

# Gender inequality and nutritional status in patriarchal societies: the case of primary school students in riyadh city, Saudi Arabia

## Abstract

Gender inequality is associated with some eating and nutritional habits that influence women and/or men nutritional status. This study examined differences between male and female Sudanese Primary School pupils, in Riyadh city, daily food intake and compared between the males and females nutritional status. Data regarding the students' food intake (type, quantity and frequency) and daily food intake were collected from a stratified random sample of 400 students through personal interview. T-test and Chi-Square were used to analyze the data. The girls' intake from calories, carbohydrates, cholesterol and vitamin B12 is significantly lower than that of the boys. The girls' average intake of saturated fat and unsaturated fat is significantly higher than that of boys. A significant association between the respondents' gender and nutritional status was observed. There are some dietary habits that are associated with gender inequality and resulted in differential intake of most the nutrients and consequently a discrepancy in the nutritional status of the male and female pupils. Thus, the study findings are in line with the extant literature urging for adoption of a more holistic and gender sensitive nutritional policies that aims at mainstreaming gender issues in nutrition improvement initiative.

**Keywords:** gender inequality, patriarchal society, children nutritional status, food habits, food intake

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## Introduction

Women contribute significantly to the economy and the labor market through their paid and unpaid work in the public and private sector. The increased recognition of women's important contribution to the global economy through their productive and reproductive roles, and the recognition of their marginalization have led to a consensus among all stakeholders about the importance and need to bring all forms of social, cultural and economic gender inequality to an end. While sex means the biological differences between the males and females, gender is related to the culturally based expectations and roles that are ascribed to each of the two sexes in the different societies. In many societies, labeled as patriarchal societies, there is discrimination in vesting power and control over resources in favor of men; gender inequality.<sup>1</sup> Thus, gender inequality means the existence of social norms and even official laws and rules that result in differential access to and control over resources, services and opportunities based on the person's sex.<sup>2</sup> Consequently, in patriarchal societies the use and control of resources and economic opportunities are dominated by men.<sup>3,4</sup> Enforcement of women's economic, social, and cultural rights will not only enhance the fulfillment of their direct physical needs (practical needs), but also help in reforming the root of the unequal power relations between the sexes (strategic needs). In patriarchal societies, such as the one under consideration, gender inequality is associated with some eating and nutritional habits that may have negative impacts on women's and/or men's nutritional status.<sup>5</sup> An example of eating habits associated with gender inequality that negatively impacts women in some societies is the tradition that women eat after men. This not only results in females having neither enough food, nor balanced meals that include all the needed nutrients,

but very commonly they eat unhealthy and unsafe food, as in some cultures the eating habit is that all the food is put in one container and the males eat first and the females eat what is left over.<sup>2</sup> In many societies women and girls eat the food remaining after the male family members have eaten.<sup>6</sup> Women, girls, the sick and disabled are the main victims of this "food discrimination", which results in chronic under-nutrition and ill-health.<sup>6</sup> It has been argued that gender inequality is positively associated with wide spread of acute and chronic under-nutrition particularly among women and children.<sup>7</sup> In 2009 the World Food Program revealed that 60% of the chronically hungry individuals were females.<sup>8</sup> Even worse than that, is the fact that when malnutrition and gender disparity interact in patriarchal societies, the female children have less chances to make up for nutritional deficiencies compared to their male counterparts due to the nutritional and eating habits that are reinforced by the male biased culture.<sup>1</sup> Another example of the association between gender inequality and nutritional status is the restriction on women movement outside their homes (such as going to restaurants) without being accompanied by one of their male relatives which limits their access to fast food. Although this might impact positively on the females' nutritional status, yet it represents one of the complicated linkages and pathways through which gender inequality interacts and influences nutrition status.<sup>7</sup> The prevalence of malnutrition is increasing at an alarming rate in both developing and developed countries and it has become a serious health problem.<sup>9</sup> About two thirds (65%) of the world's population lives in countries where overweight and obesity kills more people than underweight and in 2010 nearly 43million children under the age of five were overweight.<sup>10</sup> In the past overweight and obesity, which represents one dimension of malnutrition, was considered a high-income country problem, but now it is on the rise even in low-

