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Food Security and Some Associated Factors among Women with Poly-Cystic Ovary Syndrome

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Abstract: Food insecurity is defined as the limited or uncertain availability of enough food for an always active and healthy life. Poly-cystic ovary syndrome (PCOS) is the most common endocrine disorder among women of reproductive age. The aim of present study was assessing food security status and some associated factors in women with PCOS. A cross-sectional study was conducted on 120 women (with mean age 29.24±5.67 years) referred to Arash hospital (Tehran, Iran), in 2015. General and socioeconomic characteristics and food security status assessed using 21-item general and 18-item USDA household food security questionnaires. Chi-square, Pearson correlation and logistic regression tests and SPSS16 software were used for statistical analysis. Food insecurity percentage was 55.83 % (without hunger 29.17 %, with moderate hunger 24.16 % and with severe hunger 2.5 %). Food security was independently and significantly associated to personal education levels, and house ownership status in women with PCOS. More than half of women with PCOS were food insecure. It is essential to pay more attention for modification of food insecurity and associated factors especially in women.
Keywords: Food security, Socio-economic factors, Poly-cystic ovary syndrome, Women

INTRODUCTION

Food security is defined as unlimited or certain availability of nutritionally adequate and safe food or unlimited or certain ability to gain acceptable foods in socially acceptable ways. Food insecurity and hungry are regularly result of limited financial resources and poverty. However, applicable information about household food security status are not concluded with income measurement. Many of low-income households are food secure and a few non-poor households are food insecure (Bickel G et al, 2000; Hakim S et al, 2011). Food insecurity ranges from concerning about food in household level to hungry in children level (Keenan DP et al, 2001). According to different studies, age, education levels, economic status, job status, marriage status, ethnic/race, household dimension, and food aid status are effective risk factors for food insecurity (Campbell CC, 1991; Hamilton W et al, 1997; Radimer KL et al, 1990; Radimer KL et al, 1992). Nowadays, household food security is assessed using direct and indirect methods in Iran (Hakim S et al, 2011; Djazayeri A et al, 1999; Ghassemi H et al, 1996; SCR, 2006; Zerafati-Shoa N et al, 2007).

Polycystic ovary syndrome (PCOS) is one of the most common endocrine disorders in women, with an estimated prevalence of nearly 7%–10%. This syndrome is characterized by ovulatory dysfunction, hyperandrogenism and polycystic ovaries (Merkin SS et al, 2011). Approximately 50–60% of women with this syndrome are overweight or obese compared to 30% of women in the general population. However, the etiology of PCOS is not fully understood, insulin resistance and compensatory hyperinsulinemia appear to be key features in the majority of cases. Almostly 80% of women with PCOS are insulin resistant, and hyperinsulinemia is common in both normal-weight and overweight women with this disorder. Obese women with PCOS are significantly more likely to be insulin-resistant than their lean counterparts, although insulin resistance is common in both overweight and normal-weight women with PCOS. A decrease in fasting and non-fasting insulin levels has been observed

upon weight reduction in PCOS patients. In addition, many of PCOS patients demonstrate more central fat accumulation than peripheral fat distribution that is associated to more severe insulin resistance and hyperinsulinemia (Wright CE et al, 2004). Despite a relatively high prevalence, the etiology and natural history of PCOS are not well understood. Current theories suggest that increased risk of PCOS may involve a combination of genetic susceptibility and a myriad of environmental factors, including diet, lifestyle, and social factors. The importance of an accurate understanding of this relatively common syndrome is further underscored by growing evidence that PCOS is strongly associated with several metabolic conditions, including insulin resistance, type 2 diabetes mellitus, hypertension, dyslipidemia, metabolic syndrome, and cardiovascular outcomes. The association of PCOS and its components with socio-economic status and food insecurity might clarify the role of the environment in the development of this condition. Studies has shown that individuals with lower socio-economic status and food insecurity are more at risk for engaging in adverse health behaviors, including lack of physical activity, and poor nutritional diet. As well as, obesity is associated with low socio-economic status and food insecurity among women. Also, evidences have shown that obesity can exacerbate insulin resistance, which is a condition highly correlated with and part of the pathogenesis of PCOS (Merkin SS et al, 2011; Franklin B et al, 2012).

