

HEALTHY EATING AND PHYSICAL ACTIVITY  
AMONG ARAB MUSLIM MOTHERS OF YOUNG  
CHILDREN LIVING IN THE US:  
BARRIERS AND INFLUENCES OF CULTURE,  
ACCULTURATION AND RELIGION

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Title of Study: HEALTHY EATING AND PHYSICAL ACTIVITY AMONG ARAB MUSLIM MOTHERS OF YOUNG CHILDREN LIVING IN THE US: BARRIERS AND INFLUENCES OF CULTURE, ACCULTURATION AND RELIGION

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Abstract: Immigrants to western societies often experience changes in physical activity (PA) levels and diet because of adopting habits, beliefs and values of the new society. The study explored behavior changes of Arab Muslim mothers of young children living in the United States) as a result of acculturation and socio-cultural and religious barriers that may potentially affect diet and engagement in PA. This study used mixed methods to allow a better understanding of the factors that affect the women's ability to eat healthy and perform PA. Mothers (n=13) were recruited by convenience sampling and participated in focus group discussions to explore the socio-cultural and religious barriers to eating healthy and engaging in PA. Discussions were analyzed via direct content analysis and guided by the theory of triadic influences. Ten factors influenced eating habits and behaviors of women. Family size, competing priorities and responsibilities, income, family food preference, snacking, changes in meal times, portion sizing, self-efficacy, lack of family support, and cultural customs were among the emerging themes. Five factors influenced the women's ability to be physically active; low self-efficacy, lack of women only facilities, gender discrimination, cultural perception of women who exercise and modest dress.

Women (n=180) participated in an online questionnaire to assess intrapersonal and socio-cultural influences and barriers to healthy eating, acculturation levels and food frequency intake. Cost, feeling hungry and having low self-control, having a negative attitude towards healthy eating, family preference and disorganization were the barriers to healthy eating. Four dietary patterns were identified; 1) Fruits and vegetables; 2) Animal products; 3) Saturated fat foods; and 4) Beverages and grains. Cost of healthy food negatively influenced the participant's consumption of saturated fat foods. Mothers (n=447) identified dress code and negative perception of women who engage in physical activities, lack of motivation and stress, and responsibilities as barriers to performing physical activity. Integration to the western society significantly influenced the women's food patterns and increased their PA. Overall, participants had a positive attitude towards healthy eating and performing PA, however, adoption of these behaviors was halted by intrapersonal and socio-cultural but not religious barriers. This is the first study to investigate barriers to healthy eating and performing PA in this community. Thus, more research is needed to further understand specific obstacles. Understanding the challenges that face Arab Muslim mothers from engaging in PA and to eating healthy will help health educators develop culturally appropriate strategies to accommodate the needs of this community.

## TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION .....	1
Statement of the problem .....	1
Purpose of the study.....	3
Objectives .....	4
Significance of the study.....	4
II. REVIEW OF LITERATURE.....	5
The prevalence of overweight and obesity in the Arab Islamic world and the United States .....	5
Physical activity and potential barriers .....	6
Religious faith and body weight .....	9
Dietary patterns and acculturation .....	11
Barriers to healthy eating .....	14
The theory of triadic influence.....	15
Summary .....	17
III. METHODS .....	18
Qualitative methods .....	18
Study design.....	18
Participants.....	18
Moderation and transcription.....	19
Analysis.....	19
Validity .....	19
Discussion questions .....	21
Quantitative methods .....	23
Participants.....	23
Recruitment.....	23
Questionnaire .....	23
Sociodemographic characteristics.....	24
Food attitude subscale of the food and physical activity barriers questionnaire .....	24
Acculturation.....	24
Dietary patterns.....	25
Socio-cultural and religious barriers to physical activity .....	25
Physical activity levels.....	26
Strength of religious faith .....	26
Statistical analysis.....	27

Chapter	Page
IV. Socio-Cultural Influences and Barriers to Healthy Eating among Arab Muslim Mothers of Young Children Living in Oklahoma.....	29
Abstract.....	29
Introduction.....	30
Methods.....	32
Results.....	35
Discussion.....	47
Implications for future research and practice.....	50
References.....	51
V. Socio-Cultural and Religious Barriers on Physical Activity among Arab Muslim Mothers of Young Children Living in Oklahoma.....	55
Abstract.....	55
Introduction.....	56
Methods.....	58
Results.....	61
Discussion.....	68
Implications and future research.....	70
References.....	72
VI. Barriers to Healthy Eating and Eating Patterns of Arab Muslim Mothers of Young Children Living in the United States.....	75
Abstract.....	75
Introduction.....	76
Methods.....	78
Statistical analysis.....	81
Results.....	82
Discussion.....	96
References.....	99
VII. Physical Activity of Arab Muslim Mothers of Young Children Living in the US: Barriers and Influences.....	103
Abstract.....	103
Introduction.....	103
Methods.....	106
Statistical analysis.....	109
Results.....	110
Discussion.....	126
References.....	130

Chapter	Page
REFERENCES .....	134
APPENDICES .....	149
Appendix A: IRB Approval for Qualitative Study .....	149
Appendix B: IRB Approval for Quantitative Study .....	156
Appendix C: Demographics Questionnaire for Focus Groups (English) .....	160
Appendix D: Demographics Questionnaire for Focus Groups (Arabic) .....	161
Appendix E: Focus Group Questions (English).....	162
Appendix F: Focus Group Questions (Arabic) .....	164
Appendix G: Survey Questions (English).....	166
Appendix H: Survey Questions (Arabic).....	176
Appendix I: Consent Form for Focus Groups (English).....	188
Appendix J: Consent Form for Focus Groups (Arabic).....	190
Appendix K: Consent Form and Email Invitation for Survey Participation (English).....	193
Appendix L: Consent Form and Email Invitation for Survey Participation in Arabic .....	195
Appendix M: Oklahoma State University Institutional Review Board Declaration of Translation .....	197

## LIST OF TABLES

Table		Page
3.1	Focus group questions guided by the theory of triadic influences constructs that were used to identify factors that influence eating habits of Arab Muslim mothers of young children living in the US .....	21
3.2	Focus group questions about the factors that influence physical activity among Arab Muslim mothers of young children living in the US.....	22
4.1	Focus group questions guided by the theory of triadic influences constructs that were used to identify factors that influence eating habits of Arab Muslim mothers of young children living in the US .....	34
4.2	Sociodemographic characteristics of 13 Arab Muslim mothers of young children under the age of five living in Stillwater, Oklahoma that participated in one of the seven focus groups to explore the socio-cultural influences and barriers to healthy eating.....	36
4.3	Themes observed from Arab Muslim mothers of young children living in Oklahoma focus groups and supporting quotations regarding perceived knowledge and attitudes toward healthy eating .....	41
4.4	Themes observed from Arab Muslim mothers of young children living in Oklahoma focus groups and supporting quotations changes in eating habits and eating patterns since arriving in the US .....	46
5.1	Focus group questions guided by the Theory of Triadic Influences (TTI) constructs as well as factors that influence Arab Muslim mothers of young children living in the United States to perform physical activity .....	60



LIST OF TABLES (CONTINUED)

Table		Page
6.1	Sociodemographic characteristics of Arab Muslim mothers of young children living in the US .....	83
6.2	Beliefs about eating and body weight, sources of nutrition information and attitudes and self-efficacy towards healthy eating among Arab Muslim mothers of young children living in the US .....	85
6.3	Changes in eating behaviors among Arab Muslim mothers of young children since having children and arriving in the US .....	87
6.4	Barriers and influences to healthy eating and factor loading matrix and factor scores based on a factor analysis with Varimax rotation for 14 items of the socio-cultural barriers to healthy eating .....	89
6.5	Integration vs marginalization acculturation levels of Arab Muslim mothers of young children living in the US.....	91
6.6	Food pattern and consumption frequency of Arab Muslim mothers of young children living in the US .....	93
6.7	The influence of acculturation (integration vs marginalization) levels and individual and socio-cultural influences and barriers to healthy eating on the food pattern of Arab Muslim mothers of young children living in the US .....	95
7.1	Demographic characteristics of Arab Muslim mothers of young children living in the US .....	111
7.2	Belief and self-efficacy of Arab Muslim mothers of young children living in the US towards physical activity .....	112
7.3	Perceptions, attitudes, and changes in physical activity levels of Arab Muslim mothers of young children since arriving in the US .....	114

LIST OF TABLES (CONTINUED)

Table		Page
7.4	Self-reported weekly physical activity levels during leisure time of Arab Muslim mothers of young children living in the US .....	115
7.5	Factor loading matrix and factor analysis with Varimax rotation for 19 items of the socio-cultural barriers and influences to physical activity among Arab Muslim mothers of young children living in the US.....	118
7.6	Strength of religious faith among Muslim Arab mothers of young children living in the US .....	120
7.7	Separation vs assimilation subscale and integration vs marginalization acculturation levels of Arab Muslim mothers of young children living in the US .....	122
7.8	Bivariate correlation matrix among physical activity levels, barriers to physical activity, strength of religious faith, integration vs marginalization acculturation (IVMS), and separation vs assimilation acculturation (SVAS) reported by Arab Muslim mothers of young children living in the US .....	124
7.9	The influence of strength of religious faith, barriers to physical activity and acculturation on physical activity levels of Arab Muslim mothers of young children living in the US .....	125

## CHAPTER I

### INTRODUCTION

#### **Statement of the Problem**

Overweight and obesity are caused by many factors such as metabolic, psychological and/or genetic disorders. However, sociocultural influences can also contribute to the increased prevalence of overweight and obesity. Behavior changes as a result of westernization and cultural/religious barriers that may potentially affect diet and engagement in physical activities of Arab Muslim mothers of young children residing in a predominantly western non-Muslim society (i.e., United States) were explored in this research.

“The body- what we eat, how we dress, the daily rituals through which we attend to the body-is a medium of culture” (Bordo, 2003, p.165).

About 35% of the world’s population is either overweight or obese (WHO, 2014; Murray & Marie, 2014). The US and three Muslim countries (i.e., Egypt, Pakistan and Indonesia) are among the top ten most obese countries in the world (Murray & Marie, 2014). According to investigators, countries of the Arab World (North African and Middle Eastern regions) have high rates of overweight and obesity and the prevalence of obesity in these countries is the highest in the world (Murray & Marie, 2014; Must et al., 1991; WHO, 2014). Furthermore, the number of obese women in these regions has increased two fold over the last 3 decades (Murray & Marie, 2014).

The Arab World consists of 22 countries in the Middle East and North Africa. These countries are Algeria, Bahrain, the Comoros Islands, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Mauritania, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, the United Arab Emirates, and Yemen (The World Bank, 2015).

Both physical activity and eating habits are subject to the individual's knowledge, attitude, preference, age, and health status; otherwise known as the individual influences (Contento et al., 2016). Social factors (family, friends, and peers) as well as cultural traditions, habits, and religious beliefs are related to interpersonal influences that may also interact with the individual's values or practices (Contento et al., 2016). Moreover, religious beliefs have been shown to significantly influence cultural and social norms in regard to physical activity (Cline & Ferraro, 2006; Contento et al., 2016; Kim, 2006). Researchers suggest that religious and cultural barriers, urbanization and adoption of western behaviors have contributed to insufficient physical activity and poor eating habits and thus increased rates and prevalence of overweight and obesity in the Middle East and the Arab world at large (Hosper et al., 2007; Jaber et al., 2003; Johnson, & Fulp, 2002; Musaiger, 2011). Exploring the factors that influence body weight in this society in regards to religious and cultural restrictions and barriers for engagement in physical activities as well as transitions in food consumption patterns and habits as a result of westernization and socio-cultural barriers is essential.

Musaiger (2011) suggests that insufficient physical activity may be potentially related, in part, to lack of specialized educators and, physical activity programs that are accepted by the society and thus inadequate information provided to the community at large. Recent research suggests addressing not only cultural but also linguistic diversity as being significant to understand specific challenges and barriers to behavior change (Caperchione et al., 2009). With the increasing rise of immigrants to western societies, engagement of new migrants with the new society is essential, particularly in regards to healthcare and taking preventative health

precautions (Caperchione et al., 2009). Therefore, it is essential to encourage research to better understand specific challenges to help professionals implement culturally sensitive programs to address such factors. Moreover, healthcare professionals are encouraging individuals from diverse and minority communities to join the field of health and nutrition because they understand specific challenges of their community and can positively influence health promotion such as encouraging physical activity (PA) (Caperchione et al., 2009; Tudor-Locke et al., 2003).

### **Purpose of the Study**

Researchers suggest that cultural diversity and sensitivity need to be addressed properly to develop practical strategies to promote appropriate physical activity and nutrition programs in different communities (Caperchione et al., 2009). Furthermore, the WHO intervention summary report states that faith based interventions that addressed eating behaviors and physical activity and were culturally and environmentally tailored specifically for their communities, were the most successfully implemented and showed positive outcomes (WHO, 2009). For this reason, current standard health, nutrition and physical activity strategies may not be relevant to the Arab Muslim society and may be in need of modification.

This study focused on mothers of young children as fundamental targets for education about healthy practices due to the significant impact they have on their families (Martenz et al., 2015). Although little is known about the influences on physical activity and food choices of young Arab parents, a recent study showed that young mothers with children in the US consumed more sugar and saturated fat based foods, performed significantly less physical activity and had higher body mass index (BMI) compared to women who did not have children (Berge et al., 2011). These findings are most likely related to the demands and priorities of the mother's lifestyle (Berge et al., 2011).

## **Objectives**

The objective of the qualitative study was to identify the intrapersonal, attitudinal and socio-cultural influences in the context of the Theory of Triadic Influence (TTI) that affect eating habits and choices and participation in physical activity among Arab Muslim mothers of young children living in the United States.

The objectives of the quantitative study were to:

- a. Assess current acculturation status of Arab Muslim women residing in the United States.
- b. Document dietary patterns and levels of physical activity of Arab Muslim women residing in the US.
- c. Assess the role of intrapersonal and sociocultural factors on dietary patterns and physical activity levels.
- d. Assess the relationship between strength of faith and physical activity levels.
- e. To assess the relationship between acculturation and dietary patterns.

## **Significance of the Study**

Islam is the second largest religion in the world after Christianity and the fastest growing religion in the United States, where an estimated 3 million Muslims reside (Pew Research Center, 2016). Therefore, addressing these potential barriers and influences within the Arab Muslim community living in the United States is essential. Understanding these factors collectively will help to develop culturally appropriate strategies to prevent overweight and obesity in this growing community starting with mothers and thus future generations.

## CHAPTER II

### LITERATURE REVIEW

#### **The Prevalence of Overweight and Obesity in the Arab Islamic World and the United States**

Overweight and obesity is a substantial global concern worldwide. As of 2013, 2.1 billion people, about 35% of the world's population, were either overweight or obese (WHO, 2014; Murray & Marie, 2014). Moreover, the prevalence of obesity has doubled since 1980, with 15% of women considered obese worldwide (WHO, 2014). A systematic analysis for the years 1980-2013 revealed that worldwide more than 65% of women and 58% of men are either overweight or obese (Murray & Marie, 2014). The US along with three Muslim countries (i.e., Egypt, Pakistan and Indonesia) are among the top ten countries in the world with the most obese adults and children besides China, India, Russia, Brazil, Germany and Mexico (Murray & Marie, 2014).

According to investigators, countries of the Arab World have high rates of overweight and obesity (Murray & Marie, 2014; Must et al., 1991; Sibai et al., 2003; WHO, 1998). The World Health Organization (WHO) has classified the Middle Eastern and North African (MENA) region in a "nutritional transition stage" with increased rates of overweight and obesity as well as moderate rates of undernutrition and micronutrient deficient (Garduno, 2015). Five countries in the Arab world alone (e.g., Bahrain, Egypt, Saudi Arabia, Oman and Kuwait) have shown the highest increase in the prevalence of obesity in the last 33 years compared to other countries in the world (Murray & Marie, 2014). Specifically, the prevalence of obesity among women in the Middle Eastern and Arab world has increased by two fold between the years 1980-2013 (Murray & Marie, 2014). Also, countries such as Egypt and Morocco have a high prevalence of about 30

and 26% of overweight women and men, respectively, which is consistent with previous findings (Galal, 2003). Furthermore, the prevalence of overweight and obesity in Egypt and Morocco are higher in the urban areas compared to rural regions among both genders (about 30% vs 25% and 27% vs 17% in women and men respectively) (Galal, 2003). This is consistent with literature that suggests that urbanization may be associated with an increase in the prevalence of overweight and obesity (El-Ghazali et al., 2010; Madanat et al., 2008). Moreover, an older study conducted in 1981 found that 63.1% of Egyptian mothers of young children were either overweight or obese (Galal, 2003). These numbers have likely increased over time because current overweight and obesity rates are higher worldwide.

### **Physical Activity and Potential Barriers**

Globally, insufficient physical activity is one of the ten leading risk factors for non-communicable diseases (heart disease, diabetes, etc.) which are responsible for more than 60% of deaths worldwide (WHO, 2009). Physical inactivity has been defined as less than “2 and 1/2 hours (150 minutes) a week of moderate-intense aerobic physical activity and muscle strengthening activities at least 2 or more times a week” for adults and “at least 1 hour (60 minutes) of physical activity every day” for children (CDC, 2014). Physical inactivity many times can be a result of overlapping influences at the individual, interpersonal, community and policy levels. These factors differ among ethnicities and cultures, as well as religions.

The Arab society is unique from other cultures regarding levels of engagement in physical activities because of religious/cultural barriers that also contribute to increased body weight and thus obesity in this society (Caperchione et al., 2009; Rogerson & Emes, 2006). Insufficient physical activity is especially evident among Arab women, particularly those from the Muslim community compared to their western peers (Rogerson & Emes, 2006). Barriers to performing physical activities are significantly higher among the Arab Muslim female population compared



to males from the same community (Guthold et al., 2010). These barriers include the inability to perform specific activities in public as well as restrictions on attending mixed gender facilities, modest dress and specific dress codes, and lack of knowledge and motivation (Lawton et al., 2006; Rogerson & Emes, 2006). Participation in mixed gender gyms, for example, is traditionally and religiously inappropriate among the female Muslim society (Lawton et al., 2006).

Furthermore, modest dress and specific dress codes can also be an obstacle to performing specific activities (Lawton et al., 2006). However, the specific dress code may vary with the region. A survey conducted by the Pew Research Center (2014) with women from Arab countries as well as Turkey and Pakistan revealed that Egyptian women (52%) considered only covering their hair as acceptable for public wear whereas 63% of Saudi Arabian women considered acceptable public dress to be covering the hair and face, thus wearing wider and longer clothing. This suggests modest dress and what is considered appropriate attire among females differs from one country to another within the Arab world which may constrain physical activity performance among women.

Barriers to physical activity specific to Arab females have been reported. Over 4500 students (ages 15-18) both male and female living in seven Arab countries were asked to complete a questionnaire regarding barriers to engaging in physical activities as a part of the ARAB-EAT project (Musaiger, 2011). The countries included in this study were Algeria, Jordan, Kuwait, Libya, Palestine, Syria, and the United Arab Emirates. Results of this study revealed that lack of motivation, time and knowledge were the main barriers to performing physical activity and eating healthy. Overall, females reported significantly more barriers than males (Musaiger, 2011).

Women in most of the seven Arab countries faced more sociocultural barriers than men and attributed these barriers to the presence of more sports and exercise facilities for men and limited, if any facilities, for women. Sixty-seven percent of women from Bahrain felt gender discrimination against women to perform physical activities. Also, religious and cultural norms were among the barriers for engaging in physical activities. Women were not able to perform

sports outdoors in sports dress, and often wore traditional modest clothing which was “uncomfortable” to perform physical activities. Moreover, more than 23% of the women reported negative attitudes from the community for women who engage in sports or exercise (Musaiger, 2011).

Physical activity levels and leisure activities in women are generally controlled by the level of income, time, and having access to facilities and programs as well as cultural expectations of what is considered appropriate behavior of a woman towards her family. An Australian study found that women felt twice the pressure of having inadequate time to exercise than men and the presence of children increased that pressure (Gunthrope & Lyons, 2004). Consistently, women without children were more active than women with children (Harris et al., 1997; Ball et al., 2002). Studies show that mothers of young children (<5 years of age) were less active than women with older children (Brown et al., 2000; Marcus et al., 1994). Children, especially those who are younger than 5 years of age, require more attention than older children (Berge et al., 2011; Falba & Sindelar, 2008; Monteiro et al., 2014). Mothers of younger children experienced alterations in their physical activity habits after having children due to changes in their responsibilities towards their children especially during child-rearing stages (Berge et al., 2011; Falba & Sindelar, 2008; Monteiro et al., 2014). A study that investigated mothers in Australia found that their physical activity levels decreased after having the first or second child and the decline continued in the first four years of having their children (Brown et al., 2001).

Lack of motivation; time, especially for working mothers; and lack of childcare were among the barriers reported by Australian mothers of young children (Fjeldsoe et al., 2012). Another study conducted among Bahrain adults revealed that women were less physically active than men because of the socio-cultural barriers of commitment towards their home and family (49%), child-care (36%), and negative attitude from family members towards women that exercise and engage

in sports (24%). Women (67%) reported gender discrimination in the level of engagement in sports and exercise in favor of men (Musaiger A, 2011).

### **Religious Faith and Body Weight**

Recent literature suggests a significant association between increased body weight and religious affiliation (Cline & Ferraro, 2006; Ferraro, 1998; Kim, 2006). According to Ferraro (1998), there is a strong relationship between individuals claiming religious affiliation and the risk of obesity in the US. Many individuals from the African American community consider faith as an essential part of their everyday lifestyle and African Americans, especially women, are among the communities with the highest rates of obesity in the US (Lancaster et al., 2014). Similarly, the majority of the Arab society is Muslim and religion is especially salient for this population. Consistently, Arabs are among the highest worldwide in the prevalence of overweight and obesity (Cline & Ferraro, 2006; Kim, 2006; WHO, 1998). Although the Islamic religion specifically stresses the importance of physical activity and demands an active lifestyle, it is especially difficult for women to be physically active in such strict cultures (Rogerson & Emes, 2006).

There may be a link between physical appearance and religious affiliation. Latino women from the Catholic faith, for example, consider religion an essential aspect for health and wellness (Allen et al., 2014). Religious individuals often evaluate themselves and others based on their spiritual characteristics and individual actions and values rather than their physical appearance and body image, and are often less physically active (Ahmad et al., 1994; Cline & Ferraro, 2006; Kim, 2006). Black Muslim American women considered that dressing modestly and wearing what was appropriate for their body figure was obeying the Islamic guidelines (Odams-Young, 2008). Also, some Muslim women reported negligence to their body image as a result of modest dress. Women may not feel the burden of a “thinner” body size, as in the Western communities,

because their body shape is not clearly exposed to the public, which may result in self-neglect of their body image and thus weight gain (Odoms-Young, 2008).

On the other hand, research has shown that acculturation to the western society and adopting western values such as the “thin ideal” body image internalization can negatively influence body image and self-esteem (Mussap, 2008; Woofenden, 2012). Body dissatisfaction and negative body image have been significantly linked to eating disorders such as purging, diet control, and binge eating (Mussap, 2008; Mussap, 2009; Woofenden, 2012). Therefore, it is important to recall traditional cultural values (e.g., religion and image satisfaction) that encourage positive body image and self-esteem especially in immigrant communities as well as promoting healthy eating guidelines and standards (Bennett & Wolin, 2006; Mussap, 2008).

Overall, faith-based interventions tailored to fit the needs, beliefs and culture of specific communities have been found effective in changing behaviors and attitudes of individuals, communities at large and policies/environmental. One example of a faith-based intervention is the Faithful Families Eating Smart and Moving Move (FFESMM) intervention which targeted low-income, low-resource, African American and non-African communities that attended church often (Center Training and Research Translation, 2014). A staff formed from members from the North Carolina Cooperative Extension, North Carolina University, and North Carolina Division of Public Health was initially involved in this intervention. This intervention aimed to advocate for environmental and policy changes in the community. Faith leaders were essential to identify lay leaders from the community to assist in nine nutrition and physical activity education sessions along with health care providers. Educational cooking and “healthy” shopping sessions that involved family members were held during the nutrition education sessions (Center TRT, 2013). Moreover, to encourage physical activity within the church community, walking trails were placed around the parking lot area. Scriptures, readings and faith-based practices were used to link health information to faith tradition and culture (Center TRT, 2013). After implementation of

this intervention, fruit consumption and physical activity increased 47% and 35% in the communities that adopted the program (Center TRT, 2013). Moreover, the churches implemented 14 Eat Smart policies, 9 Move More policies and 5 environmental changes (Center TRT, 2013). Using flexible methods for implementation depending on the different faith, culture and beliefs is a key success factor for such interventions (Center TRT, 2013).

### **Dietary Patterns and Acculturation**

The WHO has identified different categories of food patterns as: 1) Western which includes whole dairy products, processed cereals, fast food, red meat and sugars 2) Healthy which includes vegetables and fruits, fish, whole grains and chicken or eggs 3) Mediterranean and 4) Mixed patterns (Garduno, 2015). A systematic review conducted in 2012 to investigate the dietary patterns in the Middle Eastern and North African region found that the main pattern was a mixed pattern between healthy and western (Garduno, 2015). As part of the healthy pattern, there was high consumption of fruits and vegetables, poultry, legumes and minimal consumption of processed foods and cereals. Dairy products particularly milk, were mainly consumed in low-fat versions and frequent beverages were tea and fruit juice. However, as part of the western pattern, researchers reported high consumption of soft drinks, fast food sandwiches, sweets and desserts and processed meat products (Garduno, 2015).

As a result of urbanization and adopting western behaviors, the Arab world's eating patterns are changing and shifting towards a western dietary pattern characterized by consumption of saturated fats and added sugar, eating out more often, and consuming less of fruits and vegetables (Galal, 2003; Garduno, 2015, Lee, 2008). A pilot study at the University of Kuwait to evaluate the relation between diet and body weight included 320 college students (El-Ghazali et al., 2010). Both females and males in the university were either overweight or obese (69.9% and 30.1% respectively). One of the major risk factors that may have contributed to the high body weight

was reduced intake of fruits and vegetables, and increased intake of fat, sugar and fast foods (El-Ghazali, 2010). Overall, energy surplus per capita in the Middle East, which includes the Arab world, is the highest among all developing countries as a result of high dietary energy supply and low energy expenditure.

As a part of acculturation to a new society, a shift from traditional dietary patterns to patterns similar to the host country is common and is thought to reflect the rise in the prevalence of overweight and obesity among ethnicities including Arabs (Galal, 2003; Law et al., 2007).

Acculturation is “the processes by which immigrants adopt the attitudes, values, customs, beliefs, and behaviors of a new culture” (Abraido-Lanza et al., 2004, p 1244). Acculturation has been suggested to affect dietary behaviors and attitudes (Hosper et al., 2007; Jaber et al., 2003; Johnson & Fulp, 2002; Musaiger, 2011). Sharma et al. (2002), suggest that immigration is one of the factors that may cause a shift in eating patterns. Research has shown that an individual’s change in lifestyle and adoption of western behaviors such as consumption of high energy foods and shift to a more sedentary lifestyle are among the most significant risk factors for increased body weight (Hope, 2014; Heiss et al., 2011; Hosper et al., 2007; Jaber et al., 2003; Johnson & Fulp, 2002; Musaiger, 2011).

Changes in eating habits that were reported by immigrants to the US included decreased meal frequency and increased meal skipping and frequent snacking (Lee et al., 2008; Mandanat, et al., 2008; El-Ghazali et al., 2010). Amongst the Arab communities, especially those who emigrated to western countries, westernization of diets and/or acculturation to “unusual” dietary habits and eating patterns may contribute to the difficulty in body weight management (El-Ghazali et al., 2010; Madanat et al., 2008). Moroccan and Turkish mothers of young children who immigrated to the Netherlands reported increased food consumption due to changes in meal times and irregular eating patterns (Nicolaou et al., 2009). They reported that meal times changed because of the different times that the children and father come home from school and work (Nicolaou et

al., 2009). Also, mothers reported eating two evening meals per day, one with their children after school then again with their husbands later in the evening (Nicolaou, 2009, p 237).

*“I eat with my children, but when my husband comes home I eat with him as well. It’s not nice for him to have to eat alone.” TW.*

*“In Morocco, people eat on time, here we can’t do that, the kids are at school, husband at work... our lives are different, we’re busy... our heads are full of other things.” MW.*

One study investigated the impact of American diets on newly-arrived international university students during their first 3 months of school (Almohanna, 2010). Thirty-five students completed a food acculturation questionnaire that addressed native and American dietary habits. Students showed significantly increased body weight about 15 weeks post-arrival to the US. Participants, who gained weight, gained an average of 9 pounds. A significant increase in consumption of high caloric foods was reported within the first 15 weeks. All students showed an increase in burger consumption and individuals who gained weight also reported increased consumption of bagels. This suggests that acculturation to American eating habits occurs within the first 15 weeks of arrival to the US. Westernization of eating habits was directly associated with increased body weight in this population (Almohanna, 2010).

Changes in eating habits as a result of acculturation have also been shown among immigrants to western countries. Korean Americans (n=327) who completed questionnaires that measured food frequency, snacking and eating out habits showed that 52% of the participants maintained their native eating habits, 32.9% were bicultural and 15% were acculturated to western eating habits (Lee, 2008). Changes in eating habits included decreased meal frequency and therefore increased meal skipping and frequent snacking. Only 36% of the participants reported eating three meals a day. The majority reported skipping breakfast and only 46% of the participants consumed

breakfast every day. Fifty-eight percent ate out at least once a week. Acculturation and increased body weight were positively correlated with frequent snacking and eating out (Lee, 2008).

### **Barriers to Healthy Eating**

Furthermore, mothers are fundamental targets for education about healthy practices due to the significant impact they have on their family (Martenz et al., 2015). Research has found that mothers of young children consume more saturated fat and added sugar compared to their peers who do not have children; this is reflected in a higher BMI (Berge et al., 2011). Mothers often feel obligated to cook for their children what they are most likely to eat. A study found that Latina mothers of young children followed the same eating pattern as their children who often included less fruit and vegetable consumption (Hromi-Fieldler et al., 2016).

Also, healthy food affordability is often perceived as expensive among low-income families who often opted to purchase foods high in added sugars and saturated fat which they viewed to be more affordable (Beydoun et al., 2011; NiMurchu et al., 2012; Pollard et al., 2002; Ryden & Hagfors, 2011; Williams et al., 2012). Food insecurity and obesity coexist and are independently associated with poor eating patterns (Frongillo & Bernal, 2014). Families with limited resources usually purchase high-density, low nutrient foods such as refined grains and foods rich in added sugar and saturated fats which are considered less expensive compared to healthier options (Darmon & Drewnowski, 2015).

Understanding the challenges that face the Arab community living in the US to eat healthy is essential with this rapidly growing population. It is especially important to understand maternal and cultural perception towards eating healthy to plan successful culturally appropriate approaches to behavior change in these minority communities. Also, promoting educational programs that raise awareness about healthy eating, and demonstrate self-control, meal planning



and healthy alternatives for food preparation especially among low-income families of this population are essential.