and middle-income countries, particularly in urban settings. About 35million overweight children are living in developing countries and 8million in developed countries and Asia, in which about 70% of the world malnourished children are found, is also facing the problem of overweight children.<sup>11</sup> The Gulf Cooperation Council Countries including the Kingdom of Saudi Arabia have witnessed significant lifestyle changes which have resulted in a significant reduction of physical activities in the daily life and encouraged sedentary lifestyle which is believed to be greatly responsible for the widespread of malnutrition in the region.<sup>12,13</sup> It had been estimated that the prevalence of overweight in Saudi Arabia is 11.7% and obesity is 15.8% among schoolchildren aged 6–18years old.<sup>14</sup> Nutritional status influences and can be considered a proxy of the health condition at the individual, particularly children, and society level.<sup>2,15,16</sup> Thus, there is a consensus in the extant literature that malnutrition (Obesity and under-nutrition) is the primary cause of many widely spread diseases especially among children.<sup>15</sup> Therefore, there is increasing evidence and international concern that the widespread of malnutrition combined with heavy burden of disease among the school-age children will negatively affect their performance and overall development. This has prompted an increased focus on the magnitude, types and possible consequences of malnutrition of the school-age (6-12years) children.<sup>17,18</sup> Moreover, gender inequality and malnutrition through their influence and interaction with health conditions affect the different aspects and dimensions of socioeconomic development; well-nourished and healthy people have higher productivity.<sup>19</sup> Although, many projects and programs that addressed and concentrated on either gender or malnutrition separately had achieved significant success, yet adopting a more holistic and gender sensitive nutrition policy (i.e. mainstreaming gender issues in nutrition improvement initiatives) is expected to result in more success and have more significant impact.<sup>27</sup> Thus, it is imperative to conduct research that highlight the impact of gender inequality on the nutritional status of one of important social groups; primary school students. Therefore, the current study examine the differences between male and female Sudanese Primary School pupils in Riyadh city daily average food intake of the different nutrients and compared the male pupils' nutritional status with that of their female counterparts.

## Methods

The study was conducted in Riyadh city, capital of Kingdom of Saudi Arabia. During the last 25years, Riyadh has become a modern city with modern schools, universities, hospitals, factories, shopping malls and entertainment facilities and different types of fast food. Riyadh hosts most of the Sudanese in Saudi Arabia because the chance to get a job here is better than in the other parts of the country. Therefore it is selected as the study area. Sudanese primary school students in Riyadh city, Saudi Arabia represent the study population. Due to difficulty in approaching the Sudanese pupils in all primary schools, a sampling frame of schools in some of the neighborhoods where most of the Sudanese live was established and then four schools (two for boys and two for girls) were selected randomly. A stratified random sample consisting of 400 primary school students (200 boys and 200 girls) of age between 6 and 12years was selected using random number generator software. Data regarding the students' food intake (type, quantity and frequency of eating and a brief description of a typical daily food intake) was collected through personal interview, by a M.Sc. student, using an interview schedule. The interview schedule was in Arabic language and consisted of open-ended questions. The 24hours recall food intake data for each respondent was entered into Esha food processor program which analyzed the food intake data and

gives the percentage of calories and nutrients that had been taken up by the students. T-test was used to compare between the students' food intake (24-hour recall) and dietary requirement intake and between the boys and girls food intake. Each student weight and height was obtained and her/his Body Mass Index (BMI) was calculated using the formula:

$$BMI = Weight (kg) / (Height in m)^2$$

The nutritional status (BMI) of the respondents is classified, according to WHO classification, into underweight, normal, overweight, obesity I, obesity II and obesity III.<sup>20</sup> Chi-Square test is used to examine the association between the pupils' gender and nutritional status (BMI).

Statement regarding ethics review committee:

Authors would like to indicate the following:

1. The study does not involve any threat or invasion of the respondents' privacy.
2. Prior to data collection the respondents and their families were fully informed by the nature and objective of the study.

