



**ASSESSMENT OF CAMEL (*Camelus dromedaries*) MILK AND URINE IN THE
MANAGEMENT OF DIABETES MELLITUS IN THE SEMI - ARID BORNO
STATE, NIGERIA**

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ABSTRACT

A survey was conducted in Maiduguri to assess the awareness and effectiveness of camel milk and urine for the control of Diabetes mellitus (DM). Snowball sampling technique was used to select 75 respondents that utilized camel milk and urine frequently. The respondents were interviewed on their level of awareness, perceived effectiveness on the use of Camel milk and urine in controlling DM, and the problems they encountered in sourcing them. The results show that all the respondents are aware of the use of camel milk in the management of DM. Greater proportion (53%) are unaware of the use of camel urine or its combination with milk in the control of DM in the study area. Camel milk was perceived to be significantly ($P<0.05$) effective than urine or milk-urine combination in the management of DM. Scarcity (32%) and distance to market (28%) were identified as the major problems encountered in sourcing the camel milk while scarcity (48%) and distance from market (28%) were the problems perceived by most of the respondents in sourcing the camel urine. It was concluded that traditionally, camel milk has potentials in the control of Diabetes Mellitus in Maiduguri, Borno State, Nigeria. It is therefore, recommended that clinical research should be conducted to validate this claim by the respondents.

Keywords: Camel milk; Camel urine; Diabetes Mellitus; Management

INTRODUCTION

The total population of camels in the world is 25.89 million, of which 89% are one-humped (dromedary) camels (*Camelus dromedarius*) (FAO, 2013). Nigeria had more than Ninety thousand (90,000) heads of one humped Camel (FAO, 2006). However, camels found

in Nigeria are predominantly imported from neighboring countries (Rabadu, 2009). Camel plays a significant role in the socio-economic affairs of people by providing meat, milk and wool (Meiloud *et al.*, 2011). Camel milk, called the “white gold”, is low in cholesterol and has high concentration of insulin. It is also a good source of various vitamins, minerals, (Knoess, 1979, Agrawal *et al.*, 2005).

Camel milk and urine are used therapeutically against hepatitis (Sharmanov and Kadyrova 1978), dropsy, asthma and spleen problems (Knoess, 1979; Rao *et al.*, 1970; Mal *et al.*, 2000). Traditionally, camel milk and urine are used in the treatment of Diabetes Mellitus for over a long period of time. This, however, is without any scientific bases and/or standard of usage.

Diabetes Mellitus (DM) is the fourth leading cause of death in most developed countries, and its prevalence has been reported to be rising in Nigeria (IDF, 2013). The conventional treatments for diabetes mellitus are costly and are associated with undesirable side effects. For these reasons, cheaper alternatives are sought, and outstanding among the alternatives to conventional drugs for DM are camel milk and urine, for which there are many anecdotal reports and few scientific studies.

The aim of the study was to assess the level of awareness, perceived effectiveness of camel milk and urine in the management of DM; and identify the problems encountered in sourcing Camel milk and urine in the study area.

MATERIALS AND METHOD

The Study Area

A survey was carried out at Maiduguri cattle market, situated in Jere Local Government Area of Borno State. Borno State is located between Latitudes 11⁰⁵' and 12⁰ N and Longitudes 13⁰⁵' and 14⁰ E at an altitude of 354m above sea level (DNMA, 2013). It has very short period (3-4 months) of rainfall with 500-700 mm/annum and a long dry season of about 8 - 9 months. The ambient temperature could be as low as 20⁰C during the dry cold season and as high as 44⁰C during the dry hot season. Relative humidity is 30-45% in August which usually lowers to about 5% in December and January. Day length varies from 11-12 hours (Afolayan *et al.*, 2013). Borno State has been reported as the largest livestock producing area in Nigeria that include cattle, sheep, goats, donkeys, poultry and camels. The state has large number of camels which normally came from the neighboring countries of Chad, Niger, Cameroun and Sudan. The camels are highly adapted to the area and play much more important role in the economy of the region. The estimated population of camels in Borno is 27,850 (FDLPCS, 1992).

Data Collection

Seventy five (75) respondents were purposively sampled for this study using snowball sampling technique. The respondents were comprised of people that frequently collect and utilize camel milk and urine. The respondents were interviewed on their awareness on the use of Camel milk and urine for the control of diabetes mellitus, their perceived effectiveness of the products, and to identify the problems, if any, encountered in sourcing and using the products.

Data Analysis

All the parameters measured were analyzed using percentage, except the respondent's perception of the effectiveness of camel milk, urine and milk-urine combination, which were tested on a 5-point scale; from 1 (not effective) to 5 (very effective). Perceived effectiveness of each product was determined by its score. General Linear Model (GLM) univariate procedure was used to compare the perceived effectiveness of the products for and means that showed significant difference were separated using Tukey's Honest Significant Difference test.

