

SOCIAL NETWORKS AND THE HEALTH OF YOUNG ADULTS
REDES SOCIAIS E A SAÚDE DE JOVENS ADULTOS
LAS REDES SOCIALES Y LA SALUD DE LOS ADULTOS JÓVENES

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ABSTRACT

Objective: The purpose of this study was to examine the relationship between social environmental variables, selected health behaviors, and health status in young adults. **Methods:** A cross-sectional web-based survey was used to elicit information from randomly selected participants about their levels of physical activity, health status, social networks, and social support. **Results:** In a total of 938 participants, network variables were not directly associated with good health. Satisfaction with support received from friends and family were the only two social support variables directly associated with good health. **Conclusions:** Participants' satisfaction with support received from either family or friends was particularly important to good health, suggesting that the provision of social support alone may not be sufficient to improve the health of young adults.

Descriptors: Social Networking, Young Adult, Health Status

RESUMO

Objetivo: Este estudo tinha por objetivo examinar a relação entre as variáveis socioambientais, comportamentos de saúde específicos e o estado de saúde em jovens adultos. **Métodos:** Um estudo transversal feito pela na internet com participantes selecionados aleatoriamente foi utilizado para coletar informações sobre os seus níveis de atividade física, seu estado de saúde, suas redes sociais e o apoio social que recebem. **Resultados:** Em um total de 938 participantes, as variáveis de redes sociais não foram diretamente associadas a uma boa saúde. Satisfação com o apoio recebido de amigos e familiares foram as duas únicas variáveis de apoio social diretamente associadas à boa saúde. **Conclusões:** A satisfação dos participantes com o apoio recebido da família ou de amigos foi particularmente importante para a boa saúde, sugerindo que o apoio social por si só pode não ser suficiente para melhorar a saúde dos jovens adultos.

Descritores: Redes Sociais, Adulto Jovem, Nível de Saúde

RESUMEN

Objetivo: El estudio objetivó examinar la relación entre las variables sociales, ambientales, comportamientos de salud y estados de salud en adultos jóvenes. **Métodos:** Se utilizó un estudio transversal basado en Internet para recabar informaciones de participantes aleatoriamente seleccionados acerca de sus niveles de actividad física, estado de salud, redes sociales y soporte social. **Resultados:** Sobre un total de 938 participantes, las variables de red

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no fueron directamente asociadas a una buena salud. La satisfacción respecto del apoyo recibido por parte de amigos y familiares fueron las únicas variables de soporte social directamente asociadas a la buena salud. Conclusiones: La satisfacción de los participantes con el apoyo recibido de la familia y amigos fue particularmente importante para la buena salud, sugiriendo que el soporte social por sí solo puede no resultar suficiente para mejorar la salud de los jóvenes adultos.

Descriptor: Red Social; Adulto Joven; Estado de Salud.

INTRODUCTION

Unhealthy lifestyle behaviors such as lack of physical activity, poor diet, and tobacco use are risk factors for many chronic conditions and diseases ⁽¹⁾. Every year about 21% of all United States deaths can be attributed to physical inactivity and poor eating habits ⁽²⁾. Poor diet and physical inactivity commonly result in excessive weight gain. This excessive weight gain leads to overweight and obesity, which are known risk factors for many chronic conditions including diabetes, coronary artery disease, stroke, and hypertension ⁽¹⁾. Chronic disorders are estimated to account for over 75 percent of the United States health care costs, which in 2010 surpassed US\$1.95 trillion, and are one of the leading causes of death globally (57 million deaths) with nearly 80% of all chronic disease related deaths occurring in low- and middle-income countries such as Brazil ⁽³⁾. Meanwhile, several studies have suggested that health promotion preventive efforts may help individuals change their lifestyles, improve their health status, reduce the burden of chronic disorders, and curb health care costs ⁽¹⁾.

In particular, the period between ages 18 and 28, which is characterized by exploration, change, and the adoption of life-long lifestyle choices ⁽⁴⁾, represents an opportune time to promote health enhancing behaviors. Young adults represent a growing and important target for health promotion efforts. Early prevention by promoting health through lifestyle changes is a more cost-effective approach to preventing diseases ⁽¹⁾, which posit young adults at their formative stages ⁽⁴⁾ as an ideal population to learn more about health behaviors and subsequently as targets of future interventions aimed to prevent avoidable diseases. Thus, developing healthy behaviors at this point in their lives may have long-lasting impact not only on their health, but also on the health of society at large.

