

Obesity Prevalence-Inducing Factors among Saudi Husbands and Wives after Marriage in Jeddah City

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ABSTRACT

This research was performed to throw the light on the mass index (BMI) values for the selected subjects of Saudi husbands and wives as well as to evaluate the association of overweight and obesity prevalence with socio-demographic, dietary habits and lifestyle factors, and with the marital duration period among Saudi husbands and wives in Jeddah city. The obtained results showed that there was direct relationship between the BMI values (kg/m²) and the age of both husbands and wives in the selected sample, and the overweight (BMI =25 to 29.9 kg/m²) prevalence was found among the selected subjects of both genders aged ≥ 29 years, while the obesity prevalence was observed among husbands and wives at the age period exceeding 29 years. Also, the BMI values for husbands and wives were markedly increased with increasing their monthly income and the obesity prevalence among the selected subjects were found at monthly income ≥ 5000 SAR. On the other hand, there was an obvious effect of the employment status on the prevalence of overweight and obesity among Saudi husbands and wives in chosen subjects sample. In addition that the BMI values decreased with increasing the education level in the participated husbands as the result of a high cultural awareness for husbands on the contrast in the participated wives BMI values. The highest prevalence rates of overweight and obesity were observed in husbands and wives having the education level of university and advanced studies. The obtained results also revealed that badly dietary habits, lifestyle factors and the lack of physical activities were being the main reasons for the prevalence of overweight and obesity among chosen Saudi husbands and wives after marriage. Furthermore, the prevalence of overweight and obesity was strongly associated with the marital status and the BMI values for husbands and wives increased with increasing the marriage duration years and the obesity prevalence was strongly associated with the years of marriage exceeding 5 years among the selected subjects; especially in the wives. The present study concluded that the marital status appears to influence the likelihood of developing the overweight and obesity among husbands and wives in Saudi Arabia. The marriage was associated with a higher prevalence of overweight and obesity in both Saudi husbands and wives; affecting by the tested socio-demographic, lifestyle, dietary habits, marital status and the marriage duration period. Therefore, there is an urgent need for effective programs, practices, policies, strategies and coordinated efforts at all levels to prevent, control or reduce the prevalence of overweight and obesity among Saudi children, adolescents, husbands and wives in Saudi Arabia; which becomes a national serious concern for the public health and to promote healthy diets and dietary habits and active lifestyles for them.

Key words: Obesity, Overweight, Husbands, Wives, Socio-Demographic factors, Dietary habits, Lifestyle factors, Marital status, Marriage, Body mass index.

Introduction

Obesity is defined as the accumulation of fatty tissue to such a level that overall health might be adversely affected and it reflects an imbalance between energy uptake and expenditure that is mediated by behavior (Neeley and Gonzales, 2007 and Knecht *et al.*, 2008). The corpulence is not only a disease itself, but the harbinger of others, recognizing that obesity is a medical disorder that leads to a lot of comorbidities (Lavie and Milani, 2003).

Obesity is associated with physical and endocrine changes of the body. Adipose tissue synthesizes and releases into the bloodstream peptides and nonpeptide compounds. Like in other organs with endocrine function, disequilibrium of the released hormones affects the homeostasis of other systems throughout the body (Schindler *et al.*, 2006; Knecht *et al.*, 2008 and Nejat *et al.*, 2010). Environmental factors including sedentary lifestyle and the consumption of high-energy foods and drinks are thought to play key roles in the development of obesity (Baur & O'Connor, 2004 and Neeley & Gonzales, 2007). Television viewing has been particularly implicated (Robinson, 2001). Dietary intake is also important. High-fat foods and sugar-containing soft drinks have been associated with increases in obesity (Astrup, 2001 and Ludwig *et al.*, 2001), as well as more high fructose corn syrup foods and drinks (Bray *et al.*, 2004 and Elliott *et al.*, 2002). Lack of physical activity was shown to be associated with obesity is a risk factor (Whitaker *et al.*, 1997 and Neeley & Gonzales, 2007).

Overweight and obesity in children and adolescents are a serious issue with many health and social consequences that often continue into adulthood (Foxhall, 2006 and Rimmer *et al.*, 2007). The worldwide epidemic of obesity that has emerged with the dawning of the 21st century are a major public health problem, having struck developed countries as well as those still developing (Wang *et al.*, 2005). Globally, it has been reported that 1.5 billion adults 20 years and older were overweight (defined as BMI \geq 25 kg/m²), and of those, 200 million men and nearly 300 million women were obese in the year of 2008 (WHO, 2011 and Dinour *et al.*, 2012), as well as it has been expected that, by 2015, approximately 2.3 billion adults will be overweight and more than 700 million will be obese (Mahfouz *et al.*, 2011; WHO, 2011 and Dinour *et al.*, 2012). In the last two decades, an alarming increase in the prevalence of overweight and obesity has been reported and become a serious public health problem affecting different social and economic classes as well as different age-groups in Saudi Arabia and other Asian countries (Abahussain *et al.*, 1999; Al-Mousa and Parkash, 2000; Sakamoto *et al.*, 2001; Ramachandran *et al.*, 2002; Al-Almaie, 2005 and Khalid, 2008). The prevalence of obesity is increasing in Saudi Arabia, affecting 30.7 % of Saudi Males and 28.4 % of Saudi females; these high rates of obesity in Saudi Arabia are due to sedentary life style, lack of physical practices and a shift to the unhealthy dietary habits such as a shift to the dietary intake of food carbonated drinks and other unhealthy food (Al-Othaimen *et al.*, 2007; Bin-Zaal *et al.*, 2009; Aldaql and Sehlo, 2013 and Musaiger *et al.*, 2014).

