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Prevalence of Major Skin Diseases of Cattle in and around Dessie, Ethiopia

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Abstract: The existence of various skin diseases affecting cattle is frequently reported from different parts of Ethiopia. A cross sectional study was conducted in and around Dessie from November 2017 to April 2018 to determine the prevalence of skin diseases in cattle and their associated risk factors. Animals were examined for the presence of any skin disease through visual inspection and palpation and from those showing clinical signs and tentatively diagnosed for the presence of skin disease appropriate samples were taken for laboratory examination. Out of 460 cattle examined, 71 (15.4%) were affected by skin diseases. There were statistically significant variations among the different age groups and origins in prevalence of skin diseases. Young animals were more affected by skin diseases than old and adult 19.4%, 14.4% and 13.7%, respectively. There was no statistically significant difference in the prevalence of skin diseases between sex, breed, body condition score and management system of the animals. But the occurrence of skin diseases was found to be higher in poor body condition (17.7%), local breed (16.8%), male (18.7%), and in extensive management system (16.4%). The skin diseases identified in the study were tick infestation (8.04%), lumpy skin disease (2.4%), lice (2.39%), demodicosis (1.52%), dermatophytosis (0.65%), and dermatophilosis (0.44%). In conclusion, the prevalence recorded in this study was found to be high in the study area. Further study on economic impact of the skin disease is highly recommended. [Haimanot Mebratu, Yalew Tefera and Negesse Welde, **Prevalence of Major Skin Diseases of Cattle in and around Dessie, Ethiopia.** *J Am Sci* 2020;16(10):67-82]. ISSN 1545-1003 (print); ISSN 2375-7264 (online). http://www.jofamericanscience.org. 8. doi:10.7537/marsjas161020.08.

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1. Introduction

Ethiopia has an estimated 53.4 million cattle distributed within the different agro-ecological zones (CSA, 2011); about 99% of cattle populations are of local Zebu breed. Genetically and geographically the main breed classifications in Ethiopia are Raya, Arsi, Fogera, Horo, Borana, Sheko and Afar breeds. The remaining 1% of exotic breeds is kept mainly for dairy production in and around urban areas (Gari *et al*., 2010).

Livestock have multiple functions in the Ethiopian economy by providing food, input for crop production and soil fertility management, raw material for industry, cash income as well as in promoting saving, fuel, social functions and employment. The sector's contribution to national output is underestimated, because traction power and manure for fertilizer are not valued. Livestock contributes 12-15% of total export earnings the sub-sector is the second major source of foreign currency through export of live animals, meat, milk, hides and skins (Ayele *et al.*, 2003).

At the household level, livestock contributes to the livelihood of approximately 70 percent of Ethiopians. Women play a critical role in livestock production (Abdulhamid, 2001) both directly in primary production of small ruminants and indirectly through the contribution of livestock to household assets. Livestock offers a particular package of benefits to pastoralists, for whom few alternative livelihoods exists (Sintayehu *et al*., 2010).

Hides and skins averaged a yearly export value of $52,160,000 USD, livestock averaged $3,390,000 USD, and meat $2,380,000 USD. Hides and skins provided on average 90% of official livestock sector exports, livestock provided 6% and meat 4%. For a time in the 1990s, hides, skins and leather were Ethiopia's second largest export earner after coffee (Fitaweke, 2012).

The existence of various skin diseases (dermatophilosis, demodicosis, sarcoptic and psoroptic manges, dermatophytosis, ticks and lice infestations and also lumpy skin disease) affecting cattle is frequently reported from different parts of Ethiopia (Woldemeskel, 2000; Tefera and Abebe, 2007). These different skin diseases in Ethiopia are accountable for considerable economic losses particularly to the skin and hide export due to various defects, 65% of which occur in the pre slaughter states directly related mostly to skin disease, (Kassa *et al*., 1998) and skin and hides are often rejected because of poor quality (Woldemeskel, 2000). Apart from quality degradation of skin and hides, skin diseases induce associated economic losses due to reduction of wool quality, meat and milk yield, losses as a result of culling and occasional mortalities and related with cost of treatment and prevention of the diseases. Some skin problems are easy to cure; others more complicated and some like ring worm are even highly contagious to the human handlers. The effect of skin problems on animal productivity also varies from mild irritations to rapid death (Yacob *et al*., 2008).

External parasites are the most serious threat since they feed on body tissues such as blood, skin and hair. More significant, however, is that any blood-sucking arthropod may transmit diseases from infected animals to healthy ones. In addition, arthropod pests also may reduce weight gains, produce general weakness, severe dermatitis, and create sites for secondary invasion of disease causing organisms. In general, infected livestock cannot be healthy or efficiently managed to realize optimum production levels (Kaufman *et al*., 2011). The potential economic loss the country is experiencing necessitates the nation-wide detailed investigation on the distribution of important skin disease. Since Ethiopia is known to use and export ruminant skin among the livestock it has, it is necessary to study the disease which affects the skin of those animals. Even though the prevalence of different skin diseases was investigated in different parts of Ethiopia; yet there is no research conducted that shows prevalence of major skin diseases in cattle and their associated risk factors at Dessie and its vicinity. Therefore the objectives of this research work were:

- To determine the prevalence of major cattle skin disease in Dessie and it's surrounding.
- To identify the different risk factors for skin diseases occurrence in the study area.

2. Literature Review

Impact of Skin Diseases

Lumpy skin disease causes considerable economic losses due to emaciation hide damage, temporary or permanent damage to the skin and hide greatly affect leather industry. It causes ban on international trade of livestock and causes prolonged economic loss as it became endemic and brought serious stock loss. Restrictions to the global trade of live animals and animal products, costly control and eradication measures such as vaccination campaigns as well as the indirect costs because of the compulsory limitations in animal movements cause significant financial losses on a national level (Waret Szkuta *et al*., 2011).

In Africa dermatophilosis in cattle causes great losses and many deaths, and the disease ranks as one of the major bacteriological diseases with importance to suffer a high incidence. Direct animal loss, decreased work ability of affected oxen, reproductive failure from vulvas infection or infection on the limbs of males preventing mounting, death from starvation of calves of dams with udder infection, loss of animal meat and milk production, and down grading of the hides and skins (Radostits *et al*., 2007).

Various ectoparasite infestations cause skin inflammation and purities, often accompanied by hair and wool loss (alopecia) and occasionally by skin thickening. The presence of ectoparasite on or in burrowing into the skin can stimulate keratinocytes to release cytokines (IL-1) which leads to epidermal hyperplasia and cutaneous inflammation (Wall and Shearer, 2001).

Common skin diseases

Lumpy skin disease

Lumpy skin disease virus (LSDV) is the causative agent of Lumpy skin disease, belonging to the family of poxviridae. It belongs to the genus capripoxvirus that includes sheep pox virus and goat pox virus. There is only one serotype of LSDV Neethling strain (James, 2004; Vorster and Mapham, 2008).

