Animal health care delivery to small ruminants in peri-urban Ghana

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ABSTRACT
The study aimed at defining the problems of small ruminant keepers in peri-urban areas of Ghana regarding animal health care (AHC), and assessing the quality of the structure and process of the AHC system. Small ruminant keepers in four regions were surveyed using a questionnaire. In all 244 respondents in the Central (35.2%), Western (35.2%), Greater Accra (26.2%), and Ashanti (3.3%) regions were interviewed. Feeding animals was the major problem (31%) identified, followed by housing, diseases, destruction of crops by animals, lack of knowledge on management and high mortality, in decreasing importance. Most animal health needs of respondents were met by veterinarians and technical officers (59%), and by animal owners (34%). The majority (61%) said they had experienced no difficulty in getting help from government veterinarians or technical officers. Most services provided by the Veterinary Services Directorate, except meat inspection, were used by most respondents. The indicators of quality of delivery of veterinary services showed significantly higher proportions of respondents finding accessibility or equity to be poor; drug costs being expensive; services, vaccines and drugs being unavailable; and service charges being unaffordable. These are indicative of weaknesses in the AHC delivery system, which ought to be addressed.

Introduction
Small ruminants are important in the agricultural economies of many developing countries by contributing to meat production. Small ruminants are kept as a source of meat, milk, skin, and fibre (Ademosun, 1989). Josserand (1985) noted that throughout Africa, but particularly in humid West Africa, small ruminants were primarily the sources of meat and meat products. Meat production from sheep and goats accounted for about 35 per cent of internal meat supplies in Ghana, and increased from 13,645 metric tonnes in 1983 to 18,817 metric tonnes in 1989 (Aryee et al., 1991). Small ruminants perform important socio-cultural functions in many societies (Oppong, 1965).

In spite of their low productivity, relative to their high genetic potential, the local breeds of small ruminants in West Africa are highly efficient in terms of the objectives of the livestock keepers (Charry, Humbert & Levif, 1992). They are reared primarily to supplement income and provide meat, and may be slaughtered on special occasions or ceremonies such as Christmas and Moslem festival of Eid ul Adha (Mack, Sumberg & Okali, 1985). In peri-urban areas, sheep are fattened for sale for ceremonial feasts, generating income for the family. Odoi & Amever (2003) observed that high fecundity, early maturity, greater turnover

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rates, smaller space requirements, simple housing, and relatively cheaper supplemental feeding make peri-urban small ruminant keeping attractive.

The nature of small ruminant production in Ghana varies from an extensive, low-input scavenging type with free-roaming animals not being provided with housing or veterinary care to a more intensive system involving total confinement (Oppong, 1973; Ockling, 1987). Generally, there is high mortality and morbidity (Opasina, 1984; Adeoye, 1985). Ockling (1987) noted that the absence of or poorly constructed shelters exposed animals to environmental stresses and inclement weather, resulting in high prevalence of diseases, especially pneumonia and diarrhoea, during the rainy season. Pneumonias, including Peste des petits ruminants, are the most common diseases with high mortality, accounting for over 35 per cent of deaths in small ruminants (Opasina, 1984; Tuah et al., 1988). Sheep and goats of all ages are affected, but lambs are more susceptible (Adeoye, 1985). Yet, the technology to control these diseases is available through provision of veterinary services. Adam et al. (1995) reported that a major constraint to small ruminant production in coastal Ghana was lack of veterinary services.

Rischkowsky, Bednarz & Jahn (2006) reported that it was unknown, in practice, if smallholders used opportunities to intensify and improve their production; and if livestock services to small ruminants were adequate. They noted that government services, such as vaccination campaigns, disease control and laboratory diagnosis, were unavailable to urban sheep keepers in Cameroon. The services available for peri-urban sheep keepers were prevention of parasites, sale of drugs, meat inspection, and castration. They concluded that the potential contribution of sheep production to income and food security was limited by access to services and general lack of organisation. They argued that an extended supply of services and better support for urban and peri-urban sheep keepers could help build the knowledge and organisational support needed for preventing and treating diseases. Whether a similar situation prevails in Ghana is yet to be reported.