The importance of social relationships to the social environment and its influence on health has been documented in the literature since the late 1970s and extended and replicated in the years since then ⁽⁵⁻⁷⁾. While the body of evidence describing the importance of the social environment to health continues to grow, little is

understood about how social relationships influence health outcomes ⁽⁶⁻⁷⁾.

Viewing social relationships within its larger cultural and social macro system, Berkman and Glass ⁽⁵⁾ proposed a conceptual model for how social networks impact health. They propose four primary pathways through which social networks are hypothesized to influence social and interpersonal behavior: (1) provision of social support, (2) social influence, (3) social engagement and attachment, and (4) access to resources and material goods ⁽⁵⁾. These processes are hypothesized to influence more proximal health behaviors such as physical activity, which then leads to better health outcomes ⁽⁵⁾.

While most studies have focused on the provision of social support alone, a social network approach to investigating the influence of social relationships on perceived health status may provide important information for developing effective intervention programs ⁽⁷⁾. The positive impact of social support on increasing physical activity levels has been studied to a much greater extent than the impact of social network characteristics viewed more broadly ⁽⁷⁾. Because social interactions do not always involve exchange of social support, it may be advantageous to study social networks of individuals rather than only examining one

of the functional features of networks such as social support.

Furthermore, exploring social network characteristics and the multiple dimensions of perceived social support provided through these characteristics may allow a more detailed portrayal of the nature of social interactions and increase understanding of social support. When investigating the association between physical activity levels and perceived health status, it is critical to also consider sources, rewards, and barriers of social support in relation to various network characteristics. It is unlikely that different dimensions of support provided and exchanged through a multitude of sources and network characteristics have the same influence on health. As such, the purpose of this study was to examine the relationship between social network characteristics, social support, physical activity, and health status in a random sample of young adults.

METHODS

Design: A cross-sectional study design was used to elicit information about subjects' levels of physical activity, perceived health status, social networks, and the types and sources of social support exchanged within these social networks. A list of e-mail addresses from young adults (ages 18 to 30) residing in the City of Denver, Colorado, USA, was obtained from

a marketing agency. Out of 10,320 addresses, 50% (5,160) were randomly chosen to participate in the current study.

Recruitment: Three e-mails were used to recruit study participants. The initial invitation e-mail included a short description of the proposed study and a link to the web-based survey. Those participants interested in learning more about the study were asked to click on the link provided within the e-mail and were re-directed to the survey welcome page where the informed consent was displayed. Three days following the initial invitational e-mail, a second e-mail was sent to the entire recruitment list. The second e-mail included the same information as the first with the addition of the following sentences at the beginning of the e-mail: “If you have completed this survey, please DISREGARD this message and THANK YOU for your participation! If you have not completed the survey, I would like to extend the invitation once more. Thanks!” Finally, six days following the second e-mail a final invitation e-mail was sent to the entire recruitment list. This final e-mail contained the same information as in the first e-mail with the addition of the following sentences: “To all of you who have graciously completed the survey THANK YOU! And please DISREGARD this final e-mail. To those who have not had a chance to complete the survey, I would

like to extend the invitation one last time. Your participation is extremely appreciated. Thanks!”

For those interested in participating in the study, informed consent was obtained through the first page of the web-based survey. Participants were informed of the potential risks involved with completing the one-time survey and informed that the completion of the survey indicated their consent to participate in the study. All study procedures were approved by the University of Denver’s Institutional Review Board for the Protection of Human Subjects in Research.

Data Collection: Web-based self-administered questionnaire was chosen as the mode of data collection rather than face-to-face interviews, mailed surveys, or telephone interviews in order to maximize the reach of potential participants and to minimize costs and the level of missing/miscoded data usually associated with these other methods. New information technologies such as the Internet and e-mail have several potential advantages over the other modes of data collection. These advantages include the ability to reach large numbers of individuals at relatively low cost ⁽⁸⁾, convenience, novelty and appeal, flexibility of use, and automated data collection. These characteristics contribute to reducing data entry errors by research personnel ⁽⁸⁾.

