ANTHROPOMETRIC MEASUREMENTS, PORTION SIZES USUALLY CONSUMED, AND BODY IMAGE PERCEPTION OF NATIVE AMERICAN CHILDREN

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CHAPTER I

INTRODUCTION

The rate of overweight and at risk of overweight has risen in the general US population of children (Morantz & Torrey 2003). Risk of overweight is when the child has a weight-for-length/stature on the Centers for Disease Control and Prevention (CDC) growth chart greater than or equal to the 85th percentile and less than the 95th percentile (CDC 2002). Among children ages 6 to 19 years, approximately 30% are overweight (Morantz & Torrey 2003). Thirty-eight to 40% of Native American youth aged 5 to 18 are overweight (Rinderknecht & Smith 2002, Zephier et al. 1999, Broussard et al. 1991). When a child is overweight or at risk of overweight, they are at increased risk for the following as an adult: obesity, cardiovascular disease, type 2 diabetes, and hypertension (Barlow et al. 2002).

Native American children who are overweight or at risk of overweight are at greater risk of developing type 2 diabetes during adolescence (Oklahoma State Department of Health 2000). After years of hyperglycemia and uncontrolled diabetes, individuals with type 2 diabetes may develop complications such as nephropathy, neuropathy, and heart disease. The earlier an individual is diagnosed with type 2 diabetes the greater number of years the individual has to develop complications.

The portion sizes eaten by the general United States population have dramatically increased in the past decade (Young & Nestle 2002). Young and Nestle (2003) found that the trend toward larger portions in the marketplace was parallel with the rising rates of obesity in the general US population. Many commonly available food portions exceed both the US Department of Agriculture's (USDA) Food Guide Pyramid and US Food and Drug Administration (FDA) standard portion sizes (Young & Nestle 2002). Rolls et al. (2002) found when adults have larger portions of food they have greater energy intake. When excess energy is consumed compared to what is expended in daily activities the individual becomes overweight (McCrory et al. 2000, Young & Nestle 2002).

Not perceiving body image correctly may be a problem for children today. Childhood obesity is associated with disturbed body image (Hill et al. 1994). Studies have found that overweight children may have low self-esteem, significant depression, and higher levels of emotional distress (Mills & Andrianopoulos 1993, Sheslow et al. 1993). In determining body perception, body figure scales are used because they are simple, quick to use, and easy for children to comprehend the visual image (Truby & Paxton 2002). The Collins (1991) pictorial scale is used in this study and has been used in previous studies.

The present study measured anthropometrics, portion sizes usually consumed, and body image perception of Native American children at the 2003 Wellness Adventures Camp hosted by the Indian Health Care Resource Center of Tulsa (IHCRC). The purpose of the camp is to educate Native American children about healthy eating, physical activity, disease prevention, and self-esteem building. The present study was

conducted as a needs assessment of Native American children to direct future areas of education for Native American children in Tulsa.

Objectives

The following objectives were used to guide this study:

1. To determine the relation between anthropometric measurements and amount of Native American blood of Oklahoma Native American children.
2. To determine the relation between food portion sizes usually consumed by Oklahoma Native American children and body mass index, age, and other portions consumed.
3. Determine the relation of body image perception of Native American children in Oklahoma to portion size, proportion Native American blood, "favorite body size" and researcher opinion.

Assumptions

This research assumed that children accurately reported their usual portion size consumed. It was assumed that the Native American children were familiar with, and commonly ate the five types of foods used to assess usual portion size. It is assumed that the children did not say they ate more of a particular food just because they thought it was a healthy food.

Definition of Terms

Overweight: Defined by a weight-for-length/stature greater than or equal to the 95th percentile on the CDC growth chart (CDC 2002).

At-risk of overweight: Defined by a weight-for-length/stature greater than or equal to the 85th percentile and less than the 95th percentile on the CDC growth chart (CDC 2002).

Self–esteem: Wylie (1979) refers to self-esteem as the person's general sense of worth and acceptance which involves self-presentation.

Body image: Dittmar et al. (2000) defines body image as an individuals' attitude toward their body with the focus often on weight. Body image is commonly conceptualized as body dissatisfaction (Dittmar et al. 2000).

Self-concept: Defined as schema of oneself (Davison & Birch 2001). The framework of self-concept incorporates descriptors used to define the self and the overall evaluative tone associated with defining the self, such as self-esteem. Self-concept is multidimensional including general sense of self, physical appearance self (including body esteem), athletic self, social self, and academic self (Davison & Birch 2001, Marsh 1990). In the reference by Davison and Birch (2001) self-concept is used interchangeably with self-identity and self-image.

CHAPTER II

LITERATURE REVIEW

The review of literature discusses the definition of overweight and at risk of overweight, the percentages of overweight and at risk of overweight children, etiology of overweight in children, children's food intake, common food portion sizes, and body image size perception of children including body dissatisfaction.

Overweight and At Risk of Overweight

The definition of overweight and obesity differs between children and adults. The term obesity is not preferred for children, and should not be used when referring to children. In this paper, the term obese is only used when the author used the term obese or obesity in the reference. According to the Centers for Disease Control and Prevention (CDC), children are defined as **overweight** when the child has a weight-for-length/stature greater than or equal to the 95th percentile on the CDC growth chart. The child is also considered **overweight** when the body mass index-for-age (BMI) is greater than or equal to the 95th percentile on the CDC growth chart. A child **at risk of overweight** has a BMI-for-age on the CDC growth chart greater than or equal to the 85th percentile and less than the 95th percentile (CDC 2002).

The American Academy of Pediatrics suggests body mass index as a primary diagnostic tool to define overweight or at risk of overweight in children (Morantz & Torrey 2003). BMI helps assess the weight status of the child, but BMI is not equal to body fatness. When researchers are relying on BMI to tell about the subject's body fatness, the researcher must take into account the following: maturation stage, race, gender, and distribution of fat (Daniels et al. 1997). If a male or female child or adolescent has central fat distribution, the BMI may underestimate the child's body fatness. If same gender subjects have similar BMI, the child who is more advanced in sexual maturation will have a lower percent body fat. When girls and boys have an equivalent BMI, the girls have greater amounts of body fat (Daniels et al. 1997). Daniels et al. (1997) found that whites had higher body fatness compared to blacks when they had identical BMIs.

According to the American Academy of Pediatrics (AAP), the number of overweight and obese children for all races has doubled in the last two decades (Morantz & Torrey 2003). Among children ages 6 to 19 years, approximately 30% are overweight (Morantz & Torrey 2003). Obesity is an epidemic problem especially for minority groups (Gahagan & Silverstein 2003, Lohman et al. 1999, Story et al. 1999, Gruber et al. 1995, Broussard et al. 1995, Broussard et al. 1991). Thirty-eight to 40% of Native American youth aged 5 to 18 are overweight (Rinderknecht & Smith 2002, Zephier et al. 1999, Broussard et al. 1991). A study of approximately 9,000 Native American children by Jackson (1993) found that 39.3% of 5 to 18 year-old Native American children were at and above the 85th percentile of the reference population. The prevalence of overweight in an ethnically diverse group of boys and girls was 10% for children aged 3 years and

younger and about 6% for 2 to 5 year-old children according to NHANES III data (Ogden et al. 1997). A study of 527 Mohawk children found that 31% of the girls and boys aged 6 to 11 years old had a weight value that was at or above the 85th percentile of the NHANES II distribution (Potvin et al. 1999).

A study by Gray and Smith (2003), looked at the relation among fitness, dietary intake, and body mass index in 155 urban Native American youth aged 5 to 18 years. Based on the BMI-for-age growth chart, 63% of the youth were either at-risk of overweight (n=34) or overweight (n=63) (Gray & Smith 2003). A study by Lohman et al. (1999), looked at the BMI-for-age in 150 Native American 11 year-old children from 6 American Indian communities. The average BMI for 11 year-old boys in the study was 20.4 (Lohman et al 1999). If an 11 year-old boy has a BMI-for-age equal or greater than 20.2 on the growth chart they are considered to be at risk of overweight (CDC 2004). The average BMI for 11 year-old girls in study was 21.1 (Lohman et al. 1999). If an 11 year-old girl has a BMI-for-age equal or greater than 20.8 on the growth chart they are considered to be at risk of overweight (CDC 2004).

