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Effects of religiosity on physical activity, fast food intake, and obesity in emerging adults

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Abstract

In adults, relationships between religiosity and positive health behaviors have been established; however, similar studies among emerging adults has not been explored. This study examined the relationship between multiple dimensions of religiosity, physical activity, fast food intake, and obesity among emerging adults. Data are from 1,319 emerging adults participating in the National Longitudinal Study of Adolescent Health during Wave IV (ages 18-29). Females were highly religious on all dimensions of religiosity. Path models showed high levels of religious practice encouraged eating less fast food, and more prayer time increased physical activity levels. More religious practice was associated with lower incidence of obesity; increasing time spent in prayer, however, heightened the risk for obesity. Thus, dimensions of religiosity in emerging adults constructed in a different ways with fast food intake, physical activity, and obesity.

INTRODUCTION

Obesity has become one of the most challenging health threats in the United States. Recent national data indicated that in the years 2007-2008, 33.8% of Americans 20 years and older were overweight (25≤BMI<30), 34.2% were obese (30≤BMI< 40), and 5.7% were extremely obese (BMI ≥ 40) [1]. Similar trends are seen in emerging adults. A recent study suggests that 20.3% of adults aged 18-29 years are obese (BMI ≥ 30) [2].

Overweight and obesity are increased risk factors for morbidity and premature mortality [3] and increased health care costs [4] which may reduce quality of life. Although genetic compositions contribute to individuals' propensity for weight gain, genetic characteristics have not changed over the past two decades; the prevalence of obesity among US adults (including emerging adults), however, has doubled [3]. The primary reason for the increasing prevalence of obesity is significant changes in lifestyle [5-6].

Empirical evidence suggests that religious commitment (religiosity), as assessed by church (religious) attendance, religious importance, prayer, and participation in religious activities, confers positive effects on health and well-being [7-8]. Documented evidence of a positive association between religiosity and health has been generally accepted, and the health benefits of religiosity are now being taken more seriously among scientific researchers. People with religious attachments have been shown to have healthier lifestyles, lower rates of illness, a stronger sense of well-being, and greater longevity [9-10]. People who attend church on a regular basis are reported to have lower rates of illness such as cardiovascular disease, cancer, mental health problems, and death [11]. Religious activities were also found to be a protective agent against depression and stress for diabetic individuals [12]. Helm et al [13] found that individuals who engage in private religious activities (e.g., prayer, meditation, Bible study) have lower mortality rates than those who never pray nor read the Bible, yet, research in support of such conclusion specifically in emerging adulthood is very limited.

Thus, the purpose of the current study was to extend current literature by exploring the relationships between the dimensions of religiosity (i.e., church attendance, importance of religion, prayer, and religious practice) and health behaviors (i.e., physical activity and fast food intake), and obesity among emerging adults. We hypothesized that: (a) high levels of religiosity (church attendance, importance of religion, prayer, and religious practice) would be linked to better health behaviors (eating less fast foods and more physical activity); (b) increased intake of fast food would raise BMI levels (overweight and obesity); and (c) high levels of religiosity would lower the incidence of BMI (overweight and obesity) among emerging adults.

Religiosity serves as an important source of identification and influence for emerging adults [14]. Arnett and Jensen [15] noted that during this time many young people start to address abstract ideals, which often entail religious identity and existential purpose. The desire to explore and question the religious identity acquired from their families increases to a mature sense of religious self for the majority of emerging adults [16-17]. A recent national study suggests majority of emerging adults believe in God, attend religious service, pray or meditate, and turn to their religious and spiritual beliefs for strength and guidance [16, 18].

Religiosity is germane for emerging adults because of its protective results. Among heterosexual young adults, it was found to reduce binge drinking, marijuana use, and cigarette smoking [19, 20]. Several other studies show associations between well-being and religious commitment, including better physical health [7, 22] and issues of negative body image [23] , accentuating the need to comprehend how dimensions of religiosity are linked with health behaviors and obesity in emerging adulthood.

Participation in regular physical activity is an important contributor to human health. Regular physical activity is positively associated with reduced risk for heart disease, various chronic diseases including Type II diabetes, osteoporosis, high blood pressure, arthritis, and may help prevent overweight or obesity [3]. Research indicates church activity has positive influence on physical activity [7, 24]; individuals attending church weekly were more likely to exercise than those attending church less than weekly [25]. African Americans who pray more were found to engage in more physical activity [26]. A national study of high school seniors indicated religious young adults are more likely to exercise [27].

