Changes in Food Supply Pattern in Jordan from 1961 to 2005

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ABSTRACT

The Ministry of Health in Jordan reported in 2004 the increase in the prevalence of chronic diseases particularly obesity, diabetes mellitus, cancers and cardiovascular diseases. These health problems are all diet and lifestyle related and are considered the leading causes of mortality in Jordan. The traditional Jordanian diet was very rich in olive oil, whole wheat cereals and vegetables and low in refined carbohydrates, meat and animal fats. Currently, the Jordanian diet has changed considerably when compared with the traditional one. The Food Balance Sheets of 44 years (from 1961 to 2005) were collected from the Department of Statistics in Amman and FAOSTAT. Data were entered and analyzed using SPSS.

The results of the study showed a significant increase in the supply of cereals, meats, animal fats and vegetable oils in 2005 as compared to that in 1961. Additionally, the supply of vegetables and fruits in 2005 was lower than that in 1961 by 25% and 52%, respectively. Meat, and poultry supply increased about 80%, 97%, and 75%, respectively from 1961 to 2002. The increase in milk supply was near from the recommended amounts which is considered the only healthy change that could be noticed in the Jordanian diet. The increase in sugar and fat consumption which had been detected from 1961 to 2005 was significant and may be attributed to the influence of western diet.

In the present, diet shifts accompanied with the sedentary lifestyle in most Jordanian communities caused the increase of chronic diseases which is not considered an unpredictable result. Going back to the traditional Jordanian diet and adopting a healthy lifestyle are very important steps to prevent those diseases and their health consequences.

Keywords: Food Balance Sheets, Food Supply Pattern, Chronic Diseases.

INTRODUCTION

The transition in eating pattern and lifestyle behaviors due to urbanization and globalization was accompanied with the increased prevalence of nutrition-related chronic diseases all over the world including Jordan (Madanat et al., 2008; Popkin, 2001; Popkin, 2002). Chronic diseases are the leading cause of mortality in Jordan. The leading causes of death in Jordan are Cardiovascular Diseases (CVD) followed by cancers, cerebrovascular diseases and Diabetes Mellitus (DM). A study of Khader et al. (2008) revealed that the age-standardized prevalence of obesity in northern Jordan was 28.1% for men and 53.1% for women. Irrespective of age or measure used, women always had a higher prevalence of obesity than men. Another study of Ajlouni et al. (2008) compared the prevalence in DM in 1994 to that in 2006, reported a significant increase in the prevalence of diabetes by 31.5% (Ajlouni et al., 2008). Additionally, they demonstrated that the prevalence of type 2 diabetes and impaired fasting glucose is high in Jordan and is increasing (Ajlouni et al., 2008).

According to the Jordanian Ministry of Health (MOH) mortality statistics, 38.2% of deaths in 2003 were attributed to cardiovascular diseases and 14.3% to cancers. The diagnosed prevalence in 2004 of diabetes mellitus, obesity and overweight, high blood pressure and high blood cholesterol were 17.9%, 70%, 22.4%, 30.2%, and 23.1%, respectively (CDC, 2003).

The first behavioral risk factor survey in Jordan which
was conducted in 1996, revealed that self-reported chronic disease risk factors are highly prevalent (MOH, 1966). Among adults aged 18 years or older, the self-reported diagnosed prevalence of diabetes mellitus, obesity and overweight, high blood pressure, high blood cholesterol were 6.8%, 45%, 12.8%, 22.2%, and 20.9%, respectively (MOH, 1996). A household survey conducted by MOH in Jordan in 1996 for adults aged 25 or older measured key chronic disease indicators. At that time, the measured prevalence of diabetes mellitus, obesity and overweight, high blood pressure, high blood cholesterol were 6.8%, 68%, 22.2%, 20.9%, respectively (Zindah et al., 2008).

Up to our knowledge, there is no information available about examining the changes in Jordanians eating habits as a consequence of civilization and globalization. The aim of the present study is to identify the shifts in eating habits from 1961 until 2005. However, since there is no national nutritional survey, we attempted to use the food balance sheets as a source for determining the changes in eating patterns among Jordanians.