### **The Theory of Triadic Influence (TTI)**

The current research was based on the socio-ecological Theory of Triadic Influence (TTI). The TTI focuses on three major influences on health-related behaviors which are: 1) intrapersonal (habits, knowledge and self-efficacy); 2) attitudinal (beliefs and values) and 3) social (social/cultural environment and norms) (Flay & Petaitis, 1994; Nicolaou et al., 2009).

Sociocultural influences and barriers that may affect eating behaviors and engagement in physical activities can be examined using TTI (Flay & Petaitis, 1994). The TTI integrates several theories that explain social, environmental, attitudinal, intrapersonal, and cognitive influences on behavior into one unified, strong exploratory model and comprehensive theoretical framework. The TTI gives a wider understanding of the health-related behaviors that influence an individual (Flay & Petaitis, 1994).

Although most theories of health-related behaviors focus on common perceptions, they generally differ in two major factors; 1) the importance of specific type(s) of factors on the behavior and 2) the time and length of exposure to these factors (Flay & Petaitis, 1994). For example, some theories emphasize the importance of beliefs (e.g., Health Belief Model) and attitude (e.g., Protection Motivation Theory) on an individual's behaviors, and others stress the impact of social influences of controlling one's knowledge, attitudes and beliefs (Denler et al., 2014). The Social Cognitive Theory (SCT), for example, states that what we learn is gained through observation of our social environment (Denler et al., 2014). Personal behavior is most likely to be adopted from the behaviors of the individuals living in the same environment through observing their behavior and behaving similarly. The SCT also refers to the ability of one to manage and control their thoughts via setting goals to accomplish particular behaviors (Denler et al., 2014). Also, the

Theory of Planned Behavior (TPB) focuses on the intention and likelihood of an individual to behave in a certain way or to motivate change in particular behaviors (e.g., healthy eating and increasing physical activity) (Lezin, 2007). The TPB focuses on the individual's attitude (positive or negative) towards a specific behavior. Also that attitude is influenced by the social norms of the people (i.e., family, friends, peers) around the individual and whether or not they would approve of the change. For example, the intention to eat healthy is regulated by a person's attitude and the influence of the people surrounding the individual (Lezin, 2007).

The time and length of exposure to specific factors also affect an individual's behaviors. Theories such as the Theory of Interpersonal Behavior (TIB) emphasize the influence of habits on one's existing behaviors. This theory emphasizes the importance of past behavior on the present such that present actions are a result of habitual responses from the past (Jackson, 2005).

The TTI takes into consideration three major streams of influences on an individual's behaviors, which are the intrapersonal, attitudinal and social influences, and integrates other theories to provide new insight into the causes and influences of behaviors (Flay & Petaitis, 1994). For example, the TTI suggests that the effects of social engagement, intrapersonal engagement and attitudes are influenced by the type and amount of exposure to the environment in which they live. An individual's beliefs, values, motivation, knowledge and attitudes will be similar to the environment in which they live and most similar to the persons with whom they spend the most time (Flay & Petaitis, 1994). Furthermore, the TTI also points out that these influences may differ within the same community depending on direct and indirect influences from the environment, thus affecting a person's perceptions. Flay & Petaitis (1994) explained that a child who lives in a family that does not smoke is likely to grow up thinking that smoking is unacceptable within the society and a child who is brought up in a family that regularly exercises is more likely to exercise as an adult, understand the value of exercise and believe that exercise is a social norm (Flay & Petaitis, 1994).

## **Summary**

In summary, mothers of young children have reported changes in eating habits and patterns after the birth of their child(ren), many times showing an increase in consumption of foods rich in added sugar and saturated fat and less intake of fruits, vegetables and whole grain. Immigration to western societies may increase the risk of these unhealthy eating patterns due to adoption of western eating habits, behaviors and values.

The Arab Muslim female faces unique barriers to performing physical activity compared to her western peers. Modest dress, gender discrimination and income were among the major barriers that influenced the women's physical activity performance. Moreover, mothers of young children have lower physical activity levels and higher BMI compared to women without children reportedly mainly due to competing priorities, time and low income. Understanding socio-cultural and religious barriers that may potentially influence the Arab Muslim mother's ability to engage in physical activity is significant for nutrition educators and health professionals to properly address these barriers and implement successful and effective strategies to enable women from this community to be more physically active. This study will investigate the socio-cultural barriers to healthy eating and the relationship between acculturation and the eating patterns of Arab Muslim mothers of young children living in the US. Also, this study will evaluate specific socio-cultural and religious barriers to physical activity; assess levels of physical activity and the relation between physical activity levels and strength of religious faith.

## CHAPTER III

### METHODS

This research was conducted using both qualitative and quantitative data collection. First, a qualitative formative study was conducted with focus group discussions on the intrapersonal, attitudinal and socio-cultural influences that affect eating habits and participating in physical activity among Arab Muslim mothers of young children living in the United States. The information gained from this study was used to develop a food attitudes and physical activity barriers questionnaire (FAPAB) that was used in the qualitative analysis. Second, a quantitative study was conducted to further assess specific influences on both dietary patterns and performing physical activity.

#### **Qualitative Methods**

A qualitative focus group study was conducted in April and May 2016 to explore the sociocultural influences and barriers that may affect dietary and physical activity behaviors and habits of Arab Muslim mothers of young children living in Stillwater, Oklahoma. Participants were recruited by convenience sampling. This sampling approach was used because the resources needed to conduct probabilistic sampling were not available for this study. Interview questions used for this study were a product of triangulation of validated questions from previous relevant studies as well as questions the researchers developed to address the intrapersonal, attitudinal and socio-cultural influences on healthy eating included in the TTI (Table 3.1). Questions were guided by the constructs of the TTI to address intrapersonal, attitudinal, sociocultural, and religious influences on physical activity (Table 3.2).

Questions were reviewed by eight researchers with experience in nutrition and/or qualitative research. Questions were pretested by asking four mothers who met the criteria for inclusion in the study to review the questions. No changes were made after the pretest. Interview questions used during the focus groups were translated from English to Arabic and the translation was validated by four individuals who were bilingual in Arabic and English to confirm accuracy of the context as well as the translation of the researcher. Approval from the Oklahoma State University (OSU) Institutional Review Board was obtained before beginning the study (see Appendix A).

Women who met the criteria of being an Arab, Muslim mother of at least one child under the age of five and not pregnant were invited to participate in one of the focus groups. Since pregnant women have different eating and potentially different physical activity requirements, they were not included in this study. A total of 13 women participated in four focus groups and one individual interview which took place on campus. Focus groups included two to four women; however, one woman was not able to attend the meetings and was interviewed separately. Interviews were conducted in Arabic. Meetings and recruitment of subjects continued until no new themes emerged and findings reached saturation. To the best of our ability, women from different Arab countries were invited to a single focus group to assure diversity in the conversation and findings.

Before participating in the discussion, participants were asked to read and sign a consent form including giving consent to record the conversation. Participants were given the option to discontinue the discussion at any time or refuse to answer questions they felt uncomfortable answering. Focus groups were completed with the assistance of another bilingual researcher who assured proper recording by using three different recorders and also took observational notes of meetings. Each focus group discussion lasted for an average of 30 minutes. Focus group discussions were transcribed and analyzed before conducting the next meeting to allow the

researcher to reflect on each session and identify new concepts until data saturation was reached. Recorded discussions were later translated to English and full transcripts were analyzed guided by the theory of triadic influence via adding codes and themes to the transcripts using direct content analysis. Direct analysis allowed us to interpret the data guided by specific constructs of a theory and previous research findings to initiate structural coding, themes and categories (Hsieh, 2005).

**Table 3.1.** Focus group questions guided by the constructs of the Theory of Triadic Influences (TTI) that were used to identify factors that influence the eating habits of Arab Muslim mothers of young children living in the US.

TTI Constructs & Barriers	Interview Questions
<b>Intrapersonal</b>	
a. Knowledge	<p>What does healthy eating mean to you?</p> <p>Where do you get your information about healthy eating?</p> <p>How do you feel about eating healthy food?</p> <p>How would you describe your level of confidence that you can eat healthy foods?</p>
b. Self-efficacy	
<b>Attitude</b>	
a. Beliefs and values	<p>Do you usually eat out or cook at home? And why?</p> <p>Do you usually eat from the same dish or on separate plates? How does that affect food intake?</p> <p>Do you appreciate second servings?</p> <p>Can you tell me something about the role that food plays in social occasions?</p> <p>How is the role of food in your social interactions different in the US than what you experienced in your country of origin?</p>
b. Barriers and influences	<p>How have your eating habits changed since moving to the US?</p>
<b>Social-cultural environment &amp; norms</b>	
	<p>Who usually makes the decision on what to eat? (spouse, you, kids)</p> <p>Who usually shops for food for your family?</p> <p>How has your diet changed since moving to the US?</p>

**Table 3.2.** Focus group questions about the factors that influence physical activity among Arab Muslim mothers of young children living in the United States.

TTI Constructs & Barriers	Interview Questions
<b>Intrapersonal</b>	
<ul style="list-style-type: none"> <li>a. Knowledge</li> </ul>	<p>How important is it for you to be physically active?</p> <p>How do you think your physical activity affects your body weight?</p>
<ul style="list-style-type: none"> <li>b. Self-efficacy</li> </ul>	<p>How confident are you in your ability to be physically active?</p>
<b>Attitude</b>	
<ul style="list-style-type: none"> <li>a. Beliefs and values</li> </ul>	<p>What do you think when you see Americans being physically active?</p> <p>How do you feel about performing physical activity in a gym and/or in public?</p>
<ul style="list-style-type: none"> <li>b. Barriers and influences</li> </ul>	<p>What are the barriers for performing physical activity? (e.g. cost, competing priorities, embarrassment, knowledge, available facilities, dislike)</p>
<ul style="list-style-type: none"> <li>c. Religious influences</li> </ul>	<p>How would you describe the influence of religion on the type and/or amount of physical activity you do (e.g. encouragement, dress code, mixed gender gyms, PA in public)?</p>
<b>Social-cultural environment &amp; norms</b>	
	<p>Does the community equally accept both men and women to perform physical activities?</p> <ul style="list-style-type: none"> <li>a. What are your thoughts/feelings about the community's perception of women's engagement in physical activity? Do they accept or reject it?</li> </ul>



## **Quantitative Methods**

### **Participants**

Muslim Arab mothers of young children (ages 0-5 years) living in the United States were recruited to participate in this study.

### **Recruitment**

Subjects were recruited with a snowball strategy through faith leaders and members of mosques in Virginia, Maine, Texas, Oklahoma, Florida and Ohio. Also, women were recruited from Islamic foundations and organizations including the Texas Muslim Women's Foundation and the Saudi Arabian Islamic Clubs in Oklahoma. Finally, women enrolled in closed Facebook groups for women living in the US from Libya, Egypt, Iraq and Tunisia were also contacted to participate. Data were collected in September, 2016.

### **Questionnaire**

A questionnaire related to acculturation, food choices and influences that affect eating habits and to PA levels, socio-cultural and religious barriers and influences to performing PA and religious strength was distributed. The questionnaire was developed by the authors based on the results of focus groups conducted with Arab, Muslim mothers of young children who lived in the US (see Appendix B). Relevant themes from the focus groups were modified to questions and were used to generate the Food Attitudes and Physical Activity Barriers (FAPAB) Questionnaire shown below. The questionnaire was pretested with five Arab Muslim mothers of young children and corrections were made to the instrument before distribution of the survey that was sent to participants as the next step of this research. The questionnaire was distributed via Qualtrics as an online questionnaire in Arabic and English. The questionnaire was initially translated to Arabic by the researcher, then reviewed by four individuals bilingual in English and Arabic. Both

versions of the questionnaire (i.e. English and Arabic) were pretested prior to distribution.

Approval from Oklahoma State University (OSU) institutional review board was obtained before beginning the study (see Appendix C). A reminder to complete the questionnaire was sent automatically via Qualtrics one week after the initial distribution. The following components were part of the questionnaire:

**Sociodemographic characteristics.** Participant's total number of children, number of children under the age of 5, country of origin, reason for coming to the US, age, and number of years living in the US were asked.

**Food attitude subscale of the food and physical activity barriers questionnaire.**

Factors that influence food choices and diet were assessed via the food barriers subscale of the Food and Physical Activity Barriers (FAPAB) questionnaire (Cronbach alpha=0.705). This questionnaire was created from the common themes that emerged from a formative quantitative study conducted previously. Questions to measure socio-cultural and acculturation influences on dietary patterns were developed after the focus groups were completed. As part of the FAPAB food subscale, participants were asked to rate statements about barriers to healthy eating using a four point Likert-type format (1= strongly disagree to 4= strongly agree).

**Acculturation.** The Male Arab-American Acculturation Scale (MAAS) (Cronbach alpha=0.626), an 8 item self-reported questionnaire that measures acculturation of adults from Arab origins to American culture was used (Tami et al., 2012). The MAAS contains two subscales (e.g. separation vs assimilation; integration vs marginalization). Women answered questions in regards to two levels of acculturation, levels of separation and integration (SVAS) assessed by the separation vs assimilation (Cronbach alpha=0.426) and the integration vs marginalization (IVMS) subscale (Cronbach alpha= 0.720). Because the SVAS subscale showed low reliability, only the IVMS subscale was used to evaluate the level of acculturation among

women in this study. Each question was scored on a 7-point Likert-type format from strongly disagree to strongly agree. Scores for each question (reverse-point and positive) were summed to rate the level of acculturation. A total score of 20 was considered the highest level of acculturation.

**Dietary patterns.** Dietary patterns of the participants were assessed using a food frequency questionnaire (FFQ) (Cronbach's alpha = 0.687). The FFQ was modified based on the results of two studies that evaluated food frequency of Arab women. One study investigated food patterns of 460 adult women ages 20-50 years old, living in Tehran, Iran. A 168 item FFQ was used to assess the association between food patterns and obesity of the women (Rezazadeh & Rashidkhani, 2010). Principle component analysis followed by factor analysis was then conducted to identify dietary patterns. The researchers identified healthy and unhealthy dietary patterns from the women's responses. The other study was a cross-sectional study that used a 168 item FFQ to evaluate the association between dietary patterns and systematic inflammatory markers in 486 healthy Iranian women ages 40-60 years of age. Healthy, western and traditional diets were the three major dietary patterns extracted from this study using factor analysis (Esmailzadeh & Azadbakht, 2008).

For the current study, a total of 28 food items were used to assess the participant's eating patterns. The 28 food items included the food items that were significantly associated with diet patterns in the previous studies. Women were asked to indicate how often they consumed each food in a day, week or month. Before summing the frequency consumption, all intakes were converted to daily food intake.

**Socio-cultural and religious barriers to physical activity.** Factors that influence behaviors regarding physical activity were assessed via the socio-cultural and religious barriers to physical activity subscale from the Food Attitudes and Physical Activity Barriers (FAPAB)

questionnaire. This questionnaire was developed from common themes that arose from a previously conducted formative qualitative study. Questions to measure socio-cultural and religious influences on physical activity levels were developed after the focus groups were completed. As part of the FAPAB, participants were asked to rate statements about barriers to physical activity using a 4 point Likert-type format (strongly disagree to strongly agree). The Cronbach alpha for the barriers questions was 0.823.

**Physical activity levels.** The Godin Leisure-Time Exercise Questionnaire (GLTEQ) was used for self-reported measures of the level and strength of PA. The two-item tool is highly reliable to assess levels and strength of physical activity of adults ages 18-65 (Godin & Shepard, 1985). The first item of the GLTEQ measured the weekly frequency of strenuous, moderate, and light activities. The estimated level of PA was calculated by multiplying the number of times per week by 9, 5 and 3 respectively. Total weekly leisure activity was calculated by summing the product of each level of PA.

Weekly leisure activity score =  $(9 \times \text{Strenuous}) + (5 \times \text{Moderate}) + (3 \times \text{Light})$

Total weekly leisure activity scores of 24 units or more, 23-14, and less than 14 are considered active, moderately active and insufficiently active/sedentary leisure physical activity levels (Godin & Shepard, 1985).

The second item measured the strength of weekly frequency of the activities that are “long enough to work up a sweat” (Godin & Shepard, 1985). This was measured by answering: often, sometimes, or rarely/never.

**Strength of religious faith.** The participant’s strength of religious faith was measured by the Santa Clara Strength of Religious Faith Questionnaire (SCSRFQ) (Plante & Boccaccini, 1997). SCSRFQ is used by researchers to examine the influence of religious strength on human behavior (Plante & Boccaccini, 1997). Nine items from the SCSRFQ were used to assess

religious strength regardless of the religious faith and affiliation. Each item was answered according to the level of agreement or disagreement to each statement with: 1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree. The total scores were summed. Scores ranged from 9 (low faith) to 36 (high faith). The item “I pray daily” was removed from the analysis to increase reliability of the tool (Cronbach alpha=0.782).

### **Statistical Analysis**

Analyses were performed using the Statistical Package for the Social Sciences (SPSS 23.0) software. Descriptive statistics were calculated for all variables. Skewness and kurtosis z-scores normality tests were conducted for all variables. Variables that showed skewness were transformed to log10 and used for parametric measures.

Factor analysis was used to categorize barriers and influences to healthy eating and physical activity. Also, dietary patterns were extracted using factor analysis. Independent factors with eigenvalues  $\geq 1.0$  were extracted. Solutions for the factors were each examined using Varimax rotation of the factor loading matrix. All items included had a primary loading of  $|\geq 0.4|$ . Scores for barriers and food patterns were computed by summing the ratings of items that had a primary loading of  $|\geq 0.4|$  on each factor. Higher scores indicated greater barriers to healthy eating or physical activity or more frequent consumption of the foods in the factor. Factors were labeled according to common themes.

Factor analysis was used to categorize specific barriers. Independent factors were extracted, labeled and scored by summing ratings of the barriers. Two items were eliminated from the healthy eating barriers score because they did not contribute to the final interpretation of the data. These items were “There are no barriers to eating healthy” and “My husband does not encourage me to eat healthy” because they did not fit the theoretical structure of the factor; negative attitude. Also, the item “I do not like to waste food, so I end up eating the leftovers” was not included in

final factors because the factor loading weight was less than 0.4. The item “It is expensive to enroll in a gym” was not included in final factors for barriers to physical activity because the factor loading weight was less than 0.4.

For food patterns, the factor score for each factor was calculated by summing the consumption frequency per day for the foods that loaded onto each factor. Although the food item hydrogenated fats loaded onto Factor 4, theoretically this food item did not fit with the low fat food pattern. For that reason, it was moved to the saturated fat foods pattern. Also, the sugar-containing beverage item primarily loaded to the fruits and vegetables factor but it was moved to the beverages and grains factor because it was more relevant to this food pattern (Costello, 2005).

Pearson bivariate correlation analyses were conducted to evaluate the relationships among barriers, acculturation and each factor of the dietary pattern and also strength of religious faith, barriers to physical activity, and physical activity levels. Multiple regression analysis was conducted to measure the relationship between acculturation and barriers to healthy eating on the women’s eating patterns and to evaluate the relationship between strength of religious faith and physical activity barriers on the mother’s physical activity levels. All tests for statistical significance were two-tailed, and  $\alpha=0.05$ .

## CHAPTER IV

### SOCIO-CULTURAL INFLUENCES AND BARRIERS TO HEALTHY EATING AMONG ARAB MUSLIM MOTHERS OF YOUNG CHILDREN LIVING IN OKLAHOMA

*To be submitted to The Journal of Nutrition Education and Behavior*

#### **ABSTRACT**

**Objective:** To identify the intrapersonal, attitudinal and socio-cultural influences in the context of the Theory of Triadic Influence that affect eating habits and choices among Arab Muslim mothers of young children living in the United States.

**Design:** Qualitative data was collected via focus groups. Audio-taped discussions were recorded, transcribed, and analyzed as part of a larger study to identify eating patterns of Arab Muslim mothers of young children living in the US.

**Setting:** Stillwater, Oklahoma. Interviews took place either at the Oklahoma State University family resource center or at the student union.

**Participants:** Thirteen women completed this study. Included Arab Muslim mothers of children under the age of five, not pregnant, and living in the US.

**Analysis:** Audio-recorded interviews were independently translated from Arabic to English, transcribed, coded and analyzed using framework analysis and guided by the theory of triadic influences. Recruitment continued until no new themes emerged and data reached saturation.

**Results:** Ten factors influenced eating habits and behaviors of the women. Family size, competing priorities and responsibilities, income, family food preference, snacking, changes in meal times, portion sizing, self-efficacy, lack of family support and cultural customs were among the most frequently emerging factors.

**Key Words:** Arab, Muslim, barriers, diet, social, culture

## **INTRODUCTION**

More than thirty percent of the world's population is either overweight or obese with numbers strikingly on the rise, increasing the prevalence of chronic diseases (Murray & Marie, 2014; WHO, 2012). And although overweight and obesity can be caused by many factors such as metabolic, psychological and/or genetic disorder; eating habits and insufficient physical activity can also significantly affect body weight. The US and three Muslim countries, Egypt, Pakistan and Indonesia, are among the top ten most obese countries in the world (Murray & Marie, 2014). Countries of the Arab World (i.e., North African and Middle Eastern regions) have reached remarkably high rates of overweight and obesity and the prevalence of obesity in these countries is the highest in the world (Murray & Marie, 2014; WHO, 2014). Six countries from the Arab world are among the top 10 countries with the highest prevalence to diabetes and among the leading countries with the highest prevalence of non-communicable diseases in general (WHO, 2014). Furthermore, the number of obese women in the Arab world has increased two fold over the last three decades (Murray & Marie, 2014). Research suggests that adverse environmental factors, such as poor eating habits, rather than genetic factors are primary causes of overweight and obesity (Law et al., 2007).

An individual's eating habits are subject to their knowledge, attitudes, preferences, and health status; however; social factors as well as cultural habits and behaviors may also interact with the individual's eating values and practices (Contento, 2016).



In the past, eating patterns of the Arab world were known to be among the healthy dietary patterns according to the World Health Organization's description of dietary patterns (Garduno, 2015). However, increasingly exposure to social media and the expansion of western foods around the world as a result of westernization, the eating habits in the Arab world have shifted from a healthy to a western dietary pattern rich in saturated fat and added sugars resulting in a mixed dietary pattern in this region (Garduno, 2015). Acculturation to predominantly western societies increases the exposure to western dietary behaviors and results in changes in eating habits that may contribute to increased rates of overweight and obesity (El-Ghazali et al., 2010; Lee, 2008; Madanat et al., 2008). In one study, Almohanna (2010) saw that newly-arrived international students had an increase in body weight within the first 15 weeks post-arrival to the US. Students gained an average of 9 pounds and reported increased consumption of fast food and foods rich in saturated fats and added sugar (Almohanna, 2010).

Although the Muslim community is considered a minority in the US, consisting of only 1% of the US population; today three million Muslims of all ages live in the US and are estimated to double by 2050 (Pew Research Center, 2016). Women with young children, especially women who originate from a predominantly non-western society and move to a western culture have a high potential for changes in eating habits. Mothers of young children consume more foods rich in saturated fat and added sugars than women without children, most likely due to the demands and priorities of the mother's lifestyle (Berge et al., 2011). Moroccan and Turkish mothers of young children, who immigrated to the Netherlands, reported increased food consumption due to changes in meal times and irregular eating patterns. The mothers reported eating two evening meals per day, one with their children after school then again with their husband later in the evening (Nicolaou et al., 2009). Therefore, we hypothesized that Arab mothers of young children living in the US may face significant barriers that affect their ability to eat healthy.

Cultural diversity and sensitivity need to be addressed properly to develop practical strategies to promote appropriate nutrition programs in different communities (Caperchione et al., 2009). Limited research has been conducted to identify the needs of Arab Muslim mothers living in western societies. Therefore, this qualitative study was conducted to identify the intrapersonal, attitudinal and socio-cultural influences in the context of the Theory of Triadic Influence (TTI) that affect eating habits and choices among Arab Muslim mothers of young children living in the US. Understanding these factors will help nutrition educators develop culturally appropriate strategies to prevent overweight and obesity in this growing community.

## **METHODS**

A qualitative focus group study was conducted in April and May 2016 to explore the sociocultural influences and barriers that may affect dietary behaviors and habits of Arab Muslim mothers of young children living in Stillwater, Oklahoma. Participants were recruited by convenience sampling. This sampling approach was used because the resources needed to conduct probabilistic sampling were not available for this study. Interview questions used for this study were a product of triangulation of validated questions from previous relevant studies as well as questions the researchers developed to address the intrapersonal, attitudinal and socio-cultural influences included in the TTI (Table 4.1). Questions were reviewed by eight researchers with experience in nutrition and/or qualitative research and questions were pretested by asking the questions to four mothers who met the criteria to review the questions. No changes were made after the pretest. Interview questions used during the focus groups were translated from English to Arabic and validated by four individuals who were bilingual in Arabic and English to confirm accuracy of the context as well as the translation of the researcher (Table 4.1). Approval from the Oklahoma State University (OSU) institutional review board was obtained before beginning the study. Women were invited to participate in focus groups that took place on campus. A total of 13 women participated in four focus groups and one individual interview took place on campus.

Focus groups included two to four women; however, one woman was not able to attend to the meetings and was interviewed separately. Women who met the criteria of being an Arab, Muslim mother of at least one child under the age of five, not pregnant were invited to participate in one of the focus groups. Interviews were conducted in Arabic. Meetings and recruitment of subjects continued until no new themes emerged and findings reached saturation. To the best of our ability, women from different Arab countries were invited to a single focus group to assure diversity in the conversation and findings.

Before participating in the discussion, participants were asked to read and sign a consent form including giving consent to record the conversation. Participants were given the option to discontinue the discussion at any time or refuse to answer questions they felt uncomfortable answering. Focus groups were completed with the assistance of another bilingual researcher who assured proper recording by using three different recorders and also took observational notes of meetings. Each focus group discussion lasted for an average of 30 minutes. Focus group discussions were transcribed and analyzed before conducting the next meeting to allow the researcher to reflect on each session and identify new concepts until data saturation was reached. Recorded discussions were later translated to English and full transcripts were analyzed guided by the theory of triadic influence via adding codes and themes to the transcripts using direct content analysis. Direct analysis allows us to interpret the data guided by specific constructs of a theory and previous research findings to initiate structural coding, themes and categories (Hsieh & Shannon, 2005).

**Table 4.1.** Focus group questions guided by the Theory of Triadic Influences (TTI) Constructs that were used to identify factors that influence the eating habits of Arab Muslim mothers of young children living in the US

TTI Constructs & Barriers	Interview Questions
<b>Intrapersonal</b>	
<ul style="list-style-type: none"> <li>a. Knowledge</li> <li>b. Self-efficacy</li> </ul>	<p>What does healthy eating mean to you?</p> <p>Where do you get your information about healthy eating?</p> <p>How do you feel about eating healthy food?</p> <p>How would you describe your level of confidence that you can eat healthy foods?</p>
<b>Attitude</b>	
<ul style="list-style-type: none"> <li>a. Beliefs and values</li> <li>b. Barriers and influences</li> </ul>	<p>Do you usually eat out or cook at home? And why?</p> <p>Do you usually eat from the same dish or on separate plates? How does that affect food intake?</p> <p>Do you appreciate second servings?</p> <p>Can you tell me something about the role that food plays in social occasions?</p> <p>How is the role of food in your social interactions different in the US than what you experienced in your country of origin?</p> <p>How have your eating habits changed since moving to the US?</p>
<b>Social-cultural environment &amp; norms</b>	<p>Who usually makes the decision on what to eat? (spouse, you, kids)</p> <p>Who usually shops for food for your family?</p> <p>How has your diet changed since moving to the US?</p>

## **RESULTS**

### **Sociodemographic Characteristics**

Sociodemographic characteristics of the 13 participants are listed in Table 4.2. The ages of the participants were between 24-40 years old. The number of total children living in the home varied between one to five children; however, most families had 1-2 children. The number of children under the age of five was between one to two children per household. Only three women were students attending school for higher education and all other women were stay-at-home mothers. All women were married to an Arab Muslim spouse and were living with their spouses in the US. All but one of the women lived in the US between one to nine years. The main reason for coming to the US was for their husband to attend school or to attend school themselves. These women were from Libya, Egypt, Iraq, Jordan, and Saudi Arabia.

**Table 4.2.** Sociodemographic characteristics of 13 Arab Muslim mothers of young children under the age of five living in Stillwater, Oklahoma that participated in one of seven focus groups to explore the socio-cultural influences and barriers to healthy eating

<b>Age, y</b>	<b>n</b>	<b>%</b>
24-29	4	31
30-34	6	46
35-40	3	23
<b>Number of children</b>		
1-2	8	61
3-4	4	31
5-6	1	8
<b>Number of children under the age of five</b>		
1-2	13	100
<b>Number of years lived in the US</b>		
5 to >10 years	5	38
1 to > 5 years	7	54
Less than 1 year	1	8
<b>Primary reason for coming to the US</b>		
School	3	23
Accompanied husband	10	77

### **Perceived Knowledge about Healthy Eating**

Participants perceived healthy eating to be foods that contained less sugar, carbohydrates and fat and included higher intake of fruits, vegetables, whole grain, fiber and protein. Participants recognized healthy eating habits as essential for health and overall well-being and most participants agreed that eating habits and behaviors affected body weight. Other participants believed that age had the biggest effect on bodyweight and that their eating pattern was not a major factor that affected their body weight (Table 4.3).

### **Sources of Nutrition**

The internet was the main source of nutrition information for the participants. All women reported searching the internet for videos, blogs and social media posts for information about healthy diets and nutrition information. A minority of women reported receiving some information through television programs; however, many either did not watch local broadcast television or did not watch such programs mainly because of language barriers. Others reported recalling information from school. Very few gained their information from being raised in a family that ate healthy according to the participant's definition of healthy eating (Table 4.3).

### **Attitude and Self-Efficacy towards Eating Healthy**

In general, the women expressed a positive attitude towards healthy eating and described themselves as feeling light, happy and satisfied when eating a healthy diet. However, most women did not prefer the taste of grilled food and fresh fruits and vegetables as opposed to fried food and sweets. Women felt very low confidence in their ability to maintain a healthy diet and cook healthy meals (Table 4.3).

## **Barriers to Healthy Eating**

Women acknowledged the importance of healthy eating and expressed a positive attitude towards following a healthy diet. However, mothers of young children faced many challenges towards being able to eat healthy even if they felt the confidence to do so. Barriers such as the number of children and their family member's food preferences joined with low income were among the emerging themes in all focus groups (Table 4.3).

**Income and family size.** Most women considered themselves to be low-income. Healthy food was considered expensive and this limited their ability to maintain a healthy diet for themselves and their families. This was especially true for women with larger families. The women were faced with lack of income to provide more than one meal option (one healthy meal and one less healthy meal) for their families and also lack of time to prepare multiple meals even if the resources were available. "Eating healthy requires a high income because healthy food is expensive." "I have four children and I can't provide to them healthy food options because I have to pay rent, of course everything in the US requires money." "I cannot provide healthy options all day long." "Sometimes I put my mind to eating healthy but sometimes my income does not allow me to maintain a healthy diet. Frankly, with my level of income, I cannot afford to eat healthy all the time" (Table 4.3).