Dietary factors are key to becoming or preventing overweight or obesity [3]. Fast foods with their high fat count and energy density have large implications for energy imbalance [28]. Consuming fast food is likely to result in excess energy and hence promote overweight and obesity [28]. Many components of religious denominations' theology espouse fasting and vegetarian diets, which have been linked to lower body weight [29]. Or, as found by [8], high religious participation in a community-focused context resulted in a lower fat intake. Similarly, Reeves, et al [21] found individuals with high religious participation consumed fewer calories and displayed a lower frequency of drinking and smoking; and Dodor [26] reported that African Americans who attend church more and practice their religion ate less fast food.

METHODS

Participants

Fourth-wave data from the National Longitudinal Study of Adolescent Health (Add Health)—a stratified sampling of 80 high schools and one feeder school for each high school—was used in this study. The Add Health study began as a nationally representative telephone survey of adolescents enrolled in grades 7 to 12 (ages 12-20). The baseline study was conducted between 1994 and 1995. The second, third, and fourth waves of the Add Health were resurveys of Wave 1 adolescent respondents using computer-assisted personal interview to reduce sensitive health risk behavior questions. Details about the sample and methods are described elsewhere [33].

The fourth-wave data used in this study was conducted with the original Wave I respondents in 2007 and 2008.However, only 1,319 emerging adults (ages 18-29) were utilized to meet the purpose of the study. Approval from the Institutional Review Board was granted to conduct this study.

Measures

Obesity

Body mass index (BMI) is the most appropriate and acceptable measure for assessing overweight and obesity [34]. BMI is defined as weight in kilograms divided by height in meters squared (kg/m^2). Participants with $25 \leq BMI < 30$ were considered overweight, those with $30 \leq BMI < 40$ were classified obese, and those with $BMI \geq 40$ were considered extremely obese [1, 34]. Interviewer's anthropometric measures of weight and height were used to compute BMI. Participants with missing weight or height measurements (n=68) were handled through list wise deletion.

Church Attendance

This variable was assessed by the question: "How often have you attended church, synagogue, temple,

mosque, or religious service in the past 12 months?" Responses ranged from never (0) to more than once a week (5).

Religious Importance

Religious importance was assessed by the question: "How important (if at all) is your religious faith to you?" Answers to this question ranged from not important (1) to more important than anything (4).

Prayer

Prayer refers to being alone with God other than a church, synagogue, temple, mosque, or religious assembly and was assessed by the question: "How often do you pray privately?" Responses ranged from never (0) to more than once a day (7).

Religious Practice

Religious practice was appraised by the question: "How often do you turn to your religious or spiritual beliefs for help when you have personal problems or problems at school or work?" Responses ranged from never (0) to very often (4).

Fast Foods

Fast food consumption was measured by the question: "How many times in the past seven days did you eat food from a fast food restaurant such as McDonald's, Burger King, Wendy's, Arby's, Kentucky Fried Chicken, or a local fast food restaurant?" Responses varied from minimum (0) to maximum (35).

Physical Activity

Moderate to vigorous physical activity were measured using items based on Centers for Disease Control and Prevention examples of physical activity for a healthy weight [3]. Seven variables were selected based on exploratory factor analysis in which the items loaded on one common factor; and previous studies used similar items to assess vigorous physical activity among adolescents [35]. Responses to the 7 items ranged from 0 (not at all) to 7 (7 times a week).

Analytical Approach

The proposed model examined dimensions of religiosity associated with health behaviors and obesity in emerging adults. Descriptive statistics were computed with SPSS-PASW 18.0. Second, analysis of variance (ANOVA) to identify gender group differences in physical activity and fast food intake with Bonferoni paired comparisons was conducted. Third, a fully saturated structural equation model (estimated with AMOS 19.0 using the maximum likelihood procedure) with observed variables (that is, a path model) was estimated. Four indices were used to assess goodness of fit of the model: (a) chi-square with p-value > .05; (b) root mean square error of approximation (RMSEA) less than .05; (c) comparative fit index (CFI) greater than .95; and (d) relative fit index (RFI) greater than .95 [36-37].