## Results

To compare the boys' daily intake from different nutrients (calories, protein, carbohydrates, dietary fiber, total fat, saturated fat, unsaturated fat, cholesterol, vitamins, folate and minerals) with that of the girls, the 24hours recall food intake for each pupil was entered to Esha food processor program which analyzed and provided the percentage of the different nutrients that had been taken by the respondents. Table 1 showed that the average intake of both boys and girls of carbohydrates, cholesterol, vitamin B12, vitamin B2, iron and selenium is significantly higher than the DRI. Furthermore, the difference between the boys and girls average intake of carbohydrates, cholesterol and vitamin B12 is statistically significant ( $P \leq 0.01$ ) and that of vitamin B2 is significant at  $P \leq 0.05$  level with the girls having lower intake. On the other hand, the girls' average intake of unsaturated fat, iron and selenium is significantly higher than that of boys at  $P \leq 0.01$ . The results showed that the average intake of the two categories of respondents (boys and girls) of calories, vitamin E, folate, calcium, copper and phosphorous is significantly lower than the DRI. Moreover, the average intake of boys of calories, folate, calcium and phosphorous is significantly higher than that of girls, while the average intake of girls of vitamin E and copper is significantly higher than that of boys. Table 2 shows the frequency distribution of Sudanese pupils (boys and girls) according to some food habits. The majority of the respondents' two strata (78.0% of boys, 82.0% of girls) reported that sometimes they eat their meals at fast food restaurants. Although, the percentage of the respondents who indicated that they always eat meals at fast food restaurants is small, yet it is higher among boys (6.0%) compared to that among girls (2.0%). About half of the respondents (50% of the boys and 54.5% of the girls) mentioned that they drink soft drink sometimes. On the other hand, about one third of the boys (32.5%) and one fourth of the girls (25%) indicated that they always drink soft drink. Although a relatively higher percentage of boys (61%) revealed that they eat sweets sometimes compared to that of girls (52.5%), a relatively higher portion of girls (37%) indicated that they always eat sweets compared to that of boys (27.5%) who do that. The habit of eating potato chips sometimes, is relatively higher among girls (51%) compared to boys (48%), while the percentage of those who always eat potato chips is higher among boys (47.5%)

compare to girls (42%). Anthropometry is widely used as a tool to estimate the nutritional status of populations and to monitor the growth and health of individuals. One of the most commonly used anthropometric indices to assess the nutritional status is Body Mass Index (BMI). To examine the difference between the boys and girls nutritional status the BMI was determined and Chi-Square test is used to compare the nutritional status of the respondents two strata (boys and girls) (Table 3). The results showed that the nutritional status of

the majority of boys (65.5%) and girls (55.0%) of the Sudanese pupils in Riyadh city, Saudi Arabia is normal and only 3.5% of the boys and 0.5% of girls were obese. Also it was found that the percent of overweight among boys was 6.5% and among girls was 7.0% while the rate of underweight was 24.5% for boys and 37.5% for girls. Chi-Square test revealed that the association between the respondent sex and nutritional status (BMI) is statistically significant at  $P \leq 0.01$ .

**Table 1** The difference between boys and girls average daily consumption of nutrients (24-hours recall) and its deviation from the daily dietary requirement intakes (DRI)