It has been reported that overweight and obesity; especially abdominal obesity, are a very important increased risk factor of many chronic disease and complications; that increase the rates of morbidity and mortality, including non-insulin-dependent diabetes mellitus (Wang *et al.*, 2002; Foxhall, 2006 and Brennan *et al.*, 2009), gastro – intestinal problems (Kaats *et al.*, 1996 and Knecht *et al.*, 2008), hypertension and hyperlipidemia (Anon, 1998; Sanchez – Castillo *et al.*, 2005; Poirier *et al.*, 2006 and Knecht *et al.*, 2008), stroke disease (Suk *et al.*, 2003 and Thomas *et al.*, 2005), cerebro – and cardiovascular diseases (Berenson, 2001 and Wilson *et al.*, 2002), dementia (Yaffe *et al.*, 2004 and Whitmer *et al.*, 2005), sleep disorders (O'Donnell *et al.*, 2000 and Knecht *et al.*, 2008), depression (Faith *et al.*, 2002 and Knecht *et al.*, 2008); cholelithiasis, particularly in women (Bellentani *et al.*, 2000 and Knecht *et al.*, 2008), pulmonary and renal diseases (Bray, 2004 and Nejat *et al.*, 2010), psychosocial problems (Everson *et al.*, 2002, Knecht *et al.*, 2008 and Brennan *et al.*, 2009), musculoskeletal disorders (Cicutini *et al.*, 2002 and Brennan *et al.*, 2009); alteration of the endocrine and immune systems (Heber *et al.*, 2000 and Knecht *et al.*, 2008), and various cancers including breast, cervical, ovarian, gall bladder, prostate, stomach and colon cancer (Must *et al.*, 1999; Van den – Brandt *et al.*, 2002; Call *et al.*, 2003; Schouten *et al.*, 2004; Olsen *et al.*, 2007; Renehan *et al.*, 2008; Fader *et al.*, 2009; Nejat *et al.*, 2010 and Dinour *et al.*, 2012).

Marital status is related to mortality and morbidity; especially for men, with married people at lower risk of death and more likely to be healthy than those unmarried (Gove *et al.*, 1983 and Janghorbani *et al.*, 2008). However, it is not clear how marital status is associated with obesity and the role of marriage, as a risk factor for obesity and abdominal obesity, remains still unsolved. There have been conflicting reports about relationship between marital status and obesity. Several of these studies showed a positive association (Kahn and Williamson, 1990; Kahn *et al.*, 1991; Sobal *et al.*, 2003; Sobal and Hanson, 2011 and Janghorbani *et al.*, 2012), whereas others reported no association (Gove *et al.*, 1983 and House *et al.*, 1988) or an inverse relation (Noppa and Bengtsson, 1980 and Noppa and Hallstrom, 1981) or a different association for men and women (Evers, 1987; Sobal *et al.*, 1991 and Dinour *et al.*, 2012); reflecting a complex and often paradoxical relationship. In this concern, it has been reported that marriage may be associated with body weight and obesity-related behaviors among adults (Sobal *et al.*, 2003 and Dinour *et al.*, 2012). For example, research investigation the influences on the individual food decisions has found that, among married couples at different stages of the life course, spousal influence was consistently rated as one of the most important sources of influence on individual food decisions (Schafer and Keith, 1978 and Dinour *et al.*, 2012). While, some studies have found that current marital status is itself correlated with body weight and obesity (Sobal and Hanson, 2011). On the other hand, other research suggested that marital transition; the act of moving from one marital status to another, is also important in predicting body weight changes and the behavioral risk factors associated with weight gain (Umberson *et al.*, 2009 and Dinour *et al.*, 2012).

Although, the obvious increase in prevalence rate of overweight and obesity among husbands and wives after marriage in Saudi Arabia, the little efforts have been done and the available published data about the obesity-inducing factors among married couples are scanty. Therefore, this research was performed to assess the body mass index (BMI) for the selected subjects of husbands and wives in Jeddah city, Saudi Arabia, as well as to evaluate the association of overweight and obesity prevalence with socio-demographic, dietary habits and lifestyle factors, and with the marital duration period among husbands and wives in Jeddah city, Saudi Arabia.

Subjects and Methods:

Subjects:

This study was performed on overweight and obese 165 husbands and 212 wives, aged 16 – 55 years, which were chosen randomly from whom attending to the Physical Rehabilitation and Obesity Treatment Centers in Jeddah, Saudi Arabia on April 2013. The overweight and obese subjects, under investigation, were selected from Saudi husbands and wives having a desire to participate in this study.

