

Research report

Enhanced salt appetite, diet and drinking in traditional Bedouin women in the Negev

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Abstract

The Negev Bedouin are desert dwellers in high summer heat and scarce shade and water. They are under pressure to cease their traditional way of life. To document, while still possible, how traditional Bedouin nutritional habits may have accommodated to these conditions, we evaluated sodium appetite, diet and drinking in Bedouin women ($n = 31$) who still partially maintained their traditional way of life in isolated tribal encampments in the spring of 2005. Data were compared to urban Bedouin women ($n = 15$), and to urban Jewish women ($n = 15$) representing mainstream dietary habits in the same region, and to published data. About 60% (by energy) of the encampment diet is traditional, but this proportion is reduced in summer. Encampment Bedouin women rated concentrated salt solution as more preferred than other groups, added 40% more salt to an ideal test soup and had a ~50% greater absolute dietary sodium intake. The sodium content of the traditional Bedouin diet is ~25% higher than the Jewish women's diet. This enhanced sodium appetite is reflected in the value of salt in their folklore. The possible causes of the enhanced salt appetite are considered. In addition, dietary intake ($M = 3470$, $SE = 285$ kcal) was ~50% greater than in urban Jewish women. Fluid intake (~2.4 L/d) was ~20% greater than Jewish women, but may have been inadequate in the exposed encampments because 8 of the 31 women reported an occurrence of dehydration, 6 of them while pregnant. Encampment women BMI (30.3 ± 1.1 kg/m²) was high, and health problems were typical of populations in transition.

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Keywords: Bedouin; Desert; Diet; Drinking; Negev; Salt; Salt appetite; Sodium appetite; Tradition; Women**Introduction**

The Bedouin way of life has undergone extensive changes in the past decades (Aburabia-Queder, 2005; Abu-Saad, Weitzman, Abu-rabiah, Abu-shareb, & Fraser, 2001; Cwikel, Lev-Wiesel, & Al-Krenawi, 2003; Degen, Benjamin, & Hoorweg, 2000; Fraser, Abu-Saad, & Abu-Shareb, 2001). One of the main influences is the government policy of resettlement in permanent places of habitation, which has severely restricted the nomadic existence of the Bedouin. Since the 1960s when this and subsequent policies were instigated, more than 50% of the ~150,000 Bedouin have been moved to permanent places of residence in 7 main townships (Abu-Saad et al., 2001).

Many of the rest live in encampment villages considered 'illegal' by the government and hence without services and amenities—water, electricity, sewage, schools, shops, etc. There they are subject to restrictions, *inter alia*, on grazing, and planting feed or crops, which are destroyed by government planes dusting herbicide (Aburabia-Queder, 2005; Abu-Ras, 2006; Abu-Saad, 2006; Degen et al., 2000; Golan-Agnon, 2006; Greenberg, 2006; Jabareen, 2006). These villages, are frequently demolished by the authorities, e.g. the same encampment of 25 families on 5 occasions during the winter of 2006–2007 (Gvirtz, 2007).

In the encampments, the prohibitions on farming and herding in a subsistence economy, together with the increasing availability of commercial foods, have impacted the diet. In order to document the vestiges of their traditional diet, we studied Bedouin women in isolated illegal encampments. Their diet is more traditional, because

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unlike the men, who drive to town to work daily and eat there, the women rarely leave the encampment as they do not travel without a male family-member chaperone (Cwikel et al., 2003). Traditional life style means, *inter alia*, that each encampment belongs to a different tribe, with no intermarriage between tribes. It is a patriarchic society. Outsiders cannot meet the Bedouin women without prior consent of a family man. Some 30% of the women are in polygamous marriages of 2 or more wives (Aburabia-Queder, 2005). Most live in sheet metal or breeze-block one-room shacks, a few still live in tents. Using their vehicles, the men tow water containers to the encampment. The water is placed centrally and is usually carried, or sometimes piped, to the homes. Some encampments have generators that operate at night for a few hours to power refrigerators¹ and TVs.

Urbanized Bedouin live in townships with amenities and services.