METHODS

The Food Balance Sheets (FBS) of 44 years (from 1961 to 2005) were collected from the Department of Statistics in Amman and FAOSTAT data (FAO, 2009). Data were entered and analyzed using SPSS. Changes from 1961 to 2005 were calculated as percentages. Data about carbohydrates (CHO), fat and protein intake as well as the amount consumed (Kg/Year) of cereals, starchy roots, sugars and sweeteners, pulses, oil crops, vegetable oil, vegetables, fruits, stimulants, meat, animal fats, milk-excluding butter, eggs, fish and sea food from 1965 to 2005. It has been shown in table (1), that the stimulant consumption is the only food item that has not been changed from 1965 to 2005. The increase in the consumption of cereals, starchy roots and sugars is noticeable and significant. This may be attributed to the increase in the total energy intake as shown in figure 1. This increase in daily energy intake (from 2128 to 2950 kcal), from 1961 to 2005, was reflected on the increment noted in carbohydrate, fat and protein consumption during this period (figure 2 and 3). However, when the percentages of energy come from fat and protein consumption in 1961 compared to 1965, 1975, 1985, 1995 and 2005, a noticeable increase could be seen. On the other hand, a clear decrease in energy percentage coming from carbohydrate could be detected (table 2). It could be understood that, even though the amount of energy coming from carbohydrate was increasing, the percentage from total energy was decreasing. The explanation is that the total energy increased and consequently the total CHO intake increased but as a percentage it decreased (from 72% to 63%) due to an increase in the percentages of fat (from 18% to 26%) and steady protein supply as a percentage but not as an amount (table 2). Regarding animal fat, there was a significant increase from the period 1961 to 2005. The same trend was detected in vegetable oil specially soybean and corn (maize) oils (figure 4). However, the reduction in olive oil consumption was accompanied with the increase in other vegetable oil consumption (figure 5). When analyzing the supply of fruits and vegetables, a significant reduction in fruit and vegetable consumption during the period from 1960 to 2005 was obtained in figure 6. More precisely, there was consumed, i.e. pattern of diets, and adequacy in relation to nutritional requirements. FBS could be a useful tool in many agricultural policy concerns including raising production levels, formulation of nutritional plans, and ensuring food security (FAO, 2009). The lack of a nutrition survey for Jordanians imposed the use of food balance sheet to trace the change in eating patterns from 1961-2005.

RESULTS AND DISCUSSION

The results of the study showed significant changes in food supply from cereals, starchy roots, sugars and sweeteners, pulses, oil crops, vegetable oil, vegetables, fruits, meat, animal fats, milk-excluding butter, eggs, fish and sea food from 1965 to 2005. It has been shown in table (1), that the stimulant consumption is the only food item that has not been changed from 1965 to 2005. The increase in the consumption of cereals, starchy roots and sugars is noticeable and significant. This may be attributed to the increase in the total energy intake as shown in figure 1. This increase in daily energy intake (from 2128 to 2950 kcal), from 1961 to 2005, was reflected on the increment noted in carbohydrate, fat and protein consumption during this period (figure 2 and 3). However, when the percentages of energy come from fat and protein consumption in 1961 compared to 1965, 1975, 1985, 1995 and 2005, a noticeable increase could be seen. On the other hand, a clear decrease in energy percentage coming from carbohydrate could be detected (table 2). It could be understood that, even though the amount of energy coming from carbohydrate was increasing, the percentage from total energy was decreasing. The explanation is that the total energy increased and consequently the total CHO intake increased but as a percentage it decreased (from 72% to 63%) due to an increase in the percentages of fat (from 18% to 26%) and steady protein supply as a percentage but not as an amount (table 2). Regarding animal fat, there was a significant increase from the period 1961 to 2005. The same trend was detected in vegetable oil specially soybean and corn (maize) oils (figure 4). However, the reduction in olive oil consumption was accompanied with the increase in other vegetable oil consumption (figure 5). When analyzing the supply of fruits and vegetables, a significant reduction in fruit and vegetable consumption during the period from 1960 to 2005 was obtained in figure 6. More precisely, there was
a fluctuated decrease in vegetable consumption; vegetable consumption in 1961 was 87.6 kg per capita then it decreased to 57.4 kg per capita in 1985 then returned to increase in 2005 (65.2 kg per capita). However, it was still lower than the consumption in 1960s. Also, there was a similar trend was observed in fruit consumption. Fruit supply decreased from 221.9 kg per capita in 1961 to 107.6 kg per capita in 2005.