RESULTS

Demographics

Wave IV (2008) Add Health data were analyzed for 1,319 emerging adults, ages 18-29. There were more female than male participants (59% vs. 41%) and the majority of the sample (71%) was unmarried. The sample included Caucasians (n = 918), African Americans (n = 325), Asian (n = 60), and American Indian (n = 18). The majority of participants completed at least some college education (72%) with an annual income of at least $40,000 or more (61%). The socio-demographic data for the sample is summarized in Table 1.

The BMI range for emerging adults in this study was between 14.7 and 62.2 (mean [SD] =28.8 [7.2]). Most participants were within the overweight and obese categories (53.8%), 36.1% within the optimal weight range, and 7.5% were extremely obese. Table 2 provides BMI categories of participants (underweight (<18.5), optimal weight, (18.5-<25), overweight (25-<30), obese (30-<40), and extremely obese (≥40) by ethnicity and gender. American Indian males had the highest mean BMI (33.7), followed by African American females (30.6). In general, Asians (both males and females) reported the lowest mean BMI (24.0). By gender, males were more likely to be overweight and obese than females (33.8% vs. 24.4%) and (27.4% vs. 24. 3%). Females were more likely to achieve optimal weight compared to males (40.2% vs. 30.3%).

Religiosity of participants differed by gender. Participants in the study were praying on average 4.08 (SD = 2.56) times a week, with females praying more than male ($p < .001$). Males were less likely to turn to religion for consolation when compared with females (1.84 ± 1.47 vs. 2.40 ± 1.42, $p < .001$) on a scale of 0 (never turn to religious/spiritual belief for help with problems) to 4 (very often turn to religious/spiritual belief for help with problems). Females were more likely to attend church approximately twice a month more than males (1.70 ± 1.59 vs. 1.34 ± 1.50, $p < .001$). Similarly, religion was more important to women than men (2.64 ± 0.88 vs. 2.43 ± 0.94, $p < .001$) on a scale of 1 (not important at all) to 4 (very important). Regarding physical activity, men were more physically functioning than women (5.96 ± 5.42 vs. 4.00 ± 4.37, $p < .001$). Gender differences in dimensions of religiosity, physical activity, fast foods, and BMI of the participants are summarized in Table 3.

Table 1. Participants Socio-demographic Information

Characteristics	n	%
Gender		
female	773	58.6
male	546	41.4
Race		
white	918	69.8
black	325	24.7
American Indian	12	0.9
Asian	60	4.6
Marital Status		
married	363	27.5
separated	18	1.4
unmarried	938	71.1
Education		
<high school	4	0.3
high school/GED	256	19.6
vocational/technical	105	8.0
some college	482	36.5
college/post grad	472	35.8
Income		
<$5,00	45	3.8
$5,000 to <$20,000	135	11.0
$20,000 to <40,000	294	24.0
$40,00 to <75,000	442	36.0
$75,000+	309	25.2

Table 2. Body Mass Index (BMI) Classification by Gender and Ethnicity

Category	**Males**	**Females**	**Total**	**%**
White	*360*	550	910	
Underweight	5	15	20	2.2
Optimal Weight	115	237	352	38.7
Overweight	123	136	259	28.5
Obese	66	125	191	23.9
Extremely Obese	51	37	88	6.5
BMI (mean)	*28.6*	27.4	27.8	
Black	141	179	320	
Underweight	6	4	10	3.1
Optimal Weight	29	46	75	23.4
Overweight	48	46	94	29.4
Obese	47	58	105	32.8
Extremely Obese	11	25	36	11.3
BMI (mean)	29.8	30.6	30.2	
American Indian	6	6	12	
Underweight	0	0	0	0.0
Optimal Weight	1	3	4	33.3
Overweight	2	2	4	33.3
Obese	1	1	2	16.7
Extremely Obese	2	0	2	16.7
BMI (mean)	33.7	25.9	29.8	
Asian	33	26	59	
Underweight	1	3	4	6.8
Optimal Weight	19	20	39	66.1
Overweight	9	2	11	18.6
Obese	4	1	5	8.5
Extremely Obese	0	0	0	0.0
BMI (mean)	25.3	22.3	24.0	
Total				
BMI (mean)	28.8	27.9	28.2	
Underweight	12	22	34	2.6
Optimal Weight	164 (30.3%)	307 (40.2%)	471	36.1
Overweight	183 (33.8%)	186 (24.4%)	369	28.3
Obese	148 (27.4%)	185 (24.3%)	333	25.5
Extremely Obese	35 (6.5%)	63 (8.3%)	98	7.5