Various factors are related to the increase in BMI. Ackard et al. (2003) showed that overeating was associated with higher BMI values and obesity status in a study of white, African American, and Asian American middle and high school children. A recent study of Helsinki children found influences that were linked to rapid gain in weight and increased BMI during childhood (Eriksson et al. 2003). These influences were as follows: fewer people in the home, father's low socioeconomic status, and high maternal BMI recorded at mother's admission to labor (Eriksson et al. 2003).

When a child is overweight, they are at increased risk for the following: obesity, cardiovascular disease, type 2 diabetes, and hypertension (Barlow et al. 2002, Pinhas-Hamiel et al. 1996, Fowler 1989, National Research Council 1989) In type 2 diabetes, the individual is insulin resistant which results in hyperglycemia (American Diabetes Association 2004). Some of the long-term complications that occur from a lifetime of frequent hyperglycemia in type 2 diabetes include cardiovascular disease, retinopathy, neuropathy, and nephropathy (American Diabetes Association 2004). When children develop type 2 diabetes they have a lifetime in which they may develop complications. Type 2 diabetes used to be considered an adult disease, but since 1980 type 2 diabetes has increased dramatically in children (Levetan 2001). According to Chronic Disease Service in Oklahoma 1/3 of children less than 18 years who are diagnosed with diabetes have type 2 diabetes (Okla. State Dept. of Health 2000).

Type 2 diabetes is present in epidemic proportions in American Indian populations because of the increase in prevalence of obesity (Gohdes 1991, Okla. State Dept. of Health 2000). According to the 2002 Behavioral Risk Factor Surveillance System (BFRSS) the prevalence of obesity among all Oklahoma adults has nearly doubled since 1990 (CDC 2004). According to the CDC, the prevalence of diabetes in Native American adults ≥ age 20 is 11.5%-15.3% (DHHS 2003A). The prevalence of diabetes in Native American adults has increased 33% from the years 1994 to 2002 (DHHS 2003A). The prevalence of diabetes among all races of US adults is 4.8% to 7.3%. In Oklahoma, the prevalence of diabetes both diagnosed and undiagnosed by race is as follows: Native Americans 18.6%, Black 8.5%, White 9.1%, and Hispanic 9.5% (Page et al. 2003).

Levetan (2001) examined 182 publications on type 2 diabetes in youth published between January 1996 and June 1999, and found 94% of the children and adolescents with type 2 were from minority communities. According to a study by Eriksson et al. (2003), children with higher BMI's at 12 years of age were more likely to develop type 2 diabetes in the future. When BMI was converted to z scores, a 1 standard deviation increase in BMI at age 12 years was associated with an odds ratio for diagnosis of type 2 diabetes of 1.77 (95% CI 1.50-2.09) (Eriksson et al. 2003).

Etiology of Overweight and At Risk of Overweight

Someone becomes overweight when excess energy is consumed compared to what is expended in daily activities (McCrory et al. 2000, Young & Nestle 2002). Research by Young and Nestle (2002) found that increased energy intake is one cause of the obesity epidemic. In a 2003 study of 4746 white boys and girls in middle and high school, overeating in boys was associated with obesity (Ackard et al. 2003). Ackard et al. (2003) found 14.2% girls and 7.8% of boys reported objective overeating in the past year. Objective overeating was defined as eating so much food in a short period of time that the student would be embarrassed if others saw the amount of food eaten. The authors also found that overeating was associated with higher BMI in both girls and boys. In boys, the overeating was associated with obesity (Ackard et al. 2003).

The recommended dietary allowance (RDA) for children aged 3 to 8 is 1,642 calories for girls and 1,742 calories for boys. The RDA for children aged 9 to 13 is 2,071 calories for girls and 2,279 calories for boys (Food & Nutrition Board 2003). A study of Mohawk children aged 4 to 9 years-old found that the diets of these children exceeded

the recommended intakes for energy by 236 calories/day, and the children consumed approximately 34% (±9%) calories from fat each day (Harvey-Berino et al. 1997).

The amount of physical activity that a child participates in is important. A telephone study using a nationally representative sample reported that 61% of children aged 9 to13 do not participate in any organized physical activity during their nonschool hours, and 22% of 9 to 13 year-old children did not engage in any free-time physical activity (DHHS 2003B). Non-Hispanic black and Hispanic children were significantly less likely ($p<0.05$) than non-Hispanic white children to report involvement in organized physical activities (DHHS 2003B). When children's parents had lower incomes and education levels, the children were less involved in organized physical activities (DHHS 2003B).

Role of Food Intake

The energy density of foods consumed by an individual influences one's daily energy intake. Fruits and vegetables have a low energy density and are high in fiber (Hyson 2002). A study by Bell and Rolls (2001) found that total daily energy intake is lowered by 20% in adult women when the women consumed a snack of foods with low energy density before a meal.

McCrory et al. (2000) asked men and women to reflect on usual food intake for the past 6 months using a food-frequency questionnaire. They analyzed the relation of 10 different food groups and energy intake. Within each of the food groups, dietary variety was positively correlated with energy intake ($r= 0.27-0.56$). Using multiple regression analysis, McCrory et al. (2000) found that when dietary variety scores in a combined group of sweets, snacks, condiments, entrees and carbohydrates, variety was positively

associated with body fatness. Dietary vegetable variety was negatively associated with body fatness (McCrory et al 2000).

The Food Guide Pyramid indicates that children should eat 3 to 5 servings of vegetables and 2 to 4 fruit servings per day (USDA 1996). One serving of fruit is a medium piece of fruit; ½ cup chopped, cooked or canned fruit; or ¾ cup of fruit juice (USDA 1996). One serving of vegetable is 1 cup of raw leafy vegetables; ½ cup other vegetables, cooked or chopped raw; or ¾ cup of vegetable juice (USDA 1996). Children usually eat less than the recommended levels of fruit, juice or vegetables (FJV) (Domel et al. 1993). One study of 210 ethnically diverse students (African American, Mexican American, mixed ethnicity) in grades 4 to 6, found that the daily intake of a combination of fruit, juice and vegetable consumption was 2.13 ±_1.43 servings per day. This was distributed as follows: fruit serving 0.57 ±_0.82, juice servings 0.49 ± 0.72, and total vegetable servings 1.07 ± 0.89 (Cullen et al. 2001). In 14 focus groups of caregivers of Native American children, Gittelsohn et al. (2000) found that children ate 2 to 3 fruits and vegetables each day (Gittelsohn et al 2000).

In a study of 80 Native American third graders living in Native American communities, researchers found that fresh and canned fruit provided 4.3% of total energy intake for all meals and snacks. For school meals and snacks, fresh and canned fruit provided 5.4% of the total energy intake. Looking at the total energy intake from meals and snacks from outside of school, fresh and canned fruit provided only 3.7% of the total energy intake at home (Lytle et al. 2002). This is unfortunate, because fruits and vegetable have a low energy density (Hyson 2002).

The following paragraphs discuss foods that are being eaten by Native American children. Gittelsohn et al. (2000) showed that the average Native American child ate about 2 snacks daily. Common snacks consumed by Native American children were chips, crackers, cookies, cheese, fruit, and popcorn (Gittelsohn et al. 2000). Children in grades 4 to 6 reported that desserts and other snacks were preferred over FJV items (Cullen et al. 2000).

Gittelsohn et al. (2000) found that many energy dense foods were eaten at school. School foodservice workers pointed out that Native American children bought at school before and after lunch cupcakes, gum, candy, popcorn, pickles, chips, and ice cream (Gittelsohn et al. 2000). Other caregivers of these Native American children also talked about the "sweet stuff" that the school sold to students (Gittelsohn et al. 2000). While observing what 7 to 12 year-olds purchased at the school bake sales, local grocery stores, reservation stores and trading posts; it was found that children purchased food high in fat or sugar such as candy, soda pop, and ice cream (Gittelsohn et al. 2000).

The intake of sugar containing beverages is high in Native American children. Gittelsohn et al. (2000) found that children in grades 3 to 5 consumed 1.7 cups of Kool-Aid, Powderade, or soda pop daily at home, based on the report from 38 caregivers of children. In a study of 155 urban Native American youth ages 5-18 years old, Gray and Smith (2003) found that soda consumption was positively correlated with higher energy consumption and increased with age, but not with increased BMI. When looking at teacher behavior, over half of teachers (11/21) reported offering their student's high-sugar or high fat foods as rewards for good behavior in the classroom (Gittelsohn et al. 2000).