Lifestyle Exposures:

The obligation of individuals overweight and obese subjects was self-reported using a special lifestyle questionnaire, which was included the information about their gender, age, monthly income, employment status, education level, dietary habits, lifestyle factors, years of marriage (marital duration period), leisure-time physical activity (LTPA), occupational activity (OA), afternoon siesta and sleeping hours, means of transportation are used for even short-distance, availability of domestic help, and thereupon the practicing hours of the physical activities a day were calculated (Cancer Council of Victoria, 2005).

Anthropometric Measurements:

Body weight of each subject was measured to the nearest 0.1 kg using an electronic portable scale (SECA, Hamburg, Germany) with minimal clothing and without shoes. To ensure accuracy the scale was checked and calibrated with a known weight on the morning of each data collection. Subject height was measured, in the standing position without shoes and socks, to the nearest 0.1 centimeter using a portable stadiometer attached to the SECA electronic portable scale. From these measurements, the body mass index (BMI) for each 4

subject was calculated as the ratio of body weight in kilograms to the height square in meters. Whereas, the selected subjects of either the husbands or the wives were categorized based on their BMI (kg/m²) according to WHO (2000) and the NHMRC (2003) as recorded in Table (1) as the following:

Table 1: Subjects' categories based on their body mass index (BMI) as kg/m².

Subjects Category	BMI (kg/m ²)
Underweight	< 18.5
Normal weight	18.5 to 24.9
Overweight	25.0 to 29.9
Obese class I	30.0 to 34.9
Obese class II	35.0 to 39.9
Obese class III	≥ 40

Statistical Analysis:

The statistical analysis for the obtained data of body mass index (BMI) of subjects was performed using the IBM-PC computer and SAS program as the procedure of ANOVA and Duncan's Multiple Range according to the procedure of Helwing (1983). Where, the differences of the obtained data for subjects BMI values, between husbands and wives on the one hand and between the effects of tested obesity-inducing factors on the other hand, were considered significant at the probability level ≤ 0.05 .

Results and Discussion

Effect of the Socio-Demographic Factors on the Prevalence of Overweight and Obesity among Saudi Husbands and Wives after Marriage:

The prevalence of the overweight and obesity among Saudi husbands and wives after marriage in Jeddah as affected by the Socio-demographic factors; including the gender, age, monthly income, employment status and education level of the couple (husbands and wives) was studied and the obtained results were recorded as in Table (2) and Figures (1, 2, 3, 4 and 5).

As shown in Figure (1); the mean of study mass index (BMI) values for the selected subjects sample from Saudi husbands and wives, composed of 165 males and 212 females, were 32.08 and 30.65 kg/m²; respectively. On the other hand, the body mass index (BMI) values for the selected husbands sample aged > 20, 20 – 29, 30 – 39 and ≤ 40 years were 26.4, 28.7, 31.3 and 35.9 kg/m², versus 25.5, 28.6, 30.9 and 34.1 kg/m², for chosen wives sample; at the former same corresponding age period; respectively, as illustrated in Table (2) and Figure (2). In addition that the percentages of husbands number in chosen sample aged the former periods were 1.82, 24.24, 55.75 and 18.18 %, against 15.09, 41.04, 28.94 and 17.92 % for the corresponding percentages of wives number in chosen sample at the same age period; respectively, as shown in Table (2) and Figure (2). Therefore, there was a direct relationship between the BMI (kg/m²) and the age of both husbands and wives in the selected subjects sample; the overweight (BMI \pm 25 to 29.9 kg/m²) prevalence was found among the selected Saudi

husbands and wives aged ≥ 29 years at rates of 26.06 and 56.13 %, while the obesity prevalence (BMI ≥ 30 kg/m²) was observed among chosen married couples at the age period exceeding 29 years at rates of 73.93 and 43.86 %; respectively. Thereupon, the prevalence of obesity ratio among chosen husbands was higher than that among chosen wives. These result are in accordance with those found by Al-Nozha *et al.* (2005); El-Mouzan *et al.* (2010); El-Mouzan *et al.* (2012) and Hajian-Tilaki and Heidari (2012).

Table 2: Association of the overweight and obesity prevalence with the socio-demographic factors among Saudi husbands and wives.