**Family food preference.** Women reported that their husband did not like the taste of grilled and fresh vegetables and preferred meals prepared using shortening and fried food. "I have to cook what my husband likes to eat. He doesn't like to eat healthy food. He appreciates traditional dishes, and our traditional dishes are not healthy." Also, their children's food preferences were similar to their father's preferred foods. Mothers of older children commented that their children choose what to eat each day and they disliked the taste of vegetables (Table 4.3).



**Snacking and feeling hungry.** Women, especially stay-at-home mothers, reported snacking on unhealthy options throughout the day. “I keep snacking all day long, so when it is time for the main meal I don’t eat well.” “Most of the time I’m not grabbing an apple or a banana for a snack, it would be mainly cookies or a doughnut.” Student mothers felt the need to eat something sweet to give them energy, and stay-at-home mothers reported feeling bored and having nothing to do other than eat. Stay-at home mothers reported reaching for sweets and sandwiches during the day especially when their children and husband were not home (Table 4.3).

**Changes in meal times and lack of organization.** Stay-at-home mothers reported eating multiple meals throughout the day. Mothers who had younger children at home reported eating a meal starting with breakfast with their husband before he left for work, then eating another breakfast with their child. This pattern was observed for both student and stay-at-home mothers after children come home from school and the husband from work. Women reported eating with their children one main meal in the evening and then eating the same meal again with their husband after he returned from work. Women mentioned not being able to organize their time to eat appropriate number of meals, to eat healthy, and to portion size their meals (Table 4.3).

**Portion sizing and eating from one plate.** Women were asked if they usually ate from one plate with their families during their main meals and how that affected food consumption. Most of the women, except women from Egypt, answered that they usually ate from the same dish, especially traditional meals. Some women explained that when they ate from the same dish they tended to eat less than they would if they ate on a separate plate. These women explained that they usually prepared a small amount of food and most of the time feed their child before eating and would not have much left to eat after their husband and family have eaten the meal. These women desired second servings but by eating from one plate were able to control their intake and believed that this helped them control their body weight. Other women believed that eating from one plate increased their intake compared to the amount they consumed when eating in separate plates.

These women explained that they were unable to control portion size because they would be busy feeding their child as they ate and would not be aware of the amount they actually ate. They thought eating from one plate increased their body weight and made it harder for them to control their body weight (Table 4.3).

**Lack of support.** Lack of support and motivation to eat healthy from the husband was another major barrier to eating healthy. Some women indicated that even if the resources were available to eating healthy, they were not able to eat healthy because of either not being able to prepare more than one meal as discussed earlier, or because of not having an encouraging family network and a healthy eating environment at home. These women mentioned that their husband enjoyed eating homemade sweets each day with his coffee and that he preferred if his wife would join him. These women said that they would find themselves not only eating sweets with their husband, but also having a variety of sweets at home readily available to snack on during the day. Many times their husband would not eat his meal unless his wife joined him even if she had already eaten (Table 4.3).

**Table 4.3.** Themes observed from Arab Muslim mothers of young children living in Oklahoma focus groups and supporting quotations regarding perceived knowledge and attitudes toward healthy eating

Theme	Selected quotations
<p><b>Perceived knowledge of healthy eating and effect on body weight</b></p>	<p>“The foods that do not contain a lot of fats and includes a lot of fruits, vegetables, fiber and water and whole wheat.”</p> <p>“A diet that contains vegetables, fruit, water, a small quantity of carbohydrates, whole wheat, mostly grilled foods and not fried.”</p> <p>“Anything that does not contain sugar and are not fried.”</p> <p>“It affects body weight...I eat a lot of sweets so it affects my weight.”</p> <p>“When you eat something rich in carbohydrates, it would of course increase body weight. However, foods like fruits and vegetables do not affect body weight.”</p> <p>“You can eat anything you want even if it contained fat, but the amount of fat consumed if is the problem; if it were too much, then that would increase the body weight.”</p>
<p><b>Sources of nutrition</b></p>	<p>“We have studied it in school. But there are very good programs on the internet that you</p>

	<p>can follow.”</p> <p>“The internet and also from the television.”</p> <p>“I search the internet for healthy foods and doctor’s recommendations for a healthy diet.”</p>
<b>Attitude towards eating healthy</b>	<p>“I feel light.”</p> <p>“You feel good about yourself, comfortable and at ease.”</p> <p>“It’s good for you, but does not taste good...I think it doesn’t taste as good as other food.”</p>
<b>Self-efficacy</b>	<p>“If an individual had the willingness to eat healthy, of course they will.”</p> <p>“I have fifty percent confidence. I can follow a good diet for a while then I start to mix in unhealthy food.”</p> <p>“I have zero determination, so my level of confidence is very bad.”</p> <p>“It’s very hard for me to follow a healthy diet.”</p> <p>“It is impossible for me to eat healthy.”</p>
<b>Barriers to eating healthy</b>	
<b>Income</b>	<p>“Eating healthy requires a high income, because healthy food is always expensive.”</p> <p>“I have 4 children. I can’t provide them healthy food options because I have to pay rent, of course everything here in America requires</p>

money.”

“If I could afford it, I would definitely begin to eat healthy.”

**Family food preference**

“Sometimes the kids don’t want to eat healthy foods.”

“I have to cook for my husband what he likes. He doesn’t like healthy food. He appreciates our traditional meals which are not healthy. When I cook for him what he likes, I don’t find time to cook for myself another meal, so I find myself eating with him.”

“My kids might not like the healthy food I cook, so I have to cook something else. Also, I don’t feel full after eating the healthy meal, so I find myself eating with them.”

**Familiarization**

“We come from a culture that consumes little healthy food; we don’t care about it a lot.”

**Snacking and lack of organization**

“I keep eating snacks all day; so when it’s time for the main meal; I don’t eat well.”

“I can’t control myself for a long time. Sometimes I do a good job on eating on one main course, and then eat unhealthy food the

remainder of the day because I feel hungry.”

“My main problem is planning the times.

Sometimes when I go out, I don’t eat anything the whole day and when I come back home, I would be really hungry and I want to eat anything I find. The easiest and fastest would be canned food or unhealthy snacks. I also eat more than I would if I was not hungry.”

“I don’t make healthy food because my husband doesn’t like healthy food.”

#### **Eating from one dish and food intake**

“I feel like I eat less when we eat from the same dish...I cook a small quantity of food and my husband eats faster and more than I do...by the time I feed my son I would not find much left to eat.”

“If we eat in separate dishes then I have the opportunity to add more.”

“When I cook a small amount and eat from one dish; I don’t eat as much as if I were to eat in a separate plate.”

“When I eat from the same dish, it’s harder for me to portion size, and so I feel like I eat more than if I were to eat in a separated dish.”

## Changes in Eating Pattern Since Arriving in the US

Eating patterns of women changed in different ways when they moved to the US. Many women reported that they were not used to having breakfast before arriving in the US. Their meal times became more organized after arriving in the US, and having breakfast with their children before going to school allowed them to have a complete breakfast. Other women said that they began to incorporate more vegetables in their meals after arriving in America. Some women lived with their extended families in their country of origin and were forced to cook and eat large meals during lunch and dinner. After arriving in the US, they found themselves eating lighter meals and most often only one main meal, usually in the evening. On the other hand, not all women experienced a positive change to their eating patterns. Food preparation did not seem to differ since arriving in the US except for using oil instead of shortening to cook. Moreover, women reported eating more during social gatherings than usual. Women commented that they were not able to change their eating habits as they prepared large amounts and many varieties of food for each meal as they did in their countries of origin. They considered that cooking a variety of food that contained rice, meat, baked pastry, and sweets was essential for each gathering regardless if it were a formal gathering or a daily get-together with friends. Women commented that it was part of their culture to eat from every variety of food available (Table 4.4).

**Table 4.4.** Themes observed from Arab Muslim mothers of young children living in Oklahoma focus groups and supporting quotations changes in eating habits and eating pattern since arriving in the US

Theme	Selected quotations
<b>Changes in eating pattern</b>	“We have breakfast here; we didn’t have breakfast back home... here I would have a

sandwich or something before I go to work.”

“When I arrived to the US, we have breakfast at a set time because my kids go to school. And of course we only have one main evening meal at home.”

“In the US, I started to eat more vegetables because my children are used to eating it at school.”

“I eat more meals throughout the day because I eat alone then again with my son and again with my husband.”

“Back home we live or spend more time with our extended families so we find ourselves cooking and serving more food. But here in the US, we can only cook for lunch and have a light dinner.”



## **DISCUSSION**

Intrapersonal knowledge and self-efficacy; attitudes, beliefs and values and social/cultural environment and norms related to healthy eating were examined in a sample of Arab Muslim mothers of young children living in the US. Our results revealed that barriers that influence and hinder the mother's ability to eat healthy were income, family size, lack of family support, family food preference, low self-efficacy, competing priorities and responsibilities, cultural values, portion sizing, increased snacking, and changes in meal times.

Study findings showed that women, particularly those with more children, believed that living a healthy lifestyle in general and particularly eating healthy was expensive especially in the United States as opposed to their country of origin. Low-income women were restricted to purchasing large quantities of food regardless of quality and felt obligated to meet their family's food preferences. Consistent with our findings, low-income parents of young children perceived healthy eating as being costly and were required to prioritize their family's essentials making them unable to buy fruits, vegetables and meat regularly (Hayter et al., 2013). Other studies also found that the consumption of fruits, vegetables, fish and meat changed among immigrants since arriving in the US as a result as people perceiving these food items to being expensive (Pan et al., 1999; Reeves & Henry, 2000). Reeves & Henry (2000) found that immigrants to the US from Malaysia consumed more beef than fish because of cost. In another study, Asian immigrants reported decreased consumption of vegetables and meat with an increase in fruit consumption (Pan et al., 1999).

Lack of time and organization were among the emerging barriers according to the women of this study. These barriers were also reported among Australian women with children who felt that lack of time and family support were the main barriers to maintaining a healthy diet, thus, a healthy weight (Andajani-Sutjahjo et al., 2004). Women in the current study lacked family

support especially from the husband; this was reflected in their low self-confidence to maintain a healthy diet. Thornton et al., (2006) found that lack of the husband's support was directly correlated with poor eating habits of Latino women. Latino women living among supportive families felt encouraged to adopt healthy eating behaviors as opposed to women living in a weaker support system (Hromi-Fiedler et al., 2016).

Food plays a fundamental role in the daily lives of Arabs. Eating together, many times from one plate, is greatly valued within the Arab culture (Kittler & Sucher, 2001). Furthermore, the Islamic religion encourages families to eat together and share their food (Mermelstein, 1999; Sakr, 1975). Women included in this study saw cooking for their families and sharing their meals together as part of their traditional values that they wished to pass down to their children. However, eating from one plate restricted the women's ability to portion size their meals.

Socialization is also greatly valued in the Arabic culture. Preparing a large variety and quantity of food is considered good hospitality from the hostess and eating from all of the varieties prepared is considered good manners from the guest. Also, it is considered good manners for the host to be the first to begin eating and the last to finish (Mermelstein, 1999; Sakr, 1975). This cultural behavior did not change since arriving in the US according to the women of this study. On the contrary, they reported attending gatherings and entertaining more often in the US than in their country of origin because of lack of family and sense of acculturation.

Finally, although food is considered a fundamental aspect of culture, traditions, religion and socialization, many people who have relocated to the US have reported changes in their eating patterns and food consumption behaviors (Ahmed, 2002; Chavez et al., 1994; Crane & Green, 1980; Gordon et al., 2000; McArthur et al., 2001; Kim et al., 1984; Story & Harris, 1989, Yang & Fox, 1979; Wenkam & Wolff, 1970). Consistent with previous findings, women reported changes in the number of meals and eating times but not in the way they prepared their food since arriving

in the US. This is consistent with the changes in Arab mothers' eating habits as a result of acculturation to the Netherlands; women reported that meal times changed because of the different times that the children and their husband come home from school and work. Also, mothers reported eating two evening meals per day, one with their children after school then again with their husbands later in the evening (Nicolaou et al., 2009). Ahmed (2002) reported that the number of meals per day decreased while the number of snacks increased among Arab students who immigrated to the US compared to their country of origin. Also, and similar to our findings, lunch was often skipped while dinner was considered the main meal of the day since arriving in the US, which was different from their country of origin (Ahmed, 2002). Arab students reported eating more snacks since arriving to the US such as cookies, candy, fruit juice, soft drinks and coffee (Ahmed, 2002). Correspondingly, Arab mothers in this study reported consuming more foods rich in added sugar and saturated fat as a result of increased snacking and changes in meal times throughout the day, staying up late at night, and having easier access to fast foods in the US.

To the best of our knowledge, this is the first qualitative study to examine facilitators and barriers to eating healthy among Arab Muslim mothers of young children living in the US. Current standard health and nutrition strategies may not be relevant to the Arab Muslim community especially those living in a predominantly western society, thus may be in need for modification.

Some of the limitations to this study may be that the researcher was part of the studied community and therefore may have uncontrolled bias in regards to specific influences and barriers. Also, using the direct content qualitative analysis, bias in asking the questions during discussions and interpreting the data may also exist as a result of analyzing the data guided by an existing theory (Hsieh & Shannon, 2005). To minimize the risk of drawing conclusions and to increase the accuracy of analysis, constant verification of understanding and interpreting the information was used throughout the discussions as well as including another researcher to audit

the discussions and further verify interpretation (Hsieh & Shannon, 2005). Although focus groups were held until data saturation was reached and no new themes emerged among the women, more research is required within a larger sample and in a variety of locations to form a complete understanding of the factors that influence healthy eating behaviors that mothers of this minority group face.

In conclusion, this qualitative study used the framework of the TTI to examine the influences on healthy eating habits among Arab Muslim mothers of young children who were living in the US. Women had low confidence in their ability to provide healthy meals for their families and were not familiar with current dietary recommendations, however they realized the importance of eating healthy for themselves and their families. Also, women lacked support from their husbands and felt obligated to cook and eat according to the family's preference regardless of the women's needs. Therefore, it is important to promote a strong culturally sensitive social support network among Arab Muslim households to increase the women's self-confidence and motivation to eat healthy and adopt healthy eating behaviors.

## **IMPLICATIONS FOR RESEARCH AND PRACTICE**

More research is critical to further understand the influences on eating healthy, promote healthy eating habits, and plan culturally sensitive strategies to generate dietary guidelines for the Arab region to accommodate the needs of this community. Also, research has found that diet theory and change in behavior are more successful when professionals are familiar with the culture, language and obstacles affecting the community's behavior (Heiss et al., 2011). Therefore, nutrition professionals and educators need to plan and provide more effective strategies to promote healthy eating habits among Arab Muslim immigrants. These professionals need to be experienced in Arab Muslim cultural foods and eating patterns and familiar with the cultural competence and language

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## CHAPTER V

### SOCIO-CULTURAL AND RELIGIOUS BARRIERS TO PHYSICAL ACTIVITY AMONG ARAB MUSLIM MOTHERS OF YOUNG CHILDREN LIVING IN OKLAHOMA

*To be submitted to The Journal Nutrition Education and Behavior*

#### **ABSTRACT**

**Objective:** To identify the intrapersonal, attitudinal, socio-cultural and religious factors that influence physical activity levels of Arab Muslim mothers of young children in the context of the Theory of Triadic Influences (TTI).

**Design:** Focus groups were conducted to collect qualitative data. Participants were recruited by convenience sampling.

**Setting:** Focus group discussions took place on a Midwestern university campus.

**Participants:** Thirteen women participated in the focus groups. Mothers of at least one child under the age of five who were Arab and Muslim were invited to participate in the discussions.

**Analysis:** Audio-taped discussions were fully transcribed, coded and analyzed using framework analysis guided by the intrapersonal, attitudinal, socio-cultural and religious constructs of the TTI.

**Results:** Five main factors that influenced the women's ability to be physically active were low self-efficacy, lack of women only facilities, gender discrimination, negative cultural perception of women who exercise and modest dress.

**Implications:** Understanding the barriers to being active among this community will help educators develop effective, acceptable and convenient strategies and interventions to meet their needs. Including community-based family activities with the help of faith leaders and trained educators would help increase family support and self-confidence, and reduce the negative perception towards women who participate in physical activities.

## **INTRODUCTION**

Obesity is one of the ten leading causes of death worldwide and has been linked to low life expectancy and non-communicable diseases such as heart disease, type 2 diabetes and certain cancers (Murray & Marie, 2014). Thirty-five percent of the world's population is either overweight or obese (Murray & Marie, 2014; WHO, 2014). Many of these chronic diseases are a result of increased body weight that can be caused by poor diet and physical inactivity.

The Arab society is unique from other cultures regarding engagement in physical activities because of religious and cultural barriers that may also contribute to increased body weight and thus obesity (Rogerson & Emes, 2006; Caperchione et al., 2009). Insufficient physical activity is especially evident among Arab women, particularly those from the Muslim community compared to their western peers (Rogerson & Emes, 2006). Barriers to performing physical activity are significantly higher among the Arab Muslim females compared to males from the same culture (Guthold et al., 2010). These barriers include the inability to perform specific activities in public as well as restrictions on attending mixed gender facilities, modest dress and specific dress codes, lack of knowledge and motivation (Lawton et al., 2006; Rogerson & Emes, 2006). Participation

in mixed gender gyms, for example, is traditionally and religiously inappropriate among the Arab female Muslim society (Lawton et al., 2006). Furthermore, modest dress and dress codes such as the hijab (the Islamic dress) can also be an obstacle to performing specific activities (Lawton et al., 2006). These barriers are a product of overlapping influences at the individual, interpersonal, social and religious levels that differ among ethnicities and cultures as well as religions.

Acculturation also affects an individual's behavior and attitude (Hosper et al., 2007; Jaber et al., 2003; Johnson & Fulp, 2002; Musaiger, 2011). Research has shown that individuals can adopt western habits such as living a sedentary lifestyle different than what they may be used to in their countries of origin (Hosper et al., 2007; Jaber et al., 2003; Johnson & Fulp, 2002; Musaiger, 2011). On the other hand, in western societies exercise is considered a social norm and society does not express gender discrimination among individuals who are physically active.

Acculturation to western habits may have positive influences in terms of motivation and flexibility to increase activity among immigrant communities. It is particularly important to address the influence of acculturation, especially with the population of Arab immigrants to the US expected to increase rapidly (Pew Research Center, 2016).

A recent study showed that mothers of young children in the US performed significantly less physical activity and had higher body mass indexes (BMI) compared to women who did not have children (Berge et al., 2011). Arab mothers of young children living in the US may be potentially at even greater risk of physical inactivity and being overweight or obese compared to their Arab and western peers. Limited research is available to address specific needs and limitations to performing exercise among women of this population. This is especially true in regards to research that addresses the cultural and religious barriers to performing physical activity among Muslim females living in a western society. Researchers suggest that cultural diversity and sensitivity need to be addressed properly to develop practical strategies to promote appropriate physical activity programs in different communities (Caperchione et al., 2009). Therefore, the

objective of this study was to identify the intrapersonal, attitudinal, socio-cultural, and religious influences in the context of the Theory of Triadic Influences (TTI) that may affect participation in physical activity among Arab Muslim mothers of young children living in the US.

Most studies completed to address the barriers to healthy eating and performing physical activity (PA) within this community were conducted among individuals living in Arab countries; however, little research has been conducted to identify barriers and struggles of living a healthy lifestyle among Arab Muslim mothers living in a predominantly western society such as the US.

## **METHODS**

Focus groups were conducted in April and May 2016 with thirteen Arab Muslim mothers of young children living in Stillwater Oklahoma. Women who agreed to participate were included in one of four focus groups or an interview. Before the beginning of the study approval from the University Institutional Review Board was obtained. Women were recruited by convenience sampling and meetings took place on campus. Women included in this study were Arab Muslim mothers who had at least one child under the age of five, were not pregnant, and lived in the US. To the best of our ability, women from different Arab countries were invited to a single focus group to allow diversity in opinions and experiences.

Before participating in the discussion, participants were asked to read and sign a consent form in Arabic including giving consent to record the conversation. Questions used for the interview were translated to Arabic and the translation was validated by four individuals bilingual in Arabic and English to confirm accuracy of the context as well as the translation of the researcher. Questions were guided by the constructs of the TTI to address intrapersonal, attitudinal, sociocultural, and religious influences on physical activity. Discussion questions were a product of triangulation of past studies including questions developed by the researcher to address the previous influences (Table 5.1). Questions were pre-tested by four Arab Muslim mothers of young children who were

familiar with qualitative research designs. No changes were made after the pretest. Also, to facilitate a productive discussion, questions and conversations were led in Arabic with the help of a trained student, fluent in Arabic and English, who took observational notes, helped record the conversations, and assured accurate interpretation of the participant's comments.

Each focus group meeting lasted an average of 30 minutes. Childcare was provided during the meetings. Complete conversations from each focus group were transcribed and analyzed guided by the Theory of Triadic Influences before conducting the next focus group to assure diversity in the women's comments. Meetings were conducted until no new themes emerged and data reached saturation.

**Table 5.1.** Focus group questions guided by the Theory of Triadic Influences (TTI) Constructs as well as the factors that influence Arab Muslim mothers of young children living in the United States to perform physical activity.

TTI Constructs & Barriers	Interview Questions
<b>Intrapersonal</b>	
a. Knowledge	<p>How important is it for you to be physically active?</p> <p>How do you think your physical activity affects your body weight?</p>
b. Self-efficacy	<p>How confident are you in your ability to be physically active?</p>
<b>Attitude</b>	
a. Beliefs and values	<p>What do you think when you see Americans being physically active?</p> <p>How do you feel about performing physical activity in a gym and/or in public?</p>
b. Barriers and influences	<p>What are the barriers for performing physical activity? (e.g. cost, competing priorities, embarrassment, knowledge, available facilities, dislike)</p>
c. Religious influences	<p>How would you describe the influence of religion on the type and/or amount of physical activity you do (e.g. encouragement, dress code, mixed gender gyms, PA in public)?</p>
<b>Social-cultural environment &amp; norms</b>	
	<p>Does the community equally accept both men and women to perform physical activities?</p> <p>What are your thoughts/feelings about the community's perception of women's engagement in physical activity? Do they accept or reject it?</p>

## **RESULTS**

### **Sociodemographic Characteristics**

Thirteen women who met the criteria of being Arab, Muslim, and mothers of at least one child under the age of five, were not pregnant, and lived in the US were invited to attend one of four focus groups or an interview conducted at the university campus. The ages of the participants were between 24-40 years old. Women were stay-at-home mothers (n=10) and mothers that attended school for higher education (n=3). All women were married to an Arab Muslim spouse and were living with their spouses in the US. Women who participated in this study were from Libya, Egypt, Iraq, Jordan, and Saudi Arabia.

### **Benefits of Exercise**

Women included in this study perceived physical activity to be essential for their health and overall wellness, a way to lose weight, and a way to improve their mood and tolerance to everyday stress

*“I don’t think exercise is to reduce body weight only... my attitude is better when I exercise.”*

*“When I used to exercise I didn’t feel tired... I felt happy and ready for the day.”*

*“I like it and I feel like it makes me feel good and relieves stress.”*

*“It is important for my appearance and self-confidence and for me to like myself and my body.”*

*“My friends will ask me: why do you want to work out...you are not overweight.”*

### **Lack of Self-Confidence**



The participants implied that they had low-confidence in performing physical activity mainly due to embarrassment and being shy about exercising with or around men.

*“I can’t exercise in front of men in a gym.”*

*“I’m too embarrassed to exercise in a gym and in front of the public. I can’t exercise in a mixed gym in front of men...If I would find a female trainer, I would feel more comfortable.”*

*“It is because we are shy. This is mainly from our religion and culture as Arabs; we tend to be shy and embarrassed to exercise in public.”*

*“My husband is always telling me to work out but I don’t think I have it in me.”*

### **Lack of Familiarity**

Most women reported not being familiar with proper exercise techniques. This was given as a reason for their low self-confidence and embarrassment in being active. None of the women were familiar with current physical activity requirements and the different physical activity options. One participant disclosed her feeling of embarrassment and low self-esteem from her lack of knowledge on how to operate some of the exercise equipment in the gym. She was concerned about being judged by others who have more experience in operating the equipment than her.

*“I started working out heavily and I injured my knee.”*

*“I have a treadmill at home but my problem is I don’t understand its settings.”*

*“I would definitely rather go to a gym where no one knows me... it has to do with confidence and self-esteem...when I go to the gym I don’t really know what I’m doing, so I think that a person is probably judging me because I don’t know how to use the machine.”*

*“We don’t have anything called exercise in my home town. We don’t have any gyms.”*

### **Lack of Time, Competing Priorities, and Lack of Support**

The vast majority of the women complained about not having time to exercise even if they had the motivation to do so because of their family responsibilities. Women also mentioned that walking with children was extremely stressful and that in turn stalled their motivation to exercise.

*“The responsibilities that I have towards my kids and home do not allow me the time to exercise.”*

*“Even if I had the determination and motivation to exercise I don’t have time.”*

*“I really wish I could exercise but at this time my kids are young and I can’t.”*

*“In our society, a woman does not have anyone to motivate her to exercise”*

*“Someone has to stay home to watch the kids. I cannot exercise with them.”*

*“It is very difficult to walk with the kids, one will pull me, the other one will run away and that increases my stress to walk.”*

### **Income**

Financial difficulty was one of the main barriers for the women. Most women considered enrolling in a gym to be beyond their priorities. All women were either students or accompanied a student spouse and completely relied on scholarship allowances to support themselves and their families.

### **Gender Discrimination**

All women believed that men had more freedom than women to be physically active; as they considered it to be socially acceptable for men and not women to exercise in public. Participants

perceived running, jogging and stretching as unacceptable in public for women because they revealed specific body parts such as their breasts and upper thighs or body part movements meant to be covered, especially for those who wore the hijab.

*“For sure the men have more freedom to exercise in public, a lot more than the women.”*

*“In our culture, if a woman was walking in the street that would be considered ok, but if you saw a woman running or jogging, then that would be very strange and unacceptable... On the other hand, if a man would run or jog in the street that would be perfectly fine.”*

*“I never saw a woman run back home...They would think it was strange for women to run...Running is not accepted, walking is fine.”*

*“Now people see others do it, so it is becoming to be more acceptable for women to exercise. They may not accept the idea of running or stretching but walking is fine.”*

*“We hear that our grandmothers and our mother never did this or that and so it is not accepted...this is true for exercising as well.”*

*“The best type of exercise I like to do at home is dancing.”*

*“There is only one park back home that women might consider for walking especially very early in the morning or very late at night.”*

### **Lack of Women Only Facilities**

Exercising in public and mixed gender facilities were among the major emerging themes of barriers to performing physical activity among the women. Crowded exercising gyms hindered the participant's motivation to attend training or exercise in gyms. Women commented that if there were women only facilities available, they would have more confidence to exercise and would go to the gym more often. All women felt embarrassed to exercise around men in the gym.

Some women suggested that they would participate in mixed gender facilities if there were specific times allocated for women only and if the trainers were female. All women believed that walking was the only socially and culturally accepted form of exercising in public whether they were in their country of origin or in a western society.

*“Here in America they don’t have women’s only gyms or empty it out just for women, that is impossible, they have to be mixed.”*

*“Because the gyms are mixed gender, I won’t be able to use all of the instruments available or do all of the activities I want. So, I will end up looking for a place that would not have a large number of people or an activity that does not require movement of my body parts such as my breasts and upper thighs and I would be forced to do that only.”*

*“I don’t mind at all if I find a place that is only for females, I would participate right away... I believe that there should be private places that take into consideration different beliefs and religious values.”*

### **Perception of Arab Men towards Women that Exercise**

Women complained about the negative perception of Arab men towards women that exercise. It was one of the main barriers for women to exercise in public and in exercise facilities. The participants exposed their concern in regards to disrespect from some Arab men. They stated that men comment with discourteous statements and question the women’s attendance to the gym or exercising in public. This was associated, in their opinion, with them not being familiar with women exercising in general. The participants also stated that they were willing to enroll in a gym where Arab men would not normally attend and if it were in a place where they were unknown.

*“I cannot be confident that no men will come in and see me. Of course if an Arab man saw me working out...I would die...I would leave right away. Even though they are men from different cultures in the gym, but Arab men would stare at you and gossip and talk about you. American men don't care.”*

*“If there were other Arabs in the gym, I would not go in in the first place; that would be impossible.”*

*“The people from our same culture would think negatively of you if you exercise.”*

### **Dress Code**

Women believed that performing vigorous forms of activities required specific clothing that may not agree with their modest dress code. Although the participants considered that religion was not a barrier to being active, many inferred that wearing the hijab affected their ability to exercise and also limited the type and time spent being active. Some participants commented that the type of activity that the Muslim female can participate in depends on the required postures and motions of the activity itself; if it revealed body parts or if the activity required direct contact with a man such as dancing then it was unacceptable. Some women felt uncomfortable exercising around western individuals because of feeling uncomfortable, strange, and unaccepted. They commented that they were under the impression that they were not accepted by the western public because of the misconception that women wearing the hijab are not allowed to exercise or that exercising was not part of the Arab culture. They also commented that they often felt stared at and were constantly asked if they were hot or felt uncomfortable wearing the hijab *and walking for example; which decreased their motivation.*

*“The main barrier to me to perform physical activity in public with other Americans is how they look at us when we exercise by them. If I'm not wearing clothing fit for exercising similar to what*

*they are wearing, and I was wearing modest clothing (hijab), they would look at me in a strange way. They make me feel as if I am not in the right place.”*

*“I want to go to the gym but I never wear pants, so if I go to the gym I have to wear pants and that makes me feel uncomfortable because I’m not used to dressing that way.”*

*“I think that the way we dress affects the type of exercise we perform. For example, we can’t ride a bike or ride a horse easily with long dresses.”*

*“I would not go to a gym here in America because I would have to wear certain clothes so that I can exercise, but if there were a place specific for women, I would go.”*

*“If I were in gym, I would have had to dress modestly. That would affect the level and type of activity I choose.”*

*“Religiously, I don’t think being active goes against religion obviously if you are dressed appropriately...I think the type of activities that you do might go against religion depending on what it is.”*

*“Physically, what you wear does affect what activity you can do... Because obviously hijab, it does get in the way...your neck feels like it’s on fire...the fact that you have to wear so many layers to cover...it does get little bit annoying.”*

### **Changes in Physical Activity Habits**

Most women indicated their physical activity level and behavior had declined since arriving to the US. Women commented that they walked more often to their destination in their home country as opposed to the US where more comfortable and affordable transportation was available. Women commented many times that they felt encouraged when seeing western women exercising, however directly noted the previous barriers that prevented them from doing the same.

