

Camel milk for reduction of diabetes risk: Are we heading toward the right direction?

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ABSTRACT

Diabetes is emerging as an important public health problem in India imparting huge burden on healthcare economics. Recently a milk packaging company has introduced camel milk product with its potential use in reducing risk of diabetes. In this study, we had evaluated the available evidences and found that though camel milk may have some benefits for the patients with type 1 diabetes, its efficacy for improving glycemic profile of type 2 diabetes is highly controversial and further evidences in the form of randomized controlled trials are needed to substantiate the effect.

Keywords: Camel milk, India, type 1 diabetes, type 2 diabetes

Background

Diabetes—a chronic condition, characterized by high blood glucose levels—is no more a diseases of developed countries. According to Indian Council of Medical Research–INDIA DIABetes study, the spread of diabetes to economically disadvantaged sections of society is a matter of great concern, warranting urgent preventive measures.^[1]

Dietary interventions having potential to modulate response of human body toward diabetes are well studied non-pharmacological interventions. Use of primary care for delivering dietary interventions may have wider impact on the community as it is known that primary care is an ideal platform for providing dietary interventions to the population suffering from chronic conditions. However, before integrating and implementing any potential

preventive solution, critical appraisal of the evidences becomes extremely important. Recently, a renowned milk packaging industry in India (largest in South-East Asia) came up with a product (camel milk) with marketing focus on possible solution for diabetes (without any reference to specific type of diabetes).

Therapeutic potential of camel milk is being proclaimed by numerous reports with diabetes treatment being one of popularly studied aspect.^[2-4] We herewith aim to critically evaluate current evidences assessing the use of camel milk for the reduction of diabetes risk and if so which type of diabetes.

How Was the Study Done?

To identify the relevant literature, we searched various electronic databases: MEDLINE, EMBASE, PubMed, CINAHL, google scholar, and the Cochrane Trial Register. Though several articles had shown potential hypoglycemic effect of camel milk in animal models under both *in vivo* and *in vitro* conditions, we adhered to our initial hypothesis of evaluating the effect in humans. The narrative findings of the individual studies are discussed below under various subheadings.

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What Did the Review Find?

Camel milk consumption and type 1 diabetes

We found six studies reporting the effect of camel milk consumption on type 1 diabetes in humans, where three were performed by Agrawal *et al.* (2003-2011) and majority of them were done on Indian population.

Evidences from India

Agrawal *et al.* through short-term randomized controlled trial (RCT) of 3 months,^[5] cross-over study (three months),^[6] and long-term RCT^[7] showed that compared to usual care, type 1 patients receiving camel milk along with usual care have significantly improved blood glucose and HbA1c levels, insulin requirement, and quality of life. In 2014, Bhat *et al.* reported very unique finding from “Raikas”—a camel rearing community having high prevalence of type 1 diabetes susceptible genes but also having near-zero incidence of diabetes. The authors explained this contradiction in the finding with the fact that camel milk was part of the community’s staple diet and, hence, there may be the presence of some protective factors in the milk.^[8]

El-Sayed *et al.* in 2011, conducted a small RCT on 50 type 1 diabetics in Egypt, showed that camel milk along with insulin can yield better effect as an adjunctive therapy rather than milk alone.^[9] Similar to this, one more RCT performed on Middle East population also advocated the usage of camel milk as an adjunct to standard therapy for the management of type 1 diabetes.^[10]

Though the findings from RCTs are promising, extremely small sample size is one of the prime limitation of the studies. Moreover, majority of the studies have advocated use of camel milk as an adjunct therapy rather than an independent mode of treatment.

Camel milk consumption and type 2 diabetes

In contrast to evidences on type 1 diabetes management, the effect of camel milk on type 2 diabetes is quite scarce, with only one Indian trial.

Small RCT of 28 participants was performed by Agrawal *et al.*^[11] to investigate the effects of camel milk consumption on insulin sensitivity and glycemic control in normal and type-2 diabetics of Raika and Non-Raika community. They reported that camel milk reduces fasting blood sugar, postprandial glucose, and HbA1c.

The pilot RCT undertaken in Iran showed no improvement in blood sugar, lipid, and pressure parameters either with camel or cow milk.^[2] Similarly in 2009, Wang *et al.*^[12] studied the hypoglycemic effect of camel milk on type 2 diabetic patients and clearly concluded that only in combination with antidiabetic medications, the hypoglycemic effect of the camel milk can be claimed. One of the recent study conducted in 2016^[13] also showed similar findings, where authors concluded that consumption of camel milk would be a useful therapeutic tool

adjunct to insulin for type 2 diabetic patients due to its significant effect in reducing blood sugar and insulin daily doses in such patients.

Conclusion

All these evidences are clearly stating that in contrast to type 1 diabetes where pilot studies results are quite promising for the use of camel milk, the research evidence supporting its use for type 2 diabetes management is blur and highly inadequate and more research in the form of RCTs are needed to support the initial findings. With current body of evidence, the sale and marketing of camel milk as a product having a positive impact on diabetes may have misleading impact on primary care.

In India, the Food Safety and Standards Authority of India (FSSAI) addresses issues related to Food Safety and Standards (Contaminants, Toxins, and Residues); however, there is lack of any legal or ethical body regulating sales of animal products proclaiming to improve health indicators in a nonpharmacological manner. This substantiates the need to empower the regulatory bodies for cross verifying the scientific evidences proclaimed by the marketed products, especially in the health care area.

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Conflicts of interest

There are no conflicts of interest.

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