Rapid lifestyle, diet and health changes among urban Bedouin Arabs of southern Israel

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Over the past half century, with the formation of nation states and the encroachment of modernization, aspects of Bedouin life throughout the Middle East have been gradually changing. Traditionally, the Bedouin Arabs of the Negev desert in southern Israel had a nomadic/semi-nomadic lifestyle based upon herding and seasonal agriculture. After the establishment of Israel in 1948, their land base and mobility were greatly reduced. Most Bedouin, however, maintained their traditional lifestyle until the mid-1960s when they began to integrate with the modern Israeli labour market (Marx, 1967).

Urbanizing the Bedouin population

In the late 1960s the Israeli Government developed plans for settling the Bedouin population in urban areas, and significant movement into towns began in the mid-1970s. As of 1998, there were seven planned towns with populations ranging in size from 27 500 to 3 500 (Ben-Gurion University, 2000). In the towns, neighbourhoods are subdivided into 0.1 ha housing lots, with community health clinics and schools, access to running water, mains electricity and telephone services and numerous small neighbourhood grocery stores. There are few jobs, so most urban Bedouin work outside their places of residence (Lithwick, 2000). In 1998, the Negev Bedouin population numbered 111 475, of whom 56 percent lived in the government-planned towns. The remaining 44 percent continued to live more traditionally in shantytowns and extended family groups that were not recognized by the governmental planning authorities (Ben-Gurion University, 1999), and thus not connected to central water, electricity and telephone services (Lithwick, 2000).

Changing patterns in diets, activity and disease

The transition of over half of the Bedouin population from a semi-nomadic and agrarian lifestyle to an urban one was accompanied by rapid changes in diet, levels of physical activity and chronic disease rates. The rapid rise of chronic diseases in urbanizing populations in developing countries in the Middle East (al-Nuaim *et al.*, 1997; Galal and Harrison, 1997a; Musaiger and al-Roomi, 1997; Stene *et al.*, 1999) and worldwide is an issue of growing concern (Dodu, 1988; Galal and

Education, poverty and health among the urban Negev Bedouin

Although Israel is a developed nation, the socio-economic and health indicators of the Negev Bedouin are similar to those found in developing country populations. The Negev Bedouin fall below the average Israeli national in terms of educational level, school dropout rates and university attendance. The unemployment rate among Negev Bedouin is estimated to be 55 percent of the total workforce. Approximately 30 percent of all working-age men and over 80 percent of all working-age women are unemployed. Employment is found in low-status, low-paying occupations such as construction, driving and unskilled labour (Shapira and Hellerman, 1998).

Sixty-five percent of Bedouin families live below the poverty line (Ghanem, 1998; Hayton, 1998). In 1996, the average annual wage per family of urbanized Bedouin was less than half (41.4 percent) of the average annual wage per family in the total Israeli population. Since the average Bedouin household size is approximately double that of the average Israeli household size, the annual family wage per capita of Bedouin was 20 percent of the Israeli average (Ben-Gurion University, 2000; Lithwick, 200l). Although families with children receive child support allowances from the government, the economic gap between the Bedouin and the Israeli Jewish population remains very high. The economic status of urban Bedouin is closer to that of the average residents of Egypt, the Syrian Arab Republic and Lebanon than it is to average residents of Israel (Lithwick, 2001).

The natural rate of increase (births minus deaths) is 43.8 and 15.9 per thousand Bedouin and Israeli Jews, respectively (CBS, 1999a). Fifty percent of Negev Bedouin are under the age of 13 (CBS, 1999b). Overcrowding in Bedouin households is common, where families numbering seven or more people constitute 40-45 percent of households, as compared to 1-10 percent of households in Israeli Jewish settlements (CBS, 1999a). These conditions are associated with higher rates of illness, hospitalization and mortality for infectious diseases among Bedouin children than Jewish children (Fraser et al., 2001; Levy et al., 1998; Weitzman, 1997).

Harrison, 1997b; McMurry *et al.*, 1991; Whiting and Mackenzie, 1998). As diabetes and cardiovascular disease are best prevented through appropriate diet and physical activity, it is important to understand how traditional dietary and lifestyle patterns changed with urbanization in order to develop effective disease prevention and health promotion interventions.