The use of Internet and e-mail is continually increasing in the United States, making this mode an ideal method for reaching large audiences at low cost. Recent data indicate that 81% percent of adults in the United States use internet, and 65% of American adults have a high-speed broadband connection at home ⁽⁹⁾. Most impressively, 94% of people who have some college education use the Internet and over 98% of 18-29 year-olds now go online ⁽⁹⁾. In addition, studies indicate that over 84% of Internet users go online daily and 59% use e-mail each day ⁽⁹⁾. For these reasons, the Internet and e-mail have considerable potential as research recruitment tools and data collection strategies to attempt to reach large numbers of subjects at low cost.

Measures: Perceived Health Status - A modified single-item measure derived from the Centers for Disease Control and Prevention's Healthy Days Measures ⁽¹⁰⁾ was used to assess perceived health status, the primary outcome measure for this study. Participants were asked: "How would you rate your overall health at the present time?" A 4-point response scale was used with choices ranging from 1 (poor), 2 (fair), 3 (good), to 4 (excellent). Consistent with previous research ⁽¹⁰⁾, responses to this measure were dichotomized into two categories (a) good health status (excellent

and good) and (b) poor health status (poor and fair).

Physical Activity Behavior -A modified short version of the International Physical Activity Questionnaire (IPAQ) ⁽¹¹⁾ was used to assess the level of physical activity (PA). The short-version of IPAQ assesses physical activity behavior over the past 7 days. It asks questions regarding vigorous and moderate physical activity behaviors as well as walking. It also provides a brief description of what constitutes the different forms of physical activity. The International Consensus Group on Physical Activity Measurement has conducted extensive reliability and validity testing of the IPAQ across 12 countries ⁽¹¹⁾. For the purposes of the current investigation, physical activity behavior was operationalized as the total weekly minutes that participants reported engaging in vigorous, moderate, and walking activities. Physical activity levels were analyzed as a dichotomous variable with those who met public health recommendations for aerobic exercise (30 minutes of walking or moderate activity 5 times per week or at least 20 minutes of vigorous activity 3 times per week) ⁽¹²⁾ in one group and those who did not meet recommendations in the second group.

Perceived Social Support - Two subscales adapted from the Social Support and Exercise Survey ⁽¹³⁾ were used to assess

perceived social support. This measure uses a series of questions that were designed to assess important social support functions (e.g. reward, punishment, participation) across multiple roles (family & friends) over the last three months. These subscales are comprised of two sets of 13 questions (one for family and one for friends). Responses use a 5-point scale with answers including 1 (none), 2 (rarely), 3 (sometimes), 4 (often), 5 (does not apply). Scores were summed up to produce two subscale scores (family participation and friend participation).

The family participation subscale includes ten items (e.g. family participated in physical activity with me, family offered to exercise with me, family helped plan activities around my exercise) meant to measure the support received from family for engagement in physical activity. The friends participation subscale includes ten items (e.g. friends offered to do physical activity with me, friends changed their schedule so we could do physical activity together, friends talked about how much they like to do physical activity) meant to measure the support received from friends for engaging in physical activity. Additionally, two individual items were taken from a previously validated instrument⁽¹⁴⁾ and adapted and reworded to measure satisfaction with received social support from family and friends. Regarding

satisfaction, participants were asked “At this point in your life, how satisfied are you with the support you have received from your family (friends) to be physically active?” A 5-point response scale was used with answers including 1 (Completely Satisfied), 2 (Satisfied), 3 (Somewhat Satisfied), 4 (Not very satisfied), 5 (Not at all satisfied). These items were reversed scored so that a higher score reflects greater satisfaction with social support received from either family or friends.

Personal Social Network - A modified version of the Social Network Index (SNI) measure⁽¹⁴⁾ was adapted for use in the current study to assess social networks. This measure uses a series of questions that were designed to assess important structural characteristics of networks and network functions (e.g. size, proximity, frequency of visual and non-visual contacts, and closeness) across multiple roles (spouse, siblings, other relatives, friends, and confidante). Each question is asked separately for each role category. Scores on four characteristics (proximity, frequency of contacts, closeness, and satisfaction) across five social roles (spouse, siblings, other relatives, friends, and confidant) were calculated. These scores were summed to produce three subscales: the friend summary subscale, the siblings summary subscale, and the relatives summary

subscale. Additionally, these subscales were summed up with scores on the frequency of contacts with a confidante item to produce the total Social Network Index score. Finally, three satisfaction items were used to measure participants' satisfaction with their relationships with a spouse or significant other, siblings, and friends.

