INTRODUCTION

Ticks (Acari: Ixodid) are active vector, next to mosquitoes (Le Bars, 2009), in disease transmission found in tropical and subtropical (Jongejan and Uilenberg, 1994), region of the world. Tick causes detrimental effect to animals via blood loss/drain, stress, irritation and despair of immune function (Ghosh et al., 2007). In addition to these effects, ticks are also reason of financial losses in term of reducing hide and skin value up to 20-30% (Biswas, 2003), and economical losses associated with the diseases they transmit directly to the hosts (Garcia, 2003). Due to climatic changes and global warming, ticks have a vectorial potential. The rate of tick infestation are expected to be change which further limit sustainable livestock production globally in general and in tropical area particular (Kabir et al., 2011). A sufficient numbers of published data is available on tick prevalence from bordering region of the study area of Azad Kashmir (Irshad et al., 2010; Atif et al., 2012) but not a single study was intended formerly to this study on tick prevalence which may represent tick infestation in the area. There is a need of improvement and awareness regarding currently practiced tick control measures.
MATERIALS AND METHODS

STUDY AREA
The study was piloted from 1st June 2011 to 31st December, 2011 in the six villages naming Nundinaar, Kamorh, Kalah, Draykutti, Numbal and Naka of Tehsil Hajira of district Poonch/Rawalakot of Azad Kashmir lies between longitude 33º 51’ 28 North and latitude 73º 45’ 39 East. The study area is bounded by Bagh from North, Sudnuti by South, and East by occupied Kashmir (India) and west by Kahuta (Pakistan). Its population according to census 2006 was 0.490 million and its area is 855 km². Average maximum temperature of the year was 21.64˚C while minimum 7.20˚C. Maximum temperature was recorded in months of June and July while minimum temperature was recorded during December and January (Anonymous, 2011).

SAMPLING TECHNIQUE
For the collection of data a random sampling technique (Thrushfield, 2007) was applied to gathered the data on tick prevalence from six village of the Tehsil Hajira. All the information required like age, sex, breed, managmental conditions, routine medication, and customs were collected on the predesigned proforma.

SPECIMEN COLLECTION
Before collection of ticks animals were restrains properly and their whole body was thoroughly inspected visually for the presence of tick. Tick specimens were collected following the procedure of Ica et al. (2007). After detachment of ticks through forcep from the animal body, they were preserved in 70% ethanol. The bottles were properly labelled and shipped to the Microbiology and Parasitological laboratory, Department of Zoology, Azad Kashmir University, Muzaffarabad, for identification and record of ticks.

MOUNTING AND IDENTIFICATION OF TICKS
Following the methods of (Soulsby, 1982), the tick specimens were mounted and identified using standard morphological tick identification keys (Walker et al., 2003) under stereomicroscope.

STATISTICAL ANALYSIS
All the data collected was analysed statistically by using software package SAS (Version 2010).

RESULTS
During the present survey six villages were visited and a total of 1350 animals viz. 600 goats, 300 sheep, 220 cows and 230 buffaloes were randomly inspected for tick collection. Out of 1350 animals 692/1350 (51.25%) animals were found positive/infested with ticks. From the sampled animals 288/600(48.00%) goats, 164/300(54.66%) sheep, 122/220(55.45%) cattle and 118/230(51.03%) buffaloes were found positive for ticks respectively. of the tick belong to genus *Hylomma* was identified i.e. *Hylomma a. anatolicum* commonly. The seasonal tick infestation during the study was observed in summer season than autumn season (Figure 1). Monthly highest prevalence of tick was during June and July and lowest during November. Sex-wise male animal were frequently infested than female animals. Association of various host and environment related determinants with the prevalence of ticks in livestock population of study area have been shown in Table 1. The overall prevalence in Livestock species, there was non-significant (P >0.05) association in the present study.

DISCUSSION
Ticks are potential vector of viral bacterial, protozoal and helminths diseases with zoonotic significance in animals.

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Figure 1: Monthly prevalence of tick infection livestock species in association with metrological data of Tehsil Hajira, Rawalakot, Azad Kashmir
Table 1: Prevalence and host associated features of ticks infesting livestock species of Tehsil, Hajira, Rawalakot, Azad Kashmir