Socio-Demographic factors	Husbands			Wives		
	BMI*	No	%	BMI*	No	%
Age						
> 20 year	26.4 \pm 0.78 ^{Aa}	3	1.82	25.5 \pm 0.91 ^{Aa}	32	15.09
20 - 29 year	28.7 \pm 0.93 ^{Ab}	40	24.24	28.6 \pm 1.09 ^{Ab}	87	41.04
30 - 39 year	31.3 \pm 1.09 ^{Ac}	92	55.75	30.9 \pm 0.83 ^{Ac}	55	25.94
≤ 40 year	35.9 \pm 1.03 ^{Ad}	30	18.18	34.1 \pm 1.07 ^{Ad}	38	17.92
Monthly Income (SAR)						
> 3000 SAR	26.1 \pm 0.97 ^{Aa}	17	10.3	24.9 \pm 0.83 ^{Aa}	25	11.79
3000 - 5000 SAR	29.9 \pm 1.03 ^{Ab}	43	26.06	28.6 \pm 1.07 ^{Ab}	57	26.89
< 5000 - 10000 SAR	31.5 \pm 0.89 ^{Ab}	60	36.36	31.3 \pm 0.91 ^{Ac}	86	40.57
< 10000 SAR	34.2 \pm 0.93 ^{Ac}	47	28.48	33.6 \pm 0.78 ^{Ad}	44	20.75
Employment Status						
Working	31.1 \pm 0.87 ^{Aa}	107	64.90	30.7 \pm 0.83 ^{Aa}	124	58.5
No Working	28.3 \pm 0.91 ^{Aa}	58	35.15	28.8 \pm 0.97 ^{Aa}	88	41.5
Education Level						
Illiterate/read and write	32.5 \pm 1.09 ^{Ab}	21	12.72	35.8 \pm 0.94 ^{Bc}	15	7.08
Primary/Preparatory	31.1 \pm 1.03 ^{Ab}	47	28.48	34.4 \pm 1.08 ^{Bc}	43	20.28
Secondary	27.9 \pm 0.87 ^{Aa}	134	20.61	31.9 \pm 0.73 ^{Bb}	76	35.85
University/ Advanced Studies	27.9 \pm 0.79 ^{Aa}	63	38.18	29.3 \pm 1.06 ^{Aa}	78	36.79

No. Number of subjects; BMI*: Its values expressed as mean \pm standard error; the means of BMI values, within either the same row or the same column, having different superscripts are significantly varied at $p \leq 0.05$, where the capital superscripts for the means within the same row between husbands and wives, while the small superscripts for the means within the same column between the tested socio-demographic factor.

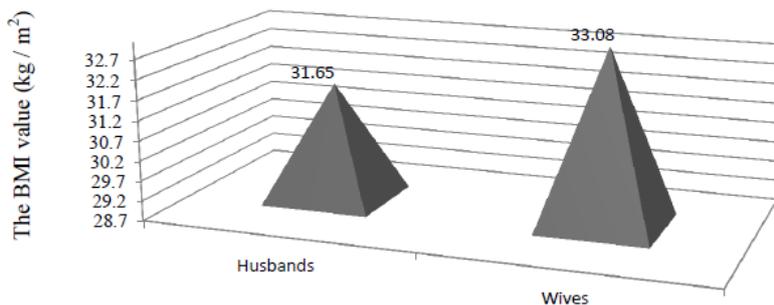


Fig. 1: The association of the BMI values with the gender among the participated Saudi husbands and wives.

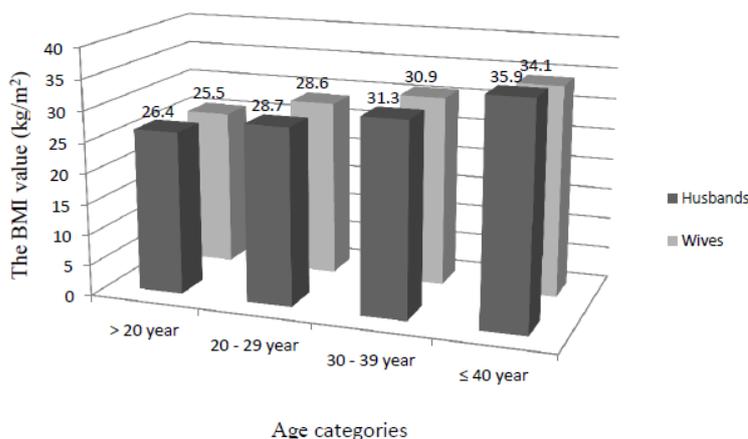


Fig. 2: The association of the BMI values with the age categories among the participated Saudi husbands and wives.

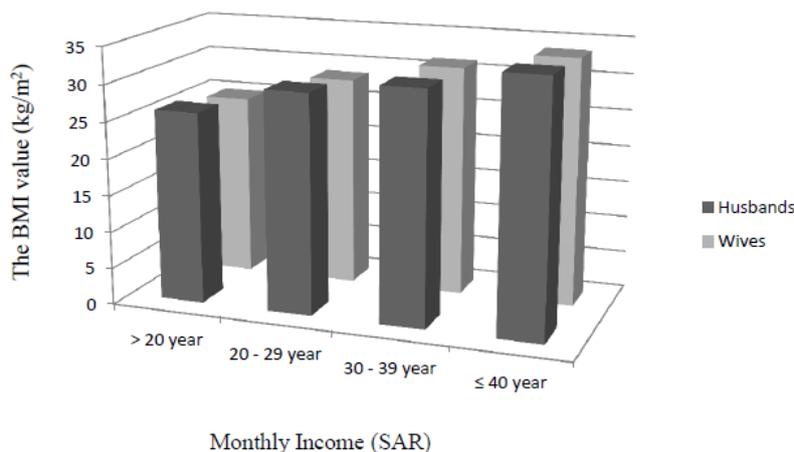


Fig. 3: The association of the BMI values with the monthly income (SAR) among the participated Saudi husbands and wives.