*Epidemiology***:** There is gigantic variation in the morbidity and mortality rates of Lumpy skin disease outbreaks. It depends on the following factors: geographic location and climate; the management conditions; the nutritional status and general condition of the animal; breed of cattle affected; immune status; population levels and dissemination of putative insect vectors in the various habitats; virus virulence. The morbidity rate for LSD ranges from 5 to 45%. However, the morbidity rate of 1 to 5 percent is considered more usual. Higher rates have been encountered in epizootics in Southern, West and East Africa and the Sudan although so far much lower rates may occur during the same epizootic. In addition, high morbidity and mortality rates 30-45 % and 12%, respectively were also reported in Oman in 2009 in a farm population of Holstein cattle (Sherrylin *et al*., 2013).

Host risk factor: All ages and types of cattle are susceptible to the causative virus, except animals recently recovered from an attack, in which case there is a solid immunity. In outbreaks, very young calves, lactating and malnourished cattle develop more severe clinical disease. British breeds, particularly Channel Island breeds, are much more susceptible than zebu types, both in numbers affected and the severity of the disease because of their thin skin. Wildlife species are not affected in natural outbreaks, although there is concern that they might be reservoir hosts. Serological evidence of naturally acquired infection has been observed only in African buffalo (Syncerus caffer). There is only one report of the natural occurrence of LSD in a species other than cattle, in water buffalo (Bubalis), but no further such cases are recorded (Radostits *et al*., 2006; Vorster and Mapham, 2008).

Transmission: The mechanical spread of the LSD virus has mainly associated with flying insects and all the possible clue confirms the field observations that epidemics of LSD occur at periods of greatest biting insect activity. Most cases are believed to be resulted from the transmission by an arthropod vector. There are variations in the attack rates from 10-15% to nearly 100% in different epidemics due to the differences in the active vector species that found in different situations. Stomoxys, the tabanids and tsetse flies, are likely to be doubtful in dry conditions and related to lower levels of transmission. However, huge mosquito breeding sites are common in very high morbidity rates that occur after rain (Lubinga, 2014).

There has been found three blood sucking hard tick species, which involved in the transmission of LSDV in sub-Saharan Africa. The three tick species identified as vectors of the disease are the *Rhipicephalus appendiculatus* (brown ear tick), *Boophilus decoloratus* (blue tick), and *Amblyomma hebraeum* (bont tick). Lubinga's (2014) study has confirmed that ticks are acted as vectors for the virus. Lubinga stated: "The ticks also act as 'reservoirs' for the virus, as it can persist in these external parasites during periods between epidemics "The virus has been found in their saliva and organs and could potentially overwinter in these ticks. Same evidence has been published and reporting a possible role for hard ticks in the transmission of LSDV (Tuppurainen *et al*., 2011).

Pathogenesis and clinical sign: During the acute stage of skin lesions, histopathological changes include vasculitis and lymphangitis with concomitant thrombosis and infarction, which result in to oedema and necrosis. LSD skin nodules may exude serum initially but develop a characteristic inverted greyish pink conical zone of necrosis. Adjacent tissue exhibits congestion, haemorrhages and oedema. The necrotic cores become separated from the adjacent skin and are referred to as 'sitfasts'. Enlarged lymph nodes are found and secondary bacterial infections are common within the necrotic cores. Multiple virus- encoded factors are produced during infection, which induce pathogenesis and disease (Tuppurainen and Oura, 2012).

The body, fever, enlarged lymph nodes, loss of appetite, reduction in milk production, some depression and reluctance to move nasal discharge and lachrymation. Young calves often have more severe disease than adults (CFSPH, 2011). The severity of clinical signs of LSD depends on the host immunity status, age, sex and breed type. The more susceptible breeds to LSD infection are related to the skinhead breeds such as Holstein Friesian and Jersey breeds (Kumar, 2011).

Lumpy skin disease may be occur acute, sub-acute and chronic form (OIE, 2010). It has an incubation period of 2 to 4 weeks in the field (Tuppurainen and Oura, 2012). The nodules developed on skin are vary from 2cm to 7cm in diameter, appearing as round, well circumscribed areas of erect hair and slightly raised from the surrounding skin and particularly conspicuous in short-haired animals. In long-haired cattle the nodules are often only recognized when the skin is palpated or moistened. In most cases the nodules are particularly noticeable in the hairless areas of perineum, udder, inner ear, muzzle, eyelids and on the vulva. Alongside other common sites are head and neck, genitalia, limb and udder; involve skin, cutaneous tissues, legs and some-time underlying part of the muscle (Alemayehu *et al.*, 2013). Histopathology can be an important tool to exclude viral, bacterial or fungal causes of nodular development in clinical cases and characteristic cytopathic effects (necrotized epidermis, ballooning degeneration of squamous epithelial cells and eosinophilic intracytoplasmic inclusion bodies) in cases of lumpy skin disease are well documented (Brenner *et al.*, 2006). Lesion of lumpy skin diseases showed presence of eosinophilic intracytoplasmic inclusions bodies was easily recorded due to lumpy skin disease virus (Tuppurainen and Oura, 2011).

Field diagnosis of LSD is often based on characteristic clinical signs of the disease. However, mild and subclinical forms require rapid and reliable laboratory testing to confirm diagnosis (Alaa *et al*., 2008). Most commonly used methods of diagnosing LSD are detecting virus DNA using the polymerase chain reaction (PCR), Different molecular tests are also the preferred diagnostic tools or by detecting antibodies to LSD virus using serology-based diagnostic tests (OIE, 2010).

Although severe LSD is highly characteristic, but milder forms can be confused and misdiagnosed with numerous skin diseases of cattle that could be considered as differential diagnosis are: (Pseudo-lumpy skin disease) The presence of Bovine Herpes

Mammilitis case has not yet been confirmed by laboratory in Ethiopia (OIE, 2009).

Dermatophilosis

Dermatophilus congolensis is a gram positive, non-acid fast, aerobic actinomycete. It has two characteristic morphologic forms: filamentous hyphae and motile zoospores. The hyphae are characterized by branching filaments (1-5µm in diameter) that ultimately fragment by both transverse and longitudinal septation in to pockets of coccoid cells. The coccoid cells mature in to flagellated ovoid zoospores (0.6-1µm in diameter) (Andrew *et al*., 2003). The disease was found to be more prevalent in the wet season (21.2%) compared to its prevalence in the dry season (14.5%) and the calves were found to be more susceptible (23.1%) compared to the adults (19%). Dermatophilosis occurs in cattle, sheep, goat, horse, dog, cat, donkey, human, and occasionally in deer, pig, camel, and wild life species (Quinn *et al*., 2002).