Chronic diseases such as ischemic heart disease (IHD), acute myocardial infarction (AMI), cerebrovascular disease (CVD) and diabetes, which were very rare among the Bedouin until the 1970s, are increasing rapidly (Ben Assa, 1961, 1964; Weitzman, Lehrmann and Abu-Rabiah, 1974; Fraser *et al.*, 1990; Weitzman, 1997, 1999). In a study conducted in 1985, Fraser *et al.* (1990) found that urbanized Bedouin men were significantly more likely than traditional Bedouin men to be obese and overweight, and to have high low density lipoproteins (LDL)-cholesterol rates, indicating that urbanization and the associated changes in lifestyle were altering the pattern of cardiovascular risk factors in this population.

Table 1 contains the age-adjusted rates (per thousand) of hospitalizations from 1994 to 1998 for AMI and CVD among Negev Bedouin and Israeli Jews by gender and community type. The rates for Bedouin men and women were much higher than those of rural Jews, and similar to those of urban Jews (Weitzman, 1999).

Table 2 contains the results of two studies on diabetes among urban Israeli Jews and Bedouin in the Negev, and indicates that the prevalence of diabetes was approximately twice as high among the Bedouin as it was among the Jews. In addition, the data in Table 3 show that the mean body mass index (BMI) (weight/height) in diabetic Bedouin males and females was generally higher than that of diabetic Jewish males and females (S. Weitzman, 2000, unpublished data).

Health services

An important difference between the Negev Bedouin and the populations of developing countries is that the Bedouin have access to Israel's highly developed health care system. As a consequence, while the infant mortality rate of Negev Bedouin is higher than that of Israeli Jews (12.3 and 5.2 per thousand live births, respectively) (CBS, 1999b), it is much lower than the infant mortality rate in developing countries in the Middle East and worldwide. With regard to chronic diseases, however, utilization of available services is problematic. Traditionally, Bedouin used health care services for acute illness; an understanding of how chronic illness is cared for, and the importance of preventive medicine, is not well developed. In addition, some traditional Bedouin customs associated with food and hospitality make compliance with treatment regimes for chronic illnesses such as diabetes and hypertension problematic.

TABLE 1

Age-adjusted rates (per thousand) of hospitalizations for acute myocardial infarction (AMI) and cerebrovascular disease (CVD) among Negev Bedouin and Israeli Jews by gender, ethnicity and community type, 1994-1998

	Males			Females		
	Bedouin	Rural Jews	Urban Jews	Bedouin	Rural Jews	Urban Jews
AMI	9.37	5.47	8.55	6.92	1.99	3.96
CVD	9.13	3.10	9.86	10.43	2.34	8.21

Traditional lifestyle and diet

Livestock and animal products

Traditionally, the Bedouin livelihood primarily involved herding of sheep, goats and camels that provided meat, milk products and wool. Meat was only eaten on special occasions (such as feasts, weddings and visits from guests) as this entailed slaughtering an animal and consuming it before the meat spoiled. Limited amounts of meat were made into *hamit* (meat cooked and then sealed in mutton fat at a ratio of 1:2), which kept well for extended periods and was used as a source of fat, flavouring and meat for cooking. Many families raised chickens as a source of eggs rather than of meat. In addition, they trapped or captured wild birds and fowl, particularly during the planting and harvesting seasons.

Milk products made up a large portion of the traditional Bedouin diet. Fresh milk was used for cooking and drinking. The most common preserved milk products were *rayib*, fresh butter, *semneh*, *leben*, *jameed* and *'afiq*. *Rayib* (yoghurt with butterfat), was churned by hand to separate the butterfat from the milk. The fresh butter was made into *semneh* (ghee or clarified butter) by boiling the butter to separate it from the milk solids. It was then used for long-term storage. *Leben* (yoghurt without butterfat) was very important in the traditional Bedouin diet although it was highly perishable. *Jameed*, a soft white cheese eaten with olive oil and bread, was made from excess *leben* by reducing the moisture content. Excess *jameed* was made into *'afiq* by increasing the salt content and further reducing the moisture content until the cheese could be formed into balls, which were then thoroughly dried. *'Afiq* provided a portable, non-perishable milk product and protein source that was used throughout the year in cooking and for salads.

