The changing relationship between Islam, women's status and female obesity between 1992 and 2005

Extended Abstract
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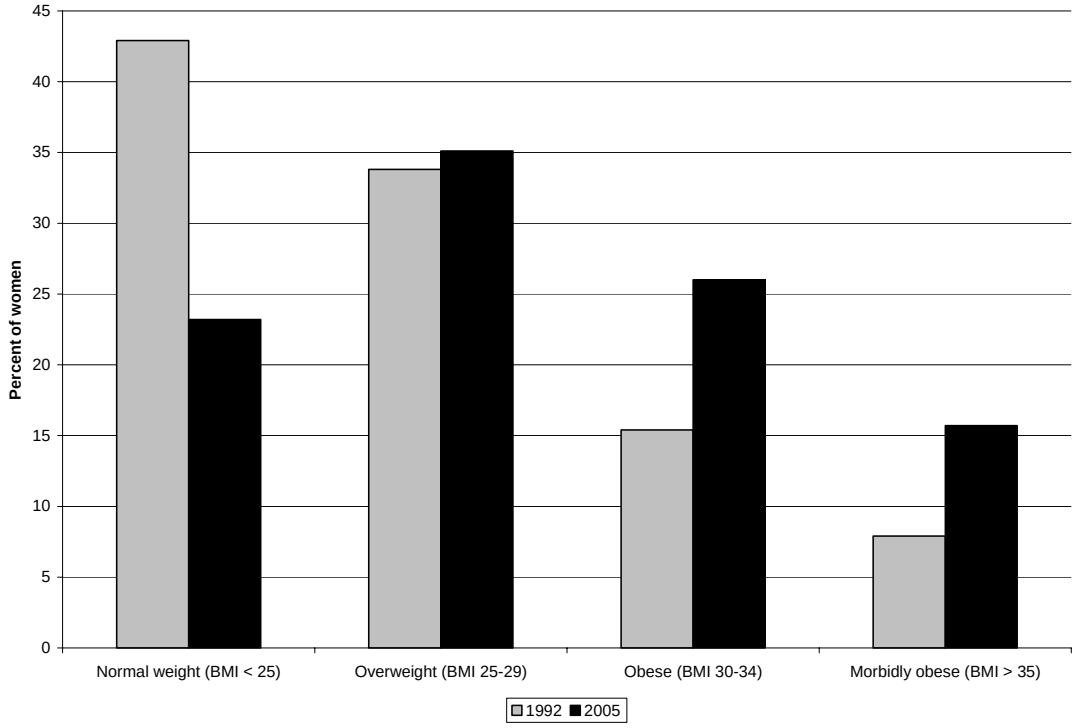
Obesity and women's health: what's the problem?

Obesity has many deleterious effects for men, women and children. However, among women of reproductive age, the situation is even more acute and pressing. In the first place, obese women are more likely to encounter problems becoming pregnant (Hartz et al. 1979, Norman and Clark 1998; Clark et al. 1998). There is a large literature demonstrating that women who are overweight are at greater risk of developing various complications leading to higher mortality and morbidity for both the mother and fetus. (See for examples of the latest literature: Ramsay et al. 2006; Pathi et al. 2006; Robinson et al. 2005; Villamor and Cnattingius. 2006).

Obesity in Egypt

Egypt, and the countries of the Middle East in general, are typical of many middle income developing countries that have experienced a rapid rise in the prevalence of obesity. Obesity in the Eastern Mediterranean Region has reached 'alarming levels' according to the World Health Organization (Musaiger 2004). The same W.H.O. study pointed out that unlike Europe and North America, obesity is more prevalent among women and in urban areas. Data from the Demographic and Health Surveys show that in 1992, women of reproductive age in Egypt had a mean body mass index (BMI) of 26.9 (the WHO designates a BMI of 25 or greater as overweight and 30 or greater as obese). By 2005, this had risen to a mean BMI of 30.1, with nearly half of Egyptian women of reproductive age classified as obese. Figure 1 shows the distribution of BMI for women of reproductive age and the changes between 1992 and 2005.