The principal source of infection for dermatophilosis is the infected animals, including the healthy carrier and the apparently recovered animals. In endemic areas, up to 50% of apparently healthy cattle may be carrier of the bacterium, while persist in the Ostie of hair follicles (Jubb *et al*., 1992).

Dermatophilus congolensis is not highly invasive and does not normally breach the barriers of healthy skin. These barriers include the sebaceous gland on the body of sheep and the physical barrier of the wool. On the feet and face these barriers are easily and commonly broken by abrasive terrain or thorny and spiny forage and food stuffs. *Dermatophilus congolensis* may infect these lesions and may be transmitted mechanically by feeding flies to result in minor infection on the face and feet. This carriage form of the disease is common in most herds and minor lesions are evident at the junction of the haired and non-haired areas of the nares and of the claws and dewclaws. They are no clinical significance to the animal except that they provide a source of more serious infection when other areas of the skin surface are predisposed to infection (Kahn, 2005).

Transmission occurs from the carriage lesions by contact from the face of one animal to the fleece or skin of another and from the feet to the skin during mounting. Dermatophilosis is transmitted by the cocoid forms, which results from the multidimensional division of the hyphae known as a zoospore. The zoospore is motile and released when the scabs are exposed to moisture. Transmission can be direct or indirectly through contaminated water or grass. Insect transmission which has been demonstrated with flies and ticks is believed to be a principal means of spreading zoospores (Quinn *et al.,* 2002).

Risk factors: There are environmental and managemental risk factors for dermatophilosis. In temperate zones, outbreak in herds and severe disease in individuals are uncommon but can occur associated with high rainfall with attack rate of 50%. The use of periodic showers or continual misting to cool cattle during hot periods is a risk factor for infection in dairy herds (Radostits *et al.*, 2007). In tropical zone, climate is the most important risk factor in tropical and subtropical regions. For example, rain fall can act indirectly to increase the range and activity of potential arthropod vectors. These arthropod vectors are important in the endemic tropical and sub-tropical areas than in temperate zones (Jubb *et al.*, 1992; Quinn *et al.,* 2002). The disease has highest incidence and severity during the humid and high rainfall season. The seasonal occurrence is associated with concomitant increase in tick and insect infestation (Quinn *et al.,* 2002). Tick infestation, particularly with *Ambylomma varigatum*, *Hyaloma asticum* and *Boophilus microplus*, is strongly associated with the occurrence of extensive lesions of dermatophilosis, which can be minimized by the use of acaricides. The lesions of dermatophilosis on the body does not occur at the predilection sites for ticks and it is thought that the importance of tick infestation relates to a tick produced immune suppression in the host rather than mechanical or biological transmission (Kahn, 2005).

Pathogenesis and clinical sign: The natural skin serves as effective barrier to infection. Minor trauma, or maceration by prolonged wetting, allows establishment of infection and multiplication of the organism in the epidermis. The formation of typical pyramidal shaped crust is caused by repeated cycles of invasion in to the epidermis by hyphae, bacterial multiplication in the epidermis, and rapid infiltration of neutrophils and regeneration of epidermis. The organism in the scab is the source for repeated and expanding invasions which occurs until immunity develops and the lesion heals. The scab then separates from the healed lesion but is still held loosely in place by hair fibers. In sheep, the extensive maceration of the skin that can occur with prolonged fleece wetting can result in extensive skin lesions under the fleece. In cattle, tick infestation suppresses immunity function and promotes the spread of the lesion. Secondary bacterial infection may occur and give rise to extensive suppuration and severe toxemia (Jubb *et al*., 1992).

Dermatophilosis is seen in animals at all ages and both sexes are also susceptible to infection (Haward, 1996). In cattle, the lesion commences as a circumscribed moist patch, often with raised or matted hairs, giving a characteristic "Paint brush" appearance. Discrete lesions occur in the initial stages which coalesce to form large areas of hyperkeratotic scab and crust. Distribution of the gross lesion usually correlates with the predisposing factors that reduce or permeate the natural barrier of the integument. Typical lesions consists of circular, dome shaped scab 2-9cm in diameter. Scab may be of variable thickness and on removal show a concave underside coated in thick, yellowish exudates, leaving a row, bleeding epidermis (Andrew *et al.*, 2003). Death usually occurs particularly in calves because of generalized disease with or without secondary bacterial infection and secondary fly or screw worm infestation (Kahn, 2005).

Microbiological methods: The organism can be demonstrated by Giemsa staining. Fresh scraping of the scab was made with scalpel blade, placed on a glass microscope slide with drops of sterile water. The slide was allowed to air dry and then stained with a Giemsa stain. It was examined with oil immersion under the microscope. The organism appears as gram-positive cocci. Superficially, within the crust there are many 1-2 um, paired coccoid bodies (zoospores) arranged in rows to form long, branching, filamentous structures (Hargis and Ginn, 2007). 2.2.3. Ectoparasites.

1. Mange mites

Mange mites belong to Phylum *Arthropoda*, Class *Arachnida*, and Order *Acarina*. The parasitic mites are small, most being less than 0.5mm long, though a few blood-sucking species may attain several mm when fully engorged. With few exceptions, they are in prolonged contact with the skin of the host, causing the condition, generally known as Mange. Mites are obligate parasites that most species spend their life cycles, from egg to adult, on the host so that transmission is mainly by contact. Mites are classified according to their location on the host as burrowing and non-burrowing mite (Urquhart *et al.,* 1996*)*. Cattle mange is caused by mange mites of four major types. In general, mange causes loss of hair and tremendous itching due to movement of these tiny parasites within the skin layers (Sloss, 1994).

Sarcoptes mites (burrowing mites) are economically the most important cause of mange in ruminants. Sorcoptic mange is a highly pruritic condition caused by irritation from tunneling of female mites in to the epidermis whereby they deposit their eggs (Sloss, 1994). The causative agent Sarcoptes scabies is usually considered to have number of varieties, each generally specific to particular host species. Morphological, immunological and molecular research confirms the close relationship among varieties, but don’t explain biological difference particularly with respect to host specificity (CSA, 2004; Radostits *et al.,* 2007). It is round in outline and up to 0.4 mm in diameter, with short legs scarcely project beyond the body margin. Its most important recognition characters are the numerous transverse ridge and triangular scales on dorsum, a feature possessed by no other manage mites of domestic mammals (Urquhart *et al.,* 1996).

