Hodge, F.S. and. Kotkin-Jaszi, S.T / Californian Journal of Health Promotion 2009, Volume 7, Special Issue (Obesity Prevention), 118 - 124

California Wellness Study: American Indians and Obesity

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Abstract

This paper identifies the prevalence and predictors of obesity among California's American Indian adults. A cross-sectional study was conducted at 13 rural sites. Indian healthcare clinics served as the sampling frame and were selected because of their proximity and access to the target population. Four-hundred and fifty adult American Indians participated; 74 percent were female and 26 percent were male. The average age was 40, ranging from 18-74. Measures included socio-demographics, general health, BMI, type 2 diabetes, exercise and dietary habits. Eighty-two percent were overweight, obese or morbidly obese. Chi-square tests revealed three variables significantly associated with BMI categories: having type 2 diabetes, female gender and poor general health status. A logistic regression model for obese/morbidly obese (BMI > 30) versus overweight/normal (BMI < 30) persons found gender and diabetes status as significant predictors, while general health status showed trend. Females had 1.59 greater odds of being obese than males (p=0.04). Those that do not have diabetes are less likely to be obese (p=0.02). Those that do not have good general health were 2.5 times more likely to be obese than those that have good general health (p=0.06). Overall goodness of fit was significant (p=0.0009). It is important to identify individuals and population who are normal/overweight, obese/morbidly obese so support and interventions can be planned and implemented.

Keywords: American Indian, overweight, obesity, morbid obesity, rural

Introduction

Obesity is a serious health problem coming to the attention of health educators and researchers due to its health risks and detrimental consequences. In some populations the prevalence of obesity is higher than other groups, placing individuals at risk of disability and early death. The 2005-2006 National Health and Nutrition Examination Survey (NHANES, 2006) (CDC, 2006) report that 32.7 percent of U.S. adults 20 years and older are overweight, 34.3 percent are obese and 5.9 percent are extremely obese (morbidly obese). American Indian populations are identified as a group with obesity rates higher than those for the U.S. population (Story et al., 1999, & Story et al., 2003). American Indian/Alaska Native adults were 1.6 times as likely as White adults to be obese (Office of Minority Health, 2009).

The primary concern of obesity is that of health and not physical appearance. The risk of premature death is high as obese individuals have a 50 - 100 percent increased risk of premature death due to numerous causes (DHHS, 2009). Obesity is a risk factor for several conditions including hypertension, type 2 diabetes, cardiovascular disease, and stroke (Must & McKeown, 2008).

Methods

A cross-sectional study using survey data was conducted among adult American Indians residing in 13 rural sites in California. The study was designed to identify the health problems and wellness issues confronting rural Indian populations. From 2002-2003, all American Indian clients who visited one of 13 Indian clinics within the past five years were identified

by family groups. Households were then randomized into groupings of 15 per site and a questionnaire was self-administered by all adult Indian residents of those households. Survey facilitators contacted each household by telephone, US mail, and by personal contact to secure their participation in the survey. Five hundred individuals were contacted and 450 participated in the survey, resulting in a 90 percent recruitment rate. Tribal council approvals were obtained either by letter or by resolution of support. Institutional Review Board approvals were obtained from the University of California at Berkeley, the University of California at San Francisco, the University of Minnesota at Minneapolis, and the national Indian Health Service. All participants were provided verbal and written information on the study and were required to read and sign an informed consent form in accordance with procedures outlined by the Human Subjects Committee. All participants were told that their participation was voluntary and that they did not have to answer any survey question that they did not want to. Also, it was carefully explained that services at the tribal clinic, or community centers were not contingent upon their participation in the study.

Health services utilization reports from the Indian Health Service Regional Differences in Indian Health (2001) indicate that the majority of rural American Indians utilize Indian clinic services for basic and referral health care. Approximately 110,000 American Indians live in areas served by rural Indian Health clinics in California (Indian Health Service, 2009). Clinic services include outpatient services such as immunizations, women, infant and children checkups, management of chronic health conditions, and other primary care services. These clinics sites were selected for this study because of their proximity and access to the target population.

Four hundred and fifty American Indian adults, aged 18 years and older, participated in the study. Twenty-six percent were male and 74 percent were female. The average age was 40 years with a range of 18 to 74 years. The participants self-identified as American Indian (87 percent were enrolled in a tribe). Twenty-three percent reported they were 75 - 100 percent Indian (blood quantum), 41.3 percent reported 75 - 50 percent Indian, 26.9 percent were 25 - 50 percent Indian, and 8.5 percent had less than 25 percent Indian blood. All recruited participants confirmed that they received their healthcare services from the local rural Indian ambulatory care clinic.

The survey consisted of seven parts: socio-demographics, general health status, major health problems, obesity, dietary/exercise habits, and preventive and high risk behaviors. This paper examines the relationships among socio-demographics, general health status, obesity status, type 2 diabetes status, dietary habits, and physical exercise.