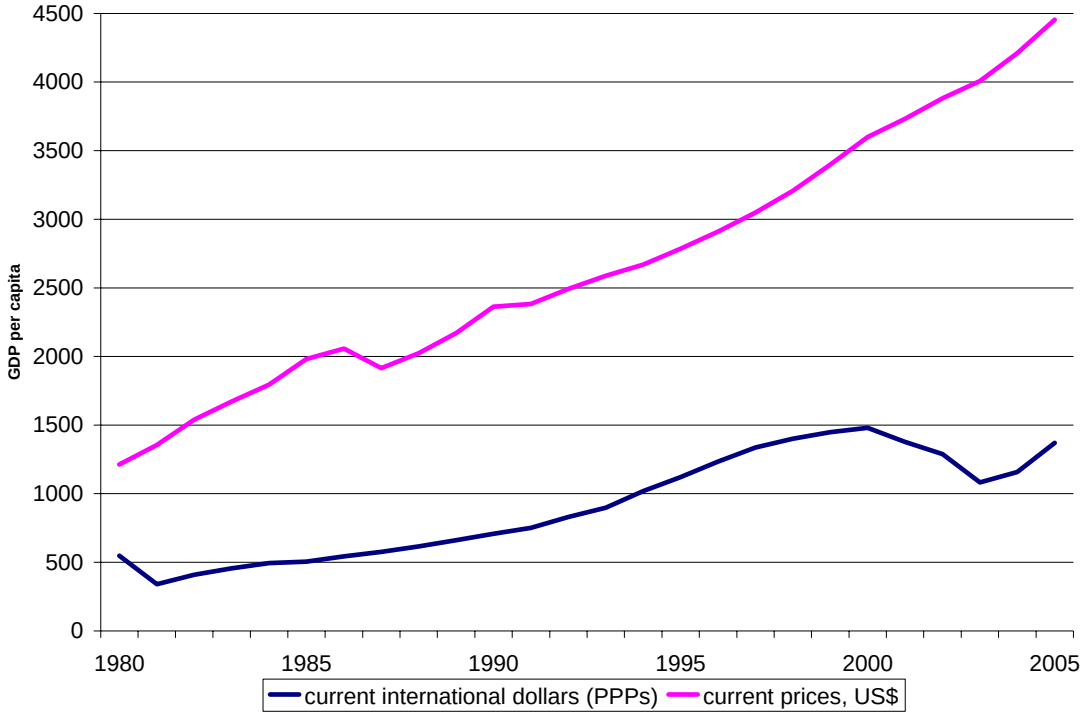
Figure 1: Weight distribution of women of reproductive age (15-49), 1992 and 2005



Some surveys have shown that women of lower SES in Egypt have higher rates of obesity than those of higher SES. However, the prevalence of obesity is lowest among those of very low SES and very high SES (Galal 2002). Interestingly, the social gradient is not seen for men (Galal 2002). However, a study in rural Giza found a positive association between SES and obesity (Khattab, Younis and Zurayk 1999:52). Urban residence is one of the greatest risk factors for obesity (Galal 2002). Many urban Egyptians are physically inactive, with 89% of high SES urban adults leading sedentary lifestyles. This pattern, at least for women, is typical of that seen globally. However, the rise in obesity has far outstripped the increase in urbanization. In 1985, 44% of the population was urban, rising to 48% in 2005 – an increase of only 10% (UN-Habitat, 2007). In the poorest lower income countries, low SES is protective against obesity. However, once countries reach a GDP per capita level of about $2500, low SES starts to become a risk factor for obesity (Popkin and Gordon-Larsen

2004; Monteiro et al. 2004). Martorell et al. (2000) noted that Egypt is an outlier in the general relationship between GDP and obesity levels; Egypt has far higher obesity than that expected by GDP alone. Figure 2 shows the changes in GDP per capita in Egypt, both in terms of current prices and also purchasing power parity (PPP). From Figure 2, it can be seen that in terms of PPP, Egypt passed the $2,500 threshold in the mid-1990s. However, in terms of current prices, Egypt's GDP growth has stagnated at below $1,500.