<table>
<thead>
<tr>
<th>Variables</th>
<th>Levels</th>
<th>Animals Screened</th>
<th>Ticks Positive</th>
<th>Prevalence (%)</th>
<th>Confidence interval 95%</th>
<th>Odds Ratio</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal Specie</td>
<td>Cattle</td>
<td>220</td>
<td>122</td>
<td>55.45</td>
<td>Lower limit 48.84, Upper limit 61.93</td>
<td>1.16</td>
<td>0.266</td>
</tr>
<tr>
<td></td>
<td>Sheep</td>
<td>300</td>
<td>164</td>
<td>54.66</td>
<td>Lower limit 49.00, Upper limit 60.24</td>
<td>1.14</td>
<td>0.289</td>
</tr>
<tr>
<td></td>
<td>Buffalo</td>
<td>230</td>
<td>118</td>
<td>51.30</td>
<td>Lower limit 44.85, Upper limit 57.73</td>
<td>1.07</td>
<td>0.614</td>
</tr>
<tr>
<td></td>
<td>Goat</td>
<td>600</td>
<td>288</td>
<td>48.00</td>
<td>Lower limit 44.02, Upper limit 52.00</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

| Cattle | Age | Young | 74 | 56 | 75.68 | Lower limit 37.21, Upper limit 54.79 | 1.67 | 0.024 |
| | Adults | 146 | 66 | 45.21 | Lower limit 45.21, Upper limit 62.79 | - | - |
| | Sex | Male | 82 | 60 | 73.17 | Lower limit 40.38, Upper limit 58.02 | 1.63 | 0.034 |
| | | Female | 138 | 62 | 44.93 | Lower limit 41.98, Upper limit 59.62 | - | - |
| | Season | Summer | 110 | 76 | 69.09 | Lower limit 53.45, Upper limit 70.56 | 1.65 | 0.027 |
| | | Autumn | 110 | 46 | 41.82 | Lower limit 29.44, Upper limit 46.55 | - | - |

| Buffalo | Age | Young | 86 | 60 | 69.77 | Lower limit 41.86, Upper limit 59.79 | 1.73 | 0.019 |
| | Adults | 144 | 58 | 40.28 | Lower limit 40.21, Upper limit 58.14 | - | - |
| | Sex | Male | 86 | 58 | 67.44 | Lower limit 40.21, Upper limit 58.14 | 1.62 | 0.034 |
| | | Female | 144 | 60 | 41.67 | Lower limit 41.86, Upper limit 59.79 | - | - |
| | Season | Summer | 115 | 74 | 64.35 | Lower limit 53.73, Upper limit 71.08 | 1.68 | 0.027 |
| | | Autumn | 115 | 44 | 38.26 | Lower limit 28.92, Upper limit 46.27 | - | - |

| Sheep | Age | Young | 86 | 68 | 79.07 | Lower limit 34.10, Upper limit 49.12 | 1.76 | 0.006 |
| | Adults | 214 | 96 | 44.86 | Lower limit 50.88, Upper limit 65.90 | - | - |
| | Sex | Male | 102 | 74 | 72.55 | Lower limit 37.62, Upper limit 52.79 | 1.60 | 0.019 |
| | | Female | 198 | 90 | 45.45 | Lower limit 47.21, Upper limit 62.38 | - | - |
| | Season | Summer | 150 | 100 | 66.67 | Lower limit 53.35, Upper limit 68.22 | 1.56 | 0.022 |
| | | Autumn | 150 | 64 | 42.67 | Lower limit 31.78, Upper limit 46.65 | - | - |

| Goat | Age | Young | 176 | 118 | 67.05 | Lower limit 35.40, Upper limit 46.73 | 1.67 | 0.001 |
| | Adults | 424 | 170 | 40.09 | Lower limit 53.27, Upper limit 64.60 | - | - |
| | Sex | Male | 204 | 128 | 62.75 | Lower limit 38.78, Upper limit 50.22 | 1.55 | 0.003 |
| | | Female | 396 | 160 | 40.40 | Lower limit 49.78, Upper limit 61.22 | - | - |
| | Season | Summer | 300 | 178 | 59.33 | Lower limit 56.09, Upper limit 67.22 | 1.62 | 0.021 |
| | | Autumn | 300 | 110 | 36.67 | Lower limit 32.71, Upper limit 43.91 | - | - |