TABLE 2

Prevalence of diabetes (percent) among urban Israeli Jews and Bedouin

Age category	Jews	Bedouin
35-44	0.9*	3.4
45-54	5.6	10.0
55-64	12.8	20.0
>65	11.7	18.1

* Age 30-44

TABLE 3

Mean body mass index for urban Bedouin and Israeli Jewish diabetics by gender, age and ethnicity

	Males		Females	
Age category	Bedouin	Jews	Bedouin	Jews
35-44	28.0	26.5	34.0	29.0
45-54	29.2	27.5	31.0	28.0
55-64	28.5	29.0	28.0	27.0
>65	28.8	26.6	30.0	27.0

Agriculture

Agriculture was an important component of the traditional Bedouin economy, through which the Bedouin produced a large part of their diet. In the northern semi-arid Negev, wheat, barley and lentils were produced. The Bedouin living in the more arid areas had larger herds and

depended more upon herding than agriculture for their livelihood. With excess livestock and animal products as a source of income, they could purchase the agricultural products they needed.

Wheat was an important staple of the Bedouin diet. Wholewheat flour was used for making several types of bread, the most common of which was *khubiz saj*, a thin, unleavened, tortilla-like bread, usually made fresh for every meal. Some of the wheat was made into cracked wheat (*jerisheh*), and used in cooking several of the main traditional dishes.

Lentil was another major crop raised by the Bedouin, and served as staple food in many traditional dishes. Poorer families ground barley into flour for making

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bread. In addition, *freekeh* was made from immature wheat and barley that were roasted and dried, and then used to make a rice-like dish.

In small fields where rainwater was collected, many Bedouin planted a variety of vegetables and fruit, such as tomatoes, onions, okra, Arabic cucumbers (*fegus*), pumpkins, courgettes, watermelons and muskmelons. Most of this produce was eaten fresh, but tomatoes and okra were dried and stored for use throughout the year.

Traditionally a number of wild plants and herbs (such as *khubaizeh* [dwarf mallow], wild chard, thyme, sage, camomile and fennel) were used either as foods or for medicinal purposes. In addition, the Bedouin purchased a number of food products, including olive oil, tea, sugar, coffee, sesame seeds, *tehineh* (sesame seed paste), fresh and dried fruits such as dates, figs, grapes, apricots, lemons and oranges, and spices and seasonings.

Lifestyle

Traditional Bedouin life entailed a great deal of rigorous physical activity and involved the whole family, particularly for the planting and harvesting of crops. Many families would plough with camels as many as 200-400 dunums (20-40 ha) of land for planting wheat and barley. These crops were harvested manually, and the processes of transporting, thrashing, winnowing and storing the grain also required primarily manual labour. Men were mainly involved in agricultural production, storage and processing (such as ploughing, planting, harvesting, storage of wheat and the transportation of the wheat to the flour mill). They also oversaw the herds. Women and children had specific tasks in addition to their agricultural work. Women did most of the food preparation and home food processing, processing of the wool and hair products (including making the tents), washing and childcare. Children often served as shepherds and took care of the animals and their pens. Water had to be drawn from wells and transported to the home, either on foot or transported on animals. Women and children also gathered brush from the hills for firewood and fuel. Since vehicles and even other sources of transportation (horses, donkeys, etc.) were limited, the routines of daily life necessitated a great deal of walking.

Limited dietary and lifestyle changes began to occur prior to the urbanization process. Tractors were introduced into Bedouin agriculture in the late 1960s and replaced manual labour in the planting and transportation processes, although harvesting remained primarily a manual operation until the mid- to late 1980s. After the 1967 Arab-Israeli War, when it became possible to access the West Bank and Gaza Strip, many new foods were introduced into the Bedouin diet. This region represented inexpensive markets with a range of food products from all types of canned goods (beans, peas, tomato paste, hummus dip,

tuna, etc.) to dry goods (rice, macaroni, etc.), and a whole new range of fresh produce, including cauliflower, eggplant, spinach, cabbage and *molokhiyeh* (a dark-green spinach-like vegetable). Many of the Bedouin had family connections in the region, through which they were introduced to new foods and new cooking methods, such as kerosene or gas burners, ovens for baking pitta bread, etc. A few of their food preservation processes (such as drying tomatoes and okra) fell into disuse since they were available as canned products, but meat and dairy preservation processes were maintained.