A study of 80 Native American children, aged 8 to 9, living in Native American communities found that children consumed a mean of 1,961 $\pm$ 111 kcal / day. The calories eaten at school were approximately 660-860 calories, and calories consumed out of school were approximately 1120-1250 calories (Lytle et al. 2002). This study estimated the children consumed a total mean of 68.8 $\pm$ 4.3 grams of fat daily. Out of school fat intake was a mean of approximately 40-45 grams of fat and the in-school fat intake was a mean of approximately 20-28 grams of fat (Lytle et al. 2002). The top contributors of energy for the 80 Native American children previously mentioned in all meals and snacks were as follows: breads/buns/tortillas 6.2%, milk 6.1%, sweetened beverages 6.1%, pizza 5.3%, and beef/beef dishes 4.5% (Lytle et al. 2002). The top contributors of energy from meals and snacks outside of school were as follows: sweetened beverages 9.5%, beef/beef dishes 6.1%, breads/buns/tortillas 4.8%, burgers with buns 4.7%, and pasta/pasta dishes 4.3% (Lytle et al. 2002).

Eighty-five pairs of third through fifth grade Native American school children from 6 different American-Indian nations were surveyed for their most frequently eaten foods. The top 6 foods the children mentioned were pizza, hamburgers, apples, milk, oranges, and soda pop (Gittelsohn et al. 2000). From the list created from the most frequently mentioned foods, the researchers wanted to know how often the children consumed the food. The children were to state if the foods were eaten everyday, sometimes or almost never/never eaten. The top everyday foods were water, apples, whole milk, bananas, and cereal. The top sometimes eaten foods were pizza, tacos, chips, hamburgers, and fries. The foods almost never/or never eaten were diet soda pop, ice cream, fries, spaghetti, and carrots (Gittelsohn et al. 2000). Fries were in the sometimes

and almost never categories because 54% of students reported that they sometimes eat fries and 29% of the children stated they almost never ate fries (Gittelsohn et al. 2000).

Influences on Children's Food Intake

A child's food intake is influenced by food availability, parental modeling, and portion size. Cullen et al. (2001) found in an ethnically diverse group of students (¼ African-American, ¼ Euro-American, 37% Mexican-American, 9% Asian and other) grades fourth through sixth that the fruit or vegetable consumption in the home is positively correlated with the fruit and vegetable availability (Cullen et al. 2001). The availability of fruits and vegetables appeared to be linked to the receipt of Food Stamps. Near the beginning of the month when food stamps were given, more fruits and vegetables were available (Gittelsohn et al. 2000).

Children's fruit and vegetable consumption has been influenced by parental modeling (Cullen et al. 2001). Parental modeling was positively correlated with the child's consumption of fruit, juice, total FJV intake (Cullen et al. 2001, Cullen et al. 2000, Cullen et al. 1998). Children believe that eating fruits and vegetables is a good thing, but focus groups of African-American Boy Scouts found that when children eat vegetables they may receive negative comments from peers (Cullen et al. 2001, Cullen et al. 1998).

Thirty-eight caregivers of Native American children were interviewed to see how the caregivers cooked at home (Gittelsohn et al. 2000). Nearly half of the caregivers said their predominant home cooking method was frying. Thirty-seven percent said baking and 16% said broiling (Gittelsohn et al. 2000). Follow-up interviews with caregivers of Native American children showed that 73% to 80% of caregivers encouraged their

children to finish all of the food on their plate (Gittelsohn et al. 2000). Broussard et al. (1995) found that the wide use of lard and butter, fried foods and whole milk may contribute to childhood obesity. It appears that what is in a child's near environment may influence food intake. The next section talks about portion sizes increasing in the United States.

Increase in Portion Sizes in Environment

Young and Nestle (2003) found that the trend toward larger portions in the marketplace is parallel with the rising rates of obesity in the general US population. Young and Nestle (2003) examined the portion sizes of ready-to-eat foods from fast-food outlets; take out places, and single serve food items. The portion sizes of many single serving items in fast food establishments, chain restaurants, and conveniences stores have increased since the mid-1980s. This means the calories from these single servings have also increased (Young and Nestle 2002). Many commonly available food portions exceed both the US Department of Agriculture (USDA) and US Food and Drug Administration (FDA) standard portion sizes (Young & Nestle 2002). In a study by Young and Nestle (2002), the following ready-to-eat prepared foods were found to exceed the standard USDA portion size by the following percentages: chocolate chip cookie 700%; cooked pasta 480%; muffin 333%, steak 224%, and bagel from independent store 195%. Individuals in the general United States population are eating out more today that in the past, so they are consuming more of the larger portion sizes. In the 1970's, approximately 34% of an individual's food budget was spent outside the home (USDA 1995). In the late 1990's, an increase to approximately 47% of the individual's food budget was spent outside the home (Clauson 1999).

According to a study by Young and Nestle (2003), the individual portion sizes manufactured today are equal to or larger than the portion size of the product when it was originally introduced. An example they sited was the Hershey bar. The original Hershey bar introduced in 1908 was only 0.6 oz and now Hershey bars range from 1.6 to 8.0 ounces (Young & Nestle 2003). When the Burger King hamburger was introduced in 1954 it was 3.9 ounces. Now the Burger King burgers are: hamburger 4.4 ounces, Whopper ^{R} Jr. 6.0 ounces, double hamburger 6.1 ounces, Whopper ^{R} 9.9 ounces, and double Whopper ^{R} 12.6 ounces (Young & Nestle 2003). In 1955, the McDonald's fountain soda drink was 7.0 ounces. Today, McDonald's sodas range from 12 ounces to 42 ounces (Young & Nestle 2003). Young and Nestle (2002) compared the number of servings identical recipes yielded in older and newer versions of *The Joy of Cooking*. The newer edition recipe yielded a smaller number of servings than the older edition recipe which means the portion sizes were larger in the newer edition than the older edition (Young & Nestle 2002, Rombauer et al. 1997, Rombauer & Becker 1964). Restaurants are using larger plates, soda containers and pans to bake pizzas and muffins to increase the portion sizes given to consumers (Young 2000). Restaurants are also using signs, placemats, and staff pins to promote larger portion sizes (Young & Nestle 2003). In adults, the portion size affects energy intake. When men and women had larger portions on their plate, the men and women had greater energy intake (Rolls et al. 2002)

Role of TV Watching

Television viewing burns few calories, and it may replace other activities the child could participate in that would burn more calories (Thompson et al. 2001). At some

schools, naps and television viewing has been substituted for physical education class (Thompson et al. 2001). Most adults are supportive of their children being physically active. In a study of 338 Native American children, over 80% of girls and boys said they are taken places by the adults in their house where they can play hard or play sports sometimes or most of the time. Of these same 338 Native American children, approximately 80% of boys and 67% of girls stated that the adults in their house wanted them to play hard (Thompson et al. 2001).

Television viewing is commonly accompanied by extra intake of calories (Van den Bulck 2000). It is documented that eating snacks and drinking high-calorie soft drinks may be a part of the total television viewing experience (Wober & Gunter 1988). A study of 1035 young adults, aged 17-18 years, found that approximately 83% say they "usually eat" while watching television (Van den Bulck 2000). Nearly 40% of these young adults reported eating candy, snacks or sweets regularly or nearly always while watching television (Van den Bulck 2000). It was statically significant that 17 and 18 year-old girls who ate candy while watching television weighed more than girls who less frequently ate candy while watching television (Van den Bulck 2000).

Research found that 32% of children age 2 to 7 years old and 65% of 8 to 18 year old children have television sets in their bedrooms (Roberts et al. 1999). A study by Gortmaker et al. (1996), stated that the amount of television that children watch is a cause of the increasing obesity in United States children. In the Gortmaker et al. (1996) study, 33% of youth ages 10-15 years watched greater than 5 hours of television per day. These children had an 8.3 greater incidence of obesity (Gortmaker et al. 1996). NHANES-III data found that 67% of children ages 8-16 years old watched at least 2 hours of television

per day. Twenty-six percent of these children watched more than 4 hours of television per day (Altman et al. 1998).