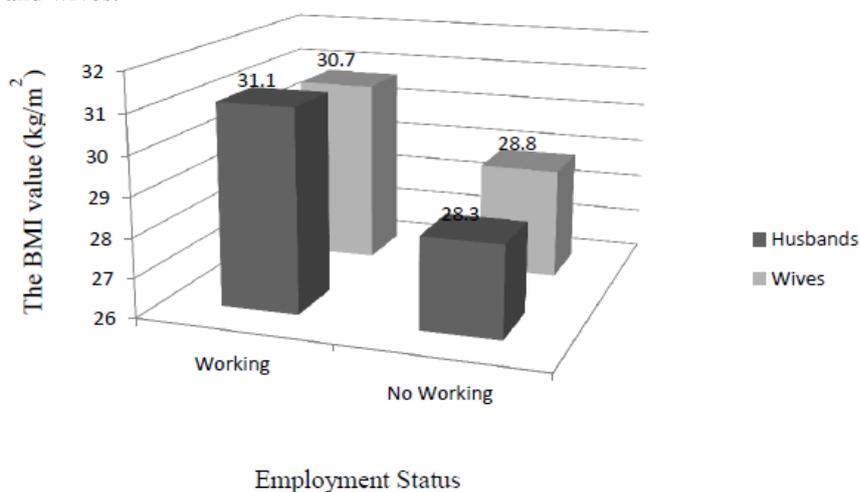


Fig. 4: The association of the BMI values with the employment status among the participated Saudi husbands and wives.

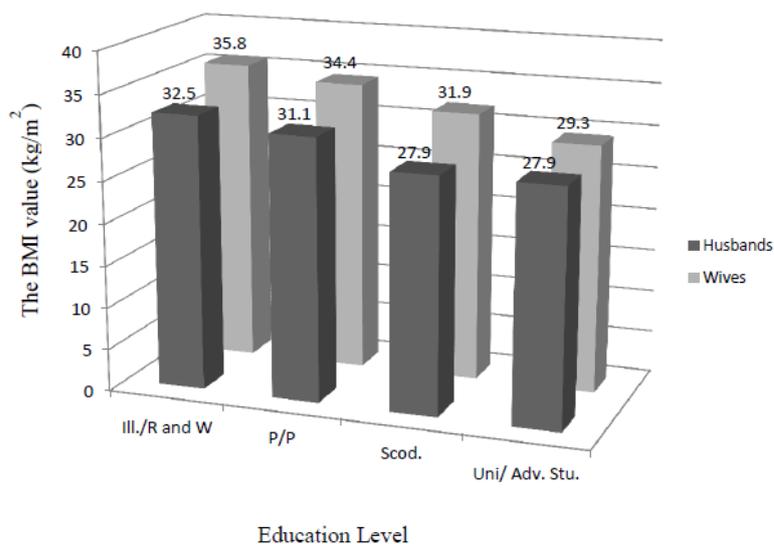


Fig. 5: The association of the BMI values with the education level among the participated Saudi husbands and wives.

Ill.R/ and W: Illiterate/read and write; P/P: Primary/Preparatory; Scod: Secondary; Uni/Adv.Stu: University/Advanced Studies

With regards the association of overweight and obesity with the monthly income for chosen Saudi husbands and wives in the selected subjects sample after marriage as given in Table (2) and Figure (3), it could be illustrated that the BMI for chosen husbands and wives was increased markedly with increasing their monthly income. The prevalence of overweight and obesity (BMI = 25 – 29.9 and ≥ 30 ; kg/m²; respectively) rates among husbands were found to be 36.36 and 64.84 %, versus 38.68 and 61.32 % among wives at monthly income of ≥ 5000 and $< 5000 - 1000$ SAR; respectively. In this concern, it could be noted that economic development of Saudi Arabia during the last 3 decades has changed the nutritional and lifestyle habits; food has become more affordable to a larger number of people with the substantial decrease in the price relative to income, and the concept of food has changed from a means of nourishment to a determinant of lifestyle and a source of pleasure coupled with physical inactivity have likely contributed to the increase in the prevalence of overweight and obesity among Saudi children, adolescents and maimed couples; husbands and wives (Amin *et al.*, 2008; Al-Rethaiaa *et al.*, 2010; Al-Hazzaa *et al.*, 2011; Mahfouz *et al.*, 2011; Al-Hazzaa *et al.*, 2012 and MUSAIGER *et al.*, 2014).

Concerning the impact of the employment status on the prevalence of overweight and obesity among Saudi husbands and wives in chosen subjects sample as after marriage recorded in Table (2) and Figure (4), it could be illustrated that working and no working husbands' categories in chosen subjects sample represented 64.85 and 35.15 %, and their BMI values were 28.6 and 31.1 kg/m²; respectively. While, the corresponding wives' categories in chosen subjects sample represented 58.5 and 41.5, and their BMI values were 30.9 and 35.4 kg/m²; respectively. Thereupon, there was an obvious effect of the employment status on prevalence of overweight and obesity among selected Saudi husbands and wives after marriage. In addition that there was a significant variation in the BMI values between working and no working subjects' categories, as well as between married men and women in the selected subjects sample. Furthermore, the never working status from the selected subjects sample was associated with a significant higher risk of overweight and obesity in both married men and women; the association for married no working women were stronger; this may be due to genetic predisposition of and high illiteracy rates of Saudi woman. The positive association of employment status for the selected subjects with prevalence of overweight and obesity can be explained by the fact that no working people after marriage have done less physical activities, change their dietary pattern, may be less focused on being attractive, have more social support, or may be exposed to other environmental factors. The current results for the relationship between the employment status of chosen subjects and the prevalence of overweight and obesity are in agreement with those reported by Aykut *et al.* (2002); O'Dea and Wilson (2006); Janghorbani *et al.* (2008) and Ozcirpici *et al.* (2009).