Psoroptic mange, known as sheep scab, is highly contagious disease of sheep which caused by the mite, *Psoroptes ovis*. *Psoroptes spp* are non-burrowing mites puncture the epidermis, suck lymph and stimulate a local inflammatory reaction (Lughano and Dominic, 1996; ESGPIP, 2009). The mite migrates to all part of the skin and prefers areas covered by wool or hair and the whole life cycle is completed in 3 weeks (Soulsby, 1982). Infestation by these mites is always superficial on the epidermis, but the piercing of the skin by the mites lead to exudation and exfoliation, causing scabs to form (Sewell and Brockesby, 1990). Psoroptes spp infestation in sheep causes a highly contagious infection (also known as sheep scab) which is characterized by intense pruritus, restlessness, scratching and rubbing on the object and raised tufts of wool. Sheep scab can affect sheep of all age group but may be particularly severe in young lambs. Mites are usually more active in winter and the oviposition rate is higher at lower temperatures. In summer the disease progress more slowly, lesions are not obvious and can be missed. The disease can become latent in summer, apparently disappearing, with mites taking refuge in protected sites (Wall and Shearer, 1997).

Chorioptic mange (tail, leg, scrotum mange) those on cattle, horse, goats and sheep are now considered to be one species; *Chorioptic bovis* (Radostits *et al.*, 1994). This condition is often referred to as leg mange or foot mange because of the distribution of the lesions, which are usually limited to the lower limbs extending up the limbs to affect the scrotum in males or udder in females (ESGPIP, 2010). Chorioptic mange is generally characterized by the production of crusts and flaking especially on the backs of the feet, dermatitis, hair loss, and scabbiness in small areas around the feet, legs, and tail head. The skin underneath the affected areas becomes swollen and inflamed. Infestations by this mite are usually localized, although in some cases the lesions can spread to cause a more generalized dermatitis resembling Sarcoptic mange (CAPC, 2013).

The life cycle of *Chorioptic bovis* is similar to *Psoroptes ovis*: egg, hexapod larva, followed by octopod protonymph, tritonymph and adult. *Chorioptes bovis* has mouthparts which do not pierce the skin of the host, but which are adapted for chewing skin debris. The complete life cycle takes about 3 weeks, during which time adult females may produce up to 17 eggs. Mites may survive for up to 3 weeks off the host, allowing transmission from housing and bedding as well as by direct contact (Peter, 1995; Wall and Shearer, 2001).

Demodectic mange tends to be the most innocuous of the mange affecting cattle, and it consists of nodules or pustules on the neck, shoulders, and trunk of affected cattle. It does not tend to cause itching and is of concern mainly because of possible damage to the hide of affected animals. Demodectic mange tends to be species specific, and cattle do not spread this problem to other livestock spp. (https://naldc.nal.usda.govdownload IND85005497PDF). Demodex species are tiny, worm like cigarette shaped mites with short, stubby legs which live in the hair follicle and sebaceous gland of host (Bowman, 2003). They have elongated tapering body up to 0.1-0.4 mm in the length with short pairs of stumpy legs ending in small blunt claws in the legs. The legs are located in front of the body (Taylor *et al*., 2007).

Diagnostic Technique: Direct smear method: collected skin scraping in 10% KOH is placed on a dry and clean slide with one drop of 10% KOH. The scraping is macerated with scalpel or spatula covered with cover slip, examine under microscope (Charles and Hindndrix, 1998). Sedimentation method: skin scraping is kept in 10% KOH or NaOH to digest the debris; the digestion process may be expedited by providing gentle heat to the sample. The scraping should be transferred to the centrifuge tube and centrifuge at 3000 rpm for 5 minutes. The supernatant is discarded and one drop of sediment is placed on dry and clean slide then covered with cover slip then examined under microscope (Chauhan and Chanel, 2003).

2.2.3.2. *Tick infestation*

Ticks are obligate, blood feeding ectoparasites of vertebrates, particularly mammals and birds and the most important group of ectoparasites, primarily because they feed on blood and tissue fluids in order to develop and because of the wide range of pathogenic agents that they transmit. In addition, they cause local irritation at the site of feeding, blood loss from severe infestations, wounds as sites for secondary infection, and tick paralysis (Wall and Shearer, 2001; William *et al*., 2001). Ticks are divided into two families: Argasidae (soft bodied ticks), a relatively small group comprising 170 species, and Ixodidae (hard ticks); a larger group comprising over 650 species. Hard ticks are more common ectoparasites of mammals, in part because of their widespread distribution and prolonged association with the host while blood-feeding. Ticks are primarily parasites of wild animals and only about 10% of species feed on domestic animals, primarily sheep and cattle (Wall and Shearer, 2001). Ixodid ticks are one of the most economically important ectoparasite of livestock in tropical and sub-tropical part of the world. Because of the direct and indirect effect on their host, ticks are considered to be not only a significant threat to successful livestock production, but also serious interfere with economy of the country (Zenebe, 2005).

Ticks undergo four life stages: egg, larva (3 pairs of legs), nymph (4 pairs of legs and no genital pore), and adult (4 pairs of legs and a genital pore). The life cycle of ticks vary widely. Some species pass their entire life on the host, others pass different stages of the life cycle on successive hosts, and others are parasitic only at the certain stages (William *et al*., 2001).

Hard ticks require three blood meals for development and to complete the life cycle. Each stage blood feeds once, detaches from the host, and molts to the subsequent life stage on the ground. Often the larva, nymph, and adult feed on different hosts (i.e. three host ticks). Some species of hard ticks are one-host ticks (all stages feed on the same individual host). Most of the life cycle of one-host ticks occurs on the host with only gravid females, egg masses, and host-seeking larvae present on the ground. Females and immature hard ticks become greatly distended when blood-fed; females, for instance, often ingest more than 100 times their body weight.

Blood meals are used for molting to the next stage or production of eggs. Eggs are laid in a mass of 100-10,000 in 3-30 days (depending on species and temperature); they are deposited on the soil, in a crevice, or beneath leaves. Males generally obtain small blood meals and expand little in size. Hard ticks feed relatively slowly and remain on the host 3-14 days before detaching. After feeding as immature, molting occurs after an interval that varies between species and with temperature (Wall and Shearer, 2001; William *et al*., 2001).

Some ticks live in open environments and crawl onto vegetation to wait for their hosts to pass by. This is a type of ambush and the behavior of waiting on vegetation is called questing. Thus in genera such as *Rhipicephalus*, *Haemaphysalis* and Ixodes the larvae, nymphs and adults will quest on vegetation. The tick grabs onto the host using their front legs and crawl over the skin to find a suitable place to attach and feed. Adult tick of genera *Ambylomma* and *Hyalomma* are active hunters, they run across the ground after nearby hosts (Walker *et al*., 2003).

Site of tick attachment site specificity is one of the populations limiting system that operate through the restriction of tick species to certain parts of the host body. The ticks grab on to the hosts using their front legs and then crawl over the skin to find a suitable place to attach and feed. They seek out places on the hosts where they are protected and have favorable conditions for their development (Jittapalapong *et al*., 2004**)** indicated that different ticks have different predilection sites on the host's body. The favorable predilection sites for *B. decoloratus* was the lateral and ventral side of the animal; *A. variegatum*, teat and scrotum; *A. coherence* udder and *H. truncatum*, scrotum and brisket and *H. marginatum* rufipes udder and scrotum, *R. evertsi* under tail and anus and *R. preaxtatus* anus and under tail (Huruma *et al*., 2015).