Researchers believe the foundation for the treatment of the obesity epidemic is modification of eating behaviors and activity (Barlow et al. 2002). Researchers have found that interventions need to be started while children are young to help prevent obesity, additional weight gain, and aid in possible weight loss (Barlow et al. 2002). In Native American adults obesity prevention programs have not been successful (Story et al. 1999). This could be because of the early onset of obesity in the Native Americans during youth (Story et al. 2001). We must find ways to reduce the prevalence of overweight among Americans (USDHHS 2000, Nestle & Jacabson 2000)

A study polled pediatricians, pediatric nurse practitioners, and registered dietitians to see how these professionals would intervene with the overweight or obese pediatric patient. Nine hundred and forty providers responded to the study. The dietary changes recommended were limitations of specific foods (64-84%) and changes in eating patterns (57-64%) were recommended by the majority of these professionals. The minority recommended modest calorie restriction (17-26%) or low-fat diet (14-27%). Less than 15% of these providers recommended very-low calorie diets to their patients (Barlow et al. 2002). Activity intervention was also recommended to intervene with the overweight patient. Over 95% of the pediatricians, pediatric nurse practitioners and registered dietitians recommend at least one of the following: increase in unstructured physical activity, increase in organized activity, increase in routine activity, and decrease in sedentary behavior (Barlow et al. 2002).

Body Perception, Self Concept and Overweight

The term body perception is used to determine the body satisfaction or dissatisfaction of an individual. This section will describe how body perception scales are used.

Self-Esteem

It is important to determine what influences a child's self-esteem. Wylie (1979) refers to self-esteem as the person's general sense of worth and acceptance which involves self-presentation. Studies have found that overweight children may have low self-esteem, significant depression and increased levels of emotional distress (Mills & Andrianopoulos 1993, Sheslow et al. 1993). Self-perceived body image is a major influence upon self-esteem (Polce-Lynch et al. 1998). Self-esteem was studied in 209 students (76% Caucasian, 18% African-American) in grades five, eight and twelve. In the study, 38% of eighth grade females and 15% of eighth grade males reported that self-perceived body image was a source of negative feelings about themselves (Polce-Lynch et al. 1998).

Self-Concept

Self-concept is defined as schema of oneself (Davison & Birch 2001). The framework of self-concept incorporates descriptors used to define the self and the overall evaluative tone associated with defining the self, such as self-esteem. Self-concept is multidimensional including general sense of self, physical appearance self (including body esteem), athletic self, social self, and academic self (Davison & Birch 2001, Marsh 1990). In the reference by Davison and Birch (2001) self-concept is used

interchangeably with self-identity and self-image. Davison and Birch (2001) referred to body esteem as part of self-concept. In children as young as 5 years-old, the parental perception of the child's body shape may influence the child's evaluation of themselves (Davison & Birch 2001). When father's of 5 year-old, non-Hispanic girls were concerned with their daughter's weight status, independent of the child's actual weight, the daughters had lower body esteem about themselves (Davison & Birch 2001).

Body perception

In determining body perception, body figure scales are used because they are simple, quick to use, and easy to comprehend the visual image (Truby & Paxton 2002). The Collins (1991) pictorial figure scale shows 7 male or 7 female child figures ranging from very thin to very heavy. According to Allison (1995), the Collins (1991) instrument had 3 day test-retest reliability numbers of 0.71 for self and 0.59 for ideal self. This is good because if the reliability number is ≥.70 the measure is found to be psychometrically sound (Allison 1995).

Researchers used the Collins, 1991 pictorial scale to access children's body dissatisfaction in 431 Australian children 7 to 10 years-old (Kostanski & Gullone 1999). The children were asked to choose the figure they thought looked most like them currently (actual cognitive), the figure that looked most like what they would like to be (ideal), and the figure that looked most like the way they felt (actual affective) (Kostanski & Gullone 1999). Body dissatisfaction was reported as a discrepancy between the child's felt figure size and his or her ideal size. Kostanski & Gullone (1999) found that 18% of the boys and 13% of the girls felt smaller than their ideal and 30% of the boys and 34%

of the girls felt larger than their ideal. Girls reported higher levels of body dissatisfaction than the boys ($p<.05$) (Kostanski & Gullone 1999).

Thompson et al. (1997) used the Collins pictorial scale to help 817 black and white children identify their ideal self and their current self. On the Collins scale of 1 to 7, white females identified a mean of 3.32 as ideal self, and a mean of 4.03 as current self; while black females identified a mean of 3.64 as ideal self, and a mean of 4.19 as current self. Black males identified a mean of 4.04 as ideal self, and a mean of 4.15 as current self; white males identified means for ideal self, and current self as 3.88 and 3.96 respectively (Thompson et al. 1997). Body size satisfaction was determined by comparing (ideal body size – current body size). A negative number represented body dissatisfaction. Forty-six percent of black females and 51% of white females selected an ideal size thinner than their current size. Thirty-nine percent of black females and 41% of white females selected an ideal size equal to their current body size. Among males 32% of blacks and 28% of whites selected an ideal size thinner than their current size. Approximately 60% of both black and white males selected an ideal body size equal to their current body size (Thompson et al. 1997). In a study by Truby & Paxton (2002) consisting of 312 Australian children 7 to 12 years-old, being larger than ones ideal size was a dominant factor in body dissatisfaction. With boys 10 to 12 years-old, being either smaller or larger than one's ideal was associated with body dissatisfaction (Truby & Paxton 2002).

Body dissatisfaction can occur very early in life, and is difficult to reverse once it is established (Shisslak et al. 1995). In a study by Kostanski and Gullone (1999), perceived body-image dissatisfaction occurred in children as young as 7 years-old. In a

study of 191 non-obese children, (second grade, fourth grade, and sixth grade) the girl's dissatisfaction with their body weight began between second and fourth grade (Thelen et al. 1992). The fourth and sixth grade girls had significantly higher concern of being or becoming overweight and desired to be thinner than their current weight (Thelen et al. 1992). In Australian schoolchildren aged 8-12 years, 50% of girls and 33% of boys were dissatisfied with their body size and wanted to be thinner (Rolland et al. 1997).

Body dissatisfaction in American adolescent girls is towards their buttocks, waist, thighs, and hips. The girls want these areas to be thinner while having larger breasts. American adolescent boys frequently report desiring larger arms, chest and shoulders (Davis et al. 1993).

Ideal Body

The current body size of a child influences their opinion on what is an ideal body size. Dittmar et al. (2000) found in a study of 58 English adolescent girls, aged 12-16, that there was a pattern in regard to an adolescents' body mass and body-image preferences of the "ideal woman". Thinner girls prefer a thinner "ideal woman", and heavier girls prefer a heavier "ideal woman" ($r = -.36$, $p<.005$) (Dittmar et al. 2000). In an Australian study of 195 children aged 5-10, children selected a significantly smaller figure as their ideal compared to their current figure ($p = .0001$) (Williamson & Delin 2001). Social standards for the total population portray the ideal man as strong, muscular and solid, while the ideal female is portrayed as lean and willowy (Muth et al. 1997, Siever 1994).

CHAPTER III

METHODS

Research Overview and Design

The three areas of data collection for this study included the one time collection of anthropometic data, portion sizes consumed, and body image perception in third through sixth grade Native American children. The information was collected during the 2003 Wellness Adventures Camp hosted by the Indian Health Care Resource Center of Tulsa (IHCRC). Four camp sessions were held during summer 2003: June 16-20, July 7-11, July 14-18 and July 28-August 1. The last 3 camps participated in the study, and data analysis was conducted on these three camps. A descriptive design was used in this study. This project was approved by the Institutional Review Board for human subjects at Oklahoma State University.

Participants

The participants in this study were children who attended the 2003 Wellness Adventures Camp. Each participant held a Certificate Degree of Indian Blood (CDIB) card and completed the third, fourth, fifth or sixth grade during the 2002-2003 school year. To participate in the study, the child's guardian had to sign the consent form and

the child had to sign the assent form at the beginning of camp (Appendix A). The child was excluded from this study if the child did not have a CDIB card, was not accepted to the 2003 Wellness Adventures Camp because the camp session was full, or if they had not just completed the third, fourth, fifth or sixth grade.

Participant Recruitment

A flyer about the 2003 Wellness Adventures Camp was mailed to each of the children who had attended the 2002 Wellness Adventures Camp. A few days later a second flyer was sent to children of families that receive care at the Indian Health Care Resource Center of Tulsa. Flyers about the Wellness Adventures Camp 2003 were also made available at a few Tulsa Public Elementary Schools. Students were assigned to each camp session on a first come, first serve basis. If a child wanted to attend one of the four weeks of camp, they completed the application form and brought or sent it to IHCRC with a copy of the CDIB Card. The purpose of the 2003 Wellness Adventures camp is to educate Native American children about healthy eating, physical activity, disease prevention, and self-esteem building.