Much of traditional dietary protein was obtained from sheep, goat, and camel milk, prepared into a variety of soured and other products such as yoghurt (labane), butter (samne), g'amid, or a rock-hard, salted, and sun-dried product (afig) which is preserved, chewed, or reconstituted by boiling in water (Abu-Saad et al., 2001; Degen et al., 2000; Fraser et al., 2001). Traditional staples include 'sahg' bread, which is served under many dishes, rice, and vegetables—wild, grown, or salted and sun-dried. Bought rice has replaced the traditional home-grown wheat grain as the basis for many recipes. Traditional drinks are sheep, goat, and camel milk, sweet tea (5.7% w/w sugar), and unsweetened coffee made from local wild beans (Degen et al., 2000; Fraser et al., 2001).

Meals are taken while seated on the ground, and served on a communal plate or large bowl and gathered to the mouth with fingers or sahg bread. All seasoning is done during food preparation. Salt, sugar or condiments are not available during the meal, so that there is no individual variation in seasoning.

Salt is of interest for a number of reasons. In the absence of refrigeration, salt is a preservative, and it is possible that the high salt content of the food would engender a preference for salty foods (Beauchamp & Cowart, 1990; Mattes, 1997; Sullivan & Birch, 1990). Moreover, in a hot desert climate, where electrolyte and water loss in perspiration is high, salt is a mainstay of adequate hydration for both Bedouin and their livestock. For these reasons, in addition to the tests and questionnaires, we asked the encampment Bedouin about salt in their folklore. We also documented their recipes and weighed the ingredients (reported here only as summarized nutrient values).

Determining salt appetite in humans is complicated by the absence of an ubiquitous definition. Ingestion of

aqueous NaCl (used in animal research) is not acceptable to humans, whose sodium intake is dependent upon food intake. Hence the evaluation of sodium appetite is compounded by the determinants of eating, and includes involuntary and discretionary sodium intake, a variety of sources, e.g., salting at table, choice of salty food items in meals, consumption of salt snacks, sodium supplementation in sports, etc., and given to diverse regulators, physiological, habitual, conditioned and cultured. Sodium intake from these various sources is not necessarily correlated, and hence a number of indices of salt preference are often combined to provide a measure of a general "salt appetite", as we do here (Crystal & Bernstein, 1995; Leshem, 1998; Mattes, 1997; see Kochli, Rakover, & Leshem, 2005, for a fuller discussion and references).

Method

The study had the approval of the University of Haifa Human Research Ethics Committee. Participants indicated their agreement to participate, and that they had the right to withdraw at any time, or refuse any test, by signing or making a mark on the letter of informed consent that was read out and explained.

Participants

Thirty-one Bedouin women from 7 encampments of the H'ura, Abu Tlul, Azazmah, Abda, Ksayfah, Beer Alh'mam and A'ojan tribes, participated in the final data set (Table 1). However, it was not possible to obtain data for all the tests from all the participants (some participants refused certain tests), and *n* varies from 27 to 31 or as stated. They were tested and interviewed in April 2005.

For dietary comparisons, we used data collected in 2002–2003 from 15 Bedouin and 15 Jewish women, 20–50 y old. The urban Bedouin women lived in townships, and the Jewish women lived in the city of Beer-Sheva, in the same region in the Negev.

Encampment participant selection and procedure

The three researchers were female and Arabic speaking (a non-family male would not be permitted to interview the women). Villages were chosen by a Bedouin male intermediary who knew the location of the remote, traditional, encampments. In the encampment, the researchers were first interviewed by a married elder of the

Table 1
Age, BMI and height of encampment participants, *n* = 28

	Bedouin
Age (y)	44 ± 2 (26–64)
Weight (kg)	73.0 ± 2.6 (47.5–96.2)
Height (cm)	154.8 ± 10.2 (143–168)
BMI (kg/m ²)	30.3 ± 1.1 (21.1–43.4)

¹No perishables can be stored with this form of refrigeration for more than a day or two. We found the fridges filled with sterilized milk cartons (used for drink and to prepare milk products), and suchlike.

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