Depending on the tick, site preference on the host depends on the accessibility for attachment, to get blood and protection to overcome the environment damage that inhibits its existence and grooming activity of the host. Tick location on the host is lined to the possibility of penetration by hypostome. Genera with short hypostome for example *Rhipicephalus*, *Dermacentor* and *Haemaphysalis* species usually attach to hairless area such as under tail and vulval area (Huruma *et al*., 2015).

Life cycle in the hard ticks mating takes place on the host, except with Ixodes where it may also occur when the ticks are still on the vegetation. Male ticks remain on the host and will attempt to mate with many females whilst they are feeding. They transfer a sack of sperm (spermatheca) to the female. The females mate only once, before they are ready to engorge fully with blood. When they finally engorge they detach from the host and have enough sperm stored to fertilize all their eggs. Female hard ticks lay many eggs (2,000 to 20,000) in a single batch. Female argasid ticks lay repeated small batches of eggs. Eggs of all ticks are laid in the physical environment, never on the host (Charles and Robinson, 2006).

Members of the family Ixodidae undergo one-host, two- host or three-host life cycles. During the one-host life cycle, ticks remain on the same host for the larval, nymphal and adult stages, only leaving the host prior to laying eggs. During the two-host life cycle, the tick molts from larva to nymph on the first host, but will leave the host between the nymphal and adult stages. The second host may be the same individual as the first host, the same species, or even a second species. Most ticks of public health importance undergo the three-host life cycle. The three hosts are not always the same species, but may be the same species, or even the same individual, depending on host availability for the tick. Argasid ticks have two or more nymphal stages, each requiring a blood meal from a host. Unlike the Ixodidae ticks, which stay attached to their hosts for up to several days while feeding, argasid ticks are adapted to feeding rapidly (about an hour) and then promptly leaving the host (Walker *et al*., 2003).

All feedings of ticks at each stage of the life cycle are parasitic. For feeding, they use a combination of cutting mouthparts for penetrating the skin and often an adhesive (cement) secreted from the saliva for attachment. The ticks feed on the blood and lymph released into this lesion. All ticks orient to potential hosts in response to products of respiration (Horak *et al*., 2002*;* Dantas Torres, 2008). The feeding of Ixodidae ticks is slow because the body wall needs to grow before it can expand to take a very large blood meal. Males of Ixodidae ticks feed but do not expand like the females. They feed enough for their reproductive organs to mature **(**Minjauw and Castro, 2000). 2.2.3. 2. *Lice infestation*

It infest a wide range of domestic livestock, including pigs, cattle, goats, and sheep, and cause a chronic dermatitis (pediculosis) (Wall and Shearer, 2001; Kufman *et al*., 2012). Both biting and sucking types of lice infest cattle. Lice usually are unable to survive for more than 1-2 days off their host and tend to remain with a single host animal throughout their lives. Most species of louse are highly host specific and many species specialize in infesting only one part of their host body (Wall and Shearer, 2001 and Kufman *et al.*, 2012) and transfer to new hosts is by body contact, particularly under condition of close confinement (Sewell and Brockesby, 1990; Peter, 1995).

To allow lice survive as permanent ectoparasites, they show a number of adaptations which enable them to maintain a life of intimate contact with their hosts. Lice are very small insects, but are visible to the naked eye (Kufman *et al*., 2012), about 0.5-8 mm in length, dorsoventrally flattened, wingless and possess stout legs and claws for clinging tightly to fur, hair and feathers. They feed on epidermal tissue debris, parts of feathers, sebaceous secretions and blood (Wall and Shearer, 1997; Radostits *et al.*, 1994). Both immature and adult stages suck the blood or feed on the skin. Louse-infested animals may be recognized by their dull, matted coat or excessive scratching and grooming behavior (Wall and Shearer, 2001; Kufman *et al*., 2012).

The major signs are itching and loss of hair in affected calves and cattle. Hair loss is self-induced due to rubbing and licking by affected animals who are greatly irritated by the lice. In severe cases, blood-loss anemia may develop due to thousands of lice draining blood from a single animal. This most often occurs in younger animals that are exposed to large numbers of lice. Many effective insecticides are available to control lice (https naldc.nal.usda.gov downloads IND 85005497 PDF).

The economic impact of ectoparasites infestations is enormous worldwide. In 1984, the United Nations Food and Agricultural Organization (FAO) estimated the global cost of Ixodidae tick infestations to be $US 7.0 billion annually. Ticks are directly or indirectly involved in causing substantial financial losses to livestock industry of Ethiopia accounts for 75% of the animal exports (Pegram *et al*., 1981). A conservative estimate of 1 million birr loss annually was made through rejection and down-grading of hides and skins in Ethiopia (Zeleke and Bekele, 2004). Apart from the direct effects of tick infestations on animal production and productivity, ticks are inevitably efficient vectors of many pathogens protozoa, viruses, bacteria and ricketssia to man and domestic animals (Radostits *et al*., 2000).

Hides, skins and leather and leather products were supplied to domestic and export markets and contributed significantly to the Ethiopian economy by providing 14-18% of the foreign exchange earnings, but have lost revenue due to decline in quality and fall in export price (CSA, 2007). Hide and skin production obtained from sheep 33%, goats 50%, cattle 13% and camel 4% (ACTESA, 2011). Quality of hides and skins is a major problem faced by tanners in Ethiopia (UNECA, 2012).

Management Strategies of ectoparasites: Integrated Parasite Management (IPM) is the integration of chemical, biological and cultural control methods to reduce parasite populations below an economic threshold. IPM basically involves the selection and use of several methods to reduce, rather than eliminate, ectoparasite population with expected ecological, economic, and sociological costs and benefits. In addition, IPM programs seek to maximize the effectiveness of parasite control actions whilst conserving beneficial insects and minimizing pesticide residue (James, 1998).

Integrated parasite management in practice is a combination of the strategic use of chemicals, grazing management, nutrition, breeding programs and management practices. The application of IPM will however be dependent on the livestock production system in use, the biology of the parasites associated with the system and being targeted by IPM, the relationship between the parasite populations and the damage to the production system and the extent to which these influence the ability of the farmer to implement control options (Kirby, 2004).

Dermatophytosis

About 40 types of fungi can cause ringworm. The important fungus of veterinary importance includes Trichophyton; Microsporum and Epidermophyton species (Chakrabarti, 2012). The predisposing factors include contact with other infected animals and spores of the fungus. Also, poor immune response of the animal facilitates the spread of infection. The diagnosis of the disease depends on the area of skin infected and the extent of infection. Confirmatory diagnosis can be done by culturing the fungus on suitable media and by microscopic examination. The dermatophyte infection is in worldwide occurrence and infects human beings too (Ganguly, 2017).