Research Personnel

Student assistants were recruited from Oklahoma State University through the efforts of Dr. Kathryn Keim. The assistants were dietetic interns and nutritional sciences undergraduates. Before coming to the 2003 Wellness Adventures Camp, each student assistant had a background check conducted by Oklahoma Bureau of Investigation, and they were cleared to work with children. When the student assistants arrived at camp, they were assigned to one of the three different data collection areas. The researcher reviewed the data collection procedure and data collection form for that area with the

student assistant. Dr. Keim greeted the parents to explain the research project and to obtain consent and assent forms. The researcher of this project collected the body perception information from each participant.

Research Instruments

Demographic Form

Each child filled out a demographic form (Appendix B) informing the researchers of the child's name, sex, age in months and years, and percent blood quantum. Some parents did not fill in their child's blood quantum and this researcher looked at the CDIB card that was attached with the child's camp application to know percent Native American blood. The demographic form was filled out by the parents at the time of the signing of consent forms.

Data Measurement Form: Anthropometrics

An anthropometric data measurement form (Appendix C) was completed for each child. Two student assistants were assigned to this area. One student assistant collected the participant's weight and height. The other student assistant collected the waist and hip circumference of the participant.

Data Measurement Form: Portion Sizes

Each child was asked to choose his/her usual portion size of five different foods. The five foods were hamburgers, baby carrots, dark soda pop, regular potato chips, and orange juice. These foods were selected after reviewing information of commonly consumed foods of Native American women by Taylor (2004). The student assistant on the Data Measurement Form recorded the participant's response: Food Portions (Appendix D).

Body Image Perception Forms

Each body perception form consisted of 7 male or female child figures ranging from thin to obese. A horizontal line with a numbering system from one to seven was below the figures. Number one represented the smallest or thinnest figure and number seven represented the largest or heaviest figure. The 7 figure form was based on Collins 1991 pictorial instrument which had test-retest reliability of 3 days (self, .71; ideal self, .59; ideal other child, .38) (Allison 1995). In this study the form we used was from Dr. Susan Johnson at The Children's Eating Lab, UCHSC and the Children's Hospital in Denver Colorado.

Data Collection and Procedures

Consent and Assent Forms

Data collection occurred at the beginning of the first day of camp. Participants were directed to an indoor gazebo for data collection. The following data were collected on each participant: portion sizes consumed anthropometric measurements, and body image perception.

When parents brought their child to the first day of camp, the parents were informed about the research project by Dr. Keim. The parent or child was encouraged to ask questions and were answered by Dr. Keim or by the researcher. The parents then signed a consent form if their child was allowed to participant in the study. Next, the child signed the assent form before heading to the data collection area. If either said no, the child was not part of the study population.

Portion Sizes Consumed

The foods chosen came from a list of most frequently consumed foods of Oklahoma Native American women by Taylor (2004). Tables were set up in the indoor gazebo with privacy screens between each food item. Three different portion sizes were set up for 5 different foods behind each screen. The foods portion sizes were randomly placed behind the screen. The goal of the random placement of foods was to prevent the portion sizes from being small to large or large to small for each food. Each child observed each set of foods and was asked to select the usual portion size eaten. Participant's response was recorded by the student assistant on the recording form (Appendix D). The 5 foods and 3 portion sizes are listed in Table 3.1.

Table 3.1. Portion sizes of foods surveyed in the 2003 Wellness Adventures Camp.

Type of Food	**Small**	**Medium**	**Large**
Hamburger From Burger King	Regular Hamburger	Whopper	Double Whopper
Raw Baby Carrots	3 baby carrots	6 baby carrots	9 baby carrots
Dark Soda Pop	12 ounce can	24-ounce bottle	32-ounce cup
Regular Potato Chips	1 ounce	2 ounces	3 ounces
Orange Juice	4 ounces	8 ounces	16 ounces

Body Weight

A student assistant recorded the weight of each participant. Weight was determined using a A&D Company, LTD portable, digital scale, model UC-300 to the 1/10 pound. The subject was not wearing shoes when weighed. One weight was taken and the information was recorded on the anthropometric data measurement form (Appendix C).

Height

Stature was measured in inches to the closest ½ inch by the student assistant. The participant stood without shoes against a wall. A non-stretchable tape measure was fastened to the flat, vertical wall surface. A right-angled headboard was used for marking the height. The subjects were standing without shoes on a flat concrete surface. The information was recorded on the anthropometric data measurement form (Appendix C).

Body Image Perception

Body image perception was the last information collected. A privacy screen was used so that other children could not see what figure the participant marked on the body perception page. The participant looked at each page and placed an X on the line below the figure that the child stated best answered the researcher's question (Appendices E and F). The line had a numbering system under it and the information was later put into the computer by recording the number represented in the middle of the child's x-mark. Each participant was asked three questions about the body image figures. The first question was, "Now look at the girl/boy's shapes on this page. Place a mark **on the line** below the body shape you think most looks like you. If you can't decide between 2 body shapes put a mark **on the line** that falls in between the 2 shapes." For the second image, the participant was then asked the following, "Look at the girl's/boy's shapes on this page. Place a mark **on the line** below the body shape you think looks closest to your favorite body shape for a girl/boy you age. The body shape you like best. If you can't decide between 2 body shapes put a mark **on the line** that falls in between the 2 shapes." For the third image, the participant was asked the following, "Look at the girl's/boy's shapes on this page. Place a mark **on the line** below the body shape you think looks the healthiest

for a girl/boy your age. If you can't decide between 2 body shapes put a mark **on the line** that falls in between the 2 shapes." The participant was then told to walk about 10 feet away where they waited for at least one other child to join them before going outside to the opening camp ceremonies. As the child was walking off, the researcher would mark on another page the body image that the researcher felt best represented the child's body shape.

Objectives and Hypotheses

The purpose of this research was to collect data regarding the anthropometrics, portion sizes and body image perception of the Native American children in Tulsa to shape future camp sessions with Native American children. Below are the objectives and hypotheses that were used in the study to evaluate the anthropometric measurements, portion sizes consumed, and body image perception of Native American Children.

1. To determine the relation between anthropometric measurements and amount of Native American blood of Oklahoma Native American children.

Hypothesis 1.1

- As the child's proportion of Native American blood increases, the body mass index will increase.

2. To determine the relation between food portion sizes usually consumed by Oklahoma Native American children and body mass index, age, and other portions consumed.

Hypothesis 2.1

- As body mass index increases, the portion size of soda pop, potato chips, and hamburger usually consumed will increase.

Hypothesis 2.2

- As body mass index increases, the portion size of carrots and orange juice will increase.

Hypothesis 2.3

- Children who report eating larger portions of carrots will also report larger portions of orange juice.

Hypothesis 2.4

- As age increases, portion size usually consumed will increase for all foods.

3. Determine the relation of body image perception of Native American children in Oklahoma to portion size, proportion Native American blood, "favorite body size", and researcher opinion.

Hypothesis 3.1

- Children that perceive their body size to be larger will consume larger portions of soda, chips or hamburgers.

Hypothesis 3.2

- As percent Native American blood increases, children will choose a larger body size for a picture of a healthy child.

Hypothesis 3.3

- As percent Native American blood increases, children will choose a larger ideal body size.

Hypothesis 3.4

- Children will perceive their body size to be bigger than their favorite body size

Hypothesis 3.5

- Children will perceive their body size the same as this researcher's perception of their body size.

Data and Statistical Analyses

The researcher used the Centers for Disease Control's Epi Info 2000 at **http://www.cdc.gov/epiinfo/ei2002.htm** to generate BMI z-scores to assess risk of overweight and overweight status. The participants' age in months, height in centimeters and weight in kilograms were entered into Epi Info to generate the BMI and calculate the z-scores. A z-score is the deviation of the value for an individual from the mean value of the reference population on the CDC growth chart and is then divided by the standard deviation for the reference population (CDC 2002). Z-scores and percentiles in the 2000 CDC Growth Charts are interchangeable, and z-scores are preferred for data analyses (CDC 2002). A z-score of 0 is equal to the norm and is no standard deviations from the mean. Positive z-scores are over the norm and negative z-scores are below the norm. A z-score of -1 or 1 is one standard deviation from the mean and a z-score of -2 or 2 is two standard deviations from the mean. A z-score of -2 standard deviations is at the 3rd percentile on the growth-for-age chart and a z-score of 2 standard deviations is the 97th percentile on the growth-for-age chart (CDC 2002). BMI z-scores were categorized by body weight status as follows: normal weight was -.89 to 1.03, at risk of overweight was 1.05 to 1.63, and overweight 1.72 to 2.59.