However, a previous study have speculated about the contribution of some associated factors with PCOS, no study has assessed food security status among women with PCOS. This study aimed to examine the association between food security status and some socioeconomic factors among women with the PCOS.

METHODS AND SUBJECTS

Study included 120 women with PCOS newly diagnosed (<6months), aged 20-48 years and BMI≥25 that referred to infertility clinic of ARASH hospital for the care and management of PCOS. They were invited to participate voluntary in study. Exclusion criteria were any other etiology such as liver, kidney and heart problems, intake of any medication which might affect hormone metabolism or body composition, smoking and professional physical activity. The definition of PCOS was based on the standard Rotterdam Criteria 2003 and ultrasonography appearance of polycystic ovaries. At the beginning, an informed consent form was completed. Also, at beginning a pilot study was performed on 20 women with new diagnosed PCOS. Surveys were included questions from the U.S. Department of Agriculture household food security model and socio-economic characteristics. Weight (kg), height (cm) were measured using Seca scale and stadiometer in the clinic. Socio-economic factors included education level, job status, house ownership, economic level (based on number of household items that low: 1-3 items, moderate: 4-6 items and high: 7≤), household dimension, number of household employed people, support of organizations, food aid, marital status, number of children, number of pregnancy, ethnicity, disease history, age and menstrual age. Also, waist circumference and hip circumference were measured using tape (WHO, 2010). The eighteen-item USDA household food security questionnaire has been validated in Iran (Hakim S et al, 2011; Mohammadzadeh A et al, 2010; Ramesh T et al, 2010).

Food security status was considered as food secure and insecure groups. Chi-square, Mann-Whitney and Pearson correlation coefficient tests were used. Independent risk factors of food insecurity were identified using the multiple logistics regression final model. Data were analyzed using SPSS16.0 statistical software. Significant P-value was <0.05.

RESULTS

Food insecurity percentage was 55.83 % (without hunger 29.17 %, with moderate hunger 24.16 % and with severe hunger 2.5 %). Mean (± standard deviation) of age, weight, height, body mass index, waist circumference and hip circumference were 29.24 ± 5.67, 76.83 ± 10.89, 161.16 ± 5.56, 29.55 ± 3.70, 100.65 ± 12.04 and 117.22 ± 12.04, respectively. According to initial analysis, associated factors to food insecurity in women with PCOS were economic levels, house ownership, individual education, marital status, numbers of household employed peoples and number of children (Tables 1 and 2). In food insecure group, poor economic level, rental/pawn house, highschool diploma and less individual education and married peoples were 78.6 %, 64.6 %, 71.6 % and 61.2 %, respectively. Disease history, food aid and support of organizations were not existed in women and all of them had covered by therapy insurances.

Table 1. Qualitative factors associated with food security in women with PCOS

Factors		Food secure (n=53) N (%)	Food insecure (n=67) N (%)	P-Value
Economic level	Poor	9 (21.4)	33 (78.6)	<0.0001
	Wealthy and Moderate	44 (56.4)	34 (43.6)	
Ethnicity	Fars	26 (44.8)	32 (55.2)	0.917
	Turk	16 (45.7)	19 (54.3)	
	Other	11 (40.7)	16 (59.3)	
House ownership	Personal/Free	25 (61)	16 (39)	0.008
	Rental/Pawn	28 (35.4)	51 (64.6)	
Parental education	Highschool diploma and less	28 (37.3)	47 (62.7)	0.052
	Post diploma and higher	25 (55.6)	20 (44.4)	
Individual education	Highschool diploma and less	19 (28.4)	48 (71.6)	<0.0001
	Post diploma and higher	34 (64.2)	19 (35.8)	
Parental job	Unemployed/Worker/Other	11 (37.9)	18 (62.1)	0.702
	Employee of office/Manager/Pensioner	20 (44.4)	25 (55.6)	
	Free	22 (47.8)	24 (52.2)	
Individual job	Unemployed	32 (40)	48 (60)	0.272
	Free/Worker/Other	9 (45)	11 (55)	
	Employee of office/Manager	12 (60)	8 (40)	
Marital status	Single/Other	13 (76.5)	4 (23.5)	0.004
	Married	40 (38.8)	63 (61.2)	

In the linear regression analysis, food insecurity significantly increased with increasing number of children and decreasing number of household employed peoples. There were no significant relationship between food security with household dimension and anthropometric indexes (Table 2).