Pathogenesis and clinical sign: The lesions resemble red patchy raised appearance on the skin for which the disease is called ringworm. The skin portion on all the regions of the body may be infected. Even keratin tissues of hair and nails may be infested with the fungi. The disease is of tremendous zoonotic importance (Chakrabarti, 2012; Ganguly, 2017).

The signs of ringworm are hair loss and development of heavy gray-white crusts at the site of infection. The lesions do not cause itching. If the crusts are scraped or cleared away, a raw area of skin devoid of hair is found. The lesions are roughly circular and usually 1 to 10 centimeters in diameter (https naldc.nal.usda.gov download IND 85005497 PDF).

Topical antifungal drugs include clotrimazole, ketoconazole, miconazole, terbinafine and tolnaftate which should be applied on the skin of infected animal twice daily (McClellan *et al.,* 1999; Gupta and Cooper, 2008).

2. Materials and Methods

Study Area

A cross sectional study was conducted from November, 2017 to April, 2018 in Dessie, Kombolcha, Hayk and Kutaber which are found in South Wollo administrative zone of Amhara National Regional State in North Eastern Ethiopia. Dessie is located at 11 08' North latitude and 39 38' East longitude, with an elevation between 2470 and 2550 meters above sea level and has an average annual temperature 9°C. Dessie is 401km far from the capital city of Ethiopia, Addis Ababa.

Kombolcha town is located some 375 Km away from Addis Ababa in South Wollo, Northern Ethiopia at an altitude of 1500-1847 m.a.s.l. Kombolcha and its surrounding are categorized as “Weyna Dega”. Komblocha has an average monthly minimum and maximum temperature of 11.7^{o}C and 23.9^{o}C, respectively. The mean annual rainfall of Kombolcha is in the range of 581-1216mm. The vegetation of the areas changes with altitude ranging from scattered trees and bushes to dense shrubs and bushes (KWADO, 2006).

Hayk is situated at 30km from the Dessie town. Hayk is located in the north central highlands of Ethiopia. Geographically it lies between 110 3' N to 110 18' N latitude and 39 0 41' E to 39068' E longitude with an average elevation of 1911 meter above sea level (Molla *et al*., 2007).

Study Population

The study animals were cattle in Dessie, Hayk, Kombolcha and Kutaber. All sexes, breeds and age groups were included weather they are from intensive or extensive farming systems. The age of the animals was determined primarily based on the information obtained from the owners and also by looking the dentition pattern of animals (DeLahunta and Habel, 1986). Following age determination animals were categorized into three age groups, namely young (<5 years), adult (5-10years) and old (>10years).

Study Design and Sample Size Determination

A cross sectional study was conducted to determine the prevalence of major skin diseases of cattle in the study area. Simple random sampling method was applied for sampling representative animals. The total sample size for this study was determined by the formula given in Thrusfield (2007) at 95% CI and 5% precision as follows: Where; n is required sample size, P-exp is expected prevalence and d is absolute precision. Since there is no previous work done in the study area on the present work title, 50% expected prevalence was used. So, by using the given formula the sample size calculated was 384. But for the sake of increasing the precision 20% of the calculated sample size was added and the total sample size was 460.

$$n = \frac{1.96^2 P_{\text{exp}}(1 - P_{\text{exp}})}{d^2}$$

Methodology

Clinical examination and animal data collection

In the study, data of animals which include sex, age, and breed of the animals, origin, body condition and managemental conditions were collected and recorded before examination and taking samples. After taking animal data the sampled animals were examined for the presence of any skin disease. Clinical skin disease investigation was conducted by examination of skin of each animal through visual inspection and palpation. Any clinical sign observed on the animal were recorded on the data collecting format prepared for this purpose.

When the animals are tentatively diagnosed for the presence of skin disease appropriate samples were taken from different body parts of the animal. Samples were taken to Wollo University School of veterinary medicine laboratory for examination and confirmation. Depending on the clinical presentation of skin diseases, samples such as, skin-scrapings, hair specimens, crusts, pustules, abscesses and externally visible parasites like ticks and lice were collected and subjected to proper laboratory investigation. Viral infections like Lumpy Skin Disease (LSD) were diagnosed based on their occurrence in the herd and observable clinical pictures such as nodules on the shoulder, neck, flank, back side and wide spread skin lesions on the body nodules etc (Jones *et al*., 1997).

Laboratory assessment

Skin scraping samples brought to wollo university school of Veterinary microbiology and parasitology laboratory which are suspected for *Dermathophilus congolonsis* Giemsa's staining was done as described by Hargis and Ginn, (2007). Microscopic examination of the smears and typical form of the organism were identified using the procedure described by Pier *et al*. (1967) and OIE (2004).

For mange mites potassium hydroxide was used for digesting the debris exposing the parasites. For thick and lice stereo/compound microscope were used to identify the parasites. The identification of ticks and lice was carried out with the help of identification key stated by Soulsby (1982), Urquhart *et al*. (1996) and Wall and Shearer (2001). Specimen of hair plus skin scraping were plucked from lesions suspected of dermatophytosis using forceps, put in dry Petri dish and transported to the laboratory to demonstrate characteristic disease causing agent from lesion and skin scraping (Cottral 1978).

Data Management and Analysis

The data was first entered and managed in to Microsoft Excel worksheet and analyzed using Statistical Package for Social Sciences (SPSS) software version 20. The prevalence of skin diseases was expressed as percentage with 95% confidence interval by dividing the total number of cattle affected by skin disease to the total number of animal examined in the study period. The statistical significant difference in prevalence of skin disease across potential risk factors was determined using descriptive statistics when P-value was less than 0.05.

3. Results

Overall Prevalence of Skin Diseases

A total of 460 cattle were examined to determine the prevalence of skin diseases in and around Dessie, namely Dessie, Hayk, Kombolcha and Kutaber. Of these, 71 cattle were having skin diseases. The overall prevalence of skin diseases in cattle were 71 (15.4%). There was statistically significant difference in the overall prevalence skin diseases among the different origin of the study animals (P< 0.05). But difference in the prevalence of skin diseases was not statistically significant (P>0.05) between sex, age, body condition score and management system though higher prevalence was recorded in male 187 (18.7%) than 273 (13.2%) female, young 19.4% (24/124) than old 14.4% (18/125) and adult 13.7% (29/211) (Table 1). With respect to breeds of cattle, higher prevalence was observed in local breed 16.8% (34/202) than cross breed 14.3% (37/258).