With regards the association of the education level with prevalence of overweight and obesity among Saudi husbands and wives in chosen subjects sample after marriage as evident in Table (2) and Figure (5), it could be showed that the BMI values for the participated husbands were 32.5, 31.1, 27.9 and 27.9 kg/m² at education level of illiterate/read and write, primary/preparatory, secondary and university & advanced studies, versus 35.8, 34.4, 31.9 and 29.3 kg/m² for the participated wives at the same corresponding education level; respectively. On the other hand, the percentages of husbands' categories number in chosen sample at the former education levels were 12.72, 28.48, 20.61 and 38.18 %, against 7.08, 20.28, 35.85 and 36.79 % for the corresponding participated wives' categories number in chosen sample having the same education level; respectively. Therefrom, the BMI values decreased with increasing the education level in the participated husbands as the result of a high cultural awareness for husbands, while on the contrary in the participated wives BMI values which raised continuously with increasing their education level. The highest prevalence overweight and obesity was observed in husbands and wives having the education level of university and advanced studies. Those result are in 9 conformity with those found by Doak *et al.* (2006); Amin *et al.* (2008); Janghorbani *et al.* (2008); Mahfouz *et al.* (2011) and Hajian-Tilaki and Heidari (2012).

Obesity-Inducing Dietary Habits and Habits and Lifestyle Factors among Saudi Husbands and Wives after Marriage:

Since the cause of overweight and obesity is multifactorial, any program to prevent and control the overweight and obesity, especially among adolescents and married couples, should consider several social, health and lifestyle factors (Musaiger *et al.*, 2004). Excluding Saudi Arabia, studies on factors associated with obesity among adolescents and married couples in the Arab Gulf region are very limited. These studies demonstrated that some lifestyle factors and dietary habits were significantly associated with the occurrence of obesity among adolescents (Musaiger, 1994; Bin-Zaal *et al.*, 2009 and Al-Hazzaa *et al.*, 2012). Therefore, the association of dietary habits and lifestyle factors with obesity among Saudi husbands and wives in the selected subjects sample was evaluated and the obtained results were recorded as in Table (3) as the following:

(a) Obesity-Inducing Dietary Habits and Lifestyle Factors among Chosen Husbands:

As given in Table (3), the psychological and emotional stability, which resulting in the increase of the appetite, was associated with the occurrence of overweight and obesity among 92.73 % of husbands in chosen

subjects sample. While, 64.24 and 72.12 % of husbands attributed their obesity to the lack of either the interest in agility after marriage or physical activities as the result of preoccupation with their household tasks; respectively. In addition that 43.03 % from chosen husbands related their overweight and obesity to spend the leisure time in watching the TV and eating food, versus 35.15 % of husbands related their obesity to the family visits, social engagements and eating outside the home. The alteration in dietary habits and the involvement of family members in the dining caused the prevalence of overweight and obesity among 87.89 % of selected husbands sample. Also, 53.94 % of husbands evident that their overweight and obesity status were associated with taking the meals irregularly, against 69.09 % of whom related their obesity to the lack of interest in eating fresh fruits and vegetables regularly.

(b) Obesity-Inducing Dietary Habits and Lifestyle Factors among Chosen Wives:

As shown in Table (3), 78.77 % of the selected Saudi wives evident that their status of overweight and obesity were taken place as the result of their psychological and emotional stability which leading to open their appetite. While, 51.89 % from tested wives mentioned that their obesity status attributed to the taking birth-control pills which increase the appetite. From the obtained results (Table 3), it could be also observed that 70.28 and 86.32 % of chosen Saudi wives mentioned that their obesity status was occurred with the lack of either the interest in agility after marriage or the physical activities (less than 6 hours daily) as the result of preoccupation with their household tasks; respectively. Also, 79.25 % of selected wives attributed their overweight and obesity status to spend their leisure time in watching the TV and eating, against 44.81 % from the participated wives whom related their obesity to the family visits, social engagements and eating outside the home. But, 95.75 % of chosen wives attributed their obesity status to the alternation in dietary habits and the involvement of family members in the dining, and 61.32 % from the selected obese wives showed that the reason of their obesity status was the taking of meals irregularly. As also shown in the obtained results (Table 3), the lack of interest in eating fresh fruits and vegetables was associated with the presence of obesity status in 80 % of the participated wives, while eating food as myself calming with the presence of marital problems associated strongly with the occurrence of overweight and obesity among 64.15 % from the participated wives. In addition, 62.26 and 74.53 % of the participated nursing and working mothers attributed their overweight and obesity status for eating large 10 quantities of food to can feed their babies. The current results are in conformity with those reported by Lowry *et al.* (2002); He *et al.* (2004); Ali and Crowther (2009); Ozcirpici *et al.* (2009); Al-Rethaiaa *et al.* (2010); Al-Hazaa *et al.* (2011); Al-Hazaa *et al.* (2012); Hajian-Tilaki and Heidari (2012); Aldaqal and Sehlo (2013); Mahfouz *et al.* (2014) and MUSAIGER *et al.* (2014).