The findings reported here were part of a larger study involving livestock and poultry keepers published elsewhere (Turkson, 2008, 2009). The objectives of this paper were to define the problems of small ruminant keepers in peri-urban areas of Ghana regarding animal health care (AHC), and to assess the quality of the structure and process of the AHC system provided to small ruminants, while identifying steps for improvement. It is envisaged that the findings will help improve delivery of AHC to small ruminants.

Materials and methods

Study areas

Peri-urban areas in four regions of Ghana were chosen purposively: Ashanti Region (Kumasi Metropolitan Area and surrounding districts), Greater Accra Region (Accra and Tema Metropolitan Areas and Ga District), Central Region (Awutu-Efutu-Senya District), and Western Region (Shama-Ahanta East Metropolitan Area and surrounding districts). These regions are in the middle and southern parts of Ghana. They were selected for being the major peri-urban areas in Ghana.

Animal health care was provided officially in Greater Accra Region by graduate veterinarians and veterinary technical officers who were staff in the Veterinary Services Directorate (VSD) of MOFA, and seven private veterinary practices. The technical officers were products of the Pong Tamale Animal Health and Production College with certificates in animal health. In Ashanti Region, AHC was provided by VSD staff and two private practices. In Western and Central regions, AHC was provided officially by staff of VSD. In all these areas, it was common knowledge that VSD staff were “moonlighting”; that is, providing private services unofficially (Turkson & Brownie, 1999).
Animal health care delivery to small ruminants

Sampling procedure
Livestock or poultry keepers visiting government or private veterinary clinics for assistance, or to purchase vaccines were chosen purposively to be interviewed, in the absence of or unreliable list of animal owners in the study areas to serve as sample frames for structured sampling design. Others were identified with the help of staff of Ministry of Food and Agriculture in the chosen areas. The snowball technique was adopted in which farmers who were visited on their farms identified other livestock or poultry keepers in the area who were then visited and interviewed. The targeted numbers were 150 each for Ashanti and Western regions, and 300 each for Greater Accra and Central regions. These were set on the basis of availability of enumerators (one each for Ashanti and Western regions, and two each for Greater Accra and Central regions, each targeting 150 respondents).

Survey instrument and administration
The instrument used was a questionnaire developed and tested in Cape Coast on 15 livestock and poultry keepers. The questionnaire had 25 questions (14 close-ended, 11 open-ended) covering socio-economic profile of respondents, animal demographics and management, services used and the providers, and quality of animal health care service indicators (effectiveness, efficiency, accessibility, quality, equity, affordability and availability of services, staff attitude, technical competence of staff, charges for services, and availability and cost of drugs). Effectiveness was defined as how effective the veterinary services were in reducing mortality, disease, discomfort and dissatisfaction. Efficiency was defined as how well the available resources were used to achieve desirable results. Accessibility was defined as the ability of the individual to reach and obtain services. Quality of services was defined as degree to which services met the client’s expectations. Equity was the fairness of distribution of services. Staff attitude dealt with interpersonal relations shown by staff. Technical competence was defined as the knowledge, skills and actual performance of professionals. Affordability was the ability of client to pay for services, whilst availability of services was defined as services being provided when needed. Likert-scale types of answers were adopted for the indicators.

Six enumerators were trained to administer the questionnaire. Pre-testing was done in Cape Coast after which two questions were dropped for lack of clarity. The questionnaires were administered in English for those who were literate, and in the local languages (Twi, Fante or Ga-Adangme) for those with difficulties in the English language. The questionnaires were administered between June and August 2005. Each questionnaire took on average 45 min to administer.

Data analysis
The analysis presented in this paper involved only those respondents identified as small ruminant keepers. The responses to the closed questions were coded and stored using Microsoft Excel software. These were imported into Statistix® software (Version 3.5, Analytical Software Inc., St Paul, MN, USA) and analysed using descriptive statistics. The open-ended responses were tallied manually and proportions calculated. Significance testing was done at 95 per cent confidence level.