and human (Dantas-Torres, 2008). So in this regard evidence about tick prevalence in any specific area in essential for the planning of control measure towards ticks and tick borne diseases. Due to continuous change in environmental setting, tick borne emerging and re-emerging infections of different causes have been reporting globally. In the present developmental scenario, it is very much necessary to attain information about the ever changing trends of diseases particularly of vector linked which infect livestock and Humans both. Widespread research studies have been piloted on the prevalence of the tick fauna and associated risk factors in numerous part of the world but the study area is not explored regarding this aspect. This is the first effort to conduct study in the area. Only single species of tick *Hyalomma anatolicum* was identified from the examined livestock of the area. The identified species of tick was also reported by (Sajid et al., 2009; 2011; Atif et al., 2012; Biu et al., 2012; Monfared et al., 2013; Mustafa et al., 2014) from other areas. Results of the present study are somewhat similar or different to the studies carried out earlier in other part of the globe (Irshad et al., 2010; Sajid et al., 2011; Ahmed et al., 2012; Monfared et al., 2013; Iqbal et al., 2013; Tasawar et al., 2014; Hassan and Al-Zubaidi, 2014; Mustafa et al., 2014). Several environment related
factors which support tick survival in the specific area including; temperature, humidity, rainfall (Greenfield et al., 2011), vegetation (Gray, 2002), host availability, season (Teel et al., 1996), altitude (Cadenas et al., 2007), breed, age, sex, stage of lactation, gestation period and nutritional status of the animal (Alonso et al., 2007; Yacob et al., 2008), body condition (Rony et al., 2010), method of application of acaricides (Bianchi et al., 2003) and husbandry practices (Sajid et al., 2011), and animal movement (Hasan and Osman, 2003). The reason of higher prevalence of tick in livestock species of the study area could be due to the climate and geography of the study area as the climate variables significantly affect ticks distribution in particular region (Estrada-Pena, 2003). Season plays key role in tick propagation and distribution and it is an established that peak tick prevalence has been reported in summer (Rony et al., 2010). From the surrounding part of the study area reports have shown that higher tick prevalence in summer (Durrani and Shakoori, 2009). Present study was carried-out in summer and autumn season depicted higher prevalence in summer when weather conditions were hot and humid that support ticks survival and expanding (Ghosh et al., 2007). Husbandry practices are also correlated with tick richness and distribution. In this situation, mixed grazing of different animal species at same pasture and/ or mixed housing provides maximum opportunity for tick to infest large population at a time. In study area, sheds for animals are made of bricks and stones with mud which provides cracks and cervices that suits for nidiculoous attachment (Sajid et al., 2009; Kabir et al., 2007), breed, age, sex, stage of lactation, gestation period and nutritional status of the animal (Alonso et al., 2007; Yacob et al., 2008), body condition (Rony et al., 2010), method of application of acaricides (Bianchi et al., 2003) and husbandry practices (Sajid et al., 2011), and animal movement (Hasan and Osman, 2003). The reason of higher prevalence of tick in livestock species of the study area could be due to the climate and geography of the study area as the climate variables significantly affect ticks distribution in particular region (Estrada-Pena, 2003). Season plays key role in tick propagation and distribution and it is an established that peak tick prevalence has been reported in summer (Rony et al., 2010). From the surrounding part of the study area reports have shown that higher tick prevalence in summer (Durrani and Shakoori, 2009). Present study was carried-out in summer and autumn season depicted higher prevalence in summer when weather conditions were hot and humid that support ticks survival and expanding (Ghosh et al., 2007). Husbandry practices are also correlated with tick richness and distribution. In this situation, mixed grazing of different animal species at same pasture and/ or mixed housing provides maximum opportunity for tick to infest large population at a time. In study area, sheds for animals are made of bricks and stones with mud which provides cracks and cervices that suits for nidiculoous attachment (Sajid et al., 2009; Kabir et al., 2011). Soft and pliable skin due to which male animals are more prone to ticks then females (Bilbo and Nelson, 2001). Present study was carried-out in summer and autumn season depicted higher prevalence in summer when weather conditions were hot and humid that support ticks survival and expanding (Ghosh et al., 2007). Husbandry practices are also correlated with tick richness and distribution. In this situation, mixed grazing of different animal species at same pasture and/ or mixed housing provides maximum opportunity for tick to infest large population at a time. In study area, sheds for animals are made of bricks and stones with mud which provides cracks and cervices that suits for nidiculoous attachment (Sajid et al., 2009; Kabir et al., 2011). Soft and pliable skin due to which male animals are more prone to ticks then females (Bilbo and Nelson, 2001). Soft and pliable skin due to which male animals are more prone to ticks then females (Bilbo and Nelson, 2001). So it has been concluded that ticks are prevalent in the livestock population of study area and different determinants including age, sex, and season are the risk factors for tick distribution.

RECOMMENDATIONS

On the basis of results of the present study some recommendations are advised for farmers and researchers (a) prophylactic therapy, to their livestock population must be administered at the start of warm season (April–May), (b) young and male animals should especially be attended (c) livestock and dairy development organizations must launch an awareness campaign to the areas for possible threats of tick and ticks borne diseases to the livestock (d) screening of ticks for the detection of pathogen of zoonotic significance using modern biotechnology tools. (e) arrange such kind of study in other areas of Azad Kashmir.

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CONFLICT OF INTEREST

There exist no conflict of interest.

AUTHORS CONTRIBUTION

All the authors have equal contribution for this manuscript.

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