Table 3: Association of the overweight and obesity prevalence with dietary habits and lifestyle factors among Saudi husbands and wives

Obesity-Inducing dietary habits and lifestyle factors	Selected subjects	
	No	%
<i>Among Husbands:</i>		
Open appetite as a result of psychological and emotional stability	153	92.73
Lack of interest in agility after marriage	106	64.24
Lack of physical activities as the result of preoccupation with their household tasks	119	72.12
Spending to leisure time in watching the TV and Eating	71	43.03
Family Visits, social engagements and eating outside the home	58	35.15
Alteration the dietary habits and the involvement of family members in the dining	145	87.89
Tacking the meals irregularly	89	53.24
Lack of interest in eating fresh fruits and vegetables	114	69.09
<i>Among Wives:</i>		
Open appetite as a result of psychological and emotional stability	167	78.77
Taking birth-control pills which increased the appetite	110	51.89
Lack of interest in agility after marriage	149	70.28
Lack of physical activities as the result of preoccupation with their household tasks	183	86.32
Spending to leisure time in watching the TV and Eating	168	79.25
Family Visits, social engagements and eating outside the home	95	44.81
Alteration the dietary habits and the involvement of family members in the dining	203	95.75
Tacking the meals irregularly	130	61.32
Lack of interest in eating fresh fruits and vegetables	171	80.66
Eating food as myself calming with the presence of marital problems	136	64.15
Nursing mothers eat large quantities of food to can feed their babies	132	62.26
Working mothers eat large quantities of food to can feed their babies after returning from the work	158	74.53

No. Number of subjects.

Association of the Overweight and Obesity Prevalence with the Years of Marriage among Saudi Husbands and Wives:

The association of the overweight and obesity prevalence with the years of marriage among Saudi husbands and wives in the selected sample of participants was evaluated and the obtained results were recorded as in Table (4) and Figure (6).

From the obtained results (Table 4 and Figure 5), it could be exhibited that the BMI values for the participated Saudi husbands at marriage duration period of ≥ 1 , $< 1 - 5$, $< 5 - 10$ and < 10 years were 26.2, 29.7, 30.6 and 32.3 kg/m², against 25.6, 28.7, 31.2 and 34.8 kg/m² for the participated Saudi wives at the same corresponding duration period of marriage; respectively.

Table 4: Association of the overweight and obesity prevalence with the years of marriage among Saudi husbands and wives

Years of Marriage	Husbands			Wives		
	BMI*	No	%	BMI*	No	%
≥ 1	26.2 ^{Aa} ± 1.10	6	3.64	25.6 ^{Aa} ± 1.00	23	10.85
$< 1 - 5$	29.7 ^{Aa} ± 1.49	34	20.6	28.7 ^{Aa} ± 1.09	14	6.6
$< 5 - 10$	30.6 ^{Aa} ± 1.29	27	16.36	30.2 ^{Aa} ± 1.15	65	30.66
< 10	32.3 ^{Aa} ± 1.07	98	59.4	31.8 ^{Aa} ± 0.93	110	51.89

No. Number of subjects; BMI*: Its values expressed as mean \pm standard error; the means of BMI values, within either the same row or the same column, having different superscripts are significantly varied at $p \leq 0.05$, where the capital superscripts for the means within the same row between husbands and wives, while the small superscripts for the means within the same column between the effect of years of marriage.

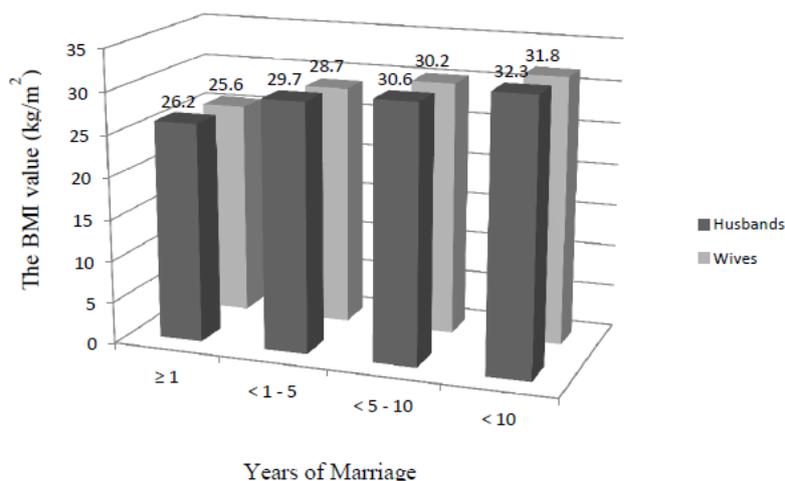


Fig. 6: The association of the BMI values with the years of marriage among the participated Saudi husbands and wives.