Results
A total of 244 respondents identified themselves as small ruminant keepers. They were located as follows: Ashanti Region (3.3%), Greater Accra Region (26.2%), Western Region (35.2%), and Central Region (35.2%). The management systems used were extensive (0.4%), semi-intensive (88.1%), and intensive (11.5%).

The educational backgrounds and proportions in each category were as follows: no education, 19.7 per cent; basic (primary, middle or junior secondary school), 34 per cent; secondary (secondary, senior secondary, technical or
vocational schools), 33.2 per cent; and tertiary (post-secondary, polytechnic or university), 12.7 per cent.

Table 1 shows the animal holdings for the respondents.

A higher proportion (30.7 per cent) identified feeding of animals as the foremost problem. The others (in decreasing proportions) were housing (23.0%), diseases (18.0%), animals destroying crops (13.5%), lack of drugs to treat animals (2.0%), lack of knowledge on management of animals (2.0%), and high mortality (1.6%); with no or non-specific problem being reported by 9.0 per cent of the respondents.

Table 2 shows the animal health services used by the respondents and the providers. Table 3 shows the frequency of use of veterinarians, veterinary staff, laboratory, or clinic over a 6-month period.

As to how satisfied they were with delivery of veterinary services to their farms and homes, the proportions were as follows: very dissatisfied, 8.2 per cent; dissatisfied, 15.2 per cent; fairly satisfied, 29.5 per cent; satisfied, 39.8 per cent; and very satisfied, 7.4 per cent. The difference between the proportions dissatisfied (combining those very dissatisfied, dissatisfied and fairly satisfied, 52.9%) and satisfied (comprising those satisfied and very satisfied, 47.1%) was not significant.

Table 5 gives the proportions for the indicators of quality used in this study.

**Discussion**

Most (70%) of the respondents were from the Central and Western regions, with very few from

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**Table 1**

<table>
<thead>
<tr>
<th>Species</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>Range</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>0.3</td>
<td>2.9</td>
<td>0</td>
<td>0-39</td>
<td>-0.02-0.70</td>
</tr>
<tr>
<td>Goats</td>
<td>16.8</td>
<td>15.1</td>
<td>15.0</td>
<td>0-120</td>
<td>14.9-18.7</td>
</tr>
<tr>
<td>Sheep</td>
<td>17.4</td>
<td>17.5</td>
<td>14.0</td>
<td>0-100</td>
<td>15.2-19.6</td>
</tr>
<tr>
<td>Pigs</td>
<td>1.0</td>
<td>12.9</td>
<td>0</td>
<td>0-200</td>
<td>-0.6-2.7</td>
</tr>
<tr>
<td>Poultry</td>
<td>5.1</td>
<td>27.0</td>
<td>0</td>
<td>0-300</td>
<td>1.7-8.5</td>
</tr>
<tr>
<td>Dogs</td>
<td>0.9</td>
<td>1.6</td>
<td>0</td>
<td>0-7</td>
<td>0.7-1.1</td>
</tr>
</tbody>
</table>

no difficulty in getting help from a government veterinarian or technical officer. The ease of getting help was stated as follows: very easy, 10.7 per cent; easy, 53.7 per cent; difficult, 30.3 per cent; and very difficult, 5.3 per cent.

Table 4 shows the distances covered and times used in seeking animal health care.

As to how satisfied they were with delivery of veterinary services to their farms and homes, the proportions were as follows: very dissatisfied, 8.2 per cent; dissatisfied, 15.2 per cent; fairly satisfied, 29.5 per cent; satisfied, 39.8 per cent; and very satisfied, 7.4 per cent. The difference between the proportions dissatisfied (combining those very dissatisfied, dissatisfied and fairly satisfied, 52.9%) and satisfied (comprising those satisfied and very satisfied, 47.1%) was not significant.