Statistical and data analyses were conducted using the Statistical Package for Social Sciences (SPSS) Version 11.0 for Windows, Chicago, IL 2002. One-tailed Spearman's rho analyses were used to determine correlations between portion sizes of

food and BMI, portion sizes of food, portion sizes of food and age, portion sizes of food and body perception "looks like me". The significance level was $p \leq .05$. Paired sample t-tests were used to determine differences between selected body perceptions with significance set at $p < .01$.

CHAPTER IV

RESULTS

There were 24 males (53%) and 21 females (47%) in the final sample of 45 Native American children at the 2003 Wellness Adventures camp. Table 4.1 presents the demographic and anthropometric characteristics of the participants. There was no significant difference in demographic and anthropometric characteristics by sex. The percent Native American blood quantum was 14% ± 13%. Mean age was 11.3 years with a range of 10 years to 12.6 years. Other measurements of body size such as BMI-for-age percentile, BMI-for-age z-score, stature-for-age percentile and all others were are within normal limits (Table 4.1). Approximately half of the children were normal weight and the remaining half were at risk of overweight (34%) or overweight (18%). There was no significant association between Native American blood quantum and BMI, (Spearman's rho = -.183).

Table 4.2 summarizes energy and fat composition of food portions consumed by camp participants. Selection of usual portion size appeared to be similar in children who were normal weight, at risk and overweight. No association was found between BMI and portion size usually consumed (Table 4.3). Approximately one third of the children at camp reported that they usually consumed the double Whopper ^{R} or large hamburger portion. Over half of all children selected the small hamburger as the portion size

usually consumed. The majority of participants usually consumed the medium (47%) or large (44%) portions of carrots. Most (64%) of the participants usually consumed the 12 ounce soda pop. The majority of participants (71%) usually consumed the small or 1 ounce portion of potato chips. When looking at the orange juice portion usually consumed, 76% of the children chose the large portion of orange juice which was 16 fluid ounces (Table 4.2).

There was a significant and positive rank-order correlation between carrot and orange juice portion usually consumed (Table 4.4). Another significant and positive correlation was found between hamburger portion and potato chip portion usually consumed. Several trends were noted. The first was a positive trend between soda portion and hamburger portion usually consumed. A second trend was a negative trend between soda pop portion and carrot portion usually consumed.

There was a significant and negative rank-order correlation between age and carrot portion usually consumed (Table 4.5). A positive trend was noted between age and soda pop portion usually consumed.

Table 4.6 presents the association between the children's perceived body image and the food portion usually consumed for hamburger, soda pop, and potato chips. Perceived body size had no association with portion size usually consumed for hamburger, soda pop, or potato chips.

The Collins (1991) pictorial figure rating scale for children consists of seven male or female child figures ranging from very thin (1) to very heavy (7). Spearman's rho correlation found no association between percent Native American blood and the figure that children chose to be representative of a healthy child. There was also no

association between percent Native American blood quantum and the figure chosen as "favorite body size".

Table 4.7 summarizes the body size perceptions of the children at the 2003 Wellness Adventures Camp. There was no significant difference between the child's choice of the body size that "looks like me" and the researcher's assessment of the child's body size for either the girls or the boys. "Body size looks like me" was 3.8 for girls and 3.9 for boys, and the "researcher's opinion" was 3.8 for girls and 3.9 for boys. Both girls and boys selected a "favorite body size" that was significantly smaller than their "looks like me" body size, ($p < .05$). There was no significant difference in body perception when comparing "most healthy" with "looks like me" or "most healthy" with "favorite body size".

Table 4.1. Demographic and anthropometric characteristics of Native American children at the 2003 Wellness Adventures Camp. N=45[1]

	Total			Male			Female		
Demographic and Anthropometric Characteristics	n	Mean	Standard Deviation	n	Mean	Standard Deviation	n	Mean	Standard Deviation
Percent NA blood quantum (%)	42	13.7	13.4	21	14.4[1]	14.7	21	12.9	12.2
Weight (lb)	44	103.8	32.3	23	106.0	30.3	21	101.3	34.9
Height (inches)	45	58.2	3.7	24	59.1	3.1	21	57.2	4.2
Age (years)	45	11.3	1.3	24	11.7	1.2	21	10.9	1.4
BMI-for-age	44	21.2	4.6	23	20.9	3.9	21	21.5	5.4
BMI-for-age percentile	44	72.5	27.2	23	71.7	28.9	21	73.4	26.0
BMI-for-age z score	44	0.83	1.0	23	0.8	1.0	21	0.9	1.0
Stature-for- age percentile	45	56.7	24.6	24	60.7	20.0	21	52.1	28.8
Stature-for-age z-score	45	0.23	0.80	24	0.3	0.6	21	0.14	1.0
Weight-for-age percentile	44	69.5	26.8	23	69.4	28.2	21	69.6	25.9
Weight-for-age z-score	44	0.74	1.0	23	0.7	1.0	21	0.8	1.0

[1]Means were not significantly different by gender using independent two-tailed t-test at $p \leq .05$

Table 4.1. Continued

Demographic and Anthropometric Characteristics	Total Sample		Male		Female	
	n	%	n	%	n	%
Weight Category						
Normal Weight	21	48	10	44	11	52
At risk of overweight	15	34	10	44	5	24
Overweight	8	18	3	13	5	24

[1]Means were not significantly different by sex using independent two-tailed t-test at $p \leq .05$

Table 4.2. Calories and fat grams of food portion sizes usually consumed by Native American children at the 2003 Wellness Adventures Camp. N = 45

Food Items and Portion Sizes	Calories	Fat Grams	n Selection[1]	% Portion Usually Consumed
Hamburger				
Small (hamburger)	310	13	24	53
Medium (Whopper)	540	24	7	16
Large (double Whopper)	970	61	14	31
Carrots				
Small (3 carrots)	12	0.3	4	9
Medium (6 carrots)	24	0.6	21	47
Large (9 carrots)	36	0.9	20	44
Soda Pop				
Small (12 ounces)	150	0	29	64
Medium (24 ounces)	300	0	10	22
Large (32 ounces)	400	0	5	11
Potato Chips				
Small (1 ounce)	150	10	32	71
Medium (2 ounces)	300	20	9	20
Large (3 ounces)	450	30	3	7
Orange Juice				
Small (4 fluid ounces)	60	0	2	4
Medium (8 fluid ounces)	120	0	9	20
Large (16 fluid ounces)	240	0	34	76

[1]Selection is the number of children that usually consume the food item.

[2] N for each food item does not equal 45 because some children did not usually consume the food item.

[3] Nutritional information on carrots from *The Nutribase Nutrition Facts-Desk Reference 2nd Edition.* Nutritional information on hamburgers from www.burgerking.com. Nutritional information on other foods from that food's nutrition label.

Table 4.3. Spearman's rho correlation between portion sizes of different foods usually consumed by Native American children and body mass index.[1] N = 45

	Body mass index
Hamburger	.12
Carrot	.03
Soda Pop	.03
Potato Chip	-.06
Orange Juice	.02

[1]The 1-tailed Spearman's rho correlation is not significant between portion size usually consumed and BMI for age z-score.

Table 4.4. Spearman's rho correlation between portion sizes of different foods usually consumed by Native American children.[1] N = 45

	Carrot	Soda Pop	Potato Chip	Orange Juice
Hamburger	-.08	.22[3]	.29[2]	-.06
Carrot		-.24[3]	.04	.37[2]
Soda Pop			.18	.03
Potato Chip				.08

[1]Correlation is 1-tailed Spearman's rho.
[2]$p < .05$
[3]$p < .10$

Table 4.5. Spearman's rho correlation between portion sizes of different foods usually consumed by Native American children and age.[1] N = 45

	Age
Hamburger	.10
Carrot	-.37[2]
Soda Pop	.20[3]
Potato Chip	.05
Orange Juice	.04

[1] Correlation is 1-tailed Spearman's rho.
[2] $p < .05$
[3] $p < .10$

Table 4.6. Spearman's rho correlation between portion sizes of hamburger, soda pop and potato chips usually consumed by Native American children and body perception "looks like me".[1] N = 45

	Body perception "looks like me"
Hamburger	.20
Soda Pop	.13
Potato Chip	.11

[1]The 1-tailed Spearman's rho correlation is not significantly different between portion size usually consumed and body perception "looks like me".

