incidence of dystocia.
- Producers and farm owners should be well-informed on management and control strategies.
- Dairy farm owners should avoid mismatch of the size between sire and dam at the time of breeding and evade breeding of heifers prior to mature.
- The obstetrician should have sufficient knowledge and handle cases with necessity.
- Appropriate feeding management and exercise should be adapted by cattle rearing groups.

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