The overall prevalence of skin diseases was higher in cattle from Kombolcha 23.4 % (18/77), and Kutaber 22.4% (11/49) than Hayk 20.2% (29/143) and Dessie 6.8% (13/191) which is the lowest. With regard to body condition, cattle with poor body condition were more affected by skin diseases than medium and good body condition cattle 17.7 % (44/249), 13.9% (27/194) and 0.0% (0/17), respectively. Animals managed under extensive management system 16.4% (66/402) were more affected by skin diseases than those managed under semi-intensive management system 8.6% (5/58).

Table 1: Overall prevalence of skin diseases in cattle with respect to sex, age, breed, Origin, body condition score and management system

Factor	Category	Animal examined	No. of positive animals	Prevalence	X^2	p value
Sex	Female	273	36	13.2%	2.600	0.107
	Male	187	35	18.7%		
Age	Young	124	24	19.4%	2.025	0.363
	Adult	211	29	13.7%		
	Old	125	18	14.4%		
Breed	Cross breed	258	37	14.3%	0.538	0.463
	Local breed	202	34	16.8%		
Origin	Dessie	191	13	6.8%	19.034	0.000
	Hayk	143	29	20.3%		
	Kombolcha	77	18	23.4%		
	Kutaber	49	11	22.4%		
Body condition score	Good	17	0	0.0%	4.399	0.111
	Medium	194	27	13.9%		
	Poor	249	44	17.7%		
Management	Semi intensive	58	5	8.6%	2.361	0.124
	Extensive	402	66	16.4%		
Total		**460**	**71**	**15.4%**		

Prevalence of Specific Skin Diseases

The specific akin diseases identified in this study are tick infections, lumpy skin disease, lice, demodicosis, dermatophytosis and dermatophilosis. The most prevalent skin disease was tick infestation, 8.08% (37/460). The rest skin diseases identified in this study have a prevalence of lice 2.39% (12/460), demodicosis 1.5% (7/460), lumpy skin diseases 2.39% (11/460) dermatophytosis 0.65% (3/460) and dermatophilosis 0.44% (2/460).

With regard to age of the study animals, there was statistically significant difference (P<0.05) in the prevalence of specific skin diseases. At indicated in table 2 the prevalence is as follows. In young cattle tick infections 12.1% (15/124), Lice 4.8% (6/124), demodicosis 1.6% (2/124), dermatophytosis 0.8% (1/124) dermatophilosis 0.0% (0/124) and lumpy skin diseases 0.0% (0/124), and in adult cattle tick infections 7.1% (15/211), lice 1.9% (4/211), demodicosis 1.9% (4/211), lumpy skin diseases 1.9% (4/211), dermatophytosis 0.9% (2/211) and dermatophilosis 0.0% (0/211); and in old cattle tick infestation 5.6% (7/125), lumpy skin diseases 5.6% (7/125), dermatophilosis 1.6% (2/125), lice 0.8% (1/125), demodicosis 0.8% (1/125) and dermatophytosis 0.0% (0/125).

Statistically significant difference (p<0.05) was also observed among the origin of cattle in the prevalence the skin diseases. Consequently, in Dessie 3.1% (6/191) tick infestation, 2.1% (4/191) lice, 1.0% (2/191) demodicosis, 0.5% (1/191) dermatophytosis, 0.5% (1/191) lumpy skin diseases and 0.0% (0/191) dermatophilosis, in Hayk 11.9% (17/143) tick infestation, 2.8% (4/143) lice, 2.8% (4/143) lumpy skin diseases, 1.4% (2/143) demodicosis, 0.7% (1/143) dermatophilosis, and 0.0% (0/143) dermatophytosis, in kombolcha 9.1% (7/77) tick infestation, 7.8% (6/77) lumpy skin diseases, 3.9% (3/77) Lice, 2.6% (2/77) demodicosis, 0.0% (0/77) dermatophilosis, and 0.0% (0/77) dermatophytosis, in kutaber 14.3% (7/49) tick infestation, 2.0% (1/49) dermatophilosis, 2.0% (1/49) lice, 2.0% (1/49) demodicosis, 2.0% (1/49) dermatophytosis and 0.0% (0/49) lumpy skin diseases (Table 2).

Table 2: Association of age and origin with respect to types of major skin diseases

Factor	Category	Disease	No. of positive animals	Prevalence	P- Value
Age	Young	Tick infestation	15	12.1%	0.018
		Dermatophilosis	0	0.0%	
		Lice	6	4.8%	
		Demodicosis	2	1.6%	
		Dermatophytosis	1	0.8%	
		Lumpy skin disease	0	0.0%	
	Adult	Tick infestation	15	7.1%	
		Dermatophilosis	0	0.0%	
		Lice	4	1.9%	
		Demodicosis	4	1.9%	
		Dermatophytosis	2	0.9	
		Lumpy skin disease	4	1.9%	
	Old	Tick infestation	7	5.6%	
		Dermatophilosis	2	1.6%	
		Lice	1	0.8%	
		Demodicosis	1	0.8%	
		Dermatophytosis	0	0.0%	
		Lumpy skin disease	7	5.6%	
Origin	Dessie	Tick infestation	6	3.1%	0.007
		Dermatophilosis	0	0.0%	
		Lice	4	2.1%	
		Demodicosis	2	1.0%	
		Dermatophytosis	1	0.5%	
		Lumpy skin disease	1	0.5%	
	Hayk	Tick infestation	17	11.9%	
		Dermatophilosis	1	0.7%	
		Lice	4	2.8%	
		Demodicosis	2	1.4%	
		Dermatophytosis	0	0.0%	
		Lumpy skin disease	4	2.8%	
	Kombolcha	Tick infestation	7	9.1%	
		Dermatophilosis	0	0.0%	
		Lice	3	3.9%	
		Demodicosis	2	2.6%	
		Dermatophytosis	0	0.0%	
		Lumpy skin disease	6	7.8%	
	Kutaber	Tick infestation	7	14.3%	
		Dermatophilosis	1	2.0%	
		Lice	1	2.0%	
		Demodicosis	1	2.0%	
		Dermatophytosis	1	2.0%	
		Lumpy skin disease	0	0.0%	

4. Discussion

This study indicates that skin diseases caused by parasites, bacteria, viruses and fungus were common in and around Dessie in cattle. The present study revealed that the overall prevalence of skin diseases in cattle was 15.4%. This result is in agreement with Yacob *et al.* (2008a), 15.41% at Adama Veterinary Clinic, Oromia regional state, Ethiopia. But the current study is higher than the previous studies conducted by Chalachew (2001), 1.63% in Wolayita Sodo, and Bogale (1991), 4.19% in Southern rangelands of Ethiopia. In other words this result was lower than the prevalence 40.2% (Yacob *et al.*, 2008b), 27.3% Onu and Shiferaw (2013) from Bench Maji zone, southwest Ethiopia. This indicates that bovine skin disease is one of the prevalent diseases of cattle in the study area. The difference in the prevalence of skin diseases might be due to agro-ecological and nutritional status difference between the present studies and the previous studies conducted in other areas.