Table 4.7.Body size perceptions of Native American children at the 2003 Wellness Adventures Camp.[1] N = 45

	Male			Female		
Body Perception	n	Mean	Standard Deviation	n	Mean	Standard Deviation
Body size perception "looks like me"[2]	24	3.9	0.7	21	3.8	1.1
Body size perception "my favorite"[3]	24	3.4	0.9	21	3.1	0.7
Body size perception "most healthy"	23	3.9	1.3	21	3.3	0.7
Body size perception "researcher opinion"	24	3.9	0.4	21	3.8	0.8

[1]Body perception figures are on a scale ranging from 1 to 7. The smallest figure is represented by the number 1 and the largest figure is represented by the number 7.
[2]Body size perception "looks like me" is not significantly different from "researcher opinion" of body size based on independent t-test for either sex.
[3]Body size perception "looks like me" is significantly different from body size is "my favorite" based on paired sample t-test at $p < .01$ for both sexes.

CHAPTER V

DISCUSSION

Approximately half of the Native American children who attended the 2003 Wellness Adventures Camp were at risk of overweight or overweight. This agrees with other research. Gray and Smith (2003) studied 155 urban Native Americans aged 5 to 18 and found 63% were at risk of overweight or overweight. Other researchers found that 38% to 40% of Native American youth aged 5 to 18 were overweight (Rinderknecht & Smith 2002, Zephier et al. 1999, Broussard et al. 1991, Jackson 1993). Based on our results we are recruiting the appropriate target audience into the Wellness Camp.

The body mass index for age of Native American children in the present study was similar to Lohman et al. (1999). Lohman et al. (1999) found that the average BMI for Native American 11 year olds was 21.1 for girls and 20.4 for boys. No association was found between Native American blood quantum and BMI in the present study; this association has not been reported in the research literature. Factors other than Native American blood quantum influence the BMI of Native American children. Eriksson et al. (2003) found that BMI was higher in children who had fewer people in the home, father's low socioeconomic status, and high maternal BMI at delivery. Perhaps additional factors influence BMI.

No studies were found that determined specific portion size of foods consumed or usually selected by Native American children. Approximately one-third of the Native American children who attended the 2003 Wellness Adventures Camp usually consumed a double Whooper ^{R} or large hamburger portion size, which provided 970 calories and 61 grams of fat. The recommended dietary allowance for energy for children aged 9 to 13 years old is 2,071 calories/day for girls and 2,279 calories/day for boys (Food and Nutrition Board 2003). When using the Dietary Goal of 30% of calories from fat, this means the average girl should consume no more than 69 grams of fat/day and the average boy should consume no more than 76 grams of fat/day (Food and Nutrition Board 2003). One double Whooper ^{R} provides nearly half of the energy and approximately 85% of the fat recommended for a child in a day. Eating high energy, high fat foods such as the double Whooper^{R} could result in the child not being able to consume other nutrient dense foods without going over the daily recommended level of energy. When excess energy is consumed compared to what is expended in daily activities the individual becomes overweight (McCrory et al. 2000, Young & Nestle 2002).

In the present study, the portion size for orange juice was influenced by the food guide pyramid. In the food guide pyramid a serving of juice is ¾ cup and a serving of raw carrots is ½ cup. The other portion sizes were based on what the researcher felt was a typical portion size. The majority of participants usually consumed the medium (47%) or large (44%) portion of carrots. Carrots have few calories and are nutrient dense, so they are an appropriate snack for children. Gittelsohn et al. (2000) found that the average Native American child ate about 2 snacks a day, and the common snacks were chips, crackers, cookies, cheese, fruit, and popcorn (Gittelsohn et al. 2000). A study by Cullen

et al. (2001) determined the frequency of fruit, juice, and vegetables consumed by children, but not the portion sizes consumed. Encouraging the children to consume nutrient dense, low calorie carrots and other vegetables and fruits as snacks may help to lessen the rising rates of overweight in Native American children.

Most of the children in the present study usually consumed the 16 fluid ounce portion of orange juice providing 240 calories. There was a significant and positive rank-order correlation between carrot and orange juice portion usually consumed in the present study. Perhaps an association between carrots and orange juice portion exists because the children feel they are "healthy" foods.

Most of the participants reported they usually consumed the 12 ounce soda pop providing 150 calories. Gittelsohn et al. (2000) found that children consumed 1.7 cups (approximately 14 fluid ounces) of Kool-Aid, Powderade, or soda pop daily.

A significant and positive correlation was found between potato chip and hamburger portion usually consumed, and both foods are high in fat and calories. This is disconcerting because eating excessive amounts of fat and calories may contribute to overweight. In adults, larger portions lead to greater energy intake (Rolls et al. 2002).

In the present study, there was a significant and negative rank-order correlation between age and carrot portion usually consumed. A positive trend was noted between age and soda pop portion usually consumed. Perhaps children are filling up on larger portions of soda pop and do not have room for carrots because they are already full. In a study of 155 urban Native American youth ages 5 to 18 years old, Gray and Smith (2003) found that soda consumption was positively correlated with higher energy consumption and increased with age.

Based on portion size data, it is important to instruct Native American children about portion sizes. Children need to be taught appropriate portion sizes so that they can make informed decisions about their energy intake in order to prevent excess energy intake.

Truby and Paxton (2002) stated that body figure scales are used to determine body perception because they are simple, quick to use and easy to comprehend the visual image. The researcher assessed body size of the Native American children and there was no significant difference between body size "looks like me" and the "researcher opinion" of the children. This indicates the children perceived their body size appropriately. Allison (1995) stated that the Collins 1991 pictorial instrument had good test-retest reliability of 3 days for self, (.71) and; ideal self, (.59), but not for; ideal other child, (.38) (Allison 1995). No other research compared researcher opinion of body size to perceived body size.

Other researchers asked children to identify their "ideal body size" and not their "favorite body size" as was done in the present study. Because of this, direct comparisons cannot be made between the present study and other research, but a comparison can be discussed if it is assumed ideal is the same as favorite.

Kostanski and Gullone (1999) reported body dissatisfaction or satisfaction as a discrepancy between the child's current perceived size body and his or her ideal body size. In body dissatisfaction, the current perceived body size is larger than the ideal body size. In the study by Kostanski and Gullone (1999), 34% of the girls and 30% of the boys reported there current size to be larger than their ideal body size. Rolland et al. (1997) found that among Australian schoolchildren aged 12 to 18 years, 50% of girls and 33% of

boys were dissatisfied with their bodies and wanted to be thinner. No studies were found involving Native American children.

In the present study, the body size that children identified as their favorite was significantly smaller than the body size the children thought "looks like me" (Table 4.7). On the Collins (1991) body perception scale of 1 to 7, the boys marked 3.9 as body size "looks like me" and their favorite was 3.4. For the girls the body size "looks like me" was 3.8 and favorite was 3.1. Although these numbers were statically different, the numbers have only a slight difference between each other when marked on the Collins body perception scale and this difference may not be of practical importance. Thompson et al. (1997) had 817 black and white fourth-grade children identify on the Collins pictorial scale the body figure that represented the ideal and current body size for both boys and girls. Thompson et al. (1997) had similar results to the present study. Students identified the following body sizes as ideal and current body size respectively. Black males 4.04 and 4.15, Black females 3.64 and 4.19, white males 3.88 and 3.94, and white females 3.32 and 4.03. Thompson reported significant difference in cross-gender comparisons of body size satisfaction (ideal body size – current body size) with females being found to experience more body dissatisfaction. Thompson did not analyse the difference between ideal and current body size in subjects of the same gender. In the present study, the children may have body dissatisfaction, but this dissatisfaction can't be concluded because the children weren't asked directly if they were dissatisfied with their current body size.

CHAPTER VI

SUMMARY AND CONCLUSIONS

The current research found no association between percent Native American blood and BMI. Factors other than percent Native American blood are affecting the BMI of Native American children. The current research found that children ate portion sizes of some foods that are larger than the USDA recommendations based on the Food Guide Pyramid. Children are not eating portion sizes based on the Food Guide Pyramid for some foods. The current research supports the idea that Native American children need to be educated on healthy portion sizes and the calories and fat in foods so that the children can make healthy decisions about their diet. The current research found that children identified a body size as their favorite that was significantly smaller than the body size the children thought "looks like me". This indicates that some children may have body dissatisfaction.