With regard to meat consumption, the increase in meat consumption was 78.5% during the period from 1961 to 2005 which was significant. However, meat consumption increased from 7.7 kg per capita in 1961 to 60.5 kg per capita in 1990 then decreased to 35.9 kg per capita in 2005. This trend of rise in 1990 dropped in 2005. This could be attributed to the increase in consumer knowledge towards the detrimental effects of excessive meat intake. Additionally, the type of meat consumed changed during this period; chicken meat was the predominant type consumed followed by mutton and goat meat and then bovine meat (figure7). Even though, there was a significant change on fish and sea food consumption, the highest amount consumed per capita was in 2000 followed by a decrease in the last 5 years (table 1). Regarding milk supply, a trend of increase in milk and milk product consumption is significant during this period. However, this increase could not be detected when milk consumption in 1961 was compared to that in 2005 (table 1). The increase in milk supply was more than 25% in 1961 compared to any period of time from 1975 to 2000. Stimulants’ consumption, including tea and coffee, is the only food item which didn’t show any significant change from 1961 to 2005.

From all of the above, it can be concluded that this nutrition transition may be a contributor to the increase in the prevalence of chronic diseases. Data on risk factors associated with diet-related non-communicable diseases indicate a high prevalence of these risk factors among both men and women. Obesity, hypertension, high blood cholesterol and diabetes are increasing according to many studies conducted on a national level in Jordan (Ajlouni et al., 2008; CDC 2003; Khader et al., 2008; Madanat et al., 2008; Popkin 2001; Popkin 2002). Almost all those chronic diseases are related and correlated to unhealthy dietary habits. Other risk factors include smoking and physical inactivity, both of which are widespread in the population. Current smokers compose 29.8% of the population, with large differences between men and women (50.5% and 8.3%, respectively). Moreover, physical inactivity levels indicate that 47.4% of the population are not engaged in any weekly physical activity, with rates higher among women than men (51.8% and 43.1%, respectively) (CDC, 2003).

The present results are in agreement with many other studies conducted all over the world. Bermudez and Tucker (2003) revealed that in Latin America a remarkable nutrition transition affected the eating patterns of the Latin American population. They found that the intake of total fat, animal products, and sugar were increasing (Bermudez and Tucker, 2003). Similarly, Levy-Costa et al. (2005) demonstrate the evolution of food consumption patterns in Brazil in the last three decades (Levy-Costa et al., 2005). There were systemic increments in total and animal fats as well as total energy intake. Additionally, excessive sugar consumption was also noticed (Levy-Costa et al., 2005). In Morocco, similar shifts were also seen. Daily caloric supply per capita increased from 2410 kcal in 1968-1970 to 3031 kcal in 1997-1999 (Benjelloun, 2002). The daily supply of fat per capita increased from 42gm to 59gm. In Thailand, the dietary pattern changes (from 1960 to 1995) were demonstrated in the decline in the consumption in total cereals and tubers as well as the remarkable increase in meat and animal fats (Kosulwat, 2002). However, this high supply of animal fat decreased drastically in 1995; animal fat consumption dropped from 13.5 to 1.9g which may be due to people’s awareness of its health complications (Kosulwat, 2002). In a closer country like Egypt, the consumption of cereals increased from 186 to 280 kg per capita; fat increased from 4.6 to 15.6 kg per capita; and refined sugar increased from 17.5 to 29.0 kg per capita in the period between 1960 to 1997 (Galal, 2002).