*“Here in the US seeing people walk and exercise encourages me to be active, but again I don’t have time. I used to swim back home, but it is impossible for me to swim here in the US for religious reasons.”*

*“Here in the US there are more resources, for example, there are outdoor spaces to exercise such as the lake and around campus; the place is encouraging, the problem is that I don’t have time.”*

*“Here in the US we don’t walk as much as we used to back home, most places can’t be reached within walking distance, we have to drive.”*

## **DISCUSSION**

The Arab population in general has low levels of physical activity (Abdul-Rahim et al., 2003; Baron-Epel et al., 2005; Henry et al., 2004). This is due, in part, to particular barriers that affect their ability to be physically active. A study that investigated the role of culture, environment and religion on physical activity among adults living in Israel found that the Arab community was less physically active than the Jewish population living in Israel (Shuval et al., 2008). This current study investigated potential factors that affect the women’s physical activity in the content of the TTI. The main constructs of the theory explored were intrapersonal (knowledge and self-efficacy), attitude (beliefs and values), socio-cultural and religious factors.

Women, especially Arab Muslim women, face significant barriers to being active compared to men from the same society (Guthold et al., 2010). The participant’s comments and views in regards to factors that influenced their ability to be physically active were to a great extent consistent with previous findings. Arab Muslim females faced more obstacles to being able to exercise compared to males such as their inability to exercise in public; participate in mixed gender facilities; need to dress modestly; lack of knowledge, and motivation, and low levels of acculturation (Guthold et al., 2010; Hosper et al., 2007; Jaber et al., 2003; Johnson & Fulp, 2002; Lawton et al., 2006; Musaiger, 2011; Rogerson & Emes, 2006). Women included in this study

mentioned being embarrassed to work out in a gym because of lack of knowledge in operating the equipment and also feeling shy and judged, especially from Arab men in the community.

Consistent with our findings, women reported gender discrimination against women who perform exercise in the Arab culture (Lawton et al., 2006). We suggest that the negative perception of Arab men towards women that exercise may be, in part, from not being familiar with women exercising in their country of origin and the perception that physical activity and exercising is culturally and traditionally inappropriate for women (Lawton et al., 2006).

The need to wear modest clothing and the absence of a female only gym were significant barriers to the participant's ability to engage in activities. Women indicated that availability of female only gyms, especially with a female trainer, would enable them to dress more comfortably, engage in more activities and for a longer period of time. Similarly, women in another study perceived modest clothing as "uncomfortable" to perform exercise and therefore limited their engagement in physical activity (Musaiger, 2011).

Living in a predominantly western society appeared to negatively change the women's ability to be active. This was consistent with research that found that individuals who reside in a western society may adopt western behaviors such as living a sedentary lifestyle compared to their prior lifestyle when they lived in their country of origin (Hosper et al., 2007; Jaber et al., 2003; Johnson & Fulp, 2002; Musaiger, 2011).

Consistent with previous findings, participants believed that the Islamic religion promoted physical activity and did not consider the Islamic religion specifically to restrain physical activity according to scriptures from the Quran (Shuval et al., 2008). However, the women identified specific cultural and religious barriers such as dress code, participating in mixed gender facilities and the limited ability to exercise in public to be constructs of the Islamic religion. The



participants considered these determinants to hinder their ability to freely engage with all and any activity they enjoyed and thus encourage them to maintain the activity.

Women who moved from an Arab Muslim society were not encouraged to exercise by living in a western society; and socio-cultural and religious factors remained significant barriers to the women to perform physical activity regardless of location.

The main barriers identified by women were intrapersonal (low self-efficacy, feeling shy, and lack of knowledge about activity techniques); attitudinal (religious beliefs and values about modest dress and exercising in public) and sociocultural (cultural beliefs, gender discrimination and cultural perception towards women that exercise) as well as environmental (lack of single gender facilities and exercising in public). To the best of our knowledge, this is the first qualitative study to examine religious and cultural influences to performing physical activity among Arab Muslim mothers of young children living in the US.

Limitations to this study were that the primary investigator is part of the Arab Muslim community and is a mother of young children, which may have resulted in unintended bias or reflexivity to interpreting some of the participant's comments and analysis. The number of eligible women willing to participate in the study was small and did not include women from all different Arab regions which may have limited diversity on their perspective and attitude towards performing PA.

### **Implementations and Future Research**

Understanding the factors that prevent Muslim females from engaging in physical activities will help nutrition and health educators to develop culturally appropriate strategies to provide a more suitable environment to exercise in this community. Interventions should encourage social support to encourage behavior change (Hromi-Fiedler et al., 2016). Community, faith based approaches have proven to be successful among African American and Latino communities and

have been suggested for the Arab community (Shuval et al., 2008). Walking in groups and including faith leaders in interventions and community programs would be a good approach to encourage women to be active and to change cultural perception towards women who exercise. Changes can be made to replace running, jogging or using exercise equipment usually found in gyms to more convenient options such as walking vigorously.

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## CHAPTER VI

### BARRIERS TO HEALTHY EATING AND EATING PATTERNS OF ARAB MUSLIM MOTHERS OF YOUNG CHILDREN LIVING IN THE UNITED STATES

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#### **ABSTRACT**

**Purpose:** The aim of this study was to examine perceived personal, socio-cultural influences and barriers to healthy eating, to identify eating patterns and to study the relationship among acculturation, barriers and eating patterns.

**Design:** Arab Muslim mothers of young children (<5 years) living in the US (n=180) participated in an online survey to assess intrapersonal and socio-cultural influences and barriers to healthy eating, acculturation levels and food frequency intake.

**Results:** Cost, feeling hungry and having low self-control, having a negative attitude towards healthy eating, family preference and disorganization were the main intrapersonal and sociocultural barriers to eating healthy among the women. Factor analysis from the food frequency questionnaire identified four patterns: 1) Fruits and vegetables; 2) Animal products; 3) Saturated fat foods; and 4) Beverages and grains. Acculturation significantly positively influenced fruit and vegetable, saturated fats and beverages and grain intake ( $p<0.01$ ), animal products ( $p<0.05$ ) and barriers related to cost significantly negatively influenced consumption of foods rich in saturated fat ( $p<0.05$ ).

**Conclusion and Implications:** Intrapersonal and cultural barriers were significantly related to consumption of foods higher in saturated fat among Arab Muslim mothers of young children in the US. Also, acculturation to a predominantly western society such as the US affected the women's food patterns. This current study included women who originate from different Arab countries, live in various states in the US and came to the US for different reasons which suggests that this study provided strong evidence to specific barriers and eating patterns among this population. However, more research to identify specific intrapersonal and socio-cultural barriers to eating healthy and to evaluate dietary patterns of Arab immigrants to western societies are essential to tailor culturally sensitive interventions to combat overweight and obesity as well as non-communicable diseases among this growing population.

**Key Words:** Arab, Muslim, acculturation, food frequency, dietary patterns

## **INTRODUCTION**

Thirty-five percent of the world's population is either overweight or obese (WHO, 2014).

Among the countries that have reached exceptionally high rates of obesity are countries of the Arab world and the US (Murray & Marie, 2014). Five countries in the Arab world (i.e., Bahrain, Egypt, Saudi Arabia, Oman and Kuwait) have shown the highest increase in the prevalence of obesity in the last 33 years compared to other countries (Murray & Marie, 2014). Overweight and obesity can be initiated by insufficient physical activity and poor eating practices, and can contribute to metabolic disturbances such as type 2 diabetes, heart disease and some cancers (WHO, 2014).

In the last thirty years, the number of Arab women who are obese has increased by two fold, with the increase due in part to increased urbanization and adoption of western behaviors (Madanat et al., 2008; El-Ghazali et al., 2010). Embracing such behaviors may contribute to intrapersonal,

attitudinal and socio-cultural changes among women. Eating patterns in the Arab world have changed and shifted towards a western dietary pattern characterized by consumption of saturated fats, added sugar and eating out more often, and lower consumption of fruits and vegetables (Galal, 2003; Garduno, 2015; Lee, 2008).

Changes in environmental factors are thought to reflect the rise in the prevalence of overweight and obesity among ethnicities including Arabs (Galal, 2003; Law et al., 2007). Sharma et al. (2000), suggest that immigration is one of the factors that may cause a shift in eating patterns. Changes in eating habits that were reported by immigrants to the US included a decrease in meal frequency and an increase in skipping meals and frequent snacking (Lee, 2008; Madanat et al., 2008; El-Ghazali, 2010). Moroccan and Turkish mothers of young children who immigrated to the Netherlands reported increased food consumption due to changes in meal times and irregular eating patterns (Nicolaou et al., 2009). Arab women come to the US pre-exposed to the western culture as a result of urbanization and exposure to the western world through social media, television and western commercial companies. This pre-exposure may make it easier for them to adapt to the new western society. Exploring the factors that influence eating behaviors and habits are essential for implementing practical approaches to change behavior in this immigrant population.

Mothers are fundamental targets for education about healthy practices due the significant impact they have on their family (Martenz et al., 2015). Research has found that mothers of young children consume more saturated fat and added sugars compared to their peers who do not have children, and this is reflected in a higher BMI (Berge et al., 2011). These findings are most likely related to the demands and priorities of the mother's lifestyle.

Three million Arab immigrants currently live in the US and numbers are expected to double by 2050 (Pew Research Center, 2016). Therefore, it is essential to address the influences to eating



healthy in this minority community. To date, there is very limited data on the Arab Muslim community's eating practices and patterns and more importantly, the factors that influence their behaviors, especially among those who have immigrated to predominantly western societies such as the US. It has become important among researchers to identify the cultural, religious and community values to develop stronger interventions as culture is greatly related to an individual's behavior. Using culturally appropriate and tailored interventions to target specific behaviors of different cultures is essential for successful outcomes (Maiter & George, 2003). By understanding the changes in environmental factors associated with immigrating to the US, cultural values and beliefs within the Arab community, health and nutrition educators will be able to plan successful and culturally appropriate approaches to promoting healthy behaviors (Martnez et al., 2015). Therefore, the objective of this study was to understand the intrapersonal, attitudinal, and socio-cultural influences on healthy eating among Arab Muslim mothers of young children living in the US and to investigate the eating patterns of this population. We hypothesized that 1) acculturation will be related to current dietary patterns; 3) women will have a positive attitude towards eating healthy; and 4) social-cultural barriers will be negatively related to healthy dietary patterns. To the best of our knowledge, eating patterns and barriers to healthy eating in this community have not been investigated.

## **METHODS**

### **Participants**

Muslim Arab mothers of young children (ages 0-5 years) living in the United States were recruited to participate in this study.

## **Recruitment**

Subjects were recruited with a snowball strategy through faith leaders and members of mosques in Virginia, Maine, Texas, Oklahoma, Florida and Ohio. Also, women were recruited from Islamic foundations and organizations including the Texas Muslim Women's Foundation and the Saudi Arabian Islamic Clubs in Oklahoma. Finally, women enrolled in closed Facebook groups for women living in the US from Libya, Egypt, Iraq and Tunisia were also contacted to participate.

## **Questionnaire**

A questionnaire related to acculturation, food choices and influences that affect eating habits was distributed to Arab Muslim mothers of young children residing in the US. The questionnaire was distributed via Qualtrics as an online questionnaire in Arabic and English. A reminder to complete the questionnaire was sent automatically via Qualtrics one week after the initial distribution. The following components were part of the questionnaire:

### **Sociodemographic characteristics**

Participant's total number of children, number of children under the age of 5, country of origin, reason for coming to the US, age, and number of years living in the US were asked.

### **Food attitude subscale of the food and physical activity barriers questionnaire**

Factors that influence food choices and diet were assessed via the food barriers subscale of the Food and Physical Activity Barriers (FAPAB) questionnaire (Cronbach alpha=0.705). This questionnaire was created from the common themes that emerged from a formative quantitative study conducted previously (Chapter IV). Questions to measure socio-cultural and acculturation influences on dietary patterns were developed after the focus groups from a previously conducted study were completed.

As part of the FAPAB food subscale, participants were asked to rate statements about barriers to healthy eating using a 4 point Likert-type format (strongly disagree to strongly agree). Factor analysis was used to categorize barriers and influences to healthy eating.

### **Acculturation measurements**

The Male Arab-American Acculturation Scale (MAAS) (Cronbach alpha=0.626), an 8 item self-reported questionnaire that measures acculturation of adults from Arab origins to American culture was used (Tami et al., 2012). The MAAS contains two subscales (e.g. separation vs assimilation; integration vs marginalization). Women answered questions in regards to two levels of acculturation, levels of separation and integration (SVAS) assessed by the separation vs assimilation (Cronbach alpha=0.426) and the integration vs marginalization (IVMS) subscale (Cronbach alpha= 0.720). Because the SVAS subscale showed low reliability, only the IVMS subscale was used to evaluate the level of acculturation among women in this study. Each question was scored on a 7-point Likert-type format from strongly disagree to strongly agree. Scores for each question (reverse-point and positive) were summed to rate the level of acculturation. A total score of 20 was considered the highest level of acculturation.

### **Dietary patterns**

Dietary patterns of the participants were assessed using a food frequency questionnaire (FFQ) (Cronbach's alpha = 0.687). The FFQ was modified based on the results of two studies that evaluated food frequency of Arab women. One study investigated food patterns of 460 adult women ages 20-50 years old, living in Tehran, Iran. A 168 item FFQ was used to assess the association between food patterns and obesity of the women (Rezazadeh & Rashidkhani, 2010). Principle component analysis followed by factor analysis was then conducted to identify dietary patterns. The researchers identified healthy and unhealthy dietary patterns from the women's responses. The other study was a cross-sectional study that used a 168 item FFQ to evaluate the

association between dietary patterns and systematic inflammatory markers in 486 healthy Iranian women ages 40-60 years of age. Healthy, western and traditional diets were the three major dietary patterns extracted from this study using factor analysis (Esmailzadeh & Azadbakht, 2008). For the current study, a total of 28 food items were used to assess the participant's eating patterns. The 28 food items included the food items that were significantly associated with diet patterns in the previous studies. Women were asked to indicate how often they consumed each food in a day, week or month. Before summing the frequency consumption, all intakes were converted to daily food intake. The factor score for each factor was calculated by summing the consumption frequency per day for the foods that loaded onto each factor.

### **Statistical Analysis**

Analyses were performed using the Statistical Package for the Social Sciences (SPSS 23.0) software. Descriptive statistics were calculated for all variables. Skewness and kurtosis z-scores normality tests were conducted for all variables. Variables that showed skewness were transformed to log10 and used for parametric measures. Factor analysis was used to assess intrapersonal and socio-cultural barriers to eating healthy. Also, dietary patterns were extracted using factor analysis. Independent factors with eigenvalues  $\geq 1.0$  were extracted. Solutions for the factors were each examined using Varimax rotation of the factor loading matrix. All items included had a primary loading of  $|\geq 0.4|$ . Scores for barriers and food patterns were computed by summing the ratings of items that had a primary loading of  $|\geq 0.4|$  on each factor. Higher scores indicated greater barriers to healthy eating or more frequent consumption of the foods in the factor. Factors were labeled according to common themes.

Two items were eliminated from the barriers score because they did not contribute to the final interpretation of the data. These items were "There are no barriers to eating healthy" and "My husband does not encourage me to eat healthy" because they did not fit the theoretical structure of

the factor; negative attitude (Costello & Osborne, 2005; Kline, 1994). Also, the item “I do not like to waste food, so I end up eating the leftovers” was not included in final factors because the factor loading weight was less than 0.4.

For food patterns, although hydrogenated fats loaded onto Factor 4, theoretically this food item did not fit with the low fat food pattern. For that reason, it was moved to the saturated fat pattern (Costello, 2005). Also, the sugar-containing beverage item primarily loaded to the fruits and vegetables factor but it was moved to the beverages and grains factor because it was more relevant to this food pattern (Costello & Osborne, 2005; Kline, 1994).

Bivariate relationships among barriers, acculturation and each factor of the dietary pattern were examined using Pearson product moment correlation. Multiple regression analysis was used to measure the relationship between acculturation and barriers to healthy eating on the women’s eating patterns. The tests for statistical significance were two-tailed, and  $\alpha=0.05$ .

## **RESULTS**

### **Sociodemographic Characteristics**

A total of 632 women responded the survey, however, only 180 participants (28.5%) met the criteria of being Arab, Muslim, a mother of at least one child under the age of five living in the US, and providing a complete FFQ. Women from 11 different Arab countries participated in the survey, but most (60.6%) came from Libya. Most women (95.6%) had 1 or 2 children under the age of 5. Women arrived in the US to accompany their husband (45%) or to go to school (32.2%); few women moved to the US for work or immigration (Table 6.1).

**Table 6.1.** Sociodemographic characteristics of Arab Muslim mothers of young children (N=180) living in the US.

<b>Variable</b>	<b>Frequency</b>	<b>Percent (%)</b>
<b>Country</b>		
Libya	109	60.6
Egypt	25	13.9
Jordan	19	10.6
Palestine	8	4.4
Iraq	5	2.8
Morocco	3	1.7
Saudi Arabia	3	1.7
Sudan	2	1.1
Syria	2	1.1
Tunisia	2	1.1
Yemen	2	1.1
<b>Total children</b>		
1	39	21.7
2	69	38.3
3	44	24.4
4	22	12.2
5 or more	6	3.3
<b>Number of children under 5 years</b>		
1	95	52.8
2	77	42.8
3 or more	8	4.5
<b>Years living in the US</b>		
15 years or more	8	4.4
10 to less than 15 years	11	6.1
5 to less than 10 years	60	33.3
1 to less than 5 years	85	47.2
Less than 1 year	16	8.9
<b>Primary reason for coming to the US</b>		
Accompanied husband	81	45.0
School	58	32.2
Immigration	28	15.6
Work	2	1.1
Other	11	6.1
<b>Age (years)</b>		
18-23	4	2.2
24-29	51	28.3
30-34	77	42.8
35-40	42	23.3
Above 40	5	2.8

## **Food Attitudes**

Women's beliefs about healthy eating, their primary source of information for healthy eating and their attitude towards healthy eating were investigated using the healthy eating subscale of the Food Attitudes and Physical Activity Barriers (FAPAB) Questionnaire. Most women believed maintaining a healthy diet was beneficial mainly to lose or maintain body weight (78.3%). The majority of women reported the internet as their main source of information to learn about healthy eating behaviors (86.1%).

The women were asked how they felt about eating healthy food. In general, women reported a positive attitude towards eating healthy and living a healthy lifestyle. Women described feeling comfortable, light, happy and at ease when eating healthy. Maintaining a healthy diet was believed to be important for their health and the health of their children. Others felt the need to force themselves to eat healthy for the sake of their health. Less women were to say they were not familiar with or disliked the taste of healthy food. A total of 84.5% of participants were confident to some degree in their ability to maintain a healthy dietary lifestyle (Table 6.2).

**Table 6.2.** Beliefs about eating and body weight, sources of nutrition information and attitudes and self-efficacy towards healthy eating among Arab Muslim mothers of young children living in the US (N=180).

	<b>Frequency</b>	<b>Percent (%)</b>
<b>Beliefs about food and body weight</b>		
Poor eating habits increase body weight	87	48.3
Healthy eating maintains my body weight	54	30.0
Sweets increase body weight	16	8.9
Giving birth affects body weight more than food	15	8.3
The way I eat does not affect my body weight	5	2.8
Age affects body weight more than the amount of food consumed	3	1.7
<b>Source of information*</b>		
The internet	155	86.1
Television programs	43	23.9
Family	34	18.9
Friends and peers	25	13.9
School	13	7.2
<b>Attitude towards healthy eating*</b>		
I feel comfortable when I eat healthy	70	38.9
I feel light when I eat healthy	70	38.9
Healthy eating is important for the sake of my children	62	34.4
Eating healthy is good for me	61	33.9
I feel happy and at ease when I eat healthy	35	19.4
I need to force myself to eat healthy for my wellbeing	31	17.2
Healthy food tastes good if it is prepared properly	30	16.7
I am not used to eating healthy	27	15.0
Healthy food does not taste as good as fried and sweet food	18	10.0
Healthy food does not taste good	9	5.0
<b>Self-efficacy towards healthy eating</b>		
Very confident	32	17.8
Confident	47	26.1
Somewhat confident	73	40.6
Not confident	26	14.4
Not at all confident	2	1.1

\*Women could select more than one response.



### **Behavior Changes Since Arriving in the US and Having Children**

Most women reported changes in their eating habits since having children; they were preparing meals for the sake of their children rather than their own preferences and needs. A few women reported being less organized or lacking self-determination in their eating habits since marrying and having children (Table 6.3).

The majority of the women shopped for food in the US; about half of the women (46.7%) did not shop for food in their country of origin which changed after arriving in the US. Most women (56.7%) reported changes in their meal times since arriving in the US. Many women (42.2%) reported preparing only one main meal per day since arriving in the US compared to a few women (8.3%) who reported an increase in the number of meals consumed per day. Some women reported an increase in their purchase and consumption of sweets.

Most women reported becoming familiar with new food varieties to use in meals since moving to the US (51.1%). Some of the positive changes observed among the women since arriving in the US were that women reportedly included changing fat sources, and using less salt. About one third of the respondents (34.4%) felt they had no change in food preparation.

**Table 6.3.** Changes in eating behaviors among Arab Muslim mothers of young children (N=180)

since having children and arriving in the US.

<b>Changes in eating habits after having children*</b>	<b>Frequency (N)</b>	<b>Percent (%)</b>
I care more about my children than myself	93	51.7
What I eat depends on my children's food preference	61	33.9
I feel like do not care about myself anymore	50	27.8
I was more organized before marriage/children	31	17.2
I had more self-determination before marriage/children	20	11.1
<b>Changes in shopping habits since arriving in the US</b>		
I never bought food in my country of origin. In the US I usually do the shopping	88	48.9
No change; I bought the food in my country of origin and I buy it here in the US	84	46.7
I did not buy food in my country of origin and do not buy it in the US	8	4.4
<b>Changes in eating habits between US and country of origin*</b>		
My meal times changed	102	56.7
We now have only one main meal per day after school/work	76	42.2
I began to incorporate more vegetables in my meals	43	23.9
I eat more at night	40	22.2
The amount of sweets I have per day has increased	37	20.6
It is easier for me to buy sweets from store	36	20.0
My eating habits have not changed	27	15.0
I began to have breakfast	19	10.6
The number of meals increased	15	8.3
<b>Changes in food preparation*</b>		
I became familiar with new food varieties	92	51.1
There is no change in the way I prepare my meals	62	34.4
I use less oil	56	31.1
The ingredients I use now are different	53	29.4
I shifted from using shortening to oil	33	18.3
Precooked and canned meals help reduce cooking time	30	16.7
I use less salt	27	15.0

\*Women could select more than one response.

## **Barriers and Influences to Healthy Eating**

To enhance our understanding of specific factors that affect the women's eating habits and behaviors, 16 barriers and influences on healthy eating were examined using the FAPAB questionnaire. Factor analysis was conducted and four primary factors were extracted as barriers to healthy eating: 1) Hunger and lack of self-control; 2) Family preference and disorganization; 3) Negative attitude; and 4) Cost. The total variance explained from rotated extraction was 14.9%, 12.9%, 9.9% and 9.0% respectively from factors one through four (Table 6.4).

Feeling hungry throughout the day and lacking self-control thus constant snacking was a major barrier among the women to eat healthy. The majority of women (85%) often ate between meals and 70.6% reported that the idea of maintaining a healthy diet triggered a constant feeling of hunger.

Family preference was another barrier to eat healthy. More than half of the women (61.6%) felt obligated to cook only what their family members would most likely eat and enjoy. Women lacked organization in planning meals and the time to cook more than one meal.

The majority of the participants described a negative attitude towards healthy eating. More than half of the women (66.6%) did not value healthy eating and 79.4% disliked the taste of healthy food.

The cost of healthy food was perceived by women as expensive and that affected the women's ability to eat healthy. Most of the participants agreed or strongly agreed that purchasing healthy food was expensive (81.1%). They could not afford healthy food because of their family size (87.8%) (Table 6.4).

**Table 6.4.** Barriers and influences to healthy eating and factor loading matrix and factor scores based on a factor analysis with Varimax rotation for 14 items of the socio-cultural barriers to eating healthy (N =180)<sup>1</sup>.

Barriers to healthy eating	Factor loading	Strongly disagree N (%)	Disagree N (%)	Agree N (%)	Strongly agree N (%)	Score <sup>2</sup> (Mean±SD)
<b>Hunger and lack of self-control</b>						2.85±0.76
The idea of a diet triggers the feeling of hunger so I eat more	.635	18 (10.0)	35 (19.4)	88 (48.9)	39 (21.7)	
I eat between meals	.633	6 (11.7)	6 (3.3)	48 (26.7)	105 (58.3)	
I enjoy eating sweets	.602	47 (26.1)	13 (7.2)	31 (17.2)	89 (49.4)	
I lack self-control	.569	22 (12.2)	28 (15.6)	60 (33.3)	70 (38.9)	
I always feel hungry all day	.508	11 (6.1)	31 (17.2)	105 (58.3)	33 (18.3)	
<b>Family preference and disorganization</b>						2.66±1.02
Cooking a meal for the family leaves no time to cook another healthy meal	.706	48 (26.7)	16 (8.9)	57 (31.7)	59 (32.8)	
I cook what my children and husband like to eat	.650	69 (38.3)	-	8 (4.4)	103 (57.2)	
I cannot eat healthy for all meals	.586	26 (14.4)	8 (4.4)	46 (25.6)	100 (55.6)	
I lack organization and time management	.547	34 (18.9)	19 (10.6)	60 (33.3)	67 (37.2)	
<b>Negative attitude</b>						2.84±0.72
I do not like the taste of healthy food	.826	5 (2.8)	32 (17.8)	101 (56.1)	42 (23.3)	
I do not value healthy eating	.556	13 (7.2)	47 (26.1)	87 (48.3)	33 (18.3)	
<b>Cost</b>						3.02±0.74
Healthy food is expensive	.804	23 (12.8)	11 (6.1)	78 (43.3)	68 (37.8)	
I cannot afford healthy food because of my family size	.670	4 (2.2)	18 (10.0)	110 (61.1)	48 (26.7)	

1 Only items with factor loadings  $|\geq 0.4|$  are displayed and listed in order of factor loadings for simplicity and easy interpretation.

2 Scores for each item that loaded onto the factor were calculated strongly disagree=1; disagree=2; agree=3; strongly agree=4, then averaged.

## **Acculturation**

Acculturation levels of the participants were evaluated using the internalization vs marginalization (IVMS) subscale of the Arab-American Acculturation Scale ( $16.7 \pm 5.4$ ). About half of the women reported being comfortable with the company of both Arabs and Americans. However, more than half the women (58.4%) reported having difficulty making friends (Table 6.5). Bivariate Pearson correlations showed a significant negative correlation between acculturation and the women's negative attitude towards healthy eating ( $r = -0.132$ ,  $p < 0.05$ ). However, there was no correlation between acculturation and other barriers of cost, hunger and lack of self-control, and family food preference and disorganization.

**Table 6.5.** Integration vs margination acculturation levels of Arab Muslim mothers of young children (N=180) living in the US.

<b>The Arab-American Acculturation Scale</b>	<b>Strongly disagree</b> N (%)	<b>Disagree</b> N (%)	<b>Disagree somewhat</b> N (%)	<b>Neutral</b> N (%)	<b>Agree somewhat</b> N (%)	<b>Agree</b> N (%)	<b>Strongly agree</b> N (%)
I mix equally with Americans and Arabs	11 (6.1)	37 (20.6)	26 (14.4)	30 (16.7)	29 (16.1)	40 (22.2)	7 (3.9)
I am equally at ease socializing with Americans and Arabs	11 (6.1)	47 (26.1)	26 (14.4)	21 (11.7)	20 (11.1)	45 (25.0)	10 (5.6)
I have many Arab and American friends	9 (5.0)	45 (25.0)	10 (5.6)	31 (17.2)	26 (14.4)	49 (27.2)	10 (5.6)
®I have a lot of difficulty making friends	9 (5.0)	24 (13.3)	19 (10.6)	23 (12.8)	9 (5.0)	64 (35.6)	32 (17.8)

®: Reverse point questions; items were reverse scored for total score

## **Dietary Patterns**

Self-reported consumption of 28 food items was investigated using the FFQ. Four food patterns were identified by factor analysis. The food pattern fruit and vegetable explained 24.2% of the variation in food consumption. Within this food pattern, fruits, fruit juices, tomatoes and green leafy vegetables were consumed more than once a day. The animal products food pattern (14.2% of variation) included seven food items: processed meats, red meat, fish and other seafood, poultry, eggs, butter and snacks. Women consumed red meat, eggs, butter, and snacks more frequently than other food items that loaded to the same factor. The saturated fat foods pattern (13.2% of variation) was characterized by intake of French fries, other vegetables, high-fat dairy products, pizza, hydrogenated fats, and mayonnaise and other creamy salad dressings. High-fat dairy products were consumed more often than once a day. The beverages and grains food pattern (12.1% of variation) included low-fat dairy products, sweets and desserts, tea, coffee, sugar-containing beverages and soft drinks, whole grains and refined grains. Women consumed sweets and desserts, coffee, grains, and sugar-containing beverages more often than once a day and tea and low-fat dairy products less than once a day (Table 6.6).

**Table 6.6.** Food patterns and consumption frequency of Arab Muslim mothers of young children (N =180) living in the US.

<b>Food patterns</b>	<b>Factor loading</b>	<b>Intake times/day (Mean ±SD)</b>
<b>Fruit and vegetable</b>		
Green leafy vegetables	.849	1.62±1.61
Tomatoes	.769	1.43±1.57
Cruciferous vegetables	.756	0.93±1.36
Legumes	.743	0.88±1.21
Potatoes	.739	0.94±1.26
Dark-yellow vegetables	.722	1.00±1.36
Fruit	.697	1.94±1.67
Fruit juices	.539	1.41±1.58
<b>Animal products</b>		
Fish & other seafood	.743	0.89±1.01
Red meat	.718	1.54±1.63
Eggs	.691	1.13±1.19
Poultry	.689	0.61±0.83
Butter	.645	1.24±1.30
Processed meats	.569	0.40±0.54
Snacks	.495	1.23±1.30
<b>Saturated fat foods</b>		
Hydrogenated fats	.772	0.74±0.93
Mayonnaise and other creamy salad dressings	.752	0.70±1.15
Other vegetables	.718	0.71±1.04
French fries	.625	0.67±1.06
Pizza	.617	0.67±1.05
High-fat dairy products	.582	1.53±1.68
<b>Beverages and grains</b>		
Sugar-containing beverages/ soft drinks	.805	1.15±1.34
Refined grains	.677	1.02±1.34
Whole grains	.655	1.14±1.26
Tea	.489	0.95±1.32
Coffee	.464	1.51±1.60
Sweets and desserts	.450	1.37±1.52
Low-fat dairy products	.442	0.92±1.18

1- Only food groups with factor loadings  $|\geq 0.4|$  are displayed and listed in order of factor loadings for simplicity and easy interpretation.