Table 3. Bivariate Correlations among Study Variables

Variables	1	2	3	4	5	6	7
1. BMI	1						
2. Physical Activity	-.07*	1					
3. Church Attendance	.01	.01	1				
4. Importance of Religion	.06*	-.03	.59**	1			
5. Prayer	.09**	.02	.52**	.73**	1		
6. Turn to Religion	.03	.01	.56**	.75**	.79**	1	
7. Eating Habits	.03	-.07**	.02	.09**	.10**	.02	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4. Descriptive Statistics of Participants by Gender

Variables	Total	Male	Female	F	*P* Value
Independent (Religiosity)					
Prayer	4.08 ± 2.56	3.52 ± 2.65	4.46 ± 2.42	44.69	< .001
Religious Consolation	2.17 ± 1.46	1.84 ± 1.47	2.40 ± 1.42	49. 28	< .001
Religious Attendance	1.55 ± 1.56	1.34 ± 1.50	1.70 ± 1.59	17.67	< .001
Religious Importance	2.56 ± 0.92	2.43 ± 0.94	2.64 ± 0.88	16.58	< .001
Dependent					
Physical Activity	4.81 ± 4.93	5.96 ± 5.42	4.00 ± 4.37	52.54	< .001
Fast Foods	2.42 ± 4.53	2.75 ± 4.47	2.19 ± 4.27	4.90	.027
BMI	28.28 ± 7.12	28.75 ± 6.75	27.94 ± 7.52	4.00	.046

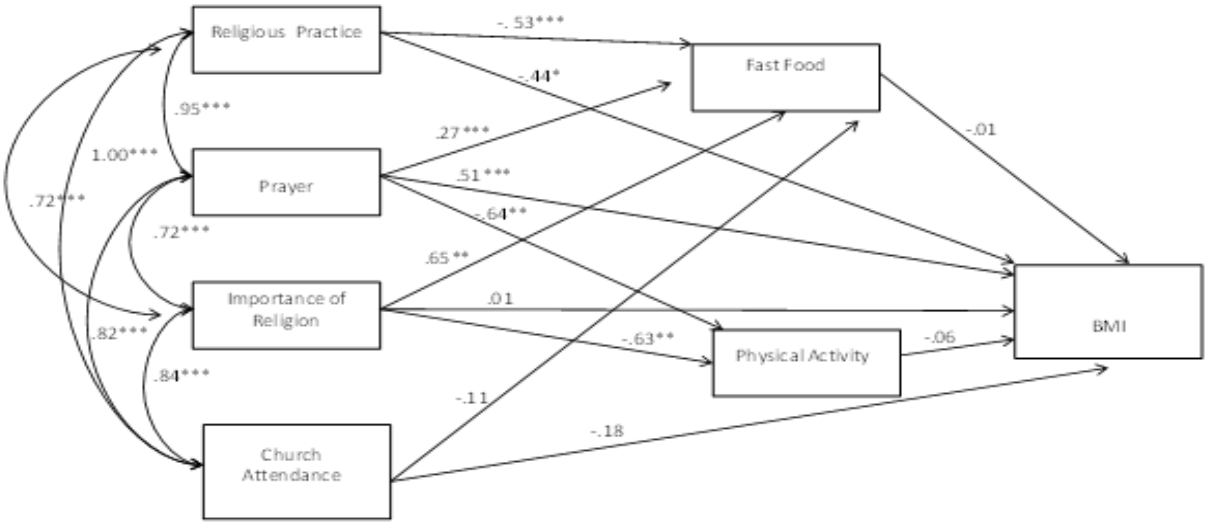

Figure 1. Structural Paths of Dimensions of Religiosity on Fast Food Intake, Physical Activity, and BMI of Emerging Adults

Bivariate correlations among the study variables (Table 4) demonstrated lower physical activity with higher BMIs. Importance of religion and prayer were highly correlated with eating more fast foods. Similarly, increased observances of prayer and importance of religion were associated with high BMIs.

Structural Paths

An estimation of the model yielded a structure path that fit the data well; χ^2 (5) = 7.118, p > 0.212, CFI > 0.999,

RFI > 0.988, RMSEA < 0.018[36-37].