The survey instrument was a 60 minute self-administered questionnaire and included the following measures:

Socio-demographic characteristics: Gender, tribal affiliation, degree of Indian blood, employment, income, marital status and educational attainment. Age was grouped into cohorts (18-24, 25-39, 40-54, and 55 +).

General health status: A single question, “How would you rate your health, nowadays? Would you say that it is excellent, very good, fair or poor?” was used to measure health status. This measure was dichotomized into two categories (good = excellent/very good and poor = fair/poor).

Obesity status: The measure of obesity was based on the Body Mass Index (BMI), which is calculated from the reported height and weight of the individual. Underweight is defined by a BMI score of less than 18.5; healthy weight is a BMI between 18.5 to 24.9; overweight is defined as a BMI between 25 to 29.9; obese is defined as a BMI score of 30 to 39.9 (Centers

for Disease Control and Prevention, 2009); morbidly obese is a BMI over 40 (California Bariatrics, 2009).

Type 2 diabetes status: A single question asked the respondent if they were diagnosed by a physician as having type 2 diabetes.

Dietary habits: Two questions measured dietary habits: the frequency of eating fried foods per week and the frequency of eating out at fast food restaurants per week.

Physical exercise: Two questions measured physical exercise: the frequency of exercising per week and the amount of time spent in physical activity per week.

The survey results were entered into Excel and analyzed using the Statistical Analysis Summary (SAS) computerized data analysis package. Participant identifiers were coded to ensure confidentiality. Frequencies on all variables were run for descriptive purposes. Chi-square tests of independence and logistic regressions were conducted to examine the relationship between BMI weight categories and age, gender, general health status, type 2 diabetes status, dietary habits and exercise habits.

Results

Study participants reported extremely high rates of overweight/obesity which are higher than that reported for the general population (NHANES, 2006). Eighty-two percent had a BMI score that placed them within the broad category range of "overweight, obese, or morbidly obese." Twenty-nine percent of respondents were of normal weight or under weight; 24.8 percent were overweight (vs. 32.7 percent for U.S. adults; NHANES, 2006). American Indians had a substantially higher rate of obesity compared to the general US population (35.7 percent American Indian vs. 34.3 percent U.S. adults, NHANES, 2006). In the morbidly obese category, the American Indian rate was nearly twice that of the U.S. adult rate (10.7 percent vs. 5.9 percent, NHANES, 2006).

Table 1

Rates and significance of select variables associated with normal & underweight, overweight, obese, and morbidly obese.

	Normal & Underweight (BMI < 25)	Overweight (BMI 25- 29.9)	Obese (BMI 30-39.9)	Morbidly Obese (BMI 40+)	Total
Type 2 Diabetes*	21.8%	16.7%	38.5%	23.1%	100.1%****
Poor General Health Status**	29.1%	19.3%	37.4%	14.3%	100.1%****
Gender (Males)***	23.3%	37.9%	31.0%	7.8%	100.0%
Gender (Females)***	31.9%	19.1%	37.3%	11.7%	100.0%
Age (Mean)	44.0	46.4	43.6	47.0	n/a
Dietary Habits#	7.7	7.6	7.4	7.8	n/a
Physical Exercise ##	80.3	93.5	79.3	41.9	n/a

* P = 0.0004 ** P = 0.0016 *** P = 0.0007 **** Due to rounding

frequency of eating fried foods per week + frequency of eating out per week.

frequency of exercising per week + amount of time spent in physical activity per week.

Of those individuals diagnosed with type 2 diabetes, 23.1 percent were morbidly obese, 38.5 percent were obese; 16.7 were overweight and 21.8 percent of individuals were normal or underweight. Chi square analysis identified three variables that are statistically significant with BMI categories (see Table 1). Having type 2 diabetes (p=0.0004); having a poor general health status (p=0.0016), and female gender (p=0.0007) was significantly associated with categories of BMI defined normal/underweight, overweight, obese, and morbidly obese. No association between age, dietary habits, physical exercise or educational attainment and the BMI categories was found.

For purposes of analysis, we merged the obese/morbidly obese (BMI > 30) measures and compared it with normal/overweight measures (BMI < 30) (see Table 2). In fitting a logistic regression model for obese and morbidly-obese persons versus overweight and normal weighing persons, we found that gender and diabetes status were significant predictors, while general health showed trend. In particular, females had 1.59 greater odds of being obese than their male counterparts (p=0.04). Similarly, those that did not have diabetes are less likely to be obese (p=0.02). Those that do not have good general health (self-reported) were 1.5 times more likely to be obese than those that had perceived good general health (p=0.06). Overall goodness of fit was significant (p=0.0009).