Food-related culture

Traditional Bedouin customs surrounding food, hospitality and social obligations are also important to understanding dietary patterns. The Bedouin ate with their hands, using bread as an eating utensil for many dishes, thus maintaining a high bread consumption. Hospitality always included food, which could not be refused without offending the host. In addition, there was an extensive system of obligations to visit relatives and friends after certain events or occasions (such as illness/hospitalization, birth, a long trip or marriage of a son or daughter), which also involved the sharing of food. Traditionally, guests would bring a gift of coffee beans, sugar, *semneh* or home-reared chickens and the hosts usually served a meal, as well as tea and coffee.

Urbanization

Radical changes in lifestyle resulted from the movement into towns. Diet was affected in a number of ways. The move to the towns ended the Bedouin involvement in food production. Some families kept a few sheep for their own household needs (such as traditional feasts or hosting guests), and other small animals such as chickens, but these activities were curtailed by the limitations of space and the cost of buying feed all year. Some families planted fruit and/or olive trees on the family plot, as well as gardens in spring, but the cost of water made it more economical to buy rather than grow fresh garden produce.

At the same time, urbanization improved access to markets. The most common businesses run in the towns are small grocery stores, which are a readily accessible source of food and, in particular, of sweets, snacks and sweetened drinks for children. Urban Bedouin now have much better access to markets in other cities as there are more private cars. This, in combination with the loss of traditionally produced foods, has led to an increase in the number of market and store-bought foods in the urban Bedouin diet.

The introduction of mains electricity in the towns also had a major effect upon the Bedouin regular diet. While the extent of change varied with the family's socioeconomic status, mains electricity and refrigeration enabled a whole new range of foods and food storage methods to be adopted. As part of their regular diet all year, urban Bedouin households could consume a range of fresh dairy products (milk, yoghurt, sour cream, soft and hard cheeses, etc.); fresh, frozen and processed meat products; an array of frozen foods; fresh fruit and vegetables in greater quantities; and sweetened soft drinks. Foods eaten prior to urbanization (such as cooked and fresh vegetables, salads, homemade bread, rice, eggs, potatoes and lentils) were still common, although combined with more meat than was traditionally eaten.

Traditional food management and diet were also affected by the changes in occupational patterns and daily routines. Most of the adult men sought employment in the Israeli labour market. They spent the day away from home and ate one or more of their meals at work where they were exposed to a Western-style diet. Most children attended schools and either had a packed lunch or bought food at school. As a result, the female head of the household, who traditionally managed all the preparation and distribution of food, lost some of her involvement in, as well as knowledge of, what family members were eating.

The urbanization process entailed a significant drop in the level of physical activity among the Bedouin. The labour requirements associated with livestock and agricultural production and the processing of food and animal products (meat, milk and wool) came to an end. The proximity to neighbours, stores, schools and health clinics, as well as the increased availability of transportation, greatly reduced the amount of walking in the daily routine. Most urban Bedouin men were employed as unskilled labourers, many of them lorry drivers, therefore not necessarily undertaking manual labour. The majority of Bedouin women do not work outside the home, and household labour demands in the towns were much fewer than they were traditionally. As of 1995, almost 30 percent of urban Bedouin households had wash-

Diabetes and cardiovascular disease are best prevented through appropriate diet and physical activity; understanding how traditional diets and lifestyles change with urbanization is important for effective disease prevention and the promotion of health

ing machines. In addition, 67 percent of urban Bedouin households had televisions, further reducing levels of physical activity, especially among children (Ben-Gurion University, 1999).

Customs associated with food and hospitality have remained much the same with urbanization. Bread, now often made only with white flour, is still used as an eating utensil for most meals. The social obligations of visiting are also still practised, and visits have become more frequent because of the greater proximity of relatives and friends in the urban settlements. Food brought by guests is now likely to be soft drinks, biscuits, cake or sweets, which are readily available. Guests are offered soft drinks, tea, coffee, biscuits and fruit, rather than a meal.