| Items intake        | Boys    |      |            | Girls   |      |            | Difference between boys and girls in nutrients intake | T-value  |
|---------------------|---------|------|------------|---------|------|------------|---|----------|
|                     | Mean    | DRI  | Difference | Mean    | DRI  | Difference |   |          |
| Calories (kcal)     | 1499.39 | 2000 | -500.60**  | 1397.89 | 2000 | -602.10**  | 101.5   | 124.31** |
| Protein (g)         | 59.78   | 32   | 27.78**    | 59.25   | 32   | 27.25**    | 0.53  | 0.65     |
| Carbohydrates (g)   | 205.72  | 130  | 75.72**    | 186     | 130  | 56.00**    | 19.72   | 24.15**  |
| Dietary fiber (g)   | 11.87   | 28   | -16.12**   | 13.52   | 28   | -14.47**   | -1.65   | -2.02    |
| Total fat (g)       | 51.88   | 65   | 13.11**    | 50.82   | 65   | -14.17**   | 1.06  | 1.3      |
| Saturated fat (g)   | 17.44   | 20   | -2.55**    | 20.4    | 20   | 0.407      | -2.96   | -3.63*   |
| Unsaturated fat (g) | 199.79  | 45   | 154.79**   | 206.68  | 45   | 161.68**   | -6.89   | -8.44**  |
| Cholesterol (mg)    | 394.38  | 300  | 94.38      | 322.02  | 300  | 22.02      | 72.36   | 97.46**  |
| Vit A µg (RE)       | 1.235   | 550  | -548.76**  | 1.1     | 550  | -548.89**  | 0.138   | 0.17     |
| Vit B1 (mg)         | 1.233   | 0.8  | 0.433**    | 1.45    | 0.8  | 0.650**    | -0.219  | -0.27    |
| Vit B2 (mg)         | 19.21   | 0.8  | 18.41**    | 15.68   | 0.8  | 14.88**    | 3.53  | 4.32*    |
| Niacin (mg)         | 0.99    | 11   | -10.00**   | 1.06    | 11   | -9.93**    | -0.07   | -0.12    |
| Vit B6 (mg)         | 2.86    | 0.9  | 1.96**     | 3.87    | 0.9  | 2.97**     | -1.01   | -1.24    |
| Vit B12 (mg)        | 80.6    | 1.6  | 79.00**    | 65.45   | 1.6  | 63.85**    | 15.15   | 18.56**  |
| Vit D (mg)          | 2.11    | 15   | -12.88**   | 3.23    | 15   | -11.76**   | -1.12   | -1.37    |
| Vit E (mg)          | 3.84    | 10   | -6.15**    | 6.68    | 10   | -3.31      | -2.84   | -3.48*   |
| Folate (mg)         | 251.27  | 270  | -18.72*    | 214.73  | 270  | -55.26**   | 36.54   | -44.75** |
| Calcium (mg)        | 456.78  | 1200 | -743.21**  | 452.01  | 1200 | -747.98**  | 4.77  | 5.85**   |
| Copper (mg)         | 0.791   | 600  | -599.20**  | 3.89    | 600  | -596.10**  | -3.1  | -5.34*   |
| Iron (mg)           | 11.29   | 9    | 2.29**     | 21.33   | 9    | 12.33*     | -10.04  | -12.30** |
| Phosphorus (mg)     | 896.66  | 1000 | -103.33**  | 788.12  | 1000 | -211.87**  | 108.54  | 132.93** |
| Selenium (mg)       | 72.17   | 37   | 35.17**    | 81.86   | 37   | 44.86**    | -9.36   | -11.87** |
| Zinc (mg)           | 5.94    | 6.96 | -1.02**    | 5.83    | 6.96 | -1.16**    | 0.11  | 0.14     |

\*P 0.05, \*\*P≤0.01

**Table 2** Frequency distribution of Sudanese pupils (boys and girls) according to some food habits

| Variable                    | Boys      |         | Girls     |         |
|-----------------------------|-----------|---------|-----------|---------|
|                             | Frequency | Percent | Frequency | Percent |
| <b>Eating at restaurant</b> |           |         |           |         |
| Does not eat                | 5         | 2.5     | 4         | 2       |
| Rarely                      | 27        | 13.5    | 28        | 14      |
| Sometimes                   | 156       | 78      | 164       | 82      |
| Always                      | 12        | 6       | 4         | 2       |
| <b>Drinking soft drinks</b> |           |         |           |         |
| Does not drink              | 12        | 6       | 18        | 9       |
| Rarely                      | 23        | 11.5    | 23        | 11.5    |
| Sometimes                   | 100       | 50      | 109       | 54.5    |
| Always                      | 65        | 32.5    | 50        | 25      |
| <b>Eating sweets</b>        |           |         |           |         |
| Does not eat                | 4         | 2       | 3         | 1.5     |
| Rarely                      | 19        | 9.5     | 18        | 9       |
| Sometimes                   | 122       | 61      | 105       | 52.5    |
| Always                      | 55        | 27.5    | 74        | 37      |
| <b>Eating potato chips</b>  |           |         |           |         |
| Does not eat                | 6         | 3       | 5         | 2.5     |
| Rarely                      | 3         | 1.5     | 9         | 4.5     |
| Sometimes                   | 96        | 48      | 102       | 51      |
| Always                      | 95        | 47.5    | 84        | 42      |

**Table 3** The association between the students' gender and body mass index (BMI) (n=400)

| Interpretation   | Gender |        | Frequency total |
|------------------|--------|--------|-----------------|
|                  | Boys   | Girls  |                 |
| Underweight      | 24.50% | 37.50% | 124             |
| Normal           | 65.50% | 55.00% | 241             |
| Overweight       | 6.50%  | 7.00%  | 27              |
| Obesity I        | 3.50%  | 0.50%  | 8               |
| Frequency total  | 200    | 200    | 400             |
| Percentage total | 100    | 100    | 100             |

Chi-Square: 12.11 (P=0.007)