Figure 2: GDP per capita, 1980-2005



Source: United Nations Statistics Division, 2007

The reproductive health issues associated with obesity represent a serious challenge for a middle income developing country like Egypt. On the one hand, Egypt has the resources constraints, health profile and socioeconomic development of a poorer country. On the other hand, Egyptian women of reproductive age currently have

higher obesity levels than those witnessed in many developed countries. Further, Egyptian women have a TFR of about three children per woman, higher than that in developed countries. Thus, the rising obesity levels among women of reproductive age present an acute and considerable health problem. It is likely that the increasing obesity prevalence among women of reproductive age accounts for much of the recent increase in C-sections in Egypt, increasing from less than one in twenty births in 1992 to more than one in five in 2005 – an astounding four fold increase.

Fat is a feminist issue: gender and obesity

Unlike many other countries, obesity in the Middle East is more prevalent among women than among men. While Western norms regarding female appearance have spread to Egypt (Basyouny 1997), disseminated by television and magazines, the cultural preference in Egypt is still for a plumper female form (Inhorn 1994; 1996, Galal 2002). On the one hand, the prevalence of obesity is increasing and overweight has become the norm for women. On the other hand, the spread of Western images of female beauty are changing local perceptions (Basyouny 1997), although fundamentalist Islam does provide a counter-balance to this influence. It would appear that a tension, present for a long time in the West, is being introduced into Egyptian society. Despite this conflict, few attempts have been made to study women's perceptions of their bodies in the Arab World and Islamic societies (Basyouny 1997)

Men and women in the Middle East have distinctly different roles in life; these roles impact upon their diet, activity levels and exposure to childbearing and lactation, and thus their risk of obesity (Batnitzky, 2005). The effect of gender roles has also been noted by Inhorn (1994, 1996) in her ethnographic work among infertile women in

Egypt where she found that many women simply ate out of boredom. Further, food and feeding the family are central in the lives of many Egyptian women (Basyouny 1997: 105). Al-Nuaim et al. (1997) also posited that the emphasis on women's domestic role was a contributing factor to female obesity in Saudi Arabia. In Egypt, the relationship between female autonomy and obesity is likely to be changing since women's roles are changing at the same time as obesity rates are rapidly increasing.

Given the rapid nutritional transition that Egypt has undergone, it would be easy to see why women of low SES would be concerned with food, and that the major concern would be to access cheap forms of palatable energy to ensure that no-one goes hungry during the day. Peralta (2003) also points out the role of acceptance of obesity in influencing obesity and overweight rates. Black and Hispanic women in the US are more likely to be overweight, but also have a much more positive body image than White women in the US. Since obesity is perceived less negatively in the Middle East, this may also contribute to the increasing rates of overweight.

Islam, women's status and obesity

Protecting female health is encouraged by the teachings of Islam - for example, abortion and contraception are permitted, in sharp contrast to Catholicism (Amin et al. 1997; Morgan et al. 2002; Underwood 2000;). However, Islamic discourse tends to conservatism (Inhorn 1996:83). The traditional and conservative values reinforced by Islam include the lower position of women vis-à-vis men and high fertility (by emphasizing a woman's role as a wife and a mother and further legitimizing patriarchy). Also, the family, as an institution, is isolated to a large degree from the larger social transformation in the Arab world; family change is considered