The path coefficients from the model are presented in Figure 1. Path from religious practice/consolation to fast food as hypothesized, was statistically significant (β = -.53; p < .001). There was statistically significant (p < .05) standardized direct effects from religious practice/consolation to BMI (β = -.44). Significant pathways (p < .001) existed from prayer to fast food (β = .27) to BMI (β = .51) and to physical activity (β = -.64). Also, there were significant standardized effects from importance of religion to fast foods (β =.65; p < .01) and physical activity (β = -.63; p < .01). No significant pathways existed from church attendance to fast food (β = -.11; p > .05) and to BMI (β = -.18; p > .05).

DISCUSSION

The significance of this study is its examination into the relationship among religiosity, physical activity, fast food intake, and obesity in emerging adults. According to this report, about one third (33.0%) of emerging adults are obese (BMI>30). This rate is higher than those reported by Sherry, et al. [2]. Rates of overweight or obesity (BMI≥25≤40) were higher among emerging adult males than females. This finding is consistent with recent findings of obesity rates among emerging adults [38]), however other studies have reported a higher BMIs among females [1] Society's perception of a good-looking man as muscular and broad-shouldered, and a beautiful woman as thin and long-legged [16] may help explain the gender differences in BMIs.

Rates of overweight and obesity were higher in African American emerging adults than their Caucasians counterparts (54.1% vs. 30.48%). Other research findings were congruent with the current research findings. For example, data from the National Health and Nutritional Examination Survey (2003-2004) demonstrated prevalence of obesity of (45% vs. 37%) among African American and Caucasian adults 20 years and older respectively[39]). It is interesting to note that American Indian males had the highest mean BMI (33.7), which invites further investigation of incidence of obesity in this population (for which there is no current data). Among female participants, African Americans had the highest mean BMI (30.6) followed by Caucasians (27.4), then American Indians (25.9), and lastly, Asians (22.3). Previous studies have also showed that African American females are at increased risk of obesity compared to Caucasian females [30, 40]. It is important to note that Asian emerging adults (both males and females) in the current study are not at risk of overweight or obesity (mean BMI = 24.0, which is considered a normal weight). Consistent with Reeves et al. [21], females reported higher religious practice, prayer, importance of religion, and religious attendance.

Dimensions of Religiosity, Fast Food Intake, and Physical Activity

The first hypothesis stated that high levels of religiosity (church attendance, importance of religion, prayer, and religious practice) would be linked to better health behaviors (less fast food intake and more physical activity). The structural paths demonstrated that emerging adults who practice their religion are less likely to consume fast food, which supports the proposed hypothesis. However, those who consider religion very important in their lives and participate in prayer regularly were more likely to consume fast food. This indicates that emerging adults who consider religion important in their life and participate in prayer may be substituting food for their faith. This finding is congruent with a recent study [26]in which African Americans who practice their religion ate less fast food, but those who participate in prayer and place more value on religion were likely to eat fast food. Sbrocco, et al. [41]], reported similar findings among religious groups. No significant association was found between church attendance and fast food intake.

Regarding religiosity and physical activity, the current study showed that emerging adults who place more emphasis on their religion were more likely to participate in physical activity. However, those who reported praying more often were less likely to make physical activity their priority, which is inconsistent with recent findings reported by Dodor [26].

The prediction that fast food intake and physical activity would influence BMI levels was not supported by the study. No significant differences were observed among these variables.

Dimensions of Religiosity and BMI

In the present study, it was predicted that high levels of religiosity would lower incidence of BMI (overweight and obesity) among emerging adults. While emerging adults with high religious practice showed lower rates of obesity; those who pray more often are at higher risk of becoming overweight or obese. However, church attendance and importance of religion were not significantly associated with obesity. Thus, religiosity—prayer, importance of religion, and church attendance—of emerging adults was not correlated with lower incidence of overweight and obesity.

Although the present study reported high emphasis on religion and prayer with increased risk of obesity, it also demonstrated high religious practice was negatively associated with obesity. Obesity is a complex disease and cannot be attributed to or

mediated by religiosity alone; nonetheless, it is recommended that religious organizations, particularly youth leaders, implement programs to encourage parishioners' physical activity and healthy diet.