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**Discussion**

Most (70%) of the respondents were from the Central and Western regions, with very few from
TABLE 2
Services Used and Providers as Indicated by Small Ruminant Keepers in Peri-urban Ghana (n=244)

<table>
<thead>
<tr>
<th>Service</th>
<th>Advice</th>
<th>Castration/Surgery</th>
<th>Deworming</th>
<th>Diagnosis</th>
<th>Meat inspection</th>
<th>Medicine</th>
<th>Spraying/Bathing</th>
<th>Treatment</th>
<th>Vaccination</th>
</tr>
</thead>
<tbody>
<tr>
<td>% using service</td>
<td>63.9</td>
<td>62.7</td>
<td>83.2</td>
<td>68.0</td>
<td>3.7</td>
<td>84.8</td>
<td>68.9</td>
<td>73.4</td>
<td>68.0</td>
</tr>
</tbody>
</table>

Provider

Not done at all (%) 36.1 37.3 16.8 32.0 96.3 15.2 31.1 26.6 32.0
Farmer (%) 6.6 41.4 50.4 31.1 1.2 2.0 56.1 33.2 9.4
Veterinarian (%) 51.2 17.6 30.3 34.0 2.5 44.3 12.3 36.9 56.6
Vet. staff (%) 1.6 0.4 0.4 0.4 0 0.4 0.4 0.4 0.4
Vet. shop (%) 0 0 0.8 0.4 0.4 0.4 0.4 0.4 0.4
Chemical seller (%) 0.4 0 0.4 1.2 0 15.2 0 1.6 0
Others (%) 4.1 3.3 1.2 1.2 0 0.8 0 0.4 1.2

The Ashanti Region. These two areas have relatively lower proportions of poultry producers (Turkson, 2007, unpublished data); therefore, small ruminants could have been preferred or used as alternatives in poultry production. The semi-intensive system of management was more popular, similar to other reports. The semi-intensive system involved confinement for the night in shelters provided by owners, with the animals being released in the morning to be herded or left to roam on their own. Reports indicate death due to ruminal impaction from swallowing of plastic bags found on rubbish dumps in urban and peri-urban areas as a result of animals roaming about (Ademosun, 1992; Addo-Kwafo et al., 2000). The mean animal holdings of 17 goats or sheep were high compared to those reported by Turkson (1992) or the World Bank (1992) for Ghana. This might be due to the popularity of small ruminant meat in urban areas, especially during festive occasions. The educational level of the respondents was varied. However, as one in five had no formal education, and were therefore considered illiterates, this could hamper effective delivery of veterinary services and management. The three major problems identified as constraints were feeding of the animals, housing, and diseases. These were similar to findings reported by Adam et al. (1995) and Odoi & Ameevor (2003). The semi-intensive system involved confinement for the night in shelters provided by owners, with the animals being released in the morning to be herded or left to roam on their own. Reports indicate death due to ruminal impaction from swallowing of plastic bags found on rubbish dumps in urban and peri-urban areas as a result of animals roaming about (Ademosun, 1992; Addo-Kwafo et al., 2000).
Turkson & Amakye-Ansah (2005). Destruction of crops or properties by animals was high on the list, being associated with practices in which animals are released unherded.

Most of the services provided by the Veterinary Services Directorate in Ghana, apart from meat inspection, were used by most respondents (Table 2). However, high proportions of keepers did castration, deworming, diagnosis, spraying, and treatment by themselves. Although slightly more than half of the respondents had their needs met by veterinarians, one in three of the respondents used self-medication to meet their needs. Self-medication is a practice whereby clients purchase drugs and administer them to their animals without consulting veterinary staff (Turkson, 2004). As to who treated most animals in the community, there was no significant difference between those saying nobody in particular (32%) and those mentioning veterinarians and technical officers (40%). Apart from purchase of drugs for which about 28 per cent of the respondents used veterinarians or veterinary facilities over five times in a 6-month period, all the other services were either not used or were used on few occasions (five or less times) by most respondents.
These findings raise questions about the impact of veterinarians and veterinary services in AHC delivery in peri-urban Ghana; because although services were provided, patronage was low, as explained by the significantly higher proportion of respondents (66%) perceiving services to be unavailable. Possibly, the range of services available had not been well publicised, leading to perceptions of unavailability and therefore, low patronage. In contrast to the finding in this study, a study in a part of Accra reported that most respondents (60%, n=30) used veterinary services (Odoi & Amevor, 2003).