catastrophic and a crime against Moslem identity (Mernissi 1978). It is likely that the effect of religion, especially Islam, on female obesity will operate through its influence on female autonomy and women's status. In other words, religion itself is not the causal factor behind the association between religion and obesity. Rather, religion is associated with differences in female autonomy and women's status, and these are the factors that are causally related to obesity. Batnitzky (2005) noted that Islam, interpreted at the individual level in Morocco, is not always compatible with health promoting activities. For example, women's use of public space is constrained by perceived Islamic expectations of female behavior. Basyouny's study of weight-loss clinics in Cairo recorded the increasing number of fully veiled women joining, quoting religious texts on ideal female behavior (Basyouny 1997: 97). Women may also be trying to meet male approval by dieting, or alternatively may be encouraged to become overweight by husbands jealous of other men looking at their wives (Basyouny, 1997: 90). However, Basyouny's findings seem to assume implicitly that the desired norm is for slenderness, whereas other studies do not find this (Inhorn 1994, 1996; Galal 2002). An extreme example of the Arab cultural preference for larger women is the traditional Mauritanian practice of force-feeding girls in order to improve their marriage prospects.

It is clear that female obesity is closely intertwined with such notions, reflecting culturally based values regarding female behavior and appearance. However, very little work has been done on the relationship between obesity and gender, or indeed other social determinants, in less developed countries. Even more surprising is the lack of a public debate in the Egyptian press or a discourse among academics regarding obesity and its particular consequences for women. Reproductive health has

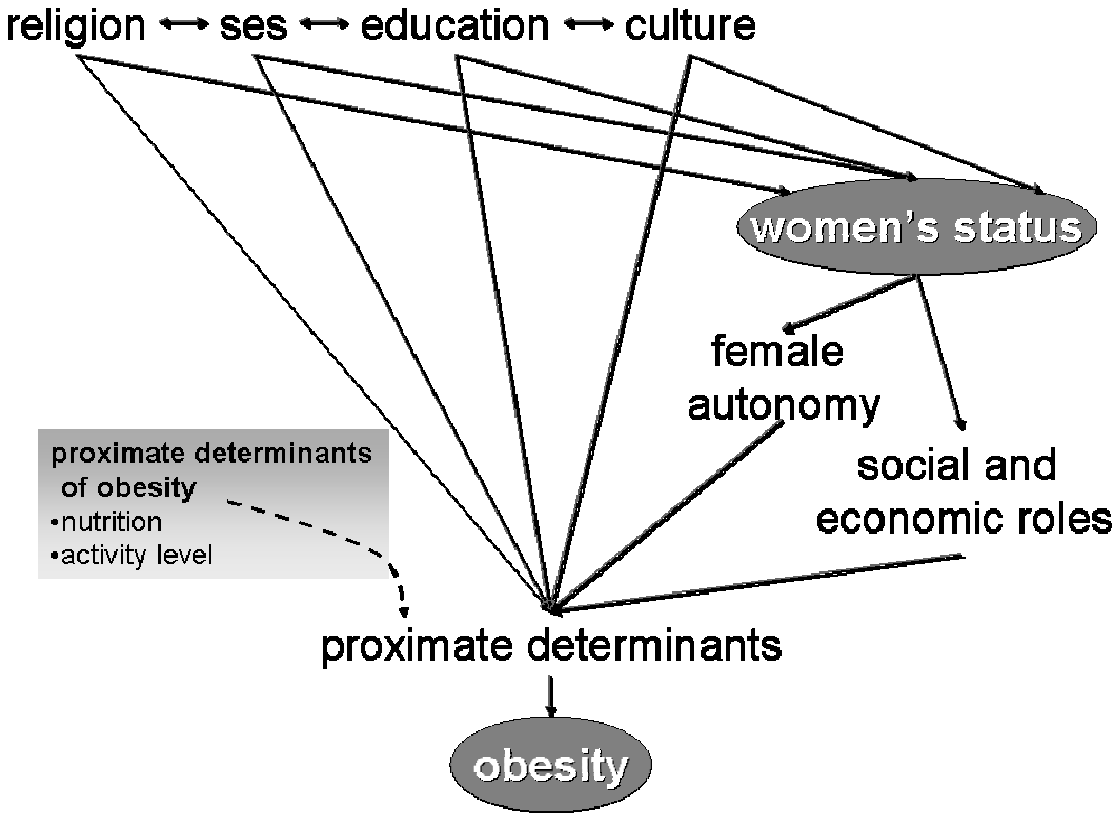
long been recognized as an area that intersects both feminism and health, particularly due to the seminal Cairo summit in 1994 (Zurayk 2001). Obesity has yet to receive that level of recognition. The challenge is to synthesize the existing work relating obesity and gender in the West, with the culturally specific literature on gender, health and religion in order to develop a framework for analyzing female obesity in non-Western societies.