### **Relations among Acculturation, Barriers to Healthy Eating and Food Patterns**

The influence of acculturation (IVMS) and barriers to healthy eating (i.e., cost, hunger and lack of self-control, negative attitude, and family preference and disorganization) on the mothers' eating patterns were examined using regression analysis (Table 6.7). The regression models explained a small but significant amount of variation in fruits and vegetables ( $R^2=0.066$ ,  $p=0.036$ ) and saturated fat food intake ( $R^2= 0.076$ ,  $p=0.017$ ). Acculturation significantly influenced the women's food patterns. The barriers of hunger and lack of self-control, negative attitude towards healthy eating and family preference and disorganization did not have a significant influence on food patterns among the women. The cost of healthy food, however, was significantly associated with less consumption of saturated fat foods but did not affect other food patterns (Table 6.7).

**Table 6.7.** The influence of acculturation (integration vs margination) levels and individual and socio-cultural influences and barriers to healthy eating on the food pattern of Arab Muslim mothers of young children (N=180) living in the US.

<b>Food pattern</b>	<b>R<sup>2</sup></b> (p-value)	<b>Cost</b> $\beta$ (p-value)	<b>Hunger and lack of self-control</b> $\beta$ (p-value)	<b>Negative attitude</b> $\beta$ (p-value)	<b>Family preference and disorganization</b> $\beta$ (p-value)	<b>Acculturation</b> $\beta$ (p-value)
<b>Fruits and vegetables</b>	0.066 (0.036**)	-0.006 (0.943)	0.003 (0.975)	-0.058 (0.449)	-0.020 (0.790)	0.238 (0.002**)
<b>Animal products</b>	0.046 (0.141)	-0.052 (0.535)	-0.053 (0.528)	-0.023 (0.769)	0.107 (0.161)	0.171 (0.025**)
<b>Saturated fats</b>	0.076 (0.017**)	-0.186 (0.026**)	0.014 (0.867)	-0.045 (0.557)	-0.016 (0.826)	0.186 (0.013**)
<b>Beverages and grains</b>	0.057 (0.066)	-0.060 (0.476)	-0.024 (0.770)	-0.080 (0.303)	0.051 (0.498)	0.194 (0.010**)

$\beta$ =standardized beta weights. Barrier results represented as  $\beta$  (p-value). \* = p<0.05; \*\*=p<0.01.

## **DISCUSSION**

In general, the Arab Muslim mothers perceived healthy eating as being beneficial. They expressed the importance of maintaining a healthy dietary lifestyle as being important for their sake and the sake of their children and had positive attitude towards healthy eating. However, specific barriers and influences prevented them from eating healthy.

Feeling hungry throughout the day and lack of self-control were among the barriers to eating healthy. Consistent with our findings, previous studies found that immigrants to western societies experienced a decrease in the number of meals, skipped meals, and reported constant snacking (El-Ghazali et al., 2010; Lee, 2008; Madanat et al., 2008; Nicolaou et al., 2009). Moreover, we found that women felt constantly hungry and had easier access to sweets, leading to consuming more sweets throughout the day. Another study found that mothers of young children consumed more added sugars than women without children (Berge et al., 2011).

Cost was a barrier to healthy eating. Women described healthy food to be expensive, especially among mothers of larger families. Healthy food affordability was also perceived as costly among low-income families who most often opted to purchase foods high in added sugars and saturated fat as they were viewed to be more affordable (Beydoun et al., 2011; NiMurchu et al., 2012; Pollard et al., 2002; Ryden & Hagfors, 2011; Williams et al., 2012).

Mothers also reported cooking and eating what was preferred by their family members, especially their children. A study conducted to explore the cultural influences on feeding practices and attitude towards healthy eating of mothers with young Latina children found that mothers felt obligated to feed their children high energy foods to enhance their growth and strength. These beliefs were reflected in their cooking and feeding behaviors (Martenez et al., 2015). Similar to our findings, Latina mothers of “fussier” and “picky eaters” included less fruits and vegetables in

their meals and women followed the same eating pattern as their children (Hromi-Fieldler et al., 2016).

Immigration has been suggested in previous research to be a major player in regards to changes in dietary patterns (Mussap, 2009). As part of acculturation to a new society, a shift from traditional dietary patterns to patterns similar to the host country is common (Mussap, 2009). Women in our current study had a high integration vs marginalization (IVMS) level and there was a significant relationship between IVMS and consumption of fruits and vegetables, animal products, saturated fats and beverages and grains.

According to researchers, a western dietary pattern consists of higher intake of high fat dairy products, red meat, processed meats and refined grains and cereals (Pryer et al., 2001). Three of the diet patterns characterized in this study (animal products, saturated fat foods and beverages and grains) primarily included foods consistent with a western diet pattern. Greater acculturation was associated with increased consumption of these foods. A prudent or a healthy pattern consists of more fruit and vegetable, fish, poultry, whole grains and eggs intake (Paradis et al., 2006). The fruit and vegetable diet pattern included foods consistent with a prudent diet pattern. Acculturation also positively correlated with fruit and vegetable intake among the women.

Research suggests that low-income families are more likely to include more saturated fat in their diets (Drewnowski & Eichelsdoerfer, 2010). However, our findings suggest that although cost was a barrier to eating healthy, women who reported higher cost barriers had lower consumption of saturated fat foods. Women in this study and from our previous study that included focus groups, reported using less shortening and butter, usually used in traditional meals and desserts, and changing to using oil because it was more affordable.

Although this study provides insight onto influences on diet in Arab Muslim mothers living in the US, the data in this study were self-reported which is a limitation to this study. The inability to

personally facilitate completion of the food frequency questionnaire may have resulted in some error to the women's eating patterns and resulted in a relatively small number of women with a complete FFQ. The primary researcher is an Arab Muslim mother of young children, this may have resulted in unintentional bias and reflectivity in discussing results of this study. Also, most women who completed the questionnaire came from the same Arab country (i.e., Libya) which may have limited the generalizability of the results.

Understanding the challenges that face the Arab community living in the US to eat healthy is essential with this rapidly growing population. Since this study found that acculturation has a significant influence on eating patterns of the mothers, it is especially important to understand maternal and cultural perception towards eating healthy to plan successful culturally appropriate approaches to behavior change in these minority communities. Also, promoting educational programs that raise awareness about healthy eating, and strategies to manage self-control, meal planning and healthy alternatives for food preparation especially among low-income families of this population are essential.

This is the first study to examine dietary patterns of Arab Muslim mothers of young children in the US and in a predominantly western society in general as well as the first to investigate the intrapersonal and sociocultural barriers and influences to healthy eating among this population in the US. Therefore, more research is needed to further verify the dietary patterns obtained from this current study as well as further understanding the barriers that face this community.

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## CHAPTER VII

### **PHYSICAL ACTIVITY OF ARAB MUSLIM MOTHERS OF YOUNG CHILDREN LIVING IN THE US: BARRIERS AND INFLUENCES**

*To be submitted to Leisure Sciences*

The aim of this study was to examine perceived personal, socio-cultural influences and barriers to performing physical activity (PA), to identify PA levels and to study relations among acculturation, strength of religious faith, barriers and PA levels. Arab Muslim mothers of young children (<5 years) living in the US (n=447) participated in an online survey. Dress code and negative perception of women who engaged in physical activities, lack of motivation and stress, and responsibilities were the barriers to PA. Barriers significantly influenced PA levels ( $p<0.001$ ) but strength of religious faith did not. Acculturation was associated with higher PA levels. Confirmation of the relations among acculturation, barriers and PA levels among Arab Muslim mothers of young children in the US may help educators tailor culturally sensitive interventions to combat obesity and other chronic diseases among this growing population.

**Key Words:** Arab, Muslim, faith, strenuous, leisure, physical activity

#### **INTRODUCTION**

The rising prevalence of overweight and obesity is related, in part, to insufficient physical activity (PA). Insufficient PA is one of the ten leading causes of non-communicable diseases such as heart disease, type 2 diabetes and breast and colon cancer that claim more than 60% of lives each year (Lee, 2003; WHO, 2014). According to the Centers for Disease Control and Prevention, a sufficient PA level for adults is defined as at least 150 minutes of moderate to intense aerobic

activities and at least 2 hours of muscle strengthening activities per week (CDC, 2014). However, intrapersonal struggles, environmental opportunities, culture, and religious influences can affect an individual's ability to meet these recommendations.

People from the Arab world have low adherence to PA compared to their western peers, reflected in the high rates of obesity in the Arab region (Caperchione et al., 2009; Rogerson & Emes, 2006). Five Arab countries (e.g. Bahrain, Egypt, Saudi Arabia, Oman and Kuwait) have reached the highest levels of overweight and obesity in the last three decades compared to other countries of the world (Murray & Marie, 2014). Moreover, the US along with three Muslim countries (Egypt, Pakistan and Indonesia) have reached remarkably high rates of overweight and obesity. These rates have doubled over the last 30 years among Arab women (Murray & Marie, 2014). Poor dietary habits, urbanization and sedentary lifestyles are significant causes to this striking increase (Galal, 2003).

Acculturation is “the process by which immigrants adopt attitudes, values, customs, beliefs, and behaviors of a new culture” (Abriado-Lanza et al., 2004, p. 1224). Studies conducted among immigrants to western societies found that the health of immigrants declines upon arrival to western countries due to changes in lifestyle practices such as walking less often and following less healthy eating patterns (Barnes & Almasy, 2005; Brown, 1991; Kalavar et al., 2004; Steffen et al., 2006). These detrimental behaviors may increase with Arab immigrants to western societies due to cultural and socioeconomic alterations, lack of social support, and religious and language differences, which may discourage them from engaging with the new culture. Furthermore, epidemiological studies show that individuals who emigrate from developing countries to western societies have increased risk of developing non-communicable diseases as well as overweight and obesity (Abate & Chandalia, 2001; Burns et al., 2000; Johnson & Fulp, 2002).

Inadequate PA is especially evident among Arab Muslim females (Rogerson & Emes, 2006).

Modest dress, inability to exercise in public, low self-efficacy, lack of knowledge and motivation

are reported barriers to performing PA among these women (Lawton et al., 2006; Musaiger, 2011; Rogerson & Emes, 2006). Most women from Bahrain who were interviewed as part of the ARAB-EAT project complained about gender discrimination and said that Arab men had more freedom to exercise than women (Musaiger, 2011).

Furthermore, women without children are more active than women with children (Harris et al., 1997; Ball et al., 2002). Studies showed that mothers of younger children (<5 years of age) are less active than women with older children (Brown et al., 2000; Marcus et al., 1994). Mothers of younger children experienced alterations in their PA habits after having children due to changes in their responsibilities towards their children, especially during child-rearing stages (Berge et al., 2011; Falba & Sindelar, 2008; Monteiro et al., 2014). Lack of motivation; time, especially for working mothers; and lack of childcare were among the barriers reported by Australian mothers of young children (Fjeldsoe et al., 2012). Galal (2003) found that 63.1% of Egyptian mothers of young children were either overweight or obese.

Recent literature suggests a significant association between increased body weight and strength of religious affiliation in the US (Cline & Ferraro, 2006; Ferraro, 1998; Kim, 2006). Many individuals from the African American community consider faith as an essential part of their everyday lifestyle and African Americans, especially women, are among the communities with the highest rates of obesity in the US (Lancaster et al., 2014). Similarly, religion is especially salient for Arab Muslims and Arab countries are among the highest worldwide in the prevalence of overweight and obesity (Cline & Ferraro, 2006; Kim, 2006; WHO, 2014). Although the Islamic religion specifically stresses the importance of PA and demands an active lifestyle, it is especially difficult for women to be physically active in this strict culture (Rogerson & Emes, 2006).

There may be a link between physical appearance and religious affiliation. Latino women from the Catholic faith, for example, consider religion to be an essential aspect for health and wellness

(Allen et al., 2014). Religious individuals often evaluate themselves and others based on their spiritual characteristics and individual actions and values rather than their physical appearance and body image, and are often less physically active (Ahmad et al., 1994; Cline & Ferraro, 2006; Kim, 2006). One aspect of the Islamic faith that may impact a women's ability to engage in PA is the expectation for modest dress. Black Muslim American women considered that dressing modestly and wearing what was appropriate for their body figure to be obeying the Islamic guidelines (Odams-Young, 2008). Egyptian women (52%) considered that only covering their hair was acceptable dress in public whereas 63% of Saudi Arabian women considered acceptable public dress was covering the hair and face and wearing wider and longer clothing (Pew Research Center, 2014), suggesting variation in cultural perception of dress among different Arab countries.

Research conducted among Arab Muslim populations living in western societies to address specific barriers and influences to exercise remains scarce. Therefore, the objective of this study was to assess current PA levels, sociocultural factors that affect PA levels, and the influence of acculturation and religion on PA levels of Arab Muslim mothers of young children living in the US. We hypothesized that women would have low PA levels but a positive attitude towards PA, religious barriers would restrict women from participating in PA, and there would be a negative relationship between PA levels and acculturation and socio-cultural barriers to engaging in PA.

## **METHODS**

### **Target Audience**

Muslim, Arab mothers of young children (ages 0-5 years) living in the US were recruited to participate in this study.

## **Recruiting**

Subjects were recruited via snowball strategy. Faith leaders from mosques in Virginia, Maine, Texas, Oklahoma, Ohio and Florida were asked to send emails to women in their community to participate in the questionnaire. Also, closed Facebook groups for women living in the US from Egypt, Libya, Iraq, and Tunisia were contacted and agreed to invite their members to participate. Finally, women were recruited from Islamic foundations and associations in the US including the Texas Muslim Women's Foundation and Saudi Arabian Islamic Clubs in Oklahoma.

## **Questionnaire**

A questionnaire related to PA levels, socio-cultural and religious barriers and influences to performing PA and religious strength was distributed to Arab, Muslim mothers of young children residing in the US. The questionnaire was distributed in English and Arabic via Qualtrics as an online questionnaire. Reminders to complete questionnaires were sent automatically via Qualtrics one week after initial distribution. The following components were included in the questionnaire.

**Demographics.** Participants were asked to provide the total number of children, numbers of children under the age of 5, country of origin, reason for coming to the US, age, and number of years living in the US.

**Socio-cultural and religious barriers to physical activity.** Factors that influence behaviors regarding PA were assessed via the socio-cultural and religious barriers to PA subscale from the Food Attitudes and Physical Activity Barriers (FAPAB) questionnaire. This questionnaire was developed from common themes that arose from a previously conducted formative quantitative study (Chapter V). Questions to measure socio-cultural and religious influences on PA levels were developed after the focus groups were completed.

As part of the FAPAB, participants were asked to rate statements about barriers to PA using a 4 point Likert-type format (strongly disagree to strongly agree). Factor analysis was used to

categorize specific barriers. Independent factors were extracted, labeled and scored by summing ratings of the barriers. The Cronbach alpha for the barriers questions was 0.823.

**Physical activity levels.** The Godin Leisure-Time Exercise Questionnaire (GLTEQ) was used for self-reported measures of the level and strength of PA. The two item tool is highly reliable to assess levels and strength of PA of adults ages 18-65 (Godin & Shepard, 1985). The first item of the GLTEQ measured the weekly frequency of strenuous, moderate, and light activities. The estimated level of PA was calculated by multiplying the number of times per week by 9, 5 and 3 respectively. Total weekly leisure activity was calculated by summing the product of each level of PA.

$$\text{Weekly leisure activity score} = (9 \times \text{Strenuous}) + (5 \times \text{Moderate}) + (3 \times \text{Light})$$

Total weekly leisure activity scores of 24 units or more, 23-14, and less than 14 are considered active, moderately active and insufficiently active/sedentary leisure physical activity levels.

The second item measured the strength of weekly frequency of the activities that are “long enough to work up a sweat” (Godin & Shepard, 1985). This was measured by answering: often, sometimes, or rarely/never.

**Strength of religious faith.** The participant’s strength of religious faith was measured by the Santa Clara Strength of Religious Faith Questionnaire (SCSRFQ) (Plante & Boccaccini, 1997). SCSRFQ is used by researchers to examine the influence of religious strength on human behavior (Plante & Boccaccini, 1997). Nine items from the SCSRFQ were used to assess religious strength regardless of the religious faith and affiliation. Each item was answered according to the level of agreement or disagreement to each statement with: 1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree. The total scores were summed. Scores ranged from 10 (low faith) to 36 (high faith). The item “I pray daily” was removed from the analysis to increase reliability of the tool (Cronbach alpha=0.782).

**Acculturation measurements.** The Male Arab-American Acculturation Scale (MAAS) (Cronbach alpha=0.639), an eight item self-reported questionnaire that measures acculturation of adults from Arab origins to American culture was used (Tami et al., 2012). The MAAS contains two subscales (e.g. separation vs assimilation; integration vs marginalization). Women answered questions in regards to two levels of acculturation, levels of separation and integration (SVAS) (Cronbach alpha=0.731) and the integration vs marginalization (IVMS) subscale (Cronbach alpha= 0.794). Each question was scored on a 7-point Likert-type format from strongly disagree to strongly agree. Scores for each question (reverse-point and positive) were summed to rate the level of acculturation. A total score of 20 was considered the highest level of acculturation for each subscale.

### **Statistical Analysis**

Analyses were performed using the Statistical Package for the Social Sciences (SPSS 23.0) software. Descriptive statistics were calculated for all variables.

Factor analysis was conducted to further increase our understanding of specific barriers to performing PA among participants. A fixed factor solution explained 42% of the variance (24%, 10% and 8.7%) for factors 1, 2, and 3 respectively. A fixed factor solution was preferred because it better defined the factor structure and could be interpreted and supported by previous theoretical data. Factors had Eigen values of  $\geq 1$ . Solutions for the factors were each examined using Varimax rotation of the factor loading matrix. All items included had primary loading of 0.4 or above. The item “It is expensive to enroll in a gym” was not included in final factors because the factor loading weight was less than 0.4. Scores for each of the three factors were computed by summing the ratings of items that had a primary loading of 0.4 or higher on the factor. Higher scores indicated a greater barrier or influence on physical activity. Finally, factors were numbered and given labels according to the interpretation of the items that loaded highly on the factor.



Pearson bivariate correlation analyses were conducted to evaluate the relationships among strength of religious faith, acculturation, barriers to PA, and PA levels. Multiple regression analysis was conducted to evaluate the relationship between strength of religious faith, acculturation, and PA barriers on the mother's PA levels. All tests for statistical significance were two-tailed, and  $\alpha=0.05$ .

## **RESULTS**

### **Sociodemographic Characteristics**

Women from 14 different Arabic countries participated in the study (n=632). A final 447 women met the criteria of being Arab, Muslim, a mother of at least one child under the age of five and living in the US. The majority of women (92.4%) had 1 or 2 children under the age of five and lived in the US between 1 and 9 years (76.5%). Most of the women (77.6%) came to the US either to accompany their husband who was completing higher education or to go to school themselves; fewer women (12.5% and 2.5%) immigrated to the US for reasons such as work and immigration respectively. Most of the participants (60.2%) came from Libya (Table 7.1).

**Table 7.1.** Demographic characteristics of Arab Muslim mothers of young children living in the US (N=477).

<b>Variable</b>	<b>Frequency (N)</b>	<b>Percent (%)</b>
<b>Country</b>		
Libya	269	60.2
Egypt	64	14.3
Palestine	34	7.6
Jordan	33	7.4
Iraq	14	3.1
Morocco	7	1.6
Syria	7	1.6
Saudi Arabia	5	1.1
Algeria	3	0.7
Tunisia	3	0.7
Bahrain	2	0.4
Lebanon	2	0.4
Sudan	2	0.4
Yemen	2	0.4
<b>Total children</b>		
1	74	16.6
2	159	35.6
3	129	28.9
4	61	13.6
5 or more	24	5.4
<b>Number of children under 5 years</b>		
1	228	51.0
2	185	41.4
3	27	6.0
4 or more	7	1.6
<b>Years living in the US</b>		
15 years or more	24	5.4
10 to less than 15 years	36	8.1
5 to less than 10 years	127	28.4
1 to less than 5 years	215	48.1
Less than 1 year	45	10.1
<b>Primary reason for coming to the US</b>		
Accompanied husband	228	51.0
School	119	26.6
Immigration	56	12.5
Work	11	2.5
Other	33	7.4
<b>Age (years)</b>		
18-23	10	2.2
24-29	135	30.2
30-34	191	42.7
35-40	97	21.7

### Beliefs and Self- Efficacy

Almost all women (95.3%) reported that it was important for them to be active. Most (60.2%) perceived PA as being important for their overall health. Many women reported believing PA reduced body weight, and improved their mood and they felt happy and at ease after exercising. However, only 33.9% felt they were confident or very confident to maintain a physically active lifestyle (Table 7.2).

**Table 7.2.** Beliefs and self- efficacy of Arab Muslim mothers of young children living in the US towards PA (N=447).

Variable	Frequency (N)	Percent (%)
<b>Importance of PA</b>		
Very important	191	52.3
Important	105	28.8
Somewhat important	52	14.2
Not important	15	4.1
Not at all important	2	0.5
<b>PA and health*</b>		
It is important for overall health	269	60.2
Exercising reduces body weight	196	43.8
It improves mood	167	37.4
Exercising increases self-confidence	157	35.1
Exercising makes me feel happy	131	29.3
It increases tolerance to everyday life stress	121	27.1
Exercising improves my attitude	116	26.0
It is a good stress reliever	85	19.0
Exercising makes me feel ready to approach the day	81	18.1
Exercising improves my thinking and memory	53	11.9
<b>Self-efficacy PA</b>		
Very confident	54	14.8
Confident	70	19.1
Somewhat confident	139	38.0
Not confident	93	25.4
Not at all confident	10	2.7

\*Women could select more than one response

### **Perceptions and Changes in PA Levels since Arriving in the US**

Most women (77.5%) reported wishing to have the same circumstances as American women that allow them to be active. More than 30% of the participants believed that Arab men had more freedom to be active than Arab women, that walking in public was the only acceptable form of exercise for women in the Arab culture and other forms of exercising were only acceptable for an Arab female if performed in a female only facility. Only 25% of women believed that women and men were accepted equally in regards to PA (Table 7.3).

About half (47.9%) of women experienced no change in their PA levels or habits since arriving in the US as opposed to 51.4% who believed they became less active compared to their PA levels and habits after residing in the US (Table 7.3).

Self-reported weekly PA levels of women revealed that the majority of the women (75.6%) did not perform strenuous PA, and about 40% reported never participating in moderate or mild exercise during their leisure time in the past week. Women reported an average of 0.5, 1.4, and 1.3 times per week of strenuous, moderate and mild PA respectively (Table 7.4). Similarly, 38.1% reported sometimes or often engaging in activities that were strenuous enough to work up a sweat. The average weekly leisure activity score was  $15.1 \pm 16.6$ .

**Table 7.3.** Perceptions, attitudes and changes in PA levels of Arab Muslim mothers of young children since arriving in the US (N=447).

Variable	Frequency (N)	Percent (%)
<b>Attitudes about Americans exercising</b>		
I wish I had the same conditions and circumstances that allow Americans to exercise	279	77.5
I feel comfortable when I see Americans exercise	72	20.0
Seeing Americans exercise makes me uncomfortable	9	2.5
<b>Perceptions about gender equality in PA*</b>		
Men have more freedom than women to exercise	159	35.6
It is only acceptable for a woman to exercise if she is in a female only gym	148	33.1
Walking is the only acceptable form of exercise for women and men equally	135	30.2
Both active men and women are equally accepted	115	25.7
Running or jogging is considered strange and unacceptable for women but suitable for men	71	15.9
Men and women are not accepted equally	17	3.8
<b>Change in PA in the US</b>		
There has been no change in my level of engagement in physical activity	152	47.9
I was more active before arriving to the US	84	26.5
I became more sedentary in the US	79	24.9

\*Women could select more than one response.

**Table 7.4.** Self- reported weekly PA levels during leisure time of Arab Muslim mothers of young children living in the US (N=447).

<b>Times per week</b>	<b>N (%)</b>	<b>Mean <math>\pm</math>SD</b>
<b>Strenuous Exercise (e.g. running, jogging)</b>		<b>0.5 <math>\pm</math> 1.1</b>
Never	226 (75.6)	
1	40 (13.4)	
2	12 (4.0)	
3	10 (3.3)	
4	3 (1.0)	
5	5 (1.7)	
6	2 (0.7)	
7 or more	1 (0.3)	
<b>Moderate Exercise (e.g. fast walking, tennis)</b>		<b>1.4 <math>\pm</math> 1.6</b>
Never	118 (39.5)	
1	74 (24.7)	
2	39 (13.0)	
3	35 (11.7)	
4	16 (5.4)	
5	8 (2.7)	
6	2 (0.7)	
7 or more	7 (2.3)	
<b>Mild Exercise (e.g. yoga, easy walking)</b>		<b>1.3 <math>\pm</math> 1.7</b>
Never	134 (44.8)	
1	67 (22.4)	
2	37 (12.4)	
3	25 (8.4)	
4	16 (5.4)	
5	10 (3.3)	
6	5 (1.7)	
7 or more	5 (1.7)	
<b>Frequency of participation in activities that work up a sweat (heart beats rapidly)</b>		
Rarely or never	185 (61.9)	
Sometimes	88 (29.4)	
Often	26 (8.7)	

## **Barriers and Influences to Performing**

Nineteen barriers and influences were examined using the FAPAB questionnaire and analyzed using factor analysis. Three factors were extracted: 1) Dress code and negative perception which included: cannot exercise with men in gym, lack of female only facilities, crowded gyms, perception of people towards women in hijab, Arab's negative perception towards women that exercise, presence of Arab men in gym, feeling hot in hijab while exercising, and dressing in multiple layers affects type and amount of PA; 2) Lack of motivation and stress which included: lack of motivation, feeling embarrassed, lack of organization, feeling stressed when exercising, and uncomfortable in gym clothes; and 3) Responsibilities which included: competing priorities, no time to exercise weather, lack of child-care, and feeling stressed when exercising with children. Dress code and negative perception towards Arab Muslim women that are involved in sports or exercise explained more of the variance in responses to the barriers (24%) followed by lack of motivation and stress and responsibilities (10% and 8.7% of the variation) (Table 7.5).

The average rating for the dress code and negative perception factor was  $2.3 \pm 0.6$ , which indicates that many women disagreed with these statements. About a third (36.3%) of the participants agreed or strongly agreed that lack of female facilities was a barrier to being active. However, more than half of the women (57.4%) agreed that some people look differently at women who wear a hijab while exercising. Most (55.6%) women did not perform PA in public because of the negative perception of Arabs toward women that participate in sports and exercise. Less than half of the women (43.8%) agreed or strongly agreed that wearing the hijab and dressing in multiple layers was a discouragement to exercise but 52.6% felt hot when exercising while wearing the hijab.

The average rating for the lack of motivation and stress factor was  $2.7 \pm 0.5$ , indicating that fewer women disagreed with the statements. The majority of the women (68.3%) lacked the motivation

and determination to be active. Most women felt stressed (76.1%), embarrassed to exercise in public (59.8%) and uncomfortable to dress in gym clothes (82.7%). Most women (64.6%) did not agree that disorganization and other priorities affected their ability to exercise.

Also, the average rating for the responsibilities factor was  $2.1 \pm 0.6$  which indicates that the women disagreed with the statements. Fewer than 25% of the mothers felt that lack of childcare, feeling stressed exercising with their children and their responsibilities were barriers to PA.

Almost half of the women (46.2%) did not have time to exercise.



**Table 7.5.** Factor loading matrix and factor scores based on factor analysis with Varimax rotation for 19 items of the socio-cultural barriers and influences to PA among Arab Muslim mothers of young children living in the US (N=447).

Barriers to PA	Factor loading <sup>1</sup>	Strongly disagree	Disagree	Agree	Strongly agree	Mean ±SD <sup>2</sup>
		N (%)	N (%)	N (%)	N (%)	
<b>Dress Code and Negative Perception</b>						2.3 ± 0.6
I do not have access to female only facilities	.724	95 (28.7)	116 (35.0)	83 (25.1)	37 (11.2)	
I cannot exercise with men in the gym	.645	124 (37.5)	110 (33.2)	66 (19.9)	31 (9.4)	
Some people look at women in hijab exercising differently	.623	37 (11.2)	104 (31.4)	142 (42.9)	48 (14.5)	
Arab individuals have a negative perception of women who are physically active	.584	46 (13.9)	101 (30.5)	148 (44.7)	36 (10.9)	
Crowded gyms halt my ability to exercise	.593	55 (16.6)	137 (41.4)	100 (30.2)	39 (11.8)	
Arab men in the gym will halt my ability to enter the gym and exercise	.573	81 (24.5)	112 (33.8)	108 (32.6)	30 (9.1)	
Dressing in hijab and multiple layers affects the amount and type of activities I can perform	.548	61 (18.4)	125 (37.8)	101 (30.5)	44 (13.3)	
I feel hot when wearing hijab and exercising in public	.417	40 (12.1)	117 (35.3)	129 (39.0)	45 (13.6)	

<b>Barriers to PA</b>	<b>Factor loading<sup>1</sup></b>	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Mean ±SD<sup>2</sup></b>
		<b>N (%)</b>	<b>N (%)</b>	<b>N (%)</b>	<b>N (%)</b>	
<b>Lack of Motivation and Stress</b>						<b>2.7 ± 0.5</b>
I do not have the motivation to exercise	.748	29 (8.8)	76 (23.0)	167 (50.5)	59 (17.8)	
I feel stressed when I exercise	.691	18 (5.4)	61 (18.4)	195 (58.9)	57 (17.2)	
I am disorganized in my time and priorities and that affects my ability to exercise	.526	53 (16.0)	161 (48.6)	90 (27.2)	27 (8.2)	
I am embarrassed to exercise in public	.475	40 (12.1)	93 (28.1)	132 (39.9)	66 (19.9)	
I feel uncomfortable with wearing pants or “gym clothes”	.424	13 (3.9)	44 (13.3)	208 (62.8)	66 (19.9)	
<b>Responsibilities</b>						<b>2.1 ± 0.6</b>
There is nobody to take care of my children when I am exercising	.797	110 (33.2)	157 (47.4)	50 (15.1)	14 (4.2)	
It can be very stressful to exercise with the kids	.677	96 (29.0)	154 (46.5)	69 (20.8)	12 (3.6)	
I have other responsibilities and priorities	.657	89 (26.9)	172 (52.0)	62 (18.7)	8 (2.4)	
I do not have time to exercise	.621	52 (15.7)	126 (38.1)	130 (39.3)	23 (6.9)	
Bad weather can inhibit my motivation to exercise	.538	59 (17.8)	181 (54.7)	79 (23.9)	12 (3.6)	

1- Only items with factor loadings  $\geq 0.4$  are displayed and listed in order of factor loadings for simplicity and easy interpretation.

1- Scores were calculated strongly disagree=1; disagree=2; agree=3; and strongly agree=4 and averaged for the items in each factor.

### Strength of Religious Faith

The majority of the women had high levels of religious affiliation. Women reported that their religious faith influenced their choices, personality and behavior. The mean rating for strength of religious faith was  $30.7 \pm 5.2$  out of 36 points (Table 7.6).