Regarding fruit and vegetable supply, these results are in contrast to many other studies all over the world. Vegetables and fruit consumption declined in Latin America (Bermudez and Tucker, 2003) and Central America (Romieu et al., 1997), while noticeable increases have been noted in Brazil (Levy-Costa et al., 2005) Morocco (Benjelloun, 2002), Thailand (Kosulwat, 2002), Egypt (Galal, 2002), and South Africa (Vorster, 2005).

Comparing the trend of meat supply in Jordan, it could be seen that meat supply was doubled in Egypt (Galal, 2002) and Malaysia (Noor, 2002) when consumption in 1960 is compared to that in 1997. Chicken was the prominent type of meat in Malaysia as
well (Noor, 2002). Consumption trends in Chile illustrate the regional trend towards increasing intake of meats at the expense of a lower intake of cereals in the 1980-1995 period. At the same time, they increased their consumption of beef, pork, and poultry in 1985, 1990, and 1995 by 43%, 140%, and 94%, respectively (Vio and Albala, 2000). On contrary to our results, consumption of fish decreased by 2% (Vio and Albala, 2000). In Korea, animal sources contribute substantially to protein intakes. Less than 10% of protein intake per capita per day came from animal sources in 1948. In 1995, almost 50% came from animal sources. These increases parallel the substantial increases in meat, poultry, and fish consumption (Kim et al., 2000). Referring to milk supply in the present study, the same trend of rise was detected in Brazil; the increase in dairy products consumption between 1972 and 2003 was +36% (Levy-Costa et al., 2005). However, the increase in milk supply in Korea was amazing; it increased in about 95% between 1969 and 1995 (Kim et al., 2000). As shown in table (1), egg consumption was increasing from year to year but a drop in egg consumption could be seen in 1990 and 2005. A similar shift is reported in many countries including Latin America (Bermudez and Tucker, 2003), Brazil (Levy-Costa et al., 2005), South Africa (Vorster, 2005) and Korea (Kim et al., 2000).

In conclusion, Jordan is one of many countries in the world that has been moving towards the nutrition transition. Nutrition transition has been occurring in developed and developing countries around the world. The increase in food energy, cereal, meat, animal fat and vegetable oil consumption and the decrease in fruit and vegetable consumption may be correlated with the increase in the diet-related chronic diseases. Physical inactivity and sedentary lifestyle are also promoters for developing those diseases. Going back to the traditional Jordanian diet and adopting a healthy lifestyle may help to prevent the consequences of these health complications.