Sample Size Calculation: Logistic regression was the primary analytic strategy used in this study. Thus, sample size calculations were based on this technique. The importance of having an appropriate sample size when conducting logistic regression analysis has been discussed by several authors^(15,16). However, Tabachnick and Fidell⁽¹⁵⁾ provide no direct guidance regarding the calculation of sample sizes for logistic regression only noting that “*some statistical software available for determining sample size and power specifically for a logistic regression analysis includes...*” (p. 442). On the other hand, Wright⁽¹⁶⁾ stated that a minimum of fifty cases per predictor variable should be used when employing logistical regression analysis. Therefore, to provide more accurate parameter estimates and avoid extremely large standard errors, a minimum of 750 respondents ($15 * 50 = 750$) were needed. This requirement was satisfied by obtaining a final sample size of 938 total participants.

Data Analysis: Descriptive statistics (table of frequencies, percentages, mean, standard deviation, and range) were used to examine the data for possible data entry errors, outliers, missing values, and coding mistakes. All categorical variables were summarized using frequencies and percentages, while interval variables such as age and physical activity levels were summarized using means, range, and standard deviations. All assumptions for sequential logistic regression analysis were checked and met. Significance levels were set at .05 for all analyses.

Sequential logistic regression analysis was used to answer the research question, “What is the relationship between social networks, perceived social support, physical activity, and perceived health status?” Sequential logistic regression allows testing models to predict categorical outcomes with two or more categories⁽¹⁵⁾. By entering factors sequentially, the relationship between each factor and the outcome as well as the improvement of the model fit can be examined⁽¹⁵⁾. It also allows predictor variables to be either categorical or continuous, or a mix of both⁽¹⁵⁾. Therefore, given the mix of categorical and continuous variables being measured for this study and the categorical nature of the dependent variable (perceived health status), this technique is ideal for answering the research question.

Multivariate-adjusted odds ratios (ORs), 95% confidence intervals (CIs), log-likelihood statistics, model fit statistics, and individual predictor statistics were calculated. For the sequential logistic model, demographic characteristics (race, education, and smoking status) were entered into block 1 to allow for the control of these variables as possible confounders. Independent variables were grouped in different sets based on the conceptual framework proposed by Berkman and Glass⁽⁵⁾, which hypothesized that social networks influence health through the provision of social support (one of four pathways), which impact more proximal health behaviors such as physical activity, which then lead to better health. The groups of independent variables (social networks, perceived social support, and physical activity) were entered as separate blocks in the final model following the order hypothesized by the framework. As such, social network predictors were entered into block 2, perceived social support in block 3, and physical activity level in block 4.

Finally, the model fit was assessed by comparing the various combinations of predictor variables to an intercept only model⁽¹⁵⁾. The differences between each model (chi-square statistics) and the intercept only model were calculated and compared. If the model chi-square statistics difference was significant, it indicated that

the addition of predictor variables contributed to improving the model fit⁽¹⁵⁾. Ideally, the chi-square statistic is significant and as predictors are added, the log-likelihood decreases and pseudo-R² increases, thus improving the model fit by the addition of new predictors⁽¹⁵⁾.

RESULTS

A total of 938 participants completed the web-based survey (18.2% response rate). On average, participants were 23.31 years of age (SD=3.48) with majority being female (69%), white non-Hispanic (81.8%), in good health status (74%), and not meeting PA recommendations (57.2%).