When asked if they had difficulties in getting help from government services, the majority (61%) said no. It is, therefore, necessary to investigate why the majority did not use veterinarians or were not using services frequently. This may point to disaffection with government services. When asked if they were willing to use private providers, most respondents (85%) said yes. The private sector is said to be more efficient in providing services than government services (Leonard, 1993), raising the expectation of clients. However, the agreement between having difficulty in getting help from government veterinary services and being willing to use private providers was slight (kappa statistic of 0.085), and does not provide support for an argument that the respondents were more willing to use private providers because they had difficulty in getting help from the public AHC delivery system.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Good</th>
<th>Poor</th>
<th>z-score</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effectiveness</td>
<td>149</td>
<td>95</td>
<td>4.81</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Efficiency</td>
<td>167</td>
<td>77</td>
<td>3.38</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Accessibility</td>
<td>96</td>
<td>148</td>
<td>4.64</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Quality of services</td>
<td>146</td>
<td>98</td>
<td>4.26</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Equity</td>
<td>61</td>
<td>183</td>
<td>10.95</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Staff attitude</td>
<td>165</td>
<td>79</td>
<td>7.70</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Technical competence</td>
<td>160</td>
<td>84</td>
<td>6.69</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Service charge</td>
<td>124</td>
<td>120</td>
<td>0.27</td>
<td>0.79</td>
</tr>
<tr>
<td>Drug costs</td>
<td>155</td>
<td>89</td>
<td>5.88</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Services</td>
<td>96</td>
<td>148</td>
<td>4.62</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Vaccines</td>
<td>97</td>
<td>147</td>
<td>4.44</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Veterinary drugs</td>
<td>107</td>
<td>137</td>
<td>2.63</td>
<td>0.01</td>
</tr>
<tr>
<td>Services</td>
<td>107</td>
<td>137</td>
<td>2.63</td>
<td>0.01</td>
</tr>
<tr>
<td>Client needs</td>
<td>124</td>
<td>119</td>
<td>0.36</td>
<td>0.72</td>
</tr>
<tr>
<td>Getting help</td>
<td>157</td>
<td>87</td>
<td>6.25</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>
In general, most respondents (64%) found getting help when needed to be easy or very easy. The mean distances travelled to get to a veterinarian, technical officer, or for medicine varied from 4 to 6 km, which was reasonable. Whereas it took a mean time of about 1 h to get medicine, it took about 15 h to get help for sick animals. Physical distance did not seem to be a major constraint, although it is said to influence transaction cost and may be a deterrent to the veterinary help-seeking process if distances are unreasonable or communication networks (roads or transport) are poor (Woods, 2000; Woodford, 2004).

The indicators of quality of delivery of veterinary services showed significantly higher proportions of respondents finding accessibility or equity to be poor; drug costs being expensive; services, vaccines, and drugs being unavailable; and service charges being unaffordable. These point to weaknesses in the delivery system, which ought to be addressed.

**Conclusion**

The study identified challenges in the delivery of AHC to small ruminant keepers in peri-urban Ghana, which need to be addressed to improve client satisfaction or to meet the needs of clients satisfactorily. The challenges included poor accessibility and equity of services, unavailability of services, high cost of drugs, and service charges perceived to be unaffordable. These call for a thorough evaluation of the delivery system as provided by the VSD, making it more responsive to the needs of the clients. The VSD needs to be better funded to meet its mandate of preventing and controlling diseases affecting animals to increase livestock production and productivity and protect humans from zoonotic diseases.

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