**Table 7.6.** Strength of religious faith among Muslim Arab mothers of young children living in the US (N=447).

Strength of Religious Faith	Strongly disagree	Disagree	Agree	Strongly agree
	N (%)	N (%)	N (%)	N (%)
My religious faith is extremely important to me	5 (1.8)	2 (0.7)	86 (31.0)	184 (66.4)
I look to my faith as a source of inspiration	6 (2.2)	7 (2.5)	89 (32.1)	175 (63.2)
I look to my faith as providing meaning and purpose in my life	5 (1.8)	8 (2.9)	83 (30.0)	181 (65.3)
I consider myself active in my faith or mosque	22 (7.9)	83 (30.0)	116 (41.9)	56 (20.2)
My faith is an important part of who I am as a person	6 (2.2)	7 (2.5)	113 (40.8)	151 (54.5)
My relationship with God is extremely important to me	5 (1.8)	1 (0.4)	79 (28.5)	192 (69.3)
I enjoy being around others who share my faith	12 (4.3)	43 (15.5)	98 (35.4)	124 (44.8)
I look to my faith as a source of comfort	5 (1.8)	3 (1.1)	91 (32.9)	178 (64.3)
My faith impacts many of my decisions	8 (2.9)	15 (5.4)	98 (35.4)	156 (56.3)

## **Acculturation**

Acculturation levels of the participants were evaluated using the internalization vs marginalization (IVMS) subscale of the Arab-American Acculturation Scale. The average score for IVMS was  $16.7 \pm 5.4$  out of 20 points and the average score for SVAS was  $18.3 \pm 4.2$  out of 20 points. About 40% of the women reported being comfortable with the company of both Arabs and Americans. However, more than half the women (58.7%) reported having difficulty making friends. Less than half of the women (36.8%) preferred living in an Arab country as opposed to living in the US (Table 7.7).

**Table 7.7.** Separation vs assimilation subscale and Integration vs marginalization acculturation and levels of Arab Muslim mothers of young children (N=447) living in the US.

<b>The Arab-American Acculturation Scale</b>	<b>Strongly disagree</b> N (%)	<b>Disagree</b> N (%)	<b>Disagree somewhat</b> N (%)	<b>Neutral</b> N (%)	<b>Agree somewhat</b> N (%)	<b>Agree</b> N (%)	<b>Strongly agree</b> N (%)
<b>Separation vs assimilation subscale</b>							
I would much prefer to live in an Arab country	35 (11.4)	61 (19.9)	15 (4.9)	83 (27.0)	43 (14.0)	44 (14.3)	26 (8.5)
Most of my friends are Arab	13(4.2)	35 (11.4)	21 (6.8)	46 (15.0)	46 (15.0)	107 (34.9)	39 (12.7)
® I behave like an American in many ways	1 (0.3)	21 (6.8)	33 (10.7)	39 (12.7)	53 (17.3)	113 (36.8)	47 (15.3)
® Generally I feel comfortable around Americans than I do Arabs	14 (4.6)	48 (15.6)	28 (9.1)	61 (19.9)	37 (12.1)	88 (28.7)	31 (10.1)
<b>Integration vs marginalization subscale</b>							
I mix equally with Americans and Arabs	19 (6.2)	63 (20.5)	42 (13.7)	61 (19.9)	41 (13.4)	65 (21.2)	16 (5.2)
I am equally at ease socializing with Americans and Arabs	21 (6.8)	79 (25.7)	41 (13.4)	40 (13.0)	40 (13.0)	68 (22.1)	18 (5.9)
I have many Arab and American friends	14 (4.6)	79 (25.7)	23 (7.5)	48 (15.6)	41 (13.4)	83 (27.0)	19 (6.2)
®I have a lot of difficulty making friends	16 (5.2)	48 (15.6)	31 (10.1)	32 (10.4)	22 (7.2)	111 (36.2)	47 (15.3)

®: Reverse point questions; items were reverse scored for total score

## **Associations among Strength of Religious Faith, Barriers to PA, Acculturation and PA levels**

Pearson bivariate correlations revealed women's PA levels were significantly negatively correlated with dress code and negative perception towards Arab Muslim women who exercise, lack of motivation and feeling stressed when performing PA, and competing priorities and responsibilities (Table 7.8). PA levels were significantly positively correlated with the women's level of IVMS acculturation but not SVAS acculturation. There was a significant negative correlation between IVMS and dress code and negative perception, and lack of motivation and stress. However, there was no correlation between IVMS and responsibilities. Acculturation (SVAS) was significantly correlated with lack of motivation and stress but not with other barriers. There were no significant correlations between strength of religious faith and PA levels or the three barriers to PA: dress code and negative perception, lack of motivation and stress, and responsibilities (Table 7.8).

Multiple regression analysis was conducted to evaluate the influence of strength of religious faith, PA barriers (i.e., dress code and negative perception, lack of motivation and stress, and responsibilities) and acculturation (IVMS and SVAS) on PA levels of the women. The regression model explained 18% of the variation in weekly leisure activity scores ( $p < 0.001$ ). Lack of motivation and stress, and responsibilities were significantly negatively associated with PA levels of the women and level of integration acculturation (IVMS) was positively related. However, dress code and negative perception, strength of religious faith and SVAS were not associated with PA levels (Table 7.9).

**Table 7.8.** Bivariate correlation matrix among physical activity levels, barriers to physical activity, strength of religious faith, integration vs marginalization acculturation (IVMS), and separation vs assimilation acculturation (SVAS) reported by Arab Muslim mothers of young children living in the US (n=447).

	<b>PA level</b>	<b>Dress code and negative perception</b>	<b>Lack of motivation and stress</b>	<b>Responsibilities</b>	<b>Strength of religious faith</b>	<b>IVMS</b>
<b>Dress code and negative perception</b>	-0.232** ( $\leq 0.001$ )					
<b>Lack of motivation and stress</b>	-0.321** ( $\leq 0.001$ )	0.457** ( $\leq 0.001$ )				
<b>Responsibilities</b>	-0.308** ( $\leq 0.001$ )	0.319** ( $\leq 0.001$ )	0.212** ( $\leq 0.001$ )			
<b>Strength of religious faith</b>	0.030 (0.621)	0.105 (0.082)	0.008 (0.895)	-0.037 (0.544)		
<b>Integration vs marginalization acculturation (IVMS)</b>	0.211** ( $\leq 0.001$ )	-0.236** ( $\leq 0.001$ )	-0.254** ( $\leq 0.001$ )	-0.102 (0.832)	0.006 (0.920)	
<b>Separation vs assimilation acculturation (SVAS)</b>	0.082 (0.160)	0.097 (0.089)	0.160** (0.005)	-0.047 (0.415)	0.163** (0.007)	-0.272** ( $\leq 0.001$ )

Results presented as r (p-value); r=Pearson bivariate correlation coefficient; \*\*=p-value  $\leq 0.01$

**Table 7.9.** The influence of strength of religious faith, barriers to physical activity and acculturation on physical activity levels of Arab Muslim mothers of young children living in the US (N=447).

<b>Variable</b>	<b>R<sup>2</sup></b> (p-value)	<b>Dress code and negative perception</b>	<b>Lack of motivation and Stress</b>	<b>Responsibilities</b>	<b>Strength of religious faith</b>	<b>IVMS</b>	<b>SVAS</b>
<b>PA level</b>	0.178 (< 0.001)	-0.024 (0.712)	-0.216** (0.001)	-0.231** (<0.001)	0.024 (0.674)	0.155** (0.011)	0.006 (0.920)

Results of barriers, strength of religious faith, and integration vs marginalization acculturation (IVMS), and separation vs assimilation

acculturation (SVAS) presented as  $\beta$  (p-value).  $\beta$ =standardized beta weights; \*\*=p-value $\leq$ 0.001.



## **DISCUSSION**

Socio-cultural and intrapersonal factors including lack of acculturation, lack of motivation and stress, and family responsibilities were the main influences that halted the ability of Arab Muslim mothers of young children to be physically active. According to Brown et al. (2001), PA levels and leisure activities in women were generally controlled by the level of income, time, and having access to facilities and programs as well as cultural expectations of what was considered appropriate behavior of a woman towards her family.

Musaiger (2011) found that women in Arab countries felt they were not able to perform sports outdoors in sports dress, and often wore traditional modest clothing, which was “uncomfortable” to perform activities. Although there was not a significant correlation between strength of religious faith and PA levels or barriers to PA in this study, many women felt the modest Islamic dress (i.e., hijab) and dressing in multiple layers were barriers to performing PA and restricted women from performing specific types of activities. According to the women in this study, people in the western society looked at women who wore the hijab and exercised differently than those who did not wear the hijab. We found dress code and negative perception towards women that exercised was a barrier to PA and was associated with lower PA levels. This is consistent with research that found that Islam as a religion encouraged PA; however Muslim women reported not feeling comfortable exercising while wearing the hijab and modest dress and that clothing can be an obstacle to PA (Brown et al., 2001; Lawton et al., 2006).

The majority of the women felt a sense of embarrassment, shyness, and discomfort wearing athletic clothing when exercising. Not being familiar with females who engaged in PA in their country of origin and culture may have influenced the women’s attitude towards PA and halted their motivation to be physically active. According to women included in this study, lack of motivation was a significant barrier to performing PA and was associated with lower PA levels. Moreover, in a previous study we conducted, women felt embarrassed to work out in a gym

because they were not familiar with operating the equipment and felt judged by others that may have more experience (See Chapter V). Also, the Arab community was unwelcoming to Arab Muslim females who engaged in PA and women faced negative attitudes from family members towards women who exercised and engaged in sports. Most Bahraini women reported gender discrimination regarding engagement in sports and exercise (Musaiger & Al-Ansari, 2000). Another study found that Arab women reported more barriers to performing PA and faced gender discrimination and more sociocultural barriers than Arab men (Musaiger, 2011).

Research suggests that young mothers with children performed significantly less PA compared to women who did not have children (Berge et al., 2011; Brown et al., 2000; Marcus et al., 1994). An Australian study found that women felt twice the pressure of having inadequate time to exercise than men and the presence of children increased that pressure (Gunthorpe & Lyons, 2004). These findings were most likely related to the demands and priorities of the mother's lifestyle. Women, as primary caregivers, often did not perceive leisure activity as being a priority within the hierarchy of demands towards their children and family (Kay, 1998). Children, especially those who are younger than five years of age, require more attention than older children (Berge et al., 2011; Falba & Sindelar, 2008; Monteiro et al., 2014). A study that investigated mothers in Australia found that their PA levels decreased after having the first or second child and the decline continued in the first 4 years of having their child(ren) (Brown et al., 2001). Australian mothers of children under five reported that lack of childcare was among the major barriers to exercise (Fjeldsoe et al., 2012). We found that competing priorities and feeling a sense of commitment were barriers that influenced the ability of some mothers to be physically active. Women who felt more obligated towards their families reported less PA. However, according to most women in this study, feeling stressed when exercising was not due to lack of childcare or exercising with their children. Another study conducted among Bahrain adults

revealed that women were less physically active than men because of the sociocultural barriers of commitment towards their home and family and child-care (Musaiger & Al-Ansari, 2000).

Studies show that immigrants to new societies face challenges and barriers that can be detrimental to their health. Cultural and religious barriers can halt the individual's ability to integrate and interact with the new society (Caperchione et al., 2009). Other studies have found that individuals with higher levels of religious affiliation were likely to be less active (Ahmad et al., 1994; Cline & Ferraro, 2006; Kim, 2006). Catholic Latina and African American women consider faith to be an essential part of their everyday lifestyle as well as a major aspect of health and wellness (Allen et al., 2014; Lancaster et al., 2014). Our findings suggest that Arab Muslim mothers of young children had high strength of religious faith and moderate leisure PA levels.

We found that socio-cultural barriers and lack of acculturation but not religious faith were significant barriers to performing PA among the Arab Muslim community of mothers of young children living in the US. Modest dress and the inability to exercise in public were among the reported barriers by some women and are also an essential aspect of the Arab culture and the Muslim religion. Responsibilities and lack of motivation reduced the women's PA levels among this population while higher levels of integration with the American society were associated with higher PA levels. Contrary to findings that show that acculturation to western society's decreases PA levels of immigrants (Gerber et al., 2012), our findings showed that higher integration to the western society was associated with higher PA levels of the mothers. Higher integration lessened the barriers of dress code and negative perceptions and increased their motivation to be active. Living in the US contributed to the women's confidence to exercise and dress in more comfortable clothing for exercise. This may have been associated with more socialization with Americans and accepting their lifestyle. Our findings suggest that cultural and individual beliefs and values as well as acculturation and religious affiliation need to be addressed appropriately to promote PA among this population.

Limitations to this study included self-reported physical activity levels, which may have resulted in some error. Also, most women who completed the questionnaire came from the same Arab country (i.e., Libya) which may have limited the generalizability of the results especially in regards to dress code barriers to physical activity.

Caperchione et al. (2009) suggested that it was important to address not only cultural but also linguistic diversity to understand specific challenges and barriers to behavior change. With the increase of immigrants in western societies, engagement of new migrants with the new society is essential particularly in regards to healthcare and taking preventative health precautions.

Therefore, it is essential to encourage research to better understand specific challenges to help professionals implement culturally sensitive programs to address such factors. Moreover, healthcare professionals should encourage individuals from diverse and minority communities to join the field of health and nutrition because they understand specific challenges of their community and can positively influence health promotion such as encouraging PA (Caperchione et al., 2009; Tudor-Locke et al., 2003).

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# APPENDICES

## Appendix A

### IRB Approval for Qualitative Study

#### Oklahoma State University Institutional Review Board

Date: Monday, March 07, 2016  
IRB Application No: HE164  
Proposal Title: Socio-cultural and religious influences on diet patterns and physical activity among Arab Muslim mothers of young children living the United States  
Reviewed and Processed as: Exempt  
Status Recommended by Reviewer(s): **Approved** Protocol Expires: 3/6/2019  
Principal Investigator(s):  
Heba Eldoumi Gail Gates  
301 HES  
Stillwater, OK 74078 Stillwater, OK 74078

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The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval. Protocol modifications requiring approval may include changes to the title, PI advisor, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms
2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of the research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Dawnett Watkins 219 Scott Hall (phone: 405-744-5700, dawnett.watkins@okstate.edu).

Sincerely,



Hugh Crethar, Chair  
Institutional Review Board

**ADULT CONSENT FORM  
OKLAHOMA STATE UNIVERSITY**

**PROJECT TITLE:** Socio-cultural and religious influences on diet patterns and physical activity among Arab Muslim mothers of young children living in the United States - Focus group

**INVESTIGATORS:** Heba Eldoumi, PhD, student in Nutritional Sciences at OSU.

**PURPOSE:**

This study will investigate the social, cultural and religious factors that influence healthy eating and participation in physical activity among Arab, Muslim mothers of young children (ages 0-5 years old) living in the United States. Little is known about the influences and barriers that prevent Muslim Arab mothers from eating healthy and also performing sufficient physical activity. Understanding these factors is significant to design successful interventions and also to develop standard guidelines for eating healthy and physical activity among this population.

**PROCEDURES**

If you agree to be part of the research study, you will be asked to participate in one focus group session at your convenience at either the local Stillwater Mosque or at the Family Resource Center at Oklahoma State University. We will invite 4-5 people to meet together to per session to discuss their experiences. The discussion topics will include social and cultural as well as religious influences that potentially affect your ability to eat healthy and perform physical activity. The focus group will last about two hours and we will record your discussion and take notes during the discussion to document observations and comments needed for analysis. A member from the community will help record the discussion to make sure the discussion is recorded accurately. You must agree to be recorded to participate in the focus group.

**RISKS OF PARTICIPATION:**

Answering questions or talking with others may cause discomfort for some people. You may choose not to answer any discussion question and you can stop your participation in the focus group at any time. While unlikely, there is a chance that another member of the focus group could reveal something about you or your family that they learned in the discussion. All focus group members are asked to respect the privacy of other group members. You may tell others that you were in a focus group and the general topic of the discussion, but actual names and stories of other participants should not be repeated.

**BENEFITS OF PARTICIPATION:**

While you may not receive a direct benefit from participating in this research, some people find sharing their stories to be a valuable experience. We hope that this study will contribute to developing future interventions and programs to promote healthy eating and physical activity of Muslim mothers living the United States.

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Expires 3-6-19
IRB # H-1104



**CONFIDENTIALITY:**

We plan to publish the results of this study, but will not include any information that would identify you or your family member. To keep your information safe, the auto-taped recorded discussion of the focus group and written observations will be placed in a locked office until a written transcript of the discussion is completed. Auto-tapes will be destroyed after the study has been completed. The researcher will enter study data on a computer in a locked office that is password-protected to protect the information. To protect confidentiality, your real name and your family member's name will not be used in the written copy of the discussion nor will it be needed to complete the demographic information questionnaire.

**COMPENSATION:**

Participation in the focus group is completely voluntary and therefore there will be no compensation for participating.

**CONTACTS:**

If you have questions about this research, including questions about the scheduling of the focus group, you can contact Heba Eldoumi, Oklahoma State University, Department of Nutritional Sciences by phone (405-334-9768), or via email ([hebae@okstate.edu](mailto:hebae@okstate.edu)). You can also contact her faculty advisor, Gail Gates, Ph.D., Oklahoma State University, Department of Nutritional Sciences ([gail.gates@okstate.edu](mailto:gail.gates@okstate.edu)). If you have questions about your rights as a research volunteer, you may contact the IRB Office at 223 Scott Hall, Stillwater, OK 74078, 405-744-3377 or ([irb@okstate.edu](mailto:irb@okstate.edu)).

**PARTICIPANT RIGHTS:**

Participating in this study is completely voluntary. Even if you decide to participate now, you may change your mind and stop at any time. You may choose not to answer a focus group question for any reason.

**CONSENT DOCUMENTATION:**

I have been fully informed about the procedures listed here. I am aware of what I will be asked to do and of the benefits of my participation. I affirm that I am 18 years of age or older.

I have read and fully understand this consent form. I sign it freely and voluntarily. A copy of this form will be given to me. I hereby give permission for my participation in this study.

\_\_\_\_\_  
Signature of Participant

\_\_\_\_\_  
Date

I certify that I have personally explained this document before requesting that the participant sign it.

\_\_\_\_\_  
Signature of Researcher

\_\_\_\_\_  
Date

Okla. State Univ.	
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Approved	3-7-16
Expires	3-6-19
IRB #	HE-16-9

عنوان الدراسة: التأثيرات الاجتماعية والثقافية والدينية على أنماط النظام الغذائي والنشاط البدني بين الأمهات العربيات المسلمات لأطفالا صغار الذين يعيشون في الولايات المتحدة.

المحققه: هبة الدومي، البكالوريوس في الكيمياء ودرجة الماجستير في الكيمياء الحيوية، وهو حاليا طالب دكتوراه في علوم التغذية

هدف الدراسة: هذه الدراسة سوف تتحقق من العوامل الاجتماعية، الثقافية والدينية التي تؤثر على لامهات العربيات المسلمات لأطفالا صغار (من سن 0-5 سنوات من العمر) والذين يعيشون في الولايات المتحدة من ناحية امكانيه تناول الأكل الصحي والمشاركة في النشاطات البدنية وممارسه الرياضة. حاليا، لا يعرف سوى القليل عن التأثيرات والحواجز التي تمنع الأم العربية المسلمه من تناول الطعام الصحي وممارسه الرياضة بشكل صحيح وصحي وكافي، لذلك فهم هذه العوامل مهمه لتصميم البرامج الناجحة وأيضا وضع مبادئ توجيهات موحدة لتناول الاكل الصحي والنشاط البدني بين هذه الفئة من النساء.

طريقه الدراسة: إذا وافقتي على أن تشاركي في هذه الدراسة البحثية، سوف يطلب منك أن تشاركي في جلسة نقاش لمناقشة تجاربي مع مجموعة مكونه من 4-5 نساء أخريات ومكان الملتقي سوف يكون اما في المسجد المحلي في مدينه سنيبلووتر أو في مركز الاف-ار-سي بجامعة ولاية أوكلاهوما (حسب رغبة المشتركات). سوف تشمل موضوعات المناقشة التأثيرات الاجتماعية والثقافية وكذلك الدينية التي قد تؤثر على قدرتك على تناول الطعام الصحي وأداء النشاط البدني والرياضه. الجلسه سوف تستمر لمدة ساعتين تقريبا، وسوف تسجل المناقشه بمسجل صوتي وسوف تدون أثناء المناقشة الملاحظات والتعليقات اللازمه لتوثيق وتحليل النتائج. احدي النساء العربيات المسلمات ستساعد على تسجيل المناقشة للتأكد من تسجيلها بدقة. يجب أن توافق على التسجيل قبل المشاركة في المجموعه.

مخاطر المشاركة: الإجابة على بعض الأسئلة أو التحدث مع مجموعه قد تكون غير مريحة لبعض الناس قد تختاري عدم الرد على أي سؤال يتم مناقشته ويمكنك التوقف عن المشاركة في أي وقت. من المحتمل أن عضو آخر في المجموعه يمكن أن ينقل بعض المعلومات خارج قاعه الاجتماع بالرغم من الطلب من جميع المشتركات في المجموعه احترام خصوصية المشتركات الأخريات. يمكنك مناقشه الموضوعات المطروحه خلال الجلسه مع اناس اخرون من غير المشاركين ولكن يجب أن لا تتكرر الأسماء الحقيقية وقصص من المشاركات الأخريات بشكل شخصي.

فوائد المشاركة: بالرغم انك قد لا تحصلين على فائدة مباشرة من المشاركة في هذا البحث، يجد بعض الناس تقاسم قصصهم أن تكون تجربة قيمة. نأمل أن هذه الدراسة ستساهم في تطوير التدخلات الصحيه والبرامج المستقبلية لتعزيز الأكل الصحي والنشاط البدني للأم المسلمة التي تعيش في الولايات المتحدة.

السريه والخصوصيه: ونحن نخطط لنشر نتائج هذه الدراسة، ولكنها لن تشمل أي معلومات من شأنها أن تعرف عليك أو علي أحد أفراد عائلتك. للحفاظ على المعلومات الخاصة بك أمانة، سيتم وضع الشريط المسجل والملاحظات المدونه في ملف مقفل حتى يتم الانتهاء من كتابه النتائج. سيتم تدمير الأشرطة بعد أن يتم الانتهاء من الدراسة. الباحث سوف يقوم بإدخال بيانات على كمبيوتر محمي بكلمة مرور لحماية السرية، لن يستخدم اسمك الحقيقي واسم أحد أفراد أسرتك في النسخة خطية من المناقشة.

تعويضات: المشاركة في مجموعه النقاش تطوعية تماما، وبالتالي لن يكون هناك أي تعويضات مادية علي المشاركة.

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Expires 3-6-19
IRB # HC-16-4

جهات الاتصال: اذا كان لديك أسئلة حول هذا البحث، بما في ذلك الأسئلة حول مكان وزمان الاجتماع، يمكنك الاتصال بـ:

Heba Eldoumi, Oklahoma State University, Department of Nutritional Sciences (405-334-9768)  
(hebae@okstate.edu).

يمكنك أيضا الاتصال بمشرف الطلبة

Gail Gates Ph.D., Oklahoma State University, Department of Nutritional Sciences  
(gail.gates@okstate.edu)

اذا كان لديك أسئلة حول حقوقك كمتطوع في البحث، يمكنك الاتصال بـ:

IRB Office at 223 Scott Hall, Stillwater, OK 74078, 405-744-3377 (irb@okstate.edu)

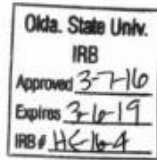
حقوق المشارك: المشاركة في هذه الدراسة تطوعيه تماما. حتى إذا قررت المشاركة الآن، يمكنك تغيير رأيك والتوقف في أي وقت خلال المناقشة، قد تختري عدم الإجابة على سؤال أو اسئله معينه مطروحه خلال المناقشة لأي سبب من الأسباب.

قبول الاشتراك: لقد فهمت تماما الإجراءات المذكورة اعلاه. وأنا أدرك ما علي القيام به وفوائد مشاركتي في هذه المناقشة.

أؤكد أنني 18 سنة من العمر أو أكثر. أنا قد قرأت وفهمت تماما هذا النموذج. وقعت علي هذا النموذج بحريه تامه. ستعطي نسخه من هذه الموافقه والنموذج لي والنسخه الاخرى ستبقى مع الباحث. بتوقيمي علي هذا النموذج اعطي الانن لمشاركتي واستعمال معلوماتي في هذه الدراسه.

توقيع المشاركه

التاريخ



Greetings,

I would like to invite you to take part in a focus group (small discussion group) with other Arab, Muslim mothers on **(date, time and location TBD)** to discuss influences and barriers to eating healthy and performing physical activity. The focus group should last no longer than 2 hours.

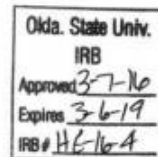
The focus group will provide an opportunity for you to talk about specific things that prevent you from being able to eat healthy or exercise. In particular, I would like to know about your current eating choices and habits and if they changed at a particular time in your life or after coming to the US. I also want to know about the things that prevent you from performing physical activities or exercising enough. We will discuss socio-cultural influences such as your culture, traditions and religious beliefs and how they may affect your eating choices and physical activity levels.

Your views will be used to help us understand the factors that influence Arab, Muslim mothers of young children that live in the United States to eat healthy and performing sufficient physical activity. It will also help us understand the specific barriers that may prevent women from following a healthy dietary pattern and/or engaging in physical activities. Understanding these factors can help develop practical strategies to promote appropriate physical activity and nutrition programs for women of the community.

If you would like to take part in the focus group on **(date, TBD)** please let me know by contacting (Heba Eldoumi, 405-334-9768) or ([hebae@okstate.edu](mailto:hebae@okstate.edu)).

Please provide in your email, **your name, country of origin and if you are currently a student, work or a stay-at-home mother.**

Yours faithfully, Heba Eldoumi



السلام عليكم ورحمة الله وبركاته

وأود أن أدعوكم للمشاركة في مجموعة التركيز (مجموعة المناقشة صغيرة) مع مجموعة من الأمهات عربيات لطفل أو اطفال في السن الخامسة أو اقل يوم... من الساعة... الي... في... لمناقشة التأثيرات والحواجز التي تحول دون تناول الطعام الصحي وأداء النشاط البدني.

هذه المناقشة سوف توفر لك فرصة للحديث عن الأشياء المحددة التي تمنعك من أن تكون قادرة على تناول الطعام الصحي أو ممارسة الرياضة. على وجه الخصوص، وأود أن أتعرف عن اختياراتك وعاداتك الغذائية الحالية وايضا إذا ما تغيرت اختياراتك وعاداتك الغذائية في وقت معين في حياتك أو بعد القدوم إلى الولايات المتحدة. أيضا، أود أن أتعرف على الأشياء التي تمنعك من أداء الأنشطة البدنية أو ممارسة الرياضة.

ستناقش هذه الحواجز والعوامل ضمن إطار التأثيرات الاجتماعية والثقافية مثل العادات والتقاليد والمعتقدات الدينية والتي قد تحول دون أو تشجعك على تناول الاكل الصحي وممارسه الرياضة.

وسوف تساهم وجهات نظرك لمساعدتنا في فهم العوامل التي تؤثر والأمهات المسلمات العربيات لأطفال الصغار والذين يعيشون في الولايات المتحدة، على تناول الطعام الصحي وممارسه الرياضة. وسوف تساعد وجهات نظرك أيضا على فهم العوائق المحددة التي قد تمنع النساء من اتباع نمط غذائي صحي و / أو المشاركة في الأنشطة البدنية المتاحة للعلمه. فهم هذه العوامل يمكن أن تساعد في وضع استراتيجيات عملية لتعزيز برامج النشاط البدني والتغذية المناسبة للمرأة في المجتمع العربي المسلم في البلدان الغربية وفي بلداننا العربية.

إذا كنت ترغبين في المشاركة في مجموعة المناقشة الرجو الاتصال عن طريق البريد الالكتروني (وترك اسمك إذا كنت طالبة أو ربة بيت ومن اي بلاد عربية) أو الاتصال عن طريق الهاتف على

[hebae@okstate.edu](mailto:hebae@okstate.edu)

(405)-334-9768

ولكم مني جزيل الشكر، هبه الدومي



APPENDIX B

IRB Approval for Quantitative Study

Oklahoma State University Institutional Review Board

Date: Wednesday, July 06, 2016 Protocol Expires: 3/6/2019  
IRB Application No: HE164  
Proposal Title: Socio-cultural and religious influences on diet patterns and physical activity among Arab Muslim mothers of young children living the United States  
Reviewed and Processed as: Exempt  
**Modification**  
Status Recommended by Reviewer(s) **Approved**  
Principal Investigator(s):  
Heba Eldoumi Gail Gates  
Stillwater, OK 74078 301 HES  
Stillwater, OK 74078 Stillwater, OK 74078

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The requested modification to this IRB protocol has been approved. Please note that the original expiration date of the protocol has not changed. The IRB office MUST be notified in writing when a project is complete. All approved projects are subject to monitoring by the IRB.

The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

The reviewer(s) had these comments:

Mod to 1) add a questionnaire to the study, 2) to recruit via snowball with faith leaders and members of the local Stillwater Mosque and well as through a closed facebook group and via Islamic Foundations in the U.S., 3) add 250 subjects, and 4) waive documentation of consent to keep study anonymous.

Signature :

  
\_\_\_\_\_  
Hugh Crethar, Chair, Institutional Review Board

Wednesday, July 06, 2016  
Date

Consent form and email invitation for survey participation

Project title: Socio-cultural and religious influences on diet patterns and physical activity among Arab Muslim mothers of young children living in the United States

Dear Participant,

My name is Heba Eldoumi, a PhD student in nutritional sciences at Oklahoma State University. I am conducting this survey to collect some data for my dissertation project. Please read carefully the following information about my research prior to agreeing to participate. I invite you to complete this anonymous survey; your participation is greatly appreciated. A link to the survey in English and Arabic is provided below (choose the language that is more convenient to you) if you choose to participate in the online survey instead.

Investigators: Heba Eldoumi and Gail Gates, PhD, RD, FAND

Purpose of the study: This study will investigate the social, cultural and religious factors that influence healthy eating and participation in physical activity among Arab, Muslim mothers of young children (ages 0-5 years old) living in the United States. Little is known about the influences and barriers that prevent Muslim Arab mothers from eating healthy and also performing sufficient physical activity. Understanding these factors is important to help design successful interventions and also to develop standard guidelines for healthy eating and physical activity among this population.

Procedures: Participation in this research will involve the completion of one questionnaire. The questions in this questionnaire will address your views about cultural and religious barriers and influences to performing physical activity and eating healthy as an Arab Muslim mother of young child(ren). It should take approximately 15-20 minutes to complete.

Risks of participation: There are no risks associated with this project which are expected to be greater than those encountered in daily life.

Benefits of participation: While you may not receive a direct benefit from participating, we hope that this study will contribute to developing future programs to promote healthy eating and physical activity of Muslim mothers living the United States.

Compensation: No compensation will be given for participation.

Your rights: Participating in this study is completely voluntary. Even if you decide to participate now, you may change your mind and stop at any time.