Based on sex, the prevalence of skin diseases observed being higher in males than in females in cattle but the difference was not statically significant ($p > 0.05$). In the current study the prevalence in female, 13.2%, and in male, 18.7%, has contradicted with the previous report of Matthes and Bukva (1993) who reported 32% in females and 1.22% in male animals in Mongolia Germany, but the current report agree with Bogale, (1991) who indicated 4.57 and 3.17% in male and female animals respectively from southern rangelands of Ethiopia.

Based on age, young animals were more frequently affected than olds and then adults ($p < 0.05$) in cattle. Based on the present finding, the prevalence of skin diseases was 19.4% in young, 14.4% in old and 13.2% in adult cattle. This was higher than whose but agrees with the previous work done by Bogale (1991) who reported 7.95% in young 2.40% adult in southern rangelands of Ethiopia. But it was not in line with the work of Yacob *et al*. (2008a) who stated 1.06 and 2.04% prevalence in young and adult cattle, respectively in Adama. This indicates that skin diseases can occur in all age groups with variable prevalence. In these studies the higher prevalence reported in young animals might be probably because of their low acquired resistance compared with old and adult age groups.

Based on breed, in the current study highest prevalence of skin diseases prevalence was found in local breeds (16.8%) and lower prevalence was observed in cross breeds (14.3%). This finding was in agreement with the report 9.425% in local breeds and 4.367% in cross breeds of cattle (Yacob *et al*., 2008a), Teshome (2016) from Gondar town who reported higher prevalence of demodicosis and psoroptes mange in local breed (8.8%) and lower in cross breeds (2.2%), in and around Gondor, Tewodros *et al*. (2012).

Based on origin, the prevalence of skin diseases was found 23.4%, 22.4%, 20.3% and 6.8% in Kombolcha, Kutaber, Hayk and Dessie, respectively. There was a significant association between origins of animals with skin diseases ($P < 0.05$). Variations in geographical locations, climatic conditions and management practices in the different study areas might have contributed for the disparity in prevalence of skin diseases (Fentahun *et al*., 2012).

In the present study, there was not significant difference ($p>0.05$) between animals with body condition and skin diseases prevalence; but the prevalence of skin diseases was higher in the poor body condition animals which is in agreement with in the report of Demissie *et al*. (2000) who reported a prevalence of 15.3% in animals with poor body condition and 3% in good body condition animals in selected sites of Amhara region. In this study the highest prevalence of skin diseases was observed in poor body condition animals 17.7% and animals with good body condition have no skin disease. This difference might be due to nutritional status, where well-fed animals can better withstand ectoparasite infestation than animals on an inadequate diet, which can influence the level of immunity. Alternatively, skin diseases might be a cause for poor body condition; hence high prevalence was computed in this group of animals (Kumilachew *et al*., 2010).

Based on management system; this study revealed higher prevalence in cattle managed under extensive (16.4%) than semi intensive management systems (8.6%). This was found lower than the results reported by Yacob *et al*. (2008a) which accounts 23.7 and 76.2% for semi-intensive and extensive systems, respectively.

Based on skin diseases, the major ectoparasites identified on cattle were tick 8.04 % (37/460), lice 2.61 % (12/460), demodicosis 1.52 % (7/460). This was found lower than the result reported by Teshome (2016) tick 116 (37.66%), mange 32 (10.38%), lice 91 (29.55%) and sheep ked 72 (23.38%) University of Gondar Veterinary Clinic, North West Ethiopia. However, there was no statistically significant variation ($P > 0.05$) among the three host species of ectoparasite infestation except sheep ked which specifically affect sheep and it had statistically significant ($P< 0.001$) with the occurrence on sheep. In the current study also no statistically significant variation ($P > 0.05$) in the host. But the current prevalence was lower than the previous prevalence, because the previous prevalence was conducted on the three hosts (cattle, sheep and goat). In addition the study was carried on animals brought to Gondor veterinary clinic. But the current prevalence was determined on the field.

The main skin diseases caused by bacteria was dermatophilosis in cattle at 0.44 % (2/460). The disease prevalence is less than the prevalence of dermatophilosis reported by Teshome (2016), 1.36%, in cattle at University of Gondar Veterinary Clinic, North West Ethiopia. In another report from in and around Ambo town, a prevalence of 5.21% dermatophilosis has been reported by Dejene *et al*. (2012). In the current study the dermatophilosis prevalence was lower than the prevalence reported by previous work because dermatophilosis occurs mainly in rainy seasons, but this study was carried out in the dry season. Furthermore agro ecology and management in the study area might contribute for the difference in the prevalence of dermatophilosis between the study areas.

Lumpy skin disease found in cattle, which accounts 2.39 % (11/460), the prevalence in and around Dessie zuria; this agrees with the previous report by Teshome (2016) 5.65% prevalence at

Gondar university veterinary clinic. However the current report is less than by 3.26%. In other ways my study is higher than the previous study, 0.68%, conducted by Yacob *et al*. (2008) at Adama veterinary clinic and lower than the study conducted Wolliso (South west Oromia) which shows a prevalence rate of 27.91% by Bishawired (1991). This is assumed to be as a result of study period, in which multiplication of flies which act as mechanical vector for the virus is common during spring in Ethiopian context and availability of flies for mechanical vector aggravates the infection rate of lumpy skin disease. There was no significant association ($P > 0.05$) between risk factors and prevalence of Lumpy skin disease.

5. Conclusion and Recommendations

Skin diseases are important animal health problems having significant economic impact. The most important skin diseases identified were tick, lice, lumpy skin diseases demodicosis, dermatophytosis and dermatophilosis. Tick was the most abundant ectoparasites in the study area followed by lice, lumpy skin disease, demodicosis, dermatophytosis and dermatophilosis. Age and origin of animals are risk factors for overall and specific skin disease in Dessie and its surrounding. The infestations of skin diseases are important affecting the health and productivity of cattle in and around Dessie. In view of the significance of skin and hide production as main source of foreign currency to the country and the over increasing demands of livestock market, the high prevalence of skin diseases prevailing in cattle in the area requires serious attention to minimize the effect of the problem. This study has elucidated the need to study the economic impact of skin disease in the study area. Based on the above conclusion the following Recommendations are forwarded:

- Strategic treatment of cattle with insecticides and acaricides should be practiced in the study area to minimize the impact of ectoparasites on the health of animals.
- Vaccination should be applied for viral skin disease before its occurrence of the outbreak Awareness creation for the local farmers about the control of skin diseases is should be practiced.
- Better animal management practices should be applied to minimize transmission of the disease and improve the productivity of the animals.
- Further study on the economic impact of the skin diseases is highly recommended.

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