Discussion

The rapid transition of Negev Bedouin Arabs from a traditionally semi-nomadic and agrarian lifestyle to an urbanized lifestyle entailed changes in both diet and levels of physical activity. Bedouin in the towns are eating a diet that is higher in calories and fats than their traditional diet, and they also have greatly reduced levels of physical activity. There is now a high prevalence of diabetes and cardiovascular disease in a population that was at low risk 30 years ago. This phenomenon has been found among other traditional indigenous peoples in developed countries whose lifestyles and diets have been affected by the dominant, Western-oriented majority cultures (Hoy *et al.,* 1999; Gittelsohn *et al.*, 1998; McMurry *et al.*, 1991; Thompson and Gifford, 2000; Whiting and Mackenzie, 1998). In addition, the same phenomenon is occurring among urbanizing populations in developing countries in the Middle East and around the world (Dodu, 1988; Galal and Harrison, 1997a, 1997b; Stene *et al.*, 1999).

Primary prevention is the key to halting the spreading diabetes and CVD epidemics among urban Bedouin by reducing the main risk factors for these diseases, such as obesity. Epidemiological studies have demonstrated the link between obesity and diabetes (Modan *et al.,* 1986; Saad *et al.*, 1988). In their prospective study, Modan *et al.* (1986) found that the risk of diabetes was twice as high for those with a BMI greater than 27 as it was for those with a BMI of 27 or less.

Physical activity and appropriate diet are the best means of preventing obesity. A diet high in energy, derived from simple sugars and dietary fats in the urban Bedouin diet, leads to obesity. Primary prevention efforts among the Bedouin must promote the consumption of a diet that is lower in energy and dietary fats and richer in complex carbohydrates, which is in fact similar to their traditional diet. This can be done without changing the way food is eaten, or the social protocols surrounding food and hospitality, but rather by monitoring what is eaten, and promoting information about the health benefits of traditional Bedouin foods and dietary patterns and their most healthy market substitutes.

Physical activity is also important because, with exercise, there is a relative loss of adipose tissue, which assists in maintaining reduced weight. Prospective studies in the United States found that among

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women, vigorous exercise more than once a week resulted in a 33 percent reduction of the incidence of diabetes (Manson *et al.*, 1991). Among men, exercising once a week, two to four times a week, and five or more times a week reduced the incidence of diabetes by 23 percent, 33 percent and 42 percent, respectively over a 15-year period (Manson *et al.*, 1992). Likewise, a random trial in China showed that diet and/or exercise interventions were inversely related to the incidence of diabetes, with the most effective intervention being a combination of diet and exercise (Pan, Li and Hu, 1995). Urbanized Bedouin have experienced a great reduction in physical activity, for which new alternatives must be sought or created in the urban setting.

The Negev Bedouin transition from a traditional diet to one consisting primarily of market and store-bought foods contains both potential risks and benefits, and must be studied further to understand the health outcomes of dietary changes fully. The standard dietary assessment methods used today originate primarily from developed societies with Western-style diets, eating patterns and lifestyles. These tools must be redesigned in the light of the particular eating patterns, food-related culture and lifestyle of the Bedouin in order to be valid and effective. A similar process is needed for developing effective prevention and health promotion interventions.

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Rapid lifestyle, diet and health changes among urban Bedouin Arabs of southern Israel

The Bedouin Arabs in southern Israel are a traditionally semi-nomadic/nomadic population undergoing a rapid process of urbanization. Prior to settling in towns, chronic diseases such as diabetes and cardiovascular disease were very rare among the Bedouin. The prevalence of diabetes among urbanized Bedouin has risen dramatically, as have hospitalization rates for acute myocardial infarction and cerebrovascular disease. There is evidence indicating that the urban lifestyle is altering the pattern of cardiovascular and diabetes risk factors in the population.

Traditionally, the Bedouin met many of their dietary needs by producing their own food. Their semi-nomadic and agrarian lifestyle also entailed a great deal of physical activity. With urbanization, the Bedouin agricultural and herding activities ended; levels of physical activity dropped greatly; access to markets and modern amenities (e.g. electricity and refrigeration) were much improved; and many new foods entered the routine diet.