From the obtained results (Table 4 and Figure 5), it could be also noticed that the percentages of chosen husbands number married from the former years of marriage (≥ 1 , $< 1 - 5$, $< 5 - 10$ and < 10 years) were 3.64, 20.60, 16.36 and 59.40 %, versus 10.85, 6.60, 30.66 and 51.89 % for the selected wives number married at the same corresponding previous years of marriage; respectively. Thereupon, the BMI values for both participated husbands and wives increased with increasing the marriage duration years and the obesity prevalence was stronger associated with the years of marriage exceeding 5 years among the selected subjects; especially in the wives. The present findings are in agreement with those reported by Kahn *et al.* (1991); Rauschenbach *et al.* (1995); Sobal *et al.* (2003); Janghorbani *et al.* (2008); Ozcipcici *et al.* (2009) and Dinour *et al.* (2012).

In this concern, it could be illustrated that the marital status was associated with a significantly higher risk of overweight and obesity in both husbands and wives; the association for wives were stronger. There have been conflicting reports about relationship between marital status and obesity. Several cross-sectional studies of marital status and obesity report that for both men and women, married individuals were more obese than those never married (Evers, 1987 and Sobal *et al.*, 1992). Nonetheless, other studies report different patterns from no differences in marital status (Noppa and Hallstrom, 1981 and Mirmiran *et al.*, 2002) to a different association between the above-mentioned parameters for men and women (Noppa and Hallstrom, 1981 and Janghorbani *et al.*, 2008). Several longitudinal studies of varying duration have assessed marital status changes and obesity

with inconsistent results. These studies suggested that marriage may be associated with weight gain and separation may be related to weight loss. However, there are exceptions for that pattern; there are some gender variations within and between studies (Sobal *et al.*, 2003 and Janghorbani *et al.*, 2008) as well as analysis of limited age range, (Khan *et al.*, 1991 and Kahn and Williamson, 1992). Our study supports some earlier studies that found married individuals were more overweight or obese than those never-married. The positive relationship between marital status and overweight, obesity, or abdominal obesity can be explained by the fact that people, after marriage have less physical activity, change their dietary pattern, may be less focused on being attractive, have more social support, or may be exposed to other environmental factors. Appearance and education have long been seen as important in marriage for both men and women. Unmarried subjects may intentionally manage their weight in an effort to be more attractive to potential marital partner. Married people have more social support than those who are not married (Janghorbani *et al.*, 2008 and Ozcirpici *et al.*, 2009). This marital support can lead to obesity through diet, activity, and social values. The lifestyle of married individuals may provide more stable eating pattern. Shared marital status from living in a common household creates responsibilities for eating together and provides social support. Some people control their weight to attract mate, and once they get married weight control may be less valued so that diet/exercise behaviors for slimness may be de-emphasized or abandoned at all (Janghorbani *et al.*, 2008).

Mechanisms through which marital status may influence obesity include the amount of energy intake, energy expenditure, and metabolic changes. We expect that married individuals eat more as part of a role obligation to their spouse and may be more exposed to snack foods of their children, which would lead to increased parental obesity. Energy expenditure is an important influence upon obesity levels, and daily activities and exercise would be expected to be lower among married people since parents have less time for exercise. Other possible explanations are that in our study married individuals tend to have a lower educational level. Married individuals are less likely to smoke than those who are not married which would lead to more obesity among married people. Married people may have more positive emotional well-being. Problems in emotional status tend to influence weight through decreased appetite.

Another finding that requires further elaboration is the higher prevalence of overweight, obesity, and abdominal obesity in married women. This may be due to genetic predisposition of Iranian women, lower smoking rates, high fertility rates, high illiteracy rates, or differences in epigenetic programming of Iranian women. The increased BMI in the married women could possibly be associated with parity, since childbearing has been suggested to be an important contributor to the development of obesity (Brown *et al.*, 1992 and Tavani *et al.*, 1994). In this concern, Williamson *et al.* (1994) after controlling for aging; found that women with at least three live births had a higher mean weight than those with fewer live births. Another study suggested that weight gain by women in pregnancy leads to retaining weight which would physiologically lead to greater maternal obesity in addition to any influences of the parental role. In our study, however, we could not investigate the relationship between BMI and childbearing, since data on parity were not available. These results may also be explained by differences in the level of physical activity. Iranian women may have less physical activity than men because of limited outdoor activities due to specific climatic and/or social conditions.

Conclusions and Recommendations:

In conclusion, the present study found that the marital status appears to influence the likelihood of developing the overweight and obesity among husbands and wives in Saudi Arabia. The marriage was associated with a higher prevalence of overweight and obesity in both Saudi husbands and wives; affecting by the tested socio-demographic, lifestyle, dietary habits, marital status and the marriage duration period. Therefore, there is an urgent need for further investigation to assess mechanism for these association, whether it be through caloric intake, energy expending, social values about overweight and obesity, or a combination of these and other factors, as well as for effective programs, practices, policies, strategies and coordinated effects at all levels to prevent control or reduce the prevalence of overweight and obesity among Saudi children, adolescents, husbands and wives; which becomes a national serious concern for the public health in Saudi Arabia and to promote healthy diets and dietary habits and active lifestyle for them.

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