This research expanded our knowledge of the relationship between religiosity and physical activity, fast food intake, obesity, and religiosity; but more specifically, it shed light on this phenomenon within the context of emerging adulthood – a relatively understudied group with respect to religiosity and obesity. It was clear that highly religious—prayer, importance of religion, and church attendance—emerging adults are at increased risk of obesity. Evidently, youth leaders and religious organizations need to advocate for faith-based practices, for example, (1 Corinthians 6:19) "the body is the temple of the Holy Spirit" to encourage better heath practices. Such practical guidance, direction, and inspiration would be beneficial in implementing culturally appropriate interventions for emerging adults to reduce the prevalence of obesity in today's society. Future research should explore how dimensions of religiosity are related to obesity during emerging adulthood by gender, ethnicity, and church affiliation.

A number of limitations restrict the generalizability of these findings outside the present study. Although the study participants are from diverse socioeconomic and ethical backgrounds, many emerging adults of other contextual circumstance including the non-religious are not represented in this sample, thus, generalization of results cannot be made to these groups. Also, the study is limited by the religious group studied, which is Christianity, and therefore cannot be generalized to all emerging adults. Another limitation is that possible self-rating bias on dimensions of religiosity could have skewed the significant relationship between the religious dimensions and BMI. Also, since the data are cross-sectional, conclusions about the direction of causality should be drawn with caution.

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REFERENCES

1. Ogden C, Carrol M. Prevalence of overweight, obesity, and extreme obesity among adults: United States, Trends, 1976-1980 Through 2007-2008. CDC/National Centers for Health Statistics – United States, 2010. http://www.cdc.gov/NCHS/data/hestat/obesity_adult_07_08/obesity_adult_07_08.pdf. [Access date: December 2, 2011].
2. Sherry B, Blanck HM, Galuska DA, Pan L, Dietz WH, Balluz L. Vital signs: State-specific obesity prevalence among adults—United States, 2009. Morb Mortal Wkly Rep. 2010; 59: 1-5.
3. Centers for Disease Control and Prevention. Overweight and Obesity-Health Consequences – United States, 2011. http://www.cdc.gov/obesity/causes/health.html. [Access date: April, 15, 2011].
4. Finkelstein E, Trodgen J, Cohen J, DietzW. Annual medical spending attributable to obesity: payer-and service-specific estimates. Health Affairs.2009; 28: 822-831.
5. Baur L. Child and adolescent obesity in the 21st century: An Australian perspective. Asia Pac J Clin Nutr. 2002; 11: S524-S528.
6. Carmona RH. 2003. The obesity crisis in America. http://www.surgeongeneral.gov/news/testimony/obesity07162003.htm. [Access date: February, 16, 2011].
7. Ayers JW, Hofstetter, CR, Irvin, VL, Song, Y, Park, H, Paik, H, Hovell, MF. Can religion help prevent obesity? Religious messages and the prevalence of being overweight or obese among Korean women in California. J Sci Study Relig. 2010; 49(3): 536-549.
8. Hart A, Tinker LF, Bowen D J, Satia-Abouta, J, McLerran D. Is religious orientation associated with fat and fruit/vegetable intake? JAM Diet Assoc. 2004; 104: 1292-1296.
9. Chida Y, Steptoe A, Powell LH. Religiosity/spirituality and mortality. Psychother Psychosom. 2009; 78: 81-90.
10. Koenig H G. The healing power of faith. New York: Simon & Schuster, 1999.
11. Levin JS. God, faith, and healing: Exploring the spirituality—healing connection. New York, NY: John Wiley & Sons; 2001.
12. Kilbourne B, Cummings S M, Levine R S. The influence of religiosity on depression among low-income people with diabetes. Health Soc Work. 2009; 34(2): 138-147.
13. Helm HM, Hays JC, Flint EP, Koenig HG, Blazer D G. (2000). Does private religious activity prolong survival? A six-year follow-up study of 3,851 older adults. J Gerontol ABiol Sci Med Sci.2000; 55a(7): 400-405.

14. Stoppa TM, Lefkowitz ES. Longitudinal changes in religiosity among emerging adult college students. J Res Adolesc. 2010; 20(1): 23-38.

15. Arnett J J, Jensen, LA. A congregation of one: Individualized religious beliefs among emerging adults. J Adoles Res. 2002; 17*:* 451-467.

16. Berk, LE. Infants, children, and adolescents (7th Ed.). Boston, MA: Pearson; 2012.

17. Fowler, J. W. Stages of faith: The psychology of human development and quest for meaning. San Francisco, CA: Harper Collins; 1981.