## Discussion

The nutritional status is an outcome and reflection of food (nutrients) intake which is partially affected by the culture of the society. Table 1 shows the respondents' average intake of nutrients compared to the dietary reference intake (DRI) and a comparison

between the males and females average intake of the different nutrients. In this section the emphasis will be on the differences between boys and girls food intake that is most likely associated with gender inequality. Although the results showed that the daily average intake of carbohydrates, cholesterol and vitamin B12 of both boys and girls is significantly higher than the DRI and the average intake of calories is significantly lower, yet it is revealed that the average intake of girls from these nutrients is significantly ( $P \leq 0.01$ ) lower than that of their male counterparts (Table 1). The wide spread of fast food restaurants in Saudi Arabia encourages families to eat food that is rich in calories, carbohydrates and cholesterol such as beef tallow, chocolate and eggs outside homes. This is confirmed by the study results where 78% and 82% of the boys and girls indicated that sometimes they eat at fast food restaurants (Table 2). It is a common practice in Saudi Arabia that during weekends both boys and girls go with their families to shopping centers and eat at fast food restaurants as a kind of recreation and entertainment. Most likely this is one of the causes of the daily intake from carbohydrates, cholesterol and vitamin B12 being significantly higher than the DRI. On the other hand, while 6% of the boys revealed that they always eat at fast food restaurants, only 2% of the girls do so (Table 2). This is most likely the primary cause of the girls' intake from calories, carbohydrates, cholesterol and vitamin B12 being significantly lower than that of boys and the underlining cause of this is gender inequality where boys can go and eat at fast food restaurants whenever they want, while girls can only go with their families during weekends. The increased prevalence of fast food restaurants and lack of awareness and failure to appreciate the damages, led to an increase in rate of consumption of fast food with soft drinks at the expense of fruit and vegetables consumption.<sup>21</sup> On the other hand, the girls' average intake of saturated fat and unsaturated fat is significantly higher than that of boys at  $P \leq 0.05$  and  $P \leq 0.01$ , respectively. This could be attributed to the eating tradition that girls eat most of their meals at home (especially dinner) and the common dinner meal in Saudi Arabia is called "Kabsa" which consists of rice and meat and it is very rich in animal fat. Again this is linked to gender inequality where females eat food that is very rich in animal fat at home, while males eat food that is less rich in animal fat more frequently outside home. To assess and compare the nutritional status of Sudanese female and male pupils, the BMI of each respondent was determined and Chi-square test is used to examine the thesis that in patriarchal societies, such as the one under consideration, there is a significant association between the individuals' gender and nutritional status. The results presented in Table 3 support this thesis and show a significant association between the respondents' gender and nutritional status at  $P \leq 0.01$  level of significance. Although the nutritional status of the majority of both male and female Sudanese pupils in Riyadh city, Saudi Arabia was normal, yet the percentage of female pupils with normal nutritional status is much lower (55.0%) compared to that of their male counterparts (65.5%). Moreover, while about one quarter (24.5%) of male pupils was of underweight, more than one third of the female pupils (37.5%) were of underweight. On the other hand, while only 0.5% of the girls were obese, 3.5% of the boys were obese. This is logical and expected outcome of the discrepancy in the intake of the main nutrients where the female pupils had significantly lower intake of calories, carbohydrates, cholesterol, vitamin B2, vitamin B12, folate, calcium and phosphorous (Table 2). It is believed that the underlining cause of the differential intake of most nutrients and consequently the discrepancy in the nutritional status of the male and female pupils is the dietary habits associated with gender inequality in this typical patriarchal society. These results are consistent with



most of the previous studies about nutritional status conducted in Saudi Arabia. Al-Nuaim showed that the prevalence of overweight and obesity among schoolchildren aged 6-18years old in Saudi Arabia was 11.7% and obesity was 15.8% and they reported that one in every six children aged 6 to 18years old is obese.<sup>14</sup> Also in the US Nicklas et al.,<sup>22</sup> and Parsons et al.,<sup>23</sup> reported that 25% of the children in the US were overweight and 11% were obese.

## Conclusion

Gender inequality and malnutrition are considered among the important factors that undermine efforts to achieve sustainable development. The study revealed that there are some dietary habits that are associated with gender inequality and resulted in differential intake of most the nutrients and consequently a discrepancy in the nutritional status of the male and female pupils. Thus, the study findings are in line with the extant literature urging for adoption of a more holistic and gender sensitive nutritional policies that aims at mainstreaming gender issues in nutrition improvement initiative.

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## Conflict of interest

The author declares no conflict of interest.

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