Table 2

Results of logistic regression comparing BMI < 30 and BMI $\geq$ 30 with gender, type 2 diabetes, general health status and dietary habits. (p=0.0009)

	OR (95% CI)
*Gender (female vs. male)	1.59 (1.01, 2.50)
**Type 2 diabetes (no vs. yes)	0.53 (0.31,0.91)
Poor general health status	1.47 (0.98, 2.21)
Dietary habits	0.91 (0.81, 1.02)

* p=0.04 **p=0.02

Note: CI=Confidence Interval; OR = Odds Ratio.

Age, education, dietary habits and physical exercise were not found to be predictors of obesity. Participants, however, reported extremely poor eating and physical exercise habits. Approximately 26 percent reported eating fried foods 3-6 times a week, and 33.6 percent said they eat out a fast food restaurants at least twice a week. Almost 60 percent of those responding to the question indicated that they exercised only 2 times or less during the week. Additionally, 42.9 percent reported that they only spent 30 minutes or less in physical activity per week.

Discussion

This paper reports on the prevalence and predictors of obesity among American Indian adults residing in rural counties in California. Study findings indicated that rural American Indians were significantly obese/morbidly obese and the rates of obesity and morbid obesity were higher than those reported for the U.S. population as a whole (35.7 percent vs. 34.3 percent and 10.7 percent vs. 5.9 percent respectively), indicating that American Indian adults are overrepresented in the extreme (morbidly obese) category.

The risks associated with BMI among American Indians include cardiovascular disease (Mendlein, 1997), type 2 diabetes (Lee, 2002), and hypertension (Welty, 1995). Our findings are comparable with other studies that report type 2 diabetes as a risk factor for obesity. More recent studies on obesity and type 2 diabetes among American Indians identified older age to be a significant risk factor for type 2 diabetes (Kong, 2007). Our study investigated age and education and did not find either variable to be a risk factor for obesity among California's rural American Indian population. We did, however, find female gender to be a significant risk factor for obesity (p=0.0007).

Studies on the risk of obesity in ethnic groups report that the risk may differ from that found in whites. Higher rates may be due to differences in

body fat distribution (Deurenberg, 1998) or other factors, such as high mineral density and body protein content in blacks as compared to whites (Wagner & Heyward, 2000). Recommendations to change BMI values to more accurately measure risk in particular ethnic minorities, however, is not a simple task due to the differences in body composition and the complexity related to ethnic identification (Stevens, 2002). For American Indians, the relationship among obesity, body fat distribution, and heart disease risk may differ from other groups, as there may be other factors influencing obesity. In a study of 4,549 American Indians, Gray et al. (2000) reported that obesity had only a modest influence on risk factors for coronary heart disease, and that waist circumference had no special effect over BMI on risk factors. Thus, American Indians can differ in many ways, including lifestyles and body composition, and may differ widely in obesity and associated risk factors.

Our study findings for California rural American Indians showed that the strongest predictors of obesity are gender and type 2 diabetes. Females had greater odds (1.59) of being obese than males. These findings point to the need to address females' weight gain early, before they transition into the obese or morbidly obese groups. Females are generally the ones who plan the food purchasing and meal preparation for their families, thus they become an important gateway for family education and intervention. Health educators and practitioners should target American Indian women during Well Baby/Infant clinics and during regular clinic hours as those events may provide an important opportunity for advice and instruction.

The health needs of American Indians are at critical stage. Resources are needed, both in terms of trained manpower and funding to address preventive, secondary and tertiary health care services. Health educators, especially those trained in chronic health conditions are needed to assist individuals and groups in maintaining a healthy weight. It is important to do more than identify individuals and population groups who are at risk of obesity; proper support and sustainable interventions that are tailored specifically to American Indians' needs, diets, and lifestyles need to be planned and offered for individuals with type 2 diabetes as well as those at-risk. Obesity is a major health problem that is not going away easily among American Indians and more attention needs to be paid to intervening at younger ages, while individuals are still at lower BMI levels, prior to reaching higher and higher BMI levels. Increasing BMI levels place American Indian adults at higher risk for a cadre of health problems including hypertension, sleep apnea, diabetes, cardiovascular disease and some cancers that are exacerbated by increasing weight gain. Interventions focusing on reducing weight gain and improving healthy weight loss should target both women and men. Particular emphasis should be placed on improving women's preventative care and chronic care management, as well as encouraging walking groups, culturally appropriate cookbooks, talking circles, and other interventions that have proven effective among rural American Indians.

Limitations

Limitations of the study are that the data are self-reported and collected from rural sites in California, thus findings cannot be generalized to the larger population of American Indians or of urban Indians. Nevertheless, the data do provide new knowledge regarding the obesity status of rural American Indian populations in California, and highlight practical advice for American Indians.

Acknowledgements

Our thanks to Karabi Sinha, PhD for her statistical support for this paper. Also, I am grateful for the editorial assistance from Briana Anisko, MPH, and Tracy Line, MPH. This study was supported by a grant from the National Institute for Nursing Research, NIH, RO1 NR04528.

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