Confidentiality: We plan to publish the results of this study, but will not include any information that would identify you or your family members. To keep your information safe, the records of this study will





be kept private and the researcher will enter study data on a computer in a locked office that is password-protected to protect the information. This survey is anonymous; names or information that can identify your identity will not be asked.

Contacts: If you have questions about this research, including questions about the questionnaire, you can contact Heba Eldoumi, Oklahoma State University, Department of Nutritional Sciences by phone (405-334-9768), or via email (hebae@okstate.edu). You can also contact her faculty advisor, Gail Gates, Ph.D., Oklahoma State University, Department of Nutritional Sciences (gail.gates@okstate.edu). If you have questions about your rights as a research volunteer, you may contact the IRB Office at 223 Scott Hall, Stillwater, OK 74078, 405-744-3377, irb@okstate.edu.

If you choose to participate: Click on one of the links below if you choose to participate. By clicking on the link... By completing the questionnaire you are indicating that you freely and voluntarily and agree to participate in this study and you also acknowledge that you are at least 18 years of age.

It is recommended that you print a copy of this consent page for your records before you begin the study by clicking below.

Oklahoma State Univ.  
IRB  
Approved: 7-16-16  
Expires: 3-16-19  
PIR: HE-16-4

## APPENDIX C

### Demographics Questionnaire for Focus Groups (English)

Please answer the following questions

- 1- What is your country of origin? \_\_\_\_\_
  
- 2- What is your age?
  - a. 18-23 years old
  - b. 24-29 years old
  - c. 30-34 years old
  - d. 35-40 years old
  - e. Above 40 years old
  
- 3- How many children do you have? \_\_\_\_\_ children
  
- 4- How many of your children are under the age of 5? \_\_\_\_\_ children
  
- 5- How many years have you lived in the United States?
  - a. 15 years or more (2001 or before)
  - b. 10- less than 15 years (2002-2006)
  - c. 5- less than 10 years (2007-2011)
  - d. 1- less than 5 years (2012-2015)
  - e. Less than 1 year (after 2015-present)
  
- 6- What was your primary reason for coming to the US?
  - a. School
  - b. Work
  - c. Immigration
  - d. Accompanied with husband
  - e. Other

## APPENDIX D

### Demographics Questionnaire for Focus Groups (Arabic)

#### استبيان الديموغرافي

الرجاء الإجابة على الأسئلة التالية

- 1- ما هي بلدك؟ \_\_\_\_\_
- 2- عمرك بين  
أ- 18-23 سنة (من سنة 2001 أو قبل ذلك)  
ب- 24-29 سنة (من سنة 2002-2006)  
ج- 30-34 سنة (من سنة 2007-2011)  
د- 35-40 سنة (من سنة 2012-2015)  
هـ- أكثر من 40 سنة (بعد سنة 2015 – الحاضر)
- 3- كم عدد الأطفال لديك؟ \_\_\_\_\_ طفل
- 4- كم عدد أطفالك هم تحت سن 5 سنوات؟ \_\_\_\_\_ طفل
- 5- كم هي عدد السنوات التي عشتها في الولايات المتحدة؟  
أ- 15 سنة أو أكثر  
ب- 10 سنوات الي أقل من 15 سنة  
ج- 5 سنوات الي أقل من 10 سنوات  
د- سنة الي أقل من 5 سنوات  
هـ- أقل من سنة
- 6- ما كان السبب الأساسي لقدمه إلى الولايات المتحدة؟  
أ- للدراسة  
ب- العمل  
ج- هجره  
د- مرافقه لزوجك  
هـ- لسبب اخر

## APPENDIX E

### Focus Group Questions (English)

#### a. Eating Habits

2. What does healthy eating mean to you?
3. Where do you get your information about healthy eating?
4. How do you think the way you eat affects your body weight?
5. How do you feel about eating healthy food?
6. How would you describe your level of confidence that you can eat healthy foods?
7. Do you experience barriers to healthy eating? If so, what are they?
8. Do you usually eat out or cook at home? And why?
9. Do you usually eat from the same dish or on separate plates?
  - a. How does that affect food intake?
10. Do you appreciate second servings?
11. Who usually makes the decision on what to eat? (Spouse, you, kids)
12. Who usually shops for food for your family? Has that changed since arriving in the US? If so, how?
13. Are there moments in life when you're eating habits changed? If so, when?
  - a. What were the differences in your eating habits before and after marriage/having children?
  - b. How has working, going to school, and/or having children at school or being a stay-at-home mother affected you're eating habits in America compared to living in your country of origin?
  - c. What are the differences in your way of eating and preparing your food since arriving to the US?

14. Can you tell me something about the role that food plays in social occasions?
15. How is the role of food in your social interactions different in the US than what you experienced in your country of origin?
16. How has your way in preparing food changed since arriving to the US?
  - a. How does this compare to typical American habits?

**b. Physical Activity**

1. How important is it for you to be physically active?
  2. How confident are you in your ability to be physically active?
  3. How do you think your physical activity affects your body weight?
  4. What are the barriers for performing physical activity? (e.g. cost, competing priorities, embarrassment, knowledge, available facilities, dislike)
  5. What do you think when you see Americans being physically active?
  6. Does the community equally accept both men and women to perform physical activities?
    - a. What are your thoughts/feelings about the community's perception of women's engagement in physical activity? Do they accept or reject it?
  7. How would you describe the level of change in engagement in physical activity after marriage, becoming a mother, and coming to the US?
  8. How do you feel about performing physical activity in a gym and/or in public?
  9. How would you describe the influence of religion on the type and/or amount of physical activity you do (e.g. encouragement, dress code, mixed gender gyms, PA in public)?
- b. Finally, are there any important points that you would like to share that have not yet been discussed?

## APPENDIX F

### Focus Group Questions (Arabic)

#### عادات الاكل

- 1- ماذا يعني الاكل الصحي بالنسبه لك؟
- 2- من اين تاتي بمعلوماتك عن الاكل الصحي؟
- 3- كيف تعتقد ان طريقه اكلك تؤثر علي وزنك؟
- 4- ما هو شعورك تجاه الأكل الصحي؟
- 5- كيف تصفين مستوى ثققت بانك تستطعين أن تأكلي الأطعمة الصحية؟
- 6- هل تواجهك عوائق لتناول الأكل الصحي؟ إذا كان الأمر كذلك فما هي؟
- 7- في العادة هل تتناولين طعامك في مطعم أو تطهين الطعام في المنزل؟ ولماذا؟
- 8- في العادة هل تاكلين في طبق واحد مع اسرتك او تتناولين طعامك في طبق منفصل؟
  - ا- كيف يؤثر ذلك علي كميته الاكل التي يتم تناوله؟
  - هل ملئ الصحن اكثر من مره شبيء محبب لديك؟ 9-
- 10- في العادة من الذي يتخذ القرار لما يتم تناوله في البيت؟ (زوجك , انتي, او ابنائك)  
في العادة من الذي يشتري الاكل للمنزل؟ هل تغيرت هذه العاده منذ وصولك للولايات المتحده؟ اذا كان الامر
- 11- كذلك فكيف؟
- 12- هل صادفتك اوقات في حياتك تغيرت فيها طريقه اكلك؟ اذا كان الامر كذلك فمتي؟
  - ا- هل تغيرت هذه العادات قبل وبعد الزواج او انجاب الاطفال؟
  - ب- كيف كان تاثير الدراسه او الشغل, وجود الاطفال في المدارس او البقاء في المنزل دون عمل علي عادتك في تناول الاكل؟ قارني بين امريكا و بيلدك الاصليه؟
  - ج- هل هناك تغيير في طريقه اكلك او تحضيرك للطعام منذ وصولك لامريكا؟
- 13- ما هو دور الاكل في المناسبات الاجتماعيه؟
- 14- قارني بين دور الاكل في بلدك و امريكا في المناسبات الاجتماعيه.

15- هل تغيرت طريقه تحضيرك للطعام منذ وصولك للولايات المتحده؟

ا- ما هي وجه التشابه بين طريقه تحضيرك وعادات الامريكان في طريقه تحضير الطعام؟

### النشاط البدني

1- ما مدي اهميه ان تكونين نشطه بدنيا بالنسبه لك؟

2- ما مدي ثقتك بنفسك انك تستطيعين ان تكونين نشطه بدنيا؟

3- كيف تعتقدين ان النشاط البدني يؤثر علي وزنك؟

4- ما هي العواقب التي تحول دون استطاعتك علي ممارسه الرياضه البدنيه؟ (كلفه البرامج

الرياضيه, اولويات الحياه, الخجل, المعرفه, توفر المراكز المناسبه, لا تعجبيني)

5- ما رأيك عندما تربين الأميركيين يمارسون الرياضه؟

6- هل النظرة الاجتماعيه للمرأه التي تمارس الرياضه هي نفسها للرجل الذي يمارس الرياضه؟

ما هي وجهه نظر المجتمع للمراه التي تمارس الرياضه؟ هل هو شي متقبل او مرفوض من

أ- قبل المجتمع؟

كيف تصفين مستوي التغير في ممارستك للرياضه بعد الزواج, بعد الانجاب, ومنذ وصولك للامريكا؟

7-

كيف تشعرين حيال اداء الرياضه في المراكز الرياضيه المختلطه والترييض في الاماكن العامه؟

8-

9- كيف تصفين تأثير الدين علي نوعيه وكميه الرياضه التي يمكن ان تمارسينها (من ناحيه اللباس,

والمراكز الرياضيه المختلطه, والرياضه في الاماكن العامه)

10- في النهايه, هل هناك نقاط مهمه لم اتطرق اليها وتعتقدين انها مهمه ولم نناقشها؟

## APPENDIX G

### Socio-Cultural and Religious Influences on Eating Patterns & Physical Activity among Arab

#### Muslim Mothers of Young Children Questionnaire (English)

##### Demographic Questionnaire

**7- What is your country of origin? (Circle your country from the list below)**

Algeria, Bahrain, the Comoros Islands, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Mauritania, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, the United Arab Emirates or Yemen

**8- What is your religion? (Circle your religion from the list below)**

Muslim, Christian, Jew or Other \_\_\_\_\_

**9- What is your age?**

- a. 18-23 years old
- b. 24-29 years old
- c. 30-34 years old
- d. 35-40 years old
- e. Above 40 years old

**10- How many children do you have? \_\_\_\_\_ children**

**11- How many of your children are under the age of 5? \_\_\_\_\_ children**

**12- How many years have you lived in the United States?**

- a. 15 years or more (2001 or before)
- b. 10 to less than 15 years (2002 to 2006)
- c. 5 to less than 10 years (2007 to 2011)
- d. 1 to less than 5 years (2012 to 2015)
- e. Less than 1 year (after 2015 to present)

**13- What was your primary reason for coming to the US?**

- a. School
- b. Work
- c. Immigration
- d. Accompanied husband
- e. Other

##### Food Acculturation and Physical Activity Barriers (FABAP) Questionnaire

**1- Which statement best describes how you think the way you eat affects your body weight?**

- a. Healthy eating maintains my body weight



- b. Sweets increase body weight
  - c. Poor eating habits increase body weight
  - d. Age affects body weight more than the amount of food consumed
  - e. Giving birth affects body weight more than food
  - f. The way I eat does not affect my body weight
- 2- **I get my information about healthy eating from: (Select all that apply)**
- a. The internet
  - b. School
  - c. Friends and peers
  - d. Television programs
  - e. Family
- 3- **How do you feel about eating healthy food? (Select all that apply)**
- a. I feel light when I eat healthy
  - b. I feel comfortable when I eat healthy
  - c. I feel happy and at ease when I eat healthy
  - d. Eating healthy is good for me
  - e. Healthy food tastes good if it is prepared properly
  - f. Healthy food does not taste good
  - g. Healthy food does not taste as good as fried and sweet food
  - h. I need to force myself to eat healthy for my wellbeing
  - i. I am not used to eating healthy
  - j. Healthy eating is important for the sake of my children
- 4- **How would you describe your level of confidence in your ability to eat healthy foods?**
- a. Very confident
  - b. Confident
  - c. Somewhat confident
  - d. Not confident
  - e. Not at all confident
- 5- **Do you usually eat out or cook at home?**
- a. I usually cook and eat at home
  - b. I occasionally eat out
  - c. Both eat out and cook at home equally
  - d. I usually eat out
- 6- **How have your eating habits changed after having children? (Select all that apply)**
- a. I care more about my children than myself
  - b. What I eat depends on my children's food preference
  - c. I feel like do not care about myself anymore
  - d. I was more organized before marriage/children
  - e. I had more self-determination before marriage/children
- 7- **How have your shopping habits changed since arriving in the US?**
- a. I never bought food in my country of origin. In the US I usually do the shopping.
  - b. No change; I bought the food in my country of origin and I buy it here in the US
  - c. I did not buy food in my country of origin and do not buy it in the US

8- To what level do you agree or disagree that the following statements are barriers for you to be able to eat healthy?

Barriers to healthy eating	Strongly disagree	Disagree	Agree	Strongly agree
Healthy food is expensive				
I cannot afford healthy food because of my family size				
I cook what my children and husband like to eat				
Cooking a meal for the family leaves no time to cook another healthy meal				
I lack organization and time management				
I cannot eat healthy for all meals				
I do not value healthy eating				
The idea of a diet triggers the feeling of hunger so I eat more				
I always feel hungry all day				
I eat between meals				
I do not like the taste of healthy food				
My husband does not encourage me to eat healthy				
I lack self-control				
I enjoy eating sweets				
I do not like to waste food, so I end up eating the leftovers				

9- How have your eating habits changed in America compared to when you were living in your country of origin? (Select all that apply)

- a. My meal times changed
- b. We now have only one main meal per day after school/work
- c. I began to incorporate more vegetables in my meals
- d. I began to have breakfast
- e. The number of meals increased (eats a meal alone, then eats again with the child, then again with husband during breakfast, lunch and/or dinner)
- f. The amount of sweets I have per day has increased
- g. It is easier for me to buy sweets from store
- h. I eat more at night (i.e. stays up late)
- i. My eating habits have not changed

**10- How has your food preparation changed since arriving in the US? (Select all that apply)**

- a. I use less oil
- b. I use less salt
- c. I shifted from using shortening to oil
- d. I became familiar with new food varieties
- e. Precooked and canned meals help reduce cooking time
- f. The ingredients I use now are different
- g. There is no change in the way I prepare my meals

**How important is it for you to be physically active?**

- a. Very important
- b. Important
- c. Somewhat important
- d. Not important
- e. Not at all important

**11- How do you think your physical activity affects your health? (Select all that apply)**

- a. It is important for overall health
- b. It improves mood
- c. It increases tolerance to everyday life stress
- d. It is a good stress reliever
- e. Exercising makes me feel happy
- f. Exercising makes me feel ready to approach the day
- g. Exercising improves my attitude
- h. Exercising improves my thinking and memory
- i. Exercising reduces body weight
- j. Exercising increases self-confidence

**12- How confident are you in your ability to be physically active?**

- a. Very confident
- b. Confident
- c. Somewhat confident
- d. Not confident
- e. Not at all confident

**13- What do you think when you see American women being physically active?**

- a. I feel comfortable when I see Americans exercise
- b. I wish I had the same conditions and circumstances that allow Americans to exercise
- c. Seeing Americans exercise makes me uncomfortable

**14- Does the Arab Muslim community equally accept both men and women who perform physical activities? (Select all that apply)**

- a. Walking is the only acceptable form of exercise for women and men equally
- b. Running or jogging is considered strange and unacceptable for women but suitable for men
- c. Men have more freedom than women to exercise
- d. Both active men and women are equally accepted
- e. Men and women are not accepted equally
- f. It is only acceptable for a woman to exercise if she is in a female only gym

**To what level do you agree or disagree that the following statements are barriers for you to be able to be physically active?**

<b>Barriers to physical activity</b>	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Agree</b>	<b>Strongly agree</b>
I have other responsibilities and priorities				
Bad weather can inhibit my motivation to exercise				
There is nobody to take care of my children when I am exercising				
It can be very stressful to exercise with the kids				
I do not have time to exercise				
It is expensive to enroll in a gym				
I cannot exercise with men in the gym				
I do not have access to female only facilities				
I do not have the motivation to exercise				
I am embarrassed to exercise in public				
Some people look at women in hijab exercising differently				
Arab men in the gym will halt my ability to enter the gym and exercise				
Dressing in hijab and multiple layers affects the amount and type of activities I can perform				
Arab individuals have a negative perception of women who are physically active				
I am disorganized in my time and priorities and that affects my ability to exercise				
I feel stressed when I exercise				
I feel uncomfortable with wearing pants or “gym clothes”				
I feel hot when wearing hijab and exercising in public				
Crowded gyms halt my ability to exercise				

APPENDIX G (CONTINUED)

15- **How would you describe your change in engagement in physical activity after coming to the US?**

- a. I was more active before arriving to the US
- b. I became more sedentary in the US
- c. There has been no change in my level of engagement in physical activity

16- **Which statement best describes the influence of religion on the type and/or amount of physical activity you do? (Select the best description)**

- a. The Islamic religion encourages being active
- b. Religion has nothing to do with physical activity
- c. Dress code and modest dress can halt the level and type of activity performed
- d. Participation in mixed gender facilities is prohibited in the Islamic religion
- e. Some types of exercises in public such as the activities that require running and stretching are prohibited in the Islamic religion

**Arab-American Acculturation Scale**

Indicate the level of agreement (or disagreement) for each statement by checking the appropriate box below.

<b>The Arab-American Acculturation Scale</b>	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Disagree Somewhat</b>	<b>Neutral</b>	<b>Agree Somewhat</b>	<b>Agree</b>	<b>Strongly agree</b>
I would much prefer to live in an Arab country							
Most of my friends are Arab							
I behave like an American in many ways							
Generally I feel more comfortable around Americans than I do around Arabs							
I mix equally with Americans and Arabs							
I am equally at ease socializing with Americans and Arabs							
I have many Arab and American friends							
I have a lot of difficulty making friends							

APPENDIX G (CONTINUED)

**Physical Activity: Godin Leisure-Time Exercise Questionnaire**

- 1. During a typical 7-Day period (a week), how many times on the average do you do the following kinds of exercise for more than 15 minutes during your free time (write on each line the appropriate number).**

**Times per week**

- a. Strenuous Exercise** (heart beats rapidly) \_\_\_\_\_

(e.g., running, jogging, hockey, football, soccer, squash, basketball, judo, roller skating, vigorous swimming, vigorous long distance bicycling)

- b. Moderate Exercise** (not exhausting) \_\_\_\_\_

(e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, popular and folk dancing)

- c. Mild Exercise** (minimal effort) \_\_\_\_\_

(e.g., yoga, archery, fishing from river bank, bowling, horseshoes, golf, easy walking)

- 2. During a typical 7-day period (a week), in your leisure time, how often do you engage in any regular activity long enough to work up a sweat (heart beats rapidly)?**
- a. Often
  - b. Sometimes
  - c. Rarely or Never

APPENDIX G (CONTINUED)

**Santa Clara Strength of Religious Faith Questionnaire**

Please answer the following questions about religious faith using the scale below.

Indicate the level of agreement (or disagreement) for each statement by checking the appropriate box.

<b>Strength of religious faith</b>	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Agree</b>	<b>Strongly agree</b>
My religious faith is extremely important to me				
I pray daily				
I look to my faith as a source of inspiration				
I look to my faith as providing meaning and purpose in my life				
I consider myself active in my faith or Mosque				
My faith is an important part of who I am as a person				
My relationship with God is extremely important to me				
I enjoy being around others who share my faith				
I look to my faith as a source of comfort				
My faith impacts many of my decisions				

APPENDIX G (CONTINUED)

**Food Frequency Questionnaire**

How many times per day, week OR month do you consume each of the food items below?

Please place a ✓ in the box of ONLY ONE choice per food item. For example, if you consume processed meat 3 times per week... choose 2-4 times per week ONLY. **Please provide ONE answer for EACH food item on the list.**

Foods	6 times/day	4 - 5 times/day	2 - 3 times/day	Once per day	5 - 6 times/week	2 - 4 times/week	Once per week	1 - 3 times per month	Less than once a month
Processed meats (bacon, sausages, hamburger, hot dogs)									
Red meat									
Fish & other seafood									
Poultry (chicken)									
Eggs									
Butter									
Hydrogenated fats (cookies, cakes, potato chips, fried food, vegetable shortening, margarine)									
Low-fat dairy products									
High-fat dairy products									



<b>Foods</b>	6 times/day	4 – 5 times/day	2 - 3 times/day	Once per day	5 - 6 times/week	2 - 4 times/week	Once per week	1 - 3 times per month	Less than once a month
Tea									
Coffee									
Fruit									
Fruit juices									
Green leafy vegetables									
Dark-yellow vegetables									
Cruciferous vegetables (broccoli, cabbage, cauliflower)									
Tomatoes									
Legumes (peas, beans, lentils)									
Potatoes									
French fries									
Other vegetables									
Whole grains (oatmeal, cereals, bread)									
Refined grains (white rice, white bread, regular pasta, and foods made with white flour)									
Pizza									
Snacks									
Sweets and desserts									
Sugar-containing beverages/ soft drinks									
Mayonnaise and other creamy salad dressings									

## APPENDIX H

### Socio-Cultural and Religious Influences on Eating Patterns & Physical Activity among Arab

#### Muslim Mothers of Young Children Questionnaire (Arabic)

1- ما هي بلدك؟ ضع دائرة علي اسم بلدك من القائمة أدناه  
الجزائر، البحرين، جزر القمر، جيبوتي، مصر، العراق، الأردن، الكويت، لبنان، ليبيا، المغرب، موريتانيا، عمان،  
فلسطين، قطر، المملكة العربية السعودية، الصومال، السودان، سوريا، تونس، الإمارات العربية المتحدة أو  
اليمن

2- ما هي ديانتك؟  
الاسلام، المسيحيه، اليهوديه، ليس واحد من الاحتمالات اعلاه

3- كم عدد الأطفال لديك؟

4- كم عدد أطفالك تحت سن 5 سنوات؟

5- كم عدد السنوات التي عشتها في الولايات المتحدة؟  
ا- خمسة عشره سنه او اكثر (قبل 2001-2001 )  
ب- عشر سنوات الي اقل من خمسة عشره سنه (2002-2006)  
ج- خمس سنوات الي اقل من عشر سنوات (2007-2011)  
د- سنه الي اقل من عشر سنوات (2012-2015)  
هـ- اقل من سنه (2015 - ما بعد 2015)

6- ما هو السبب الأساسي لقدمك إلى الولايات المتحدة؟  
ا- للدراسه  
ب- العمل  
ج- هجره  
د- مرافقه لزوجك  
هـ- لسبب اخر

7- عمرك بين  
ا- 18-23 سنه  
ب- 24-29 سنه  
ج- 30-34 سنه  
د- 35-40 سنه  
هـ- فوق 40 سنه

APPENDIX H (CONTINUED)

Food Acculturation and Physical Activity Barriers (FABAP) Questionnaire

**1- أفضل عبارة التي تصف كيف تعتقد أن طريقة تناول الطعام يؤثر على وزن الجسم؟ اختاري اجابه واحده فقط.**

- ا. يحافظ الأكل الصحي علي وزن الجسم
  - ب. تناول الحلويات يزيد من وزن الجسم
  - ج. العادات السيئة في تناول الطعام يزيد من وزن الجسم
  - د. العمر يؤثر على وزن الجسم أكثر من كمية الطعام المستهلكة
  - هـ. الولادة يؤثر على وزن الجسم أكثر من الطعام
  - و. طريقة أكل لا يؤثر على وزني جسمي
- 2- أحصل على معلوماتي عن الأكل الصحي من: (اختر كل ما ينطبق)**

- ا. الأنترنت
- ب. المدرسة
- ج. الأصدقاء
- د. البرامج التلفزيونية
- هـ. الأسرة

**3- كيف تشعرين حيال تناول طعام صحي؟ (اختر كل ما ينطبق)**

- ا. أشعر بانني خفيفه عندما أكل صحي
- ب. أشعر بالراحة عندما أكل صحي
- ت. أشعر بالسعادة عندما أكل صحي
- ث. تناول الطعام الصحي مفيد صحيا
- ج. مذاق الغذاء الصحي جيد إذا تم إعداده بشكل صحيح
- ح. مذاق الغذاء الصحي غير جيد
- خ. مذاق الأطعمة المقلية والحلويات أفضل من الاكل الصحي
- د. اجبر نفسي علي الاكل الصحي لاجل صحتي
- ذ. لست معتاده علي الاكل الصحي
- ر. الأكل الصحي مهم من أجل أولادي

**4- كيف تصفين مستوى ثققتك في قدرتك على تناول الأطعمة الصحية؟**

- ا. واثقه جدا
- ب. واثقه
- ج. واثقة إلى حد ما
- د. لست واثقه
- هـ. لست واثقه علي الاطلاق

**5- هل عادة تتناولين الطعام في المطعم أو طهين الطعام في المنزل؟**

- ا. أنا عادة اطهو واتناول الطعام في المنزل
- ب. أنا أحيانا اكل في المطعم
- ج. اتناول الطعام في المطعم وفي المنزل على حد سواء
- د. أنا عادة اتناول الطعام في المطعم

APPENDIX H (CONTINUED)

**6- كيف تغيرت عاداتك الغذائية بعد إنجاب الأطفال؟ (اختر كل ما ينطبق)**

- أ- أنا نهتم أكثر بأطفالي من نفسي  
 ب- ما أكله يعتمد على ما يفضله أطفالي  
 ج- اشعر بانني لا اهتم بنفسى كما كنت فى السابق  
 د- كنت أكثر تنظيمًا قبل الزواج / الأطفال  
 هـ- كان لدي مزيد من الإصرار على تناول الأكل الصحي قبل الزواج / الأطفال

**7- كيف تغيرت عادات التسوق للطعام لديك منذ وصولك إلى الولايات المتحدة؟**

- أ. أنا لم اشترى المواد الغذائية في بلدي الأصلي. في الولايات المتحدة عادة أنا من أقوم بالتسوق للطعام  
 ب- لم تتغير؛ اشتريت الطعام في بلدي الأصلي وأشترته هنا في الولايات المتحدة  
 ج. لم أكن شراء المواد الغذائية في بلدي الأصلي ولا اشترته في الولايات المتحدة

**8- إلى أي مستوى توافقي أو لا توافقي على أن العبارات التالية هي حواجز علي أن تكوني قادره على تناول الطعام الصحي؟**

حواجز للاكل الصحي	لا اوافق بشده	أوافق	لا اوافق	لا اوافق بشده
الغذاء الصحي غالي				
لا أستطيع تحمل تكاليف طعاما صحيا بسبب حجم اسرتي				
أطبخ الطعام التي يحبونه أولادي وزوجي				
طبخ وجبة للأسرة لا يترك لي وقت لطهي وجبة صحية أخرى لنفسى				
أنا تفتقر إلى التنظيم وإدارة الوقت				
لا أستطيع أكل طعام صحيا لجميع الوجبات				
أنا لا اقدر قيمة الأكل الصحي				
مجرد التفكير في نظام الغذائي يتسبب في الشعور بالجوع وبالتالي أكل أكثر				
أنا دائما اشعر بالجوع طوال اليوم				
أنا أكل بين الوجبات				
أنا لا أحب طعم الغذاء الصحي				
زوجي لا يشجني أن أكل صحي				
أنا افتقر إلى ضبط النفس				
أنا أستمتع بتناول الحلويات				
أنا لا أحب التبذير، لذلك اجد نفسى اتناول بقايا الطعام				
لا توجد عوائق لتناول الطعام الصحي				

## APPENDIX H (CONTINUED)

**9- كيف تغيرت عادات تناول الطعام الخاصة بك في أمريكا مقارنة عندما كنت تعيش في بلدك؟ (اختر كل ما ينطبق)**

- ا. تغير اوقات الوجبات الرئيسييه
- ب. لدينا الآن وجبة رئيسية واحدة فقط يوميا بعد المدرسة / العمل
- ث. بدأت بادمج المزيد من الخضروات في الوجبات
- ج. بدأت اتناول وجبة الإفطر
- ح. عدد الوجبات في اليوم زادت (يأكل وجبة وحده، ثم يأكل مرة أخرى مع الطفل، ثم مرة أخرى مع الزوج أثناء الإفطار والغداء / أو العشاء)
- خ. بدأت اتناول الكثير من الحلويات
- د. استطيع الحصول علي الحلويات بسهولة من السوق
- ذ. أكل أكثر ليلا إذا بقيت مستيقظا الي وقت متأخر
- ر. لم تتغير عادات أكلي منذ مجيي الي امريكا

**10- كيف تغيرت طريقه إعداده للطعام منذ وصولك إلى الولايات المتحدة؟ (اختر كل ما ينطبق)**

- ا. استخدم كميات أقل من الزيت
- ب. استخدم كميات أقل من الملح
- ت. غيرت من استخدام السمن على الزيت
- ث. تعلمت أصناف غذائية جديدة
- ج. وجبات الطعام المطبوخه الجاهزه والمعلبة ساعدتني على تقليل وقت الطبخ
- ح. المكونات التي استخدمها في الطبخ مختلفة الان
- خ. لا يوجد أي تغيير في الطريقة التي اعد بها وجبات الطعام

**11- ما مدى أهمية أن تكوني نشاطا بدنيا بالنسبه لك؟**

- ا. مهم جدا
- ب. مهم
- ج. مهم إلى حد ما
- د. غير مهم
- ه. ليس مهم ابدا

**12- كيف ترى ان ممارسه الرياضه تؤثر على صحتك؟ (اختر كل ما ينطبق)**

- ا. الرياضه مهمه للصحة بصفه عامة
- ب. الرياضه تحسن المزاج
- ت. الرياضه تيزيد من القدرة على تحمل ضغوط الحياة اليومية
- ث. تساعد علي التخفيق من الاجهاد
- ج. ممارسة الرياضه تجعلني أشعر بالسعادة
- ح. ممارسة الرياضه تجعلني أشعر بانني مستعده ليوم جديد

## APPENDIX H (CONTINUED)

- خ. ممارسة الرياضة تحسن من سلوكي ومزاجي
- د. ممارسة الرياضة تحسن ذاكرتي
- ذ. ممارسة الرياضة تقلل من وزن الجسم
- ر. ممارسة الرياضة تزيد الثقة بالنفس

### 13- كيف تصيفين درجة ثقتك في قدرتك على ممارسة الرياضة؟

- ا. واثقه جدا
- ب. واثقه
- ج. واثقة إلى حد ما
- د. لست واثقه
- ه. لست واثقه ابدا

### 14- ما رأيك عندما ترى الأميركيين ممارسة النشاط البدني؟

- ا. أشعر براحة عندما اراهم يمارسون الرياضة
- ب- اتمنى لو كان لدي نفس الظروف التي تسمح الأميركيين لممارسة الرياضة
- ج. اشعر بعدم الارتياح عندما اري الامريكيين يمارسون الرياضة