Conceptual framework

For the purposes of this study, I see social determinants influencing obesity through certain proximate determinants, in much the same way as the determinants of fertility are conceptualized. To that end, the proximate determinants of obesity are nutrition (caloric input), activity level (caloric output). In order to gain weight, caloric input must exceed caloric output and this 'energy equation' may depend on metabolic influences. For women of reproductive age, both pregnancy and breastfeeding can dramatically change their metabolic requirements (Green et al. 1988; Rosenberg et al. 1994; Kim et al. 2007). Society, through such characteristics as SES, education and religion can therefore influence obesity by determining nutritional levels and activity levels. I argue that women's status, a product itself of social structure, mediates the relationship between other social variables and the proximate determinants. In other words, urban residence in Egypt is associated with an increased risk of obesity. However, an individual woman's status and the amount of autonomy that she possesses will mediate the relationship between urban residence and obesity. Furthermore, I conjecture that women's status operates independently and not just as a mediator of other relationships. Women's status affects the social and economic roles of women and the amount of autonomy that they enjoy. Through these

determinants, women's status impacts upon obesity levels. Figure 3 presents the conceptual framework visually.

Figure 3: Conceptual framework



This paper asks the fundamental question: why is obesity among women of reproductive age increasing over time? In order to address this question, I need to first identify the significant variables and to examine the changes in these variables and their relationship with obesity over time. Based on the literature and available evidence, I hypothesize that Islam and women's status will influence both each other and obesity. However, there are undoubtedly competing hypotheses to explain increasing obesity, as mentioned above, and these will be tested. Figure 3 visually demonstrates the pathways through which these variables are seen as affecting obesity and I use this to develop the competing hypotheses, which are:

H1: Women's status is associated with obesity

H1a: The effect of women's status on obesity operates through female autonomy

H1b: The effect of women's status on obesity operates through gender specific social and economic roles

H2: Religion, SES, education and culture are associated with obesity.

H3: The effect of religion, SES, education and culture on obesity is mediated by women's status.

H3a: The interaction between women's status and other variables and their effect on obesity is due to female autonomy.

H3b: The interaction between women's status and other variables and their effect on obesity is due to gender specific social and economic roles.

Data

The analysis will use the Demographic and Health Surveys conducted in Egypt in 1992, 1995, 2000 and 2005. These are large surveys carried out periodically and intended to be uniform to facilitate cross-national comparisons; they are generally representative at the regional level. The surveys provide estimates for key indicators such as fertility, contraceptive use, infant and child mortality, immunization levels, coverage of antenatal and delivery care, nutrition, and anthropometric measurements.

The methodology is similar in each survey, with a three stage sampling process randomly selecting households to be interviewed for the household questionnaire. All ever-married women aged 15-49 who are usual residents or who were present in the sampled households on the night before the interview were eligible for the women's questionnaire. In some surveys, men were also interviewed separately and households selected for the men's

questionnaire were a random subset of the women's survey. The EDHS have very high response rates. The refusal rate is even lower, since a large proportion of the non-responders were women who were not located by the interviewers Table 2 presents details on the surveys used.