Primary prevention is the best means of halting the diabetes and cardiovascular disease epidemic among urban Bedouin, through promoting a diet lower in calories and richer in complex carbohydrates. A dietary assessment is needed to understand the health and nutritional impacts of the dietary changes in the urban setting fully. However, since most dietary assessment methods and public health interventions originate from highly developed Western societies, they need to be adapted in the light of the particular eating patterns, food-related culture and lifestyle of the Bedouin in order to be valid and effective.

Évolution rapide du style de vie, du régime alimentaire et de l'état de santé des Bédouins arabes vivant dans les zones urbaines du sud d'Israël

Les Bédouins arabes du sud d'Israël sont un peuple à tradition semi-nomade/nomade qui subit un processus rapide d'urbanisation. Avant leur installation en ville, ils ne souffraient que très rarement de maladies chroniques comme le diabète et les maladies cardiovasculaires. Les taux de prévalence du diabète chez les Bédouins vivant en zone urbaine ont fortement augmenté, de même que le taux d'hospitalisation pour infarctus du myocarde et maladies cardiovasculaires. Il est démontré que le mode de vie urbain modifie les profils des facteurs de risque du diabète et des maladies cardiovasculaires.

Les Bédouins ont toujours pourvu à nombre de leurs besoins nutritionnels grâce à leur propre production. Leur mode de vie semi-nomade et agraire nécessitait une grande activité physique. Avec l'urbanisation, leurs activités d'agriculture et d'élevage ont pris fin. Ils se dépensent beaucoup moins, l'accès aux marchés et aux commodités de la vie moderne (électricité, réfrigération) est nettement meilleur, et de nombreux aliments ont fait leur entrée dans leur régime quotidien.

La prévention primaire est le meilleur moyen de juguler la diffusion du diabète et des maladies cardiovasculaires parmi les Bédouins des zones urbaines, en encourageant un régime plus pauvre en calories et plus riche en glucides complexes. Une évaluation alimentaire est nécessaire pour comprendre parfaitement les effets sanitaires et nutritionnels des changements d'alimentation en milieu urbain. Comme la plupart des outils d'évaluation diététique et des interventions de santé publique viennent des sociétés occidentales très développées, pour être valables et efficaces, ils doivent être adaptés aux régimes alimentaires, à la culture et au mode de vie particuliers des Bédouins.

Rápidos cambios de estilo de vida, alimentación y salud entre los árabes beduinos de las zonas urbanas del sur de Israel

Los árabes beduinos del sur de Israel son tradicionalmente una población nómada o seminómada que está experimentando un rápido proceso de urbanización. Antes de que se asentaran en las ciudades, las enfermedades crónicas, como por ejemplo la diabetes y las enfermedades cardiovasculares, eran muy raras entre los beduinos. Las tasas de prevalencia de diabetes entre la población beduina urbanizada han aumentado de forma espectacular, lo mismo que las tasas de hospitalización debida a infartos de miocardio agudos y enfermedades cerebrovasculares. Los datos indican que el estilo de vida urbano está alterando los modelos de factores de riesgo de diabetes y de enfermedades cardiovasculares en esta población.

Tradicionalmente, los beduinos producían productos alimenticios y no alimenticios, con los que satisfacían muchas de sus necesidades nutricionales. Su estilo de vida seminómada y agrario conllevaba una actividad física considerable. Con la urbanización, se han terminado las actividades agrícolas y ganaderas de los beduinos; se ha reducido sensiblemente la actividad física; ha mejorado en gran medida el acceso a mercados y recursos modernos (por ejemplo, electricidad y refrigeración), y se han introducido muchos alimentos nuevos en la alimentación diaria.

La prevención primaria es el mejor modo de frenar las epidemias de diabetes, y de enfermedades cardiovasculares entre los beduinos urbanos, fomentando una alimentación con un contenido más bajo de calorías y más rico de hidratos de carbono. Es necesario hacer una evaluación de la alimentación para entender cabalmente las repercusiones de los cambios de la alimentación en el estado nutricional y de salud de esta población en las zonas urbanas. Dado que la mayor parte de los instrumentos de evaluación de la alimentación, así como las intervenciones de salud pública, provienen de sociedades occidentales altamente desarrolladas, deben adaptarse teniendo en cuenta los modelos alimentarios, la cultura relativa a la alimentación y al estilo de vida propios de los beduinos para que resulten válidos y eficaces.