### 15- هل المجتمع العربي المسلم يتقبل على حد سواء كل من الرجال والنساء الذين يؤدون الأنشطة البدنية؟ (اختر كل ما ينطبق)

- ا. المشي هي الرياضة الوحيدة المقبولة للنساء والرجال على حد سواء
- ب. يعتبر الجري أو الركض غريب وغير مقبول بالنسبة للنساء ولكن مقبول بالنسبة للرجال
- ج. الرجال لديهم اكثر حرية من النساء للممارسة الرياضة
- د. ممارسه الرياضة مقبوله الي حد سواء بين النساء والرجال
- ه. ممارسه الرياضة ليست مقبوله الي حد سواء بين النساء والرجال
- و. ممارسه الرياضة مقبولا فقط للمرأة إذا كانت في صالة للألعاب الرياضية الخاصه بالإناث فقط

APPENDIX H (CONTINUED)

16- إلى أي مستوى هل توافق أو لا توافق على أن العبارات التالية الحواجز بالنسبة لك لتكوني قادرة على ممارسة النشاط البدني؟

حواجز للممارسة الرياضية	وافق بشده	وافق	لاوافق بشده	لاوافق بشده
ا. لدي مسؤوليات وأولويات أخرى				
ب. سوء الاحوال الجوية يمكن أن تقلل من تحفيزي لممارسة الرياضة				
ت. لا يوجد أحد لرعاية أطفالي عندما أمارس الرياضة				
ث. الرياضة مع الاطفال مرهقة جدا				
ج. ليس لدي الوقت لممارسة الرياضة				
ح. أنها مكلفة للتسجيل في صالة او نادي للرياضة				
خ. لا يمكن أن أمارس الرياضة مع الرجال في صالة الألعاب الرياضية				
د. لا يوجد صاله للرياضة خاصه بالنساء قريبه مني				
ذ. ليس لدي حافز للمارسه للرياضه				
ر. اشعر بالخجل للمارسه للرياضه في الاماكن العامه				
ز. بعض الناس هنا ينظرون الي المراه المحجبه بانها مختلفه عنهم عندما تمارس الرياضة				
س. وجود الرجال العرب تقيد قدرتي علي الدخول الصالات الرياضييه				
ش. لبس الحجاب و احيانا طبقات من الملابس تقيد نوع و كميته الرياضييه التي يمكن ان امارسها				
ص. الرجال العرب لديهم نظرة سلبية للمرأة الذي تمارس الرياضييه				
ض. أنا غير منظمه في وقتي والأولويات مما تؤثر على قدرتي على ممارسة الرياضة				
ع. اشعر بالاجهاد النفسي عندما امارس الرياضييه				
غ. لا اشعر بالراحه عندما ارتدي الملابس الرياضييه				
ف. اشعر بالحر الشديد عند ممارسه الرياضييه بلباس الحجاب				
ق. الصالات الرياضييه المزدهمه تقلل من قدرتي علي ممارسه الرياضييه				

APPENDIX H (CONTINUED)

**17- كيف تصيفين التغيير في نسبة ممارستك للرياضة بعد مجيئتك إلى الولايات المتحد**

- ا. كنت أكثر نشاطا قبل وصولي إلى الولايات المتحدة  
 ب. أصبحت أكثر كسلا في الولايات  
 ج- ليس هناك اختلاف

**18- أي من بيانات التاليه أفضل وصف للتأثير الدين على نوع و / أو كمية النشاط البدني لديك؟ (اختيار أفضل وصف)**

- ا. الدين الإسلامي يشجع على ممارسة النشاط البدني  
 ب. الدين ليس له علاقه بممارسه الرياضة  
 ج. اللباس المحتشم والحجاب يقيد نوع ومستوي الرياضة التي يمكن ممارستها  
 د. ممارسه الرياضة في الاماكن المختلطة محرمة في الدين الاسلامي  
 ه. بعض انواع الحركات الرياضيه كالتي تتطلب الركض والتمرن في الاماكن العامه محرمة او غير مستحبه في الدين الاسلامي

**The Arab-American Acculturation Scale**

اوفاق بشده	اوفاق	اوفاق الا حدا	معتدل	اعارض التي حدا	اعارض	بشده اعارض	The Arab-American Acculturation Scale
							افضل أن اعيش في دولة عربية
							معظم أصدقائي عرب
							أنا اتصرف مثل أمريكي في نواح كثيرة
							عموما أشعر براحة أكبر حول الأميركيين من ان اكون حول العرب
							أنا انسجم واختلط بالتساوي مع الأميركيين والعرب
							أنا اتواصل الاجتماعيا مع الأميركيين والعرب بسهولة وبالتساوي
							لدي العديد من الأصدقاء العرب والأمريكيين
							واجه الكثير من صعوبة تكوين صداقات



APPENDIX H (CONTINUED)

**Physical Activity: Godin Leisure-Time Exercise Questionnaire**

**Godin Leisure-Time Exercise Questionnaire**

1- خلال الايام العاديه في الاسبوع ، كم مرة في المتوسط تقومين بالأنواع التالية من التمارين لأكثر من 15 دقيقة خلال وقت فراغك (الكتابة في كل سطر العدد المناسب كم مرة في الاسبوع تمارسين لكل نوع من انواع الرياضات التاليه)

1- الرياضة ذات  
النشاط العالي \_\_\_\_\_

(مثلا: كرة القدم ,الجري ,السباحة قوية، وركوب الدراجات لمسافات طويلة)

2- الرياضة ذات  
النشاط المتوسط \_\_\_\_\_

(مثلا: المشي السريع،التنس،سهلة ركوب الدراجات الخفيفه والسباحة الخفيفه والرقص)

3- الرياضة ذات  
النشاط الخفي \_\_\_\_\_

(مثلا: اليوغا، صيد الأسماك، الجولف، المشي الخفيف)

خلال الاسبوع, كم مره تمارسين الرياضة لدرجه التعرق او تصعب عليك التنفس او الكلام؟

1- اغلب ايام الاسبوع

2- احيانا

3- نادرا او لا امارس هذه الانواع من الرياضة

APPENDIX H (CONTINUED)

**Santa Clara Strength of Religious Faith Questionnaire**

الرجاء الإجابة على الأسئلة التالية حول الإيمان الديني باستخدام مقياس أدناه حدي مستوى الاتفاق ( أو خلاف ) عن كل بيان

أوافق بشدة	أوافق	لا أوافق	لا أوافق بشدة	Santa Clara Strength of Religious Faith Questionnaire
				إيماني الديني مهم للغاية بالنسبة لي
				أنا أصلي يوميا
				إيماني هو مصدر للإلهام
				إيماني يعطيني معنى وهدف في حياتي
				أنا أعتبر نفسي ناشطة في إيماني او في المسجد
				إيماني هو جزء مهم من شخصيتي
				علاقتي مع الله أمر مهم للغاية بالنسبة لي
				أنا أستمتع ان اكون مع آخرين الذين يشتركوني ديني
				أتطلع إلى إيماني كمصدر للراحة
				إيماني يؤثر علي كثير من قراراتي

APPENDIX H (CONTINUED)

**Food Frequency Questionnaire**

كم مره في اليوم, الاسبوع او في الشهر تتناولين الاطعمه التاليه لكل عنصر في قائمه. مثلا لو تتناولين اللحوم المصنعه ثلاث مرات في الاسبوع اختاري من 2-4 مرات في الاسبوع فقط لا غير

المجموعات الغذائية (العناصر)	مرات في اليوم 6	مرات في اليوم 4-5	مرات في اليوم 2-3	مره واحده في اليوم	مرات في الاسبوع 5-6	مرات في الاسبوع 2-4	مره واحده في الاسبوع	مرات في الشهر 1-3	أقل من مره في الشهر
اللحوم المصنعه (الحم المقدد, السجق, الهامبرجر, والهوت دوج)									
اللحوم الحمراء									
السمك او الماكولات البحريه									
الدجاج									
البيض									
الزبد									
الدهون المهدرجة و السمن (الكوكيز, الكعك, ورقائق البطاطس, والأطعمة المقلية والسمن)									
منتجات الألبان قليلة الدسم									
منتجات الألبان عالية الدسم									
الشاي									
القهوه									

الفواكه									
عصير الفواكه									
الخضار الورقية الخضراء									
الخضروات داكنة الصفراء									
الخضروات الصليبية (القرنبيط، والمفوف)									
طماطم									
البقوليات (البازلاء والفول والعدس)									
بطاطا									
البطاطس المقلية									
خضروات اخرى									
الحبوب الكاملة (دقيق الشوفان، والحبوب، والخبز)									
الحبوب المكررة (الأرز الأبيض والخبز الأبيض والمعكرونة العادية، والأطعمة المصنوعة من الدقيق الأبيض)									
بيتزا									
وجبات خفيفة									
الحلوى والحلويات									
المشروبات التي تحتوي على السكر / المشروبات الغازية									

الميونيز وغيرها من اضافات سلطة									
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## APPENDIX I

Consent Form for Focus Group (English)

### **ADULT CONSENT FORM OKLAHOMA STATE UNIVERSITY**

**PROJECT TITLE:** Socio-cultural and religious influences on diet patterns and physical activity among Arab Muslim mothers of young children living in the United States - Focus group

**INVESTIGATORS:** Heba Eldoumi, PhD student in Nutritional Sciences at OSU.

#### **PURPOSE:**

This study will investigate the social, cultural and religious factors that influence healthy eating and participation in physical activity among Arab, Muslim mothers of young children (ages 0-5 years old) living in the United States. Little is known about the influences and barriers that prevent Muslim Arab mothers from eating healthy and also performing sufficient physical activity. Understanding these factors is significant to design successful interventions and also to develop standard guidelines for eating healthy and physical activity among this population.

#### **PROCEDURES**

If you agree to be part of the research study, you will be asked to participate in one focus group session at your convenience at either the local Stillwater Mosque or at the Family Resource Center at Oklahoma State University. We will invite 4-5 people to meet together to per session to discuss their experiences. The discussion topics will include social and cultural as well as religious influences that potentially affect your ability to eat healthy and perform physical activity. The focus group will last about two hours and we will record your discussion and take notes during the discussion to document observations and comments needed for analysis. A member from the community will help record the discussion to make sure the discussion is recorded accurately. You must agree to be recorded to participate in the focus group.

#### **RISKS OF PARTICIPATION:**

Answering questions or talking with others may cause discomfort for some people. You may choose not to answer any discussion question and you can stop your participation in the focus group at any time. While unlikely, there is a chance that another member of the focus group could reveal something about you or your family that they learned in the discussion. All focus group members are asked to respect the privacy of other group members. You may tell others that you were in a focus group and the general topic of the discussion, but actual names and stories of other participants should not be repeated.

APPENDIX I (CONTINUED)

**BENEFITS OF PARTICIPATION:**

While you may not receive a direct benefit from participating in this research, some people find sharing their stories to be a valuable experience. We hope that this study will contribute to developing future interventions and programs to promote healthy eating and physical activity of Muslim mothers living the United States.

**CONFIDENTIALITY:**

We plan to publish the results of this study, but will not include any information that would identify you or your family member. To keep your information safe, the auto-taped recorded discussion of the focus group and written observations will be placed in a locked office until a written transcript of the discussion is completed. Auto-tapes will be destroyed after the study has been completed. The researcher will enter study data on a computer in a locked office that is password-protected to protect the information. To protect confidentiality, your real name and your family member's name will not be used in the written copy of the discussion nor will it be needed to complete the demographic information questionnaire.

**COMPENSATION:**

Participation in the focus group is completely voluntary and therefore there will be no compensation for participating.

**CONTACTS:**

If you have questions about this research, including questions about the scheduling of the focus group, you can contact Heba Eldoumi, Oklahoma State University, Department of Nutritional Sciences by phone (405-334-9768), or via email ([hebae@okstate.edu](mailto:hebae@okstate.edu)). You can also contact her faculty advisor, Gail Gates, Ph.D., Oklahoma State University, Department of Nutritional Sciences ([gail.gates@okstate.edu](mailto:gail.gates@okstate.edu)). If you have questions about your rights as a research volunteer, you may contact the IRB Office at 223 Scott Hall, Stillwater, OK 74078, 405-744-3377 or ([irb@okstate.edu](mailto:irb@okstate.edu)).

**PARTICIPANT RIGHTS:**

Participating in this study is completely voluntary. Even if you decide to participate now, you may change your mind and stop at any time. You may choose not to answer a focus group question for any reason.

**CONSENT DOCUMENTATION:**

I have been fully informed about the procedures listed here. I am aware of what I will be asked to do and of the benefits of my participation. I affirm that I am 18 years of age or older.

I have read and fully understand this consent form. I sign it freely and voluntarily. A copy of this form will be given to me. I hereby give permission for my participation in this study.

I certify that I have personally explained this document before requesting that the participant sign it.

Signature of Researcher \_\_\_\_\_

Date \_\_\_\_\_

## APPENDIX J

### Consent Form for Focus Group (Arabic)

**عنوان الدراسة:** التأثيرات الاجتماعية والثقافية والدينية على أنماط النظام الغذائي والنشاط البدني بين الأمهات العربيات المسلمات لأطفالا صغار الذين يعيشون في الولايات المتحدة.

البكالوريوس في الكيمياء ودرجة الماجستير في الكيمياء الحيوية، وهو حاليا طالب دكتوراه في علوم التغذية المحققه: هبة الدومي،

**هدف الدراسة:** هذه الدراسة سوف تتحقق من العوامل الاجتماعية، الثقافية والدينية التي تؤثر على لأمهات العربيات المسلمات لأطفالا صغار (من سن 0-5 سنوات من العمر) والذين يعيشون في الولايات المتحدة من ناحيه امكانيه تناول الأكل الصحي والمشاركة في النشاطات البدنيه وممارسه الرياضه. حاليا، لا يعرف سوى القليل عن التأثيرات والحواجز التي تمنع الأم العربيه المسلمه من تناول الطعام الصحي وممارسه الرياضه بشكل صحيح، صحي وكافي، لذلك فهم هذه العوامل مهمه لتصميم البرامج الناجحة وأيضا وضع مبادئ توجهات موحدة لتناول الاكل الصحي والنشاط البدني بين هذه الفئة من النساء.

**طريقه الدراسة:** إذا وافقتي على أن تشاركي في هذه الدراسة البحثية، سوف يطلب منك أن تشاركي في جلسة نقاش لمناقشة تجاربكي مع مجموعة مكونه من 4-5 نساء اخريات ومكان الملتقي سوف يكون اما في المسجد المحلي في مدينه ستيلووتر أو في مركز الاف- ار-سي بجامعة ولاية أوكلاهوما (حسب رغبه المشتركات). سوف تشمل موضوعات المناقشة التأثيرات الاجتماعية والثقافية وكذلك الدينية التي قد تؤثر علي قدرتك على تناول الطعام الصحي وأداء النشاط البدني والرياضه. الجلسه سوف تستمر لمدة ساعتين تقريبا، و سوف تسجل المناقشه بمسجل صوتي وسوف تدون أثناء المناقشة الملاحظات والتعليقات اللازمه لتوثيق وتحليل النتائج. احدي النساء العربيات المسلمات ستساعد علي تسجيل المناقشة للتأكد من تسجيلها بدقة. **يجب أن توافقي على التسجيل قبل المشاركة في المجموعه.**

**مخاطر المشاركة:** الإجابة على بعض الأسئلة أو التحدث مع مجموعه قد تكون غير مريحة لبعض الناس. قد تختاري عدم الرد على أي سؤال يتم مناقشته ويمكنك التوقف عن المشاركة في أي وقت. من المحتمل أن عضو آخر في المجموعه يمكن أن ينقل بعض المعلومات خارج قاعه الاجتماع بالرغم من الطلب من جميع المشتركات في المجموعه احترام خصوصية المشتركات الأخريات. يمكنك مناقشه الموضوعات المطروحه خلال الجلسه مع اناس اخرون من غير المشاركين ولكن يجب أن لا تتكرر الأسماء الحقيقية وقصص من المشاركات الأخريات بشكل شخصي.



## APPENDIX J (CONTINUED)

**فوائد المشاركة:** بالرغم انك قد لا تتحصلين على فائدة مباشرة من المشاركة في هذا البحث، يجد بعض الناس تقاسم قصصهم أن تكون تجربة قيمة. نأمل أن هذه الدراسة ستساهم في تطوير التدخلات الصحية والبرامج المستقبلية لتعزيز الأكل الصحي والنشاط البدني للأمم المسلمة التي تعيش في الولايات المتحدة.

**السريه والخصوصية:** ونحن نخطط لنشر نتائج هذه الدراسة، ولكنها لن تشمل أي معلومات من شأنها أن تعرف عليك أو علي أحد أفراد عائلتك. للحفاظ على المعلومات الخاصة بك أمانة، سيتم وضع الشريط المسجل والملاحظات المدونه في ملف مقفل حتى يتم الانتهاء من كتابه النتائج. سيتم تدمير الأشرطة بعد أن يتم الانتهاء من الدراسة. الباحث سوف يقوم بإدخال بيانات على كمبيوتر محمي بكلمة مرور لحماية السرية، لن يستخدم اسمك الحقيقي واسم أحد أفراد أسرته في النسخة خطية من المناقشة.

**تعويضات:** المشاركة في مجموعه النقاش تطوعية تماما، وبالتالي لن يكون هناك أي تعويضات مادية علي المشاركة.

**جهات الاتصال:** اذا كان لديك أسئلة حول هذا البحث، بما في ذلك الأسئلة حول مكان وزمان الاجتماع، يمكنك الاتصال ب:

Heba Eldoumi, Oklahoma State University, Department of Nutritional Sciences  
(405-334-9768) ([hebae@okstate.edu](mailto:hebae@okstate.edu)).

يمكنك أيضا الاتصال بمشرف الطالبه

Gail Gates Ph.D., Oklahoma State University, Department of Nutritional Sciences  
([gail.gates@okstate.edu](mailto:gail.gates@okstate.edu))

اذا كان لديك أسئلة حول حقوقك كمتطوع في البحث، يمكنك الاتصال ب:

IRB Office at 223 Scott Hall, Stillwater, OK 74078, 405-744-3377 ([irb@okstate.edu](mailto:irb@okstate.edu))

**حقوق المشارك:** المشاركة في هذه الدراسة تطوعية تماما. حتى إذا قررت المشاركة الآن، يمكنك تغيير رأيك والتوقف في أي وقت خلال المناقشه، قد تخترى عدم الإجابة على سؤال او اسئله معينه مطروحه خلال المناقشه لأي سبب من الأسباب.

## APPENDIX J (CONTINUED)

**قبول الاشتراك:** لقد فهمت تماما الإجراءات المذكورة اعلاه. وأنا أدرك ما علي القيام به وفوائد مشاركتي في هذه المناقشه.

أؤكد أنني 18 سنة من العمر أو أكثر. أنا قد قرأت وفهمت تماما هذا النموذج. وقعت علي هذا النموذج بحريه تامه. ستعطي نسخه من هذه الموافقه والنموذج لي والنسخه الاخري ستبقي مع الباحث. بتوقيعي علي هذا النموذج اعطي الاذن لمشاركتي واستعمال معلوماتي في هذه الدراسه.

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توقيع المشاركه

التاريخ

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## APPENDIX K

### Consent Form and Email Invitation for Survey Participation (English)

Project title: Socio-cultural and religious influences on diet patterns and physical activity among Arab Muslim mothers of young children living in the United States

Dear Participant,

My name is Heba Eldoumi, a PhD student in nutritional sciences at Oklahoma State University. I am conducting this survey to collect some data for my dissertation project. Please read carefully the following information about my research prior to agreeing to participate. I invite you to complete this anonymous survey; your participation is greatly appreciated. A link to the survey in English and Arabic is provided below (choose the language that is more convenient to you) if you choose to participate in the online survey instead.

Investigators: Heba Eldoumi and Gail Gates, PhD, RD, FAND

Purpose of the study: This study will investigate the social, cultural and religious factors that influence healthy eating and participation in physical activity among Arab, Muslim mothers of young children (ages 0-5 years old) living in the United States. Little is known about the influences and barriers that prevent Muslim Arab mothers from eating healthy and also performing sufficient physical activity. Understanding these factors is important to help design successful interventions and also to develop standard guidelines for healthy eating and physical activity among this population.

Procedures: Participation in this research will involve the completion of one questionnaire. The questions in this questionnaire will address your views about cultural and religious barriers and influences to performing physical activity and eating healthy as an Arab Muslim mother of young child(ren). It should take approximately 15-20 minutes to complete.

Risks of participation: There are no risks associated with this project which are expected to be greater than those encountered in daily life.

Benefits of participation: While you may not receive a direct benefit from participating, we hope that this study will contribute to developing future programs to promote healthy eating and physical activity of Muslim mothers living the United States.

Compensation: No compensation will be given for participation.

## APPENDIX K (CONTINUED)

**Your rights:** Participating in this study is completely voluntary. Even if you decide to participate now, you may change your mind and stop at any time.

**Confidentiality:** We plan to publish the results of this study, but will not include any information that would identify you or your family members. To keep your information safe, the records of this study will be kept private and the researcher will enter study data on a computer in a locked office that is password-protected to protect the information. This survey is anonymous; names or information that can identify your identity will not be asked.

**Contacts:** If you have questions about this research, including questions about the questionnaire, you can contact Heba Eldoumi, Oklahoma State University, Department of Nutritional Sciences by phone (405-334-9768), or via email (hebae@okstate.edu). You can also contact her faculty advisor, Gail Gates, Ph.D., Oklahoma State University, Department of Nutritional Sciences (gail.gates@okstate.edu). If you have questions about your rights as a research volunteer, you may contact the IRB Office at 223 Scott Hall, Stillwater, OK 74078, 405-744-3377, irb@okstate.edu.

**If you choose to participate:** Click on one of the links below if you choose to participate. By clicking on the link... By completing the questionnaire, you are indicating that you freely and voluntarily and agree to participate in this study and you also acknowledge that you are at least 18 years of age.

It is recommended that you print a copy of this consent page for your records before you begin the study by clicking below.

## APPENDIX L

### Consent Form and Email Invitation for Survey Participation (Arabic)

#### استبيان

**عنوان الدراسة:** التأثيرات الاجتماعية والثقافية والدينية على أنماط النظام الغذائي والنشاط البدني بين الأمهات العربيات المسلمات لأطفالا صغار الذين يعيشون في الولايات المتحدة.

عزيزتي المشاركه،

اسمي هبة الدومي, طالبة دكتوراه في علم التغذية في جامعة ولاية أوكلاهوما. اود دعوتكم للمشاركة في هذا الاستبيان لجمع بعض البيانات لمشروع أطروحة الدكتوراه. يرجى قراءة بعناية المعلومات التالية حول بحثي قبل الموافقة على المشاركة. المشاركة في استكمال هذا الاستبيان سيكون سري ولن يتم السؤال علي اسمك او اي شئ يدل علي شخصيك , مشاركتكم ومساعدتي ستفيدني كثيرا. هناك وصلة للاستبيان باللغتين العربية والإنجليزية أدناه . (online)(اختيار اللغة التي هي أكثر ملاءمة لك) اذا فضلت استكمال الاستبيان علي الكمبيوتر

[https://okstateches.az1.qualtrics.com/SE/?SID=SV\\_07FOR4YmYPMnT2R](https://okstateches.az1.qualtrics.com/SE/?SID=SV_07FOR4YmYPMnT2R)

[https://okstateches.az1.qualtrics.com/SE/?SID=SV\\_cv7Ev3ccRnAXbHn](https://okstateches.az1.qualtrics.com/SE/?SID=SV_cv7Ev3ccRnAXbHn)

**المحققون:** هبة الدومي البكالوريوس في الكيمياء ودرجة الماجستير في الكيمياء الحيوية، وهو حاليا طالب دكتوراه Gail Gates, PhD في علوم التغذية و

**هدف الدراسة:** هذه الدراسة سوف تتحقق من العوامل الاجتماعية, الثقافية والدينية التي تؤثر على لأمهات العربيات المسلمات لأطفالا صغار (من سن 0-5 سنوات من العمر) والذين يعيشون في الولايات المتحدة من ناحيه امكانيه تناول الأكل الصحي والمشاركة في النشاطات البدنيه وممارسه الرياضه. حاليا, لا يعرف سوى القليل عن التأثيرات والحواجز التي تمنع الأم العربيه المسلمه من تناول الطعام الصحي وممارسه الرياضه بشكل صحيح, صحي وكافي, لذلك فهم هذه العوامل مهمه لتصميم البرامج الناجحة وأيضا وضع مبادئ توجهات موحدة لتناول الاكل الصحي والنشاط البدني بين هذه الفئة من النساء.

## APPENDIX L (CONTINUED)

**طريقه الدراسة:** ستكون المشاركة في هذا البحث يشمل استكمال استبيان واحد. والأسئلة في هذا الاستبيان ستشمل التصوركي الخاص نحو الحواجز والتأثيرات الثقافية والدينية الرياضة وتناول الطعام الصحي كأم عربية مسلمة لديها أطفال صغار. هذا الاستبيان يستغرق حوالي 15-20 دقيقة لإكمالها.

**مخاطر المشاركة:** لا توجد مخاطر مرتبطة بهذا المشروع الذي من المتوقع أن تكون أكبر من تلك التي واجهتها في الحياة اليومية.

**فوائد المشاركة:** بالرغم انك قد لا تتحصلين على فائدة مباشرة من المشاركة في هذا البحث، نأمل أن هذه الدراسة ستساهم في تطوير التدخلات الصحيه والبرامج المستقبلية لتعزيز الأكل الصحي والنشاط البدني للأُم المسلمة التي تعيش في الولايات المتحدة.

**تعويضات:** المشاركة في مجموعه النقاش تطوعية تماما، وبالتالي لن يكون هناك أي تعويضات ماديه علي المشاركة.

**حقوقك:** المشاركة في هذه الدراسة هو طوعي تماما. إذا كنتي ترغبين في الامتناع عن المشاركة اوكنتي قد غيرتي رأيك في المشاركة يمكنك التوقف في أي وقت.

**السريه والخصوصيه:** ونحن نخطط لنشر نتائج هذه الدراسة، ولكنها لن تشمل أي معلومات من شأنها أن تعرف عليك أو علي الباحث سوف يقوم الباحث بإدخال بيانات على كمبيوتر محمي بكلمة أحد أفراد. للحفاظ على المعلومات الخاصة بك أمانة، مرور لحماية السرية، لن يستخدم اسمك الحقيقي واسم أحد أفراد أسرته في النسخة الخطية من المناقشة.

**جهات الاتصال:** اذا كان لديك أسئلة حول هذا البحث، بما في ذلك الأسئلة حول الاستبيان، يمكنك الاتصال ب:

Heba Eldoumi, Oklahoma State University, Department of Nutritional Sciences (405-334-9768)

([hebae@okstate.edu](mailto:hebae@okstate.edu)).

يمكنك أيضا الاتصال بمشرف الطالبه

Gail Gates Ph.D., Oklahoma State University, Department of Nutritional Sciences

([gail.gates@okstate.edu](mailto:gail.gates@okstate.edu))

اذا كان لديك أسئلة حول حقوقك كمتطوع في البحث، يمكنك الاتصال ب:

IRB Office at 223 Scott Hall, Stillwater, OK 74078, 405-744-3377 ([irb@okstate.edu](mailto:irb@okstate.edu) )

**قبول الاشتراك:** لقد فهمت تماما الإجراءات المذكورة اعلاه. وأنا أدرك ما علي القيام به وفوائد مشاركتي في هذه المناقشه.

أؤكد أنني 18 سنة من العمر أو أكثر. أنا قد قرأت وفهمت تماما هذا النموذج. اعطي الاذن لمشاركتي واستعمال معلوماتي في هذه الدراسة.

## APPENDIX M

Oklahoma State University  
Institutional Review Board  
Declaration of Translation

**IRB#:** HE164

**Project Title:** Socio-cultural and religious influences on diet patterns and physical activity among Arab Muslim mothers of young children living in the United States

**Principal Investigator:** Heba Eldoumi

Dear OSU Institutional Review Board:

I assure that the person(s) conducting the translation is/are fluent in and understand the English language and the Arabic language. To the best of my knowledge and belief, the attached document(s) is/are a true, accurate, and valid translation of the English version of each document.

**Translator's Statement of Qualifications:**

Include a statement of the English and foreign-language qualifications of the translator.

The questions that will be used to conduct the data will be initially translated by the principle investigator, Heba Eldoumi. Eldoumi reads, writes, and speaks both the Arabic and English languages fluently. She lived for 14 years in the US and 18 years in Libya where she completed her BS and MS degrees. She is currently a graduate student in at Oklahoma State University, College of Human Sciences, to pursue her PhD in Nutritional Sciences.

APPENDIX M (CONTINUED)

Translator's Name (Print): Heba Eldoumi

Address: 2020 East Kelsey Ln. Stillwater, Oklahoma, 74075

Phone No.: (405)-\*\*\*-\*\*\*\*

Fax No.: ( ) - -

Email: hebae@okstate.edu

\_\_\_\_\_  
**Principal Investigator's Signature**

\_\_\_\_\_  
**Date**

**If documents were back translated to English:**

**Translator's Statement of Qualifications:**

Include a statement of the English and foreign-language qualifications of the translator.

The Arabic translated version of the questions will be validated by Khaled Mansy, PhD, a professor at the College of Engineering, Architecture and Technology at Oklahoma State University. He is originally from Egypt and reads, writes and speaks fluently in both the Arabic and English languages. He is also a committee member for this current study.

Translator's Name (Print): \_\_\_\_\_

Address: \_\_\_\_\_

Phone No.: ( ) - - Fax No.: ( ) - -

Email: \_\_\_\_\_

\_\_\_\_\_  
**Principal Investigator's Signature**

\_\_\_\_\_  
**Date**





## VITA

Heba Fawzi Eldoumi  
Candidate for the Degree of  
Doctor of Philosophy

**Thesis:** HEALTHY EATING AND PHYSICAL ACTIVITY AMONG ARAB MUSLIM MOTHERS OF YOUNG CHILDREN LIVING IN THE US: BARRIERS AND INFLUENCES OF CULTURE, ACCULTURATION AND RELIGION

**Major Field: Human Sciences with an option in Nutritional Sciences**

### **Education**

**2017:** Completed the requirements for the Doctor of Philosophy in Human Sciences with a Nutritional Sciences option major at Oklahoma State University, Stillwater, Oklahoma

**2009:** Completed the requirements for the Master of Science in Biochemistry at Omar Al Mukhtar University, Libya

**2000:** Completed the requirements for the Bachelor of Science in Chemistry at Omar Al- Mukhtar University, Libya

### **Experience:**

**2011-present:** Teaching Assistant for Principles of Human Nutrition, OSU, Stillwater, OK

**2012-2013 & 2016-present:** Teaching Assistant for Food and Human Environment, OSU, Stillwater, OK

**2011-2015:** Research Assistant at Oklahoma State University, Stillwater, OK in Nutritional Sciences Department

**2009-2010:** Lecturer/Instructor in the Department of Chemistry at Omar Al-Mukhtar University, Libya

**2006-2009:** Teaching Assistant in Chemistry Department at Omar-Al-Mukhtar University, Libya

### **Professional Memberships:**

The American Society for Nutrition  
The Golden Key International Honor Society