Table 2: Survey details, 1992-2005

		Year			
		1992	1995	2000	2005
Household	Number	10,760	15,567	16,957	21,972
	Response rate (%)	98.3	99.2	99.1	98.9
Women	Number	9,864	14,779	15,573	19,474
	Response rate (%)	98.9	99.3	99.5	99.5
Overall response rate		97.2	98.5	98.6	98.4
Modules	Men's survey	√			
	Women's status		√		
	Domestic violence		√		√
	Female genital cutting		√	√	√
Georeferenced		√	√	√	Not yet available

The outcome variable is based around the body mass index or BMI. The BMI is calculated by the mass (in kilograms) divided by the square of height (in centimeters). While BMI is widely used as a diagnostic tool for obesity, it is not a perfect measure. In particular, BMI is not sensitive to weight due to adiposity and weight due to muscle mass. Muscle is denser than fat and individuals with more muscle mass will weigh more than individuals with a higher percentage body fat, all other factors being equal. Further, it takes no account of frame size, body shape and where on the body fat is accumulated – an important determinant in the effect of obesity on health. However, these problems pertain more to BMI as a medical diagnostic tool for individuals. As a

statistical categorization, it is still useful for determining obesity since there is a strong correlation between BMI and other, more precise, measures of obesity. It is also readily available and the measurements are reliable and easy to take, based solely on height and weight.

Methods

I will have a number of outcome variables based around BMI at the individual level. Obviously, there are different levels of overweight and obesity. A woman who is morbidly obese is at much greater risk of maternal health complications than a woman who is only obese. The first outcome variable will be various categories of weight: normal weight (BMI < 25), overweight (BMI 25-29), obese (BMI 30-34) and morbidly obese (BMI > 35).Given that the outcome is ordered, it is appropriate to treat the outcome variable as an ordinal variable and therefore an ordered probit model will be used to analyze the data. The second outcome will be BMI, and this will be analyzed using an OLS regression. Finally, the risk of obesity will be examined. In this case, the outcome will be obese or not, with a BMI of 30 being the cutoff point. This analysis will use logistic regression.

In the first instance, I will analyze each survey year separately. I will test the relationship between Islam and women's status, Islam and obesity, and women's status and obesity. I will then test the relationship between all three, looking at the other explanatory variables in the model. This will be in the form of nested models, looking at both the changes in the coefficients and the model statistics from one model to the next. The next step will be to create a multiyear model in order to formally test the changes between survey years. To capture the changing relationships

in the variables, I will introduce interactions in the final model. Table 3 outlines the models to be used.

Table 3: Model progression, individual year analysis and pooled year analysis.

	Model											
	1	2	3	4	5	6	7	8	9	10	11	12
Individual year analysis												
Controls	√	√	√	√	√							
Religion		√		√	√							
Women's status			√	√	√							
Religion x women's status					√							
Pooled year analysis												
Controls	√	√	√	√	√	√	√	√	√	√	√	√
Year				√		√	√	√	√	√	√	√
Religion		√			√	√		√	√	√	√	√
Women's status			√		√		√	√	√	√	√	√
Religion x women's status									√			√
Religion x year										√		√
Women's status x year											√	√
Religion x women's status x year												√

Given the importance of interactions in the regression models, I will also explore the use of recursive partitioning models. Statistical interactions can be difficult to interpret, and this difficulty increases exponentially with the number of variables involved. Recursive partitioning parses the population into mutually exclusive groups depending on common characteristics associated with the outcome variable. These groups are created by examining all the explanatory variables and selecting the variable that will create binary groups that are most different with respect to the outcome variable. The outcome is a tree depicting various pathways which lead to a subgroup of individuals with a high or low risk of obesity. It is important to emphasize that pathway does not refer to a temporal sequencing of events culminating in a certain obesity risk status; rather, each pathway represents certain combinations of individual characteristics that are associated with degrees of risk of obesity (see Gruenwald et al. 2006 for an explanation of the process with regards to mortality

risk). Recursive partitioning is a technique seldom used in public health (Lemon et al. 2003) and even less so in sociological work despite its clear benefits in identifying at risk sub-populations.

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