Table 2. Linear regression between food security score and quantitative factors in women with PCOS

Factors	Score of food security		
	n	Pearson coefficient	P-Value
Number of household employed peoples	120	-0.211	0.021
Household dimension	120	-0.125	0.173
Number of children	120	+0.293	0.001
Weight	120	+0.038	0.678
Height	120	+0.014	0.882
BMI	120	+0.047	0.608
Waist circumference	120	-0.008	0.932
Hip circumference	120	+0.001	0.990
Age	120	+0.169	0.064

In the logistic regression final model, the risk of Poly-Cystic Ovary Syndrome was significantly related to house ownership and individual education. Women with rental/pawn house ownership and highschool diploma and less individual education were 2.7 and 4.4 times more likely to be at risk of Poly-Cystic Ovary Syndrome, respectively (Table 3).

Table 3. Logistic regression model of the factors affecting food insecurity in women with PCOS

Factors		OR (CI 95%)	P-Value
House ownership	Rental/Pawn	2.77 (1.206-6.362)	0.016
	Personal/Free	-	-
Personal education	Highschool diploma and less	4.443 (2.007-9.835)	<0.0001
	Post diploma and higher	-	-

DISCUSSION

Our results were indicated a strong association between low socioeconomic status (highschool diploma and less individual education, rental/pawn house ownership, poor economic level, married, high number of children and low number of household employed peoples) and food insecurity in women with PCOS. This association was strongest among women with highschool diploma and less individual education and rental/pawn house ownership. There was no statistically significant relationship between ethnicity, parental education, parental job, individual job and household dimension with food security.

According to previous evidences among women with PCOS, low socioeconomic status is associated with many conditions, including obesity and insulin resistance. Also, a study have indicated association between childhood low socioeconomic levels and PCOS (Merkin SS et al, 2011; Senese LC et al, 2009; Lawlor DA et al,

2002). Food insecurity has been linked with general health status and chronic diseases including diabetes, obesity, cardiovascular disease and dyslipidemia that are important public health problems in women with PCOS. However, any studies have not explored the association between PCOS and food insecurity (Adams EJ et al, 2003; Seligman HK et al, 2007; Seligman HK et al, 2010). Access to nutritious food and food choice is influenced by the social, economic and environmental conditions (Cannon R, 2008). Also, food insecurity is related to gender issue because life nature of women and men is different. Women face numerous barriers to accessing food including their role in feeding the family and the costs of purchasing and preparing healthy food (Olson CM, 2005; Burns C, 2004; Babbington S and Donato-Hunt C, 2010). The most prominent characteristic of food insecurity is lack of financial resources. The ability to purchase and prepare a variety of good quality and healthy foods is dependent on individual or household finance status. Low income along with high food costs are resulted in spending a large percentage of household income on food. In women with lower incomes, the perceived high cost of healthy foods is a contributing factor to food insecurity (Dammann KW and Smith C, 2009; Wong M et al, 2005; Jilcott SB et al, 2009). We assessed some of the potential factors related to health that may influence the development of PCOS, including weight, height, body mass index, menstrual age, waist circumference and hip circumference. In previous studies some of these factors in women had related to food security, although in our study were not related. Our findings highlight the important role of socio-economic factors in the development of PCOS. As a limitation, women in this study cannot be representative of all women with PCOS.

CONCLUSIONS

This study points to an association between food security and some associated factors among women with PCOS, particularly overweight and obese women. The current results suggest that low socio-economic status can explain food insecurity in women with PCOS, although it is not alone sufficient. Future research should survey food security and some associated factors in larger populations of women with PCOS.

Conflict of interest

The author(s) declared no potential conflicts of interests with respect to the research, authorship, and/or publication of this article.

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