The Cox and Snell R² and the Nagelkerke R² indicated that the first model with demographic variables only helped to explain 3% to 4.4% of the overall variance in health status. The addition of five social network characteristics in the second block helped to explain 5.5% to 8.1% of the overall variance in health status. Omnibus chi-square test results, $\chi^2(5) = 21.049, p < .01$ indicated that the variables entered in this block made a significant contribution to the model. Further, the addition of four perceived social support variables helped to explain 10.7% to 15.7% of the variance in health status. Omnibus chi-square test results, $\chi^2(5) = 45.113, p < .001$ indicated that the variables entered in this block also

made a significant contribution to the model. Finally, the addition of physical activity level to the final model helped to explain 11.4% to 16.8% of the overall variance in health status. Overall, all four models performed relatively well. Comparison of log-likelihood ratios for models 1 and 2, $\chi^2_{\text{diff}}(5) = 21.049, p < .01$,

2 and 3, $\chi^2_{\text{diff}}(5) = 45.113, p < .001$, and 3 and 4, $\chi^2_{\text{diff}}(1) = 6.713, p < .01$, showed statistically significant improvement in explanatory power by adding additional variables with 11.4% to 16.8% of the variance in health status being explained by the final model (see Table 2).

Table 1. Descriptive characteristics of study participants

Variables	Respondents (n=938)
Age (Mean)	23.31
Sex (% female)	69.7
Race /Ethnicity (%)	
White Non-Hispanic	81.5
Black Non-Hispanic	1.8
Asian Non-Hispanic	6.5
Hispanic or Latino	6.7
Other	3.5
Level of Education (% college graduate)	55.8
Marital status (% married)	34.1
Health Status (%)	
Good Health	74.3
Poor Health	25.7
Smoking Status (% non-smokers)	88.7
Physical Activity (% meeting guidelines)	42.8

Note: ** $p < .01$, *** $p < .001$

Table 2. Goodness of Fit model comparisons

Model	χ^2_{diff}	Variance
Model 1 Demographic variables	N/A	3% to 4.4%
Model 2 Demographic variables Social Network variables	21.049**	5.5% to 8.1%
Model 3 Demographic variables Social Network variables Perceived Social Support variables	45.113***	10.7% to 15.7%
Full Model (Model 4) Demographic variables Social Network variables Perceived Social Support variables Physical Activity levels	6.713**	11.4% to 16.8%

Note: ** $p < .01$, *** $p < .001$

Table 3 shows the contribution of all individual predictors to the full model (model 4). These results indicate that smoking status influenced health status by a factor of 1.902 or 90.2%, suggesting that non-smokers were more likely to report good health than smokers (OR 1.902, 95% CI 1.158 – 3.124). Furthermore, educational level was found to influence health status by a factor of 1.800 or 80%, suggesting that college graduates were more likely to report good health than non-graduates (OR 1.800, 95% CI 1.226 – 2.642). Additionally, the greater the satisfaction with support received from friends (OR 1.417, 95% CI

1.138 – 1.765) or family (OR 1.324, 95% CI 1.119 – 1.567) the more likely good health status was reported. Finally, physical activity levels influenced health status by a factor of 1.738 or 73.8%, indicating that participants who met the public health recommendations for aerobic physical activity were more likely to report good health than those who did not (OR 1.738, 95% CI 1.148 – 2.631). The role of social networks characteristics directly influencing health status was almost nonexistent with non-significant contributions and odds ratio of close to 1.

Table 3. Logistic regression model results: Contribution of demographic, social networks, perceived social support variables, and physical activity levels

Variables	B	S.E.	Wald	OR	95% CI	
					Lower	Upper
Educational Level	.588	.196	9.008**	1.800	1.226	2.642
Race and Ethnicity	.273	.220	1.539	1.314	.853	2.024
Smoking Status	.643	.253	6.445*	1.902	1.158	3.124
Siblings Summary Scale	-.058	.059	.982	.944	.841	1.059
Relatives Summary Scale	.022	.023	.870	1.022	.976	1.070
Friends Summary Scale	-.001	.010	.010	.999	.980	1.018
Satisfaction with Siblings	.074	.067	1.232	1.077	.945	1.227
Satisfaction with Friends	.011	.095	.012	1.011	.839	1.217
Family Participation	-.012	.013	.916	.988	.963	1.013
Friend Participation	.017	.013	1.764	1.017	.992	1.043
Satisfaction with Family Support	.281	.086	10.692**	1.324	1.119	1.567
Satisfaction with Friend Support	.349	.112	9.716**	1.417	1.138	1.765
Physical Activity Levels	.553	.212	6.831**	1.738	1.148	2.631

Note: * $p < .05$, ** $p < .01$

DISCUSSION

Perceived health status has been reported as a reliable predictor of disability, healthcare utilization, morbidity, and mortality. As such, early intervention and the promotion of good health may lead to a decrease in disability and healthcare utilization as well as to prolonged life. The overall prevalence of good health in the current study was quite high. While patterns of good health tended to follow similar patterns found in the literature (college graduates tended to report better health than their counterparts), the overall prevalence of poor health was much higher than

previous research has found (26% vs. 6.7% and 11.6%) indicating that study subjects were in worse health than national estimates available for young adults⁽¹⁷⁾.