RESULTS AND DISCUSSION

Levels of Awareness on using Camel Milk and Urine in the Management of Diabetes Mellitus

The degree of awareness on the use of camel milk and urine as therapeutic agents in the management of Diabetes Mellitus varies across the products (Table 1), while all the respondents were aware of the use of camel milk and greater proportions are unaware of the use of camel urine or its combination with milk.

Table 1: Distribution of respondents (%) according to their awareness of using camel milk and urine in controlling Diabetes Mellitus

Response	Camel Products					
	Milk (%)		Urine (%)		Milk+ Urine (%)	
Aware	75	100	35	47	23	31
Unaware	0	0	40	53	52	69

All the respondents in the study area were aware of the use of camel milk in the management of DM. This might be connected to many references to the virtue of camel milk as a therapeutic agent in the Islamic literature, which have been mentioned in the Qur'an (Q: 16:66) for curing of various human diseases. This information might be available to many people in the study, the study area being a center for Islamic learning (Sifawa, 1991). Furthermore, the study area being a commercial center where people from different parts of the country and from neighbouring countries, come for business purposes. It is conceivable that information and ideas on traditional medicines could be disseminated.

That greater proportions of the respondents were unaware of the use of camel urine for the management of DM, could be as a result that many considered urine as a toxic waste product that is not safe for consumption. Madaki (2016) reported that camel urine is not safe for consumption, for its tendency to spread zoonotic diseases.

Perceived Effectiveness of Camel Milk and Urine in the Management of DM

Perceived effectiveness of camel milk in the management of DM was higher ($P<0.005$) than that of urine and combination of urine with milk (Table 2). In perceptual terms, only camel milk was found to be effective.

Table 2: Perceived effectiveness of camel milk and urine as therapeutic agents in DM

Product	Mean	Perceptual mean deviation
Milk	3.80 ^a	+0.80
Urine	2.68 ^b	-0.32
Milk-Urine Combination	2.96 ^b	-0.04
S.E	0.243	

ab, means bearing different superscripts in the same column differ significantly ($P < 0.05$)

This result may be explained by the fact that camel feed on various plant species and that some of the plants are used in the preparation of medicines (Shulz *et al.*, 2001). This might be responsible for the perception of the therapeutic value of the milk products in the management of DM. El-Shami and Jubara (1989) reported that camel browse on shrubs and trees that are used in the preparation of some drugs.

That camel milk was perceived to be significantly more effective than urine and milk-urine combination, could be due to the awareness of the reference to the therapeutic value of the camel milk in the Qur'an (Q16:66) while the therapeutic value of urine was not mentioned. Also, unlike milk, camel urine is apparently scarce due to unavailability at the desired time. This may warrant its discard hence deny the respondents knowledge about its effectiveness.

Problems Associated with Sourcing and Using Camel Milk and Urine

Scarcity, high cost, adulteration and distance to point of sale of the products were identified as the major problems of sourcing and using camel milk and urine as therapeutic agent against DM (Table 3).

Table 3: Distribution of respondents according to most important problems in sourcing of camel milk and urine

Response	Milk (%)		Urine (%)	
Scarcity	24	32	36	48
Adulteration	18	24	12	16
Distance	12	16	27	36
High cost	21	28	0	0
Total	75	100	75	100

Scarcity (32%) and high cost (28%) were identified as the major problems associated with sourcing and consumption of camel milk. Scarcity of any product can lead to its high prices (Faith *et al* 2011), which may consequently lead to adulteration in a bid by producers/sellers to maximize profit. Milk adulteration has been widely reported in developing countries such as Pakistan, Brazil, India and China (Xiu and Klein 2010; Faraz *et al.*, 2013).

The scarcity of camel milk could be as a result of low population of the animals coupled with seasonal migration of its herders, as camels are reared by transhumant pastoralists who move from one area to another in search of pasture. Low milk productivity reported by Mull *et al.* (2008) may be another reason for the scarcity. These were followed

by 24% of the respondents who identified adulteration of milk as a problem, this could be as a result of scarcity of the product.

Long distance to the market is among the problems in sourcing and consumption of camel milk was indicated by some 16% of the respondents in the study area. This may be because the camel milk market was centralized in the cattle market and Maiduguri being a large city, some places where the respondents reside are bound to be far from the selling point. Sisay (2015) also reported long market distance as a major problem faced by consumers in buying the products.

For Camel urine, scarcity (48%) and distance (32%) were the major problems considered by the respondents. Scarcity of camel urine may be explained in term of the fact that unlike milk, camel urine is not easily obtained as the herders to follow their camels to the grazing land to collect the urine. High cost was not mentioned as a problem for sourcing the product, probably because it was considered as waste product (Madaki, 2016).

CONCLUSION

Findings from this study have revealed that consumption of camel milk and urine has perceived potentials in lowering serum glucose level in diabetes patients in the study area. However, lack of scientific facts (research) has created an information gap, especially among the literate on the use of camel product and by-product as a therapeutic agent against DM. Major problems faced by the respondents in sourcing of the products are scarcity and distance to market. Further clinical studies should be conducted to check the efficacy of camel products.

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