Limitations

The first limitation of this study was the small sample size. Another limitation was the portion size of the carrots. The smallest carrot portion only contained 3 baby carrots and the largest contained 9 baby carrots. In future studies, the carrot portion sizes need to be based on the portion size from the Food Guide Pyramid, which is ½ cup of raw carrots. One cup of raw carrots could be the medium portion size in future studies.

Another limitation was relying on the children to accurately tell their usual portion size consumed. Children may under or over estimate their portion sizes. Another limitation was the lack of food intake data. The children were not asked how often they consumed the portion size consumed.

Implications for Research and Practice

The current research documents the need for programs to be available to Native American children to change food intake behaviors of the child. The current study also supports the Wellness Adventures camp educating children in a healthy diet and lifestyle because of the number of overweight and risk of overweight children at the 2003 Wellness Adventures Camp. Because of the statistical difference between "looks like me" and favorite body size, dietitians need to be aware of the difference between the two and future studies need to be conducted. In future camps children need to be asked if they are dissatisfied with their current body size.

Future Wellness Adventures Camps hosted by the Indian Health Care Resource Center of Tulsa will continue to emphasize the calories and fat in different portion sizes so the children can make informed decisions about their energy intake. In future camps, if the children's body perception is addressed, the children will be asked to identify the "ideal body size" and not the "favorite body size". The "ideal body size" will be used in order to directly compare results to other research studies. In future studies it would be beneficial to study other factors that influence the BMI of Native American children, such as food intake of the family to assess total calorie and fat intake.

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APPENDICES

APPENDIX A
Consent Form – Parents
Demographic Information Collected Form

INFORMED CONSENT FOR PARTICIPATION IN RESEARCH ACTIVITIES
Parent
Anthropometrical Measurements, Portion Sizes Consumed and Body Image Perceptions of Native American Children

PURPOSE OF THIS RESEARCH STUDY
The present research project is being conducted by Oklahoma State University and Indian Health Care Resource Center of Tulsa. The purpose of this project is to help develop nutrition and health programs to lower the risk of overweight in Native American children.

WHAT WILL BE DONE
The child's height and weight will be measured. Skinfold measures will be taken on the upper arm and calf of the leg to measure percent body fat. The child will remain clothed but shoes will be removed. The child will be asked to point to their usual portion size eaten of five different foods: hamburger, raw carrots, soda pop, potato chips, and orange juice. The children will be asked three questions related to body size while viewing drawings of different sized children. The questions are: Which body shape looks most like you; which body shape looks closes to your favorite body shape; and which body shape looks the healthiest to you. There will be no follow-up procedures.

POSSIBLE BENEFITS
The nutrition and health program developed from this information will be helpful in preventing overweight in children and the long term goal of preventing type 2 diabetes.

POSSIBLE RISK AND DISCOMFORTS
A child may feel uncomfortable when asked about the pictures of body sizes or while being measured. The child can refuse to answer any questions or partake of any part of the study. They will still stay at camp and any data collected will not be used if the child wants to not participate.

CONFIDENTIALITY OF RECORDS
Any information learned from the child cannot be identified with the child by name. A subject number will be assigned to your child. After data collection and making sure that a child's data is correctly identified, the name of the child will be removed from the form by cutting the name off of the form and then can only be identified by the subject number. When reporting the information learned from this study, only group information will be discussed.

OFFER TO ANSWER QUESTIONS
I or my child may ask questions to the principal investigator, Karen Rodgers,RD/LD at who is responsible for this research study. You may also ask question to Nancy

O'Banion MS, Director of Health and Wellness at the Indian Health Care Resource Center of Tulsa.

COST TO SUBJECT
There will be no cost to the child or the parent to participate in this study.

VOLUNTARY PARTICIPATION WITH RIGHT OF REFUSAL
I have been informed that my child's participation in this research study is voluntary. Myself or my child are free to withdraw consent for participation in this study at any time without penalty or loss of benefits to which we may otherwise be entitled.

IRB REVIEW AND IMPARTIAL THIRD PARTY
This study has been reviewed and approved by the Oklahoma State University Institutional Review Board (IRB). A representative of that Board, Sharon Bacher is available to discuss the review process or my rights as a research subject. The telephone number of the IRB Office is (405) 744-5700. You may also contact Karen Rodgers or Nancy O'banion at 918-382-1273 or Dr. Kathryn S. Keim at 405-744-5040.

SIGNATURE FOR CONSENT: The above-named investigator has answered my questions and I agree that my child may be a participant in this study. I have received a copy of this consent form.

Print Subject's Name: _____ Date: _____

Parent or Guardian's Signature: _____ Date: _____

Witness's Signature: _____ Date: _____

Signature: _____ Date: _____

INFORMED ASSENT FOR PARTICIPATION IN RESEARCH ACTIVITIES
Script for Children Assent

The following will be read to the child on the first day of camp before any data collection is conducted. The child will sign the "Record of Assent Form" to show assent to participate. Both the child must assent and the parent consent for information from the child to be used in research. Read the following:

PURPOSE:
The present research project is being conducted by Oklahoma State University and Indian Health Care Resource Center of Tulsa. The purpose of this project is to help develop nutrition and health programs to lower the risk of overweight in Native American children.

WHAT WILL BE DONE
Your height and weight will be measured. You remain clothed but shoes will be removed.
Skinfold measures, which are slight pinches with small tool, will be taken on the upper arm and calf of the leg to measure percent body fat.
You will be asked to point to your usual portion size eaten of five different foods: hamburger, raw carrots, soda pop, potato chips, and orange juice.
You will be asked three questions related to body size while viewing drawings of different sized children. The questions are: Which body shape looks most like you; which body shape looks closes to your favorite body shape; and which body shape looks the healthiest to you.
There will be no follow-up procedures.

POSSIBLE BENEFITS
The nutrition and health program developed from this information will be helpful in preventing overweight in children and the long term goal of preventing type 2 diabetes.

POSSIBLE RISK AND DISCOMFORTS
You may feel uncomfortable when being asked about the pictures of body sizes or while being measured. You
can refuse to answer any questions or partake of any part of the study.
You will still stay at camp and any data collected will not be used if you do not participate.

CONFIDENTIALITY OF RECORDS
Any information learned from you cannot be identified with your name.

A subject number will be assigned to you.
After data collection and making sure your information is correctly matched across all data forms, your name will be removed from the form by cutting the name off of the form and then can only be identified by the subject number.
When reporting the information learned from this study, only group information will be discussed.

OFFER TO ANSWER QUESTIONS
You may ask questions to the principal investigator, Karen Rodgers,RD/LD at who is responsible for this research study. You may also ask question to Nancy O'Banion MS, Director of Health and Wellness at the Indian Health Care Resource Center of Tulsa.

COST TO SUBJECT
There will be no cost to you to participate in this study.

VOLUNTARY PARTICIPATION WITH RIGHT OF REFUSAL
You have been informed that your participation in this research study is voluntary. You stop participating in this study at any time without penalty to you.
Please sign your name to the form to show assent.

IRB REVIEW AND IMPARTIAL THIRD PARTY
This study has been reviewed and approved by the Oklahoma State University Institutional Review Board (IRB). A representative of that Board, Sharon Bacher is available to discuss the review process or my rights as a research subject. The telephone number of the IRB Office is (405) 744-5700. You may also contact Karen Rodgers or Nancy O'banion at 918-382-1273 or Dr. Kathryn S. Keim at 405-744-5040.

Assent Form – Child

I, _____, have been read the assent script .
Print Subjects Name Here

Signature of child _____ Date _____

Witness _____ Date _____

Signature: _____ Date _____

Appendix B

DEMOGRAPHIC FORM

Name _____

ID # _____

Child's Name _____

Sex Male Female

Age _____years _____ months

Percent blood quantum on CDIB card _____

Appendix C

Data Measurement Form Anthropometric

Name _____

ID # _____

Weight _____ pounds

Height _____

Waist Circumference _____cm

Hip Circumference _____cm

BMI _____

Percent Body Fat

Triceps _____

Calf _____

Percent Body Fat _____

Appendix D

Data Measurement Form Food Portions

Name _____

ID # _____

Circle the portion size chosen

Hamburger from Burger King

Regular Hamburger	Whooper Junior	Whooper

Raw Baby Carrots

3 baby carrots	6 baby carrots	9 baby carrots

Dark soda pop

12-ounce can	24-oz bottle	32-oz cup

Regular Potato Chips

1 ounce	2 ounces	3 ounces