18. Higher Education Research Institute. The spiritual life of college students: A national study of students' search for meaning and purpose. Los Angeles, CA: UCLA; 2005.

19. Martin T, Kirkcaldy B, Siefen G. Antecedents of adult wellbeing: Adolescent religiosity and health. Journal of Managerial Psychology. 2003; 18(5): 453-470.

20. Rostosky SS, Danner F, Riggle ED. Is religiosity a protective factor against substance use in young adulthood? Only if you're straight! J Adolesc Heath. 2007; 40: 440-447.

21. Reeves R R, Adams CE, Dubbert PM, Hickson DA, Wyatt SB. Are religiosity and spirituality associated with obesity among African Americans in the Southeastern United States (the Jackson Heart Study)? J Relig Health, 2012; 52: 31-48.

22. Francis LJ, Robbin M, Lewis CA, Quigley CF, Wheeler C. Religiosity and general health among undergraduate students. Pers Individ Dif. 2004; 37*:* 485-494.

23. Boyatziz C J, McConnell KM. Quest orientation in young women: Age trends during emerging adulthood and relations to body image and disordered eating. Int J Psychol Relig.2006; 16: 197-207.

24. Kim KH, Sobal J. Religion, social support, fat intake, and physical activity. Public Health Nutr. 2004; 7(6): 773-781.

25. Merrill MR, Thygerson AL. Religious preference, church activity, and physical exercise. Prev Med. 2001; 33: 38-45.

26. Dodor B. 2012. The impact of religiosity on health behaviors and obesity among African Americans. J Hum Behav Soc Environ. 2012; 22(4): 451-462.

27. Wallace JM, Forman TA. (1998). Religion's role in promoting health and reducing risk among American youth. Health Education Behavior. 1998; 25: 721-741.

28. Prentice M, Jebb SA. Fast foods, energy density, and obesity. A possible mechanistic link. Obes Rev. 2003; 4(4): 187-194.

29. Kim K, Sobal J, Wethington E. Religion and body weight. Int J Obes. 2003; 27: 469-477.

30. Bruce MA, Sims M, Miller S, Elliot V, Ladipo M. One size fits all? Race, gender and body mass index among U. S adults. J Natl Med Assoc. 2007; 99(10): 1152-1158.

31. Cline K M, Ferraro K F. Does religion increase the prevalence and incidence of obesity in adulthood? J Sci Study Relig. 2006; 45(2): 269-281.

32. Gatineau M, Mathrani S. Ethnicity and obesity in the UK. Perspect in Public Health. 2011; 131(4): 59-160.

33. Bearman PS, Jones J, Udry RJ. The National Longitudinal Survey of Adolescent Health: Research design. Chapel Hill, NC: University of North Carolina at Chapel Hill; 1997.

34. Centers for Disease Control and Prevention. How is BMI calculated and interpreted? – United States, 2011. http://www/cdc.gov/healthyweight/assessingbmi/adult_bmi/index.html. [Access date February 28, 2011].

35. Gordon-Larsen P, Adair LS, Popkin BM. Ethnic differences in physical activity and inactivity patterns and overweight status. Obesity Research. 2002; 10(3); 141-149.

36. Byrne BM. Structural equation modeling with Amos: Basic concepts, applications, and programming. Mahwah, NJ: Lawrence Erlbaum; 2001.

37. Hu LT, Bentler PM. (1999). Cutoff criteria for fit indices in covariance structure analysis. Structural Equation Modeling. 1999; 6(1):1-55.

38. Sira N, Pawlak R. Prevalence of overweight and obesity, and dieting attitudes among Caucasian and African American college students in Eastern North Carolina: A cross-sectional survey. Nutr Res Pract. 2010; 4(1): 36-42.

39. Pan L, Galuska DA, Sherry, Hunter AS, Rutledge GE, Dietz, WH,…Balluz LS. Difference in prevalence of obesity among black, white, and Hispanic adults—United States, 2006-2008.Morb Mortal Wkly Rep. 2009; 58(27): 740-744.

40. Sherwood NE, Story E, Obarzanek E. Correlates of obesity in African American girls: An overview. Obesity Research Journal. 2004; 1: 3S-6S.

41. Sbrocco T, Carter MM, Lewis EL, Vaugh NK, Kalupa KL, King S, Suchday S, Osborn RL, Cintron JA. Church-based obesity treatment for African-American women improves adherence. Ethn Dis. 2005; 14: 246-255.