The sequential logistic regression results appear to support the conceptual model proposed by Berkman & Glass⁽⁵⁾ suggesting that after controlling for demographic variables, social networks were not directly associated with health, but contributed to the overall predictive value of the model. Additionally, perceived social support and physical activity were directly associated with participants' perceived health status. While various studies have

investigated the influence of social support on physical activity and health ⁽⁷⁾, few studies have examined the association between social networks and health in a sample of young adults ⁽¹⁸⁾.

Furthermore, after controlling for demographic variables, few variables remained significant in sequential logistic models. Good health status was more likely in those with high levels of satisfaction with the support received from either family or friends to be physically active, and in those meeting national public health recommendations for aerobic physical activity. Additionally, those who did not smoke and were college graduates remained more likely to report good health.

In this study, the actual support received from friends and family to be physically active was not associated with good health status, but the satisfaction with this support was most important. This finding suggests that in a sample of young adults, contrary to most research, which suggests the importance of the provision of support as a key predictor to physical activity, and overall health ⁽⁷⁾, how satisfied one is with the amount, type, and quality of support received is more important than the support itself. Just providing support in larger “quantities” may not be sufficient, indicating the need to consider more intrinsic characteristics of support. This finding supports emerging literature

suggesting that more intrinsic characteristics of social support may be more important than just the provision of support ⁽¹⁹⁾. Moreover, it suggests that because social support is intended to be helpful does not mean that support recipients perceive it that way.

Furthermore, social networks become especially relevant to the nursing profession because of their influence on the health-disease process. An active and stable network has several beneficial effects for its members including (a) serving as a protective factor against the development of illnesses and (b) having a positive impact on the effectiveness of health care services, thus turning social networks into potential health generating resources. The family system is one of the first social networks formed by the individual. Thus, the study of social networks becomes essential in the context of Brazil’s major Primary Health Care policy: the Family Health Strategy ⁽²⁰⁾. Therefore, the knowledge generated by studies such as this can lead to reflection and contribute to nurse professionals by informing the planning and conduction of activities coordinating holistic and humanized health promotion and disease prevention efforts among individuals, families, and their communities.

Limitations: In spite of the strengths of the study, it has several limitations. As such, the results of this study must be

interpreted in the context of its limitations. First, the cross-sectional nature of the data does not allow for causal inferences to be made. While associations between social support variables, physical activity behavior, smoking, educational level, and health status were found, it is not possible to determine the order of these associations. Second, although young adults were randomly selected, data were collected from a single marketing company rather than from a random sample of all young adults; therefore, the results cannot be generalized to young adults nationally and may be pertinent only to the population captured by the e-mail list. Future studies should attempt to recruit a nationally representative sample in order to learn more about young adults and health. Finally, another limitation is the fact that this study used self-report methods of data collection and is subject to several sources of error. Participants who intentionally or unintentionally distorted their responses may represent a source of bias. Additionally, it is possible that the self-report format may have led to overestimation of socially desirable responses (e.g. physical activity behavior and good health) and underestimation of less desirable ones (e.g. smoking behavior and poor health) as well as biased reports of correlates assessed. Nevertheless, the present study employed validated self-

report measures whenever possible in order to address some of these limitations.

CONCLUSIONS

This study sought to investigate the relationship between social networks, perceived social support, physical activity, and perceived health status in a sample of young adults. Although the body of literature continues to grow, little is known regarding social network characteristics and health among young adults. Study results suggest that social networks were indirectly associated with health through its contribution to the overall predictive ability of the model. However, the specific network characteristics that are supportive of good health remain unknown. On the other hand, social support was found to be very important for physical activity and good health. Of greater interest was the fact that participants' satisfaction with the support received from either family or friends to be physically active was most important, suggesting that the provision of social support alone may not be sufficient to improve the health of young adults. Future interventions, especially those planned and delivered by nursing professionals should include social support needs assessment prior to the implementation of social support strategies. Finally, physical activity and smoking were found to be instrumental in determining the

likelihood of participants reporting good health, suggesting that health promotion programs may consider focusing on multiple health behaviors in order to have a greater impact on the health of young adults.