Table 1: Amounts of foods supplied (per capita) from 1961-2005

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<tbody>
<tr>
<td>Cereal</td>
<td>133.4</td>
<td>140.7</td>
<td>151.9</td>
<td>153.6</td>
<td>158.84</td>
<td>162.16</td>
<td>152.96</td>
<td>162.42</td>
<td>143.07</td>
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<tr>
<td>Starchy roots</td>
<td>10.26</td>
<td>9.7</td>
<td>9.5</td>
<td>14.04</td>
<td>15.86</td>
<td>15.32</td>
<td>14.998</td>
<td>18.26</td>
<td>24.13</td>
<td>&lt;0.000</td>
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<tr>
<td>Sugars and sweeteners</td>
<td>27.44</td>
<td>29.54</td>
<td>25.9</td>
<td>43.06</td>
<td>43.32</td>
<td>43.9</td>
<td>40.52</td>
<td>34.3</td>
<td>39.66</td>
<td>&lt;0.000</td>
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<tr>
<td>Pulses</td>
<td>6.22</td>
<td>6.64</td>
<td>5.38</td>
<td>7.0</td>
<td>7.2</td>
<td>7.72</td>
<td>8.16</td>
<td>7.76</td>
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<td>&lt;0.000</td>
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<tr>
<td>Animal fats</td>
<td>0.38</td>
<td>0.42</td>
<td>0.38</td>
<td>0.9</td>
<td>1.26</td>
<td>1.26</td>
<td>1.04</td>
<td>1.14</td>
<td>2.60</td>
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<td>Vegetable oil</td>
<td>8.38</td>
<td>9.28</td>
<td>10.38</td>
<td>9.92</td>
<td>9.88</td>
<td>11.3</td>
<td>14.9</td>
<td>15.86</td>
<td>16.29</td>
<td>&lt;0.000</td>
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<tr>
<td>Oil crops</td>
<td>4.94</td>
<td>3.66</td>
<td>3.46</td>
<td>5.46</td>
<td>8.74</td>
<td>5.64</td>
<td>4.94</td>
<td>5.58</td>
<td>7.75</td>
<td>0.023</td>
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<tr>
<td>Fruits</td>
<td>87.64</td>
<td>69.54</td>
<td>38.86</td>
<td>50.02</td>
<td>57.44</td>
<td>66.14</td>
<td>71.6</td>
<td>54.12</td>
<td>65.24</td>
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<tr>
<td>Vegetables</td>
<td>221.9</td>
<td>111.7</td>
<td>82.52</td>
<td>68.08</td>
<td>82.32</td>
<td>112.28</td>
<td>125.68</td>
<td>85.48</td>
<td>107.61</td>
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<tr>
<td>Meat</td>
<td>7.68</td>
<td>11.98</td>
<td>16.66</td>
<td>21.26</td>
<td>34.38</td>
<td>60.54</td>
<td>36.02</td>
<td>32.68</td>
<td>35.85</td>
<td>&lt;0.000</td>
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<tr>
<td>Fish, Sea food</td>
<td>2.24</td>
<td>1.54</td>
<td>2.66</td>
<td>3.56</td>
<td>5.14</td>
<td>4.22</td>
<td>4.42</td>
<td>5.34</td>
<td>3.61</td>
<td>&lt;0.000</td>
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<tr>
<td>Milk-excluding butter</td>
<td>41.46</td>
<td>49.92</td>
<td>55.86</td>
<td>71.42</td>
<td>77.06</td>
<td>66.8</td>
<td>73.8</td>
<td>62.08</td>
<td>40.3</td>
<td>&lt;0.000</td>
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<tr>
<td>Eggs</td>
<td>2.68</td>
<td>4.54</td>
<td>4.42</td>
<td>6.1</td>
<td>6.58</td>
<td>5.28</td>
<td>9.38</td>
<td>7.62</td>
<td>5.90</td>
<td>&lt;0.000</td>
</tr>
<tr>
<td>Stimulants</td>
<td>1.92</td>
<td>3.18</td>
<td>2.76</td>
<td>1.98</td>
<td>2.24</td>
<td>2.98</td>
<td>2.36</td>
<td>8.66</td>
<td>3.98</td>
<td>0.426</td>
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* Values were calculated as average of 5 years.
** P-value is <0.05.

Table 2: Changes in macronutrient percents of total energy from 1961-2005

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<tr>
<td>Protein</td>
<td>10</td>
<td>11</td>
<td>11</td>
<td>10</td>
<td>11</td>
<td>11</td>
<td>11</td>
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<td>Fat</td>
<td>18</td>
<td>21</td>
<td>21</td>
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<td>22</td>
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<td>CHO</td>
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<td>69</td>
<td>67</td>
<td>67</td>
<td>64</td>
<td>63</td>
<td>63</td>
</tr>
</tbody>
</table>
Figure 1: Energy supply from 1961-2005

Figure 2: Energy from CHO, protein and fat
Figure 3: Supplied amounts of protein and fat from 1961-2005 (kg/yr)

Figure 4: Supplied amounts of different fats from 1961-2005 (kg/yr)
Figure 5: Supplied amounts of different vegetable oils (kg/yr)

Figure 6: Supplied amounts of fruits and vegetables (kg/yr)
Figure 7: Types and amounts of supplied meats (kg/yr)

Figure 8: Supplied amounts of milk, eggs and fish (kg/yr)
REFERENCES