REFERENCES

1. World Health Organization (WHO). Global status report on noncommunicable diseases. Geneva, Switzerland: WHO, 2011.
2. Danaei G, Ding EL, Mozaffarian D, Taylor B, Rehm J, et al. The Preventable Causes of Death in the United States: Comparative Risk Assessment of Dietary, Lifestyle, and Metabolic Risk Factors. *PLoS Med.* 2009; 6(4).
3. Centers for Disease Control and Prevention. Rising Health Care Costs Are Unsustainable. April 2011.
4. Arnett JJ. Emerging adulthood : A theory of development from the late teens through the twenties. *Am Psychol.* 2000; 55(5):469-480.
5. Berkman LF and Glass T. Social integration, social networks, social support and health. In LF. Berkman, and I. Kawachi (Eds.), *Social Epidemiology*. New York: Oxford University Press. 2000; pp. 137-173.
6. Christakis NA, Fowler JH. The spread of obesity in a large social network over 32 years. *N Engl J Med.* 2007; 357(4): 379-379.
7. Umberson D, Crosnoe R, Reczek C. Social relationships and health behavior across life course. *Annu Rev Sociol.* 2010; 36:139.
8. Fan W, & Yan Z. Factors affecting response rates of the web survey: A systematic review. *Comput Human Behav.* 2010; 26(2):132-139.
9. Pew Internet & American Life Project. Pew Internet & American life project tracking surveys (December 2012). Retrieved on May 10, 2012 from <http://www.pewinternet.org>
10. Scientific Advisory Committee of the Medical Outcomes. Trust Assessing health status and quality-of-life instruments: Attributes and review criteria. *Qual Life Res.* 2002; 11:193–205.
11. Craig CL., Marshall AL, Sjostrom M, et. all. International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc.* 2003; 35:1381-1395.
12. U.S.Department of Health and Human Services. Physical Activity Guidelines Advisory Committee. Physical Activity Guidelines Advisory Committee Report, 2008. Washington, DC: U.S.Department of Health and Human Services, 2008.
13. Sallis JF, Grossman RM, Pinski RB, Patterson TL, Nader PR. The development of scales to measure social support for diet and exercise behaviors. *Prev Med.* 1987;16:825-836.
14. Glass T, Mendes de Leon C, Seeman TE, Berkman LF. Beyond single indicators of social networks: a Lisrel analysis of social ties among the elderly. *Soc Sci Med.* 1997; 44(10):1503-1517.
15. Tabachnick, BG, Fidell, LS. Using multivariate statistics (5th ed.). New York: Pearson Education, Inc; 2007.
16. Wright RE. Logistic regression. In Grimm LG, Yarnold PR, (Eds.), *Reading and understanding multivariate statistics* Washington, DC: American Psychological Association. 1995; pp. 217-244.
17. Zahran HS, Zack MM, Vernon-Smiley ME, Hertz MF. Health-related quality of life and behaviors risky to health among adults aged 18-24 years in secondary or higher education—United States, 2003-2005. *J Adolesc Health.* 2007; 41: 389-397.
18. Keating XD, Guan J, Pinero JC, Bridges DM. A meta-analysis of college students' physical activity behaviors. *J Am Coll Health.* 2005; 54(2):116-125.
19. Gorin A, Phelan S, Tate D, Sherwood N, Jeffery R, Wing R. Involving support partners in obesity treatment. *J Consul Clin Psychol.* 2005; 73(2): 341-343.

20. Brasil. Portaria nº 2488, de 21 de outubro de 2011. Aprova a Política Nacional de Atenção Básica, estabelecendo a revisão de diretrizes e normas para a organização da Atenção Básica, para a Estratégia Saúde da Família (ESF) e o Programa de Agentes Comunitários de Saúde (PACS). Diário Oficial [da

República Federativa do Brasil]. Brasília. 24 out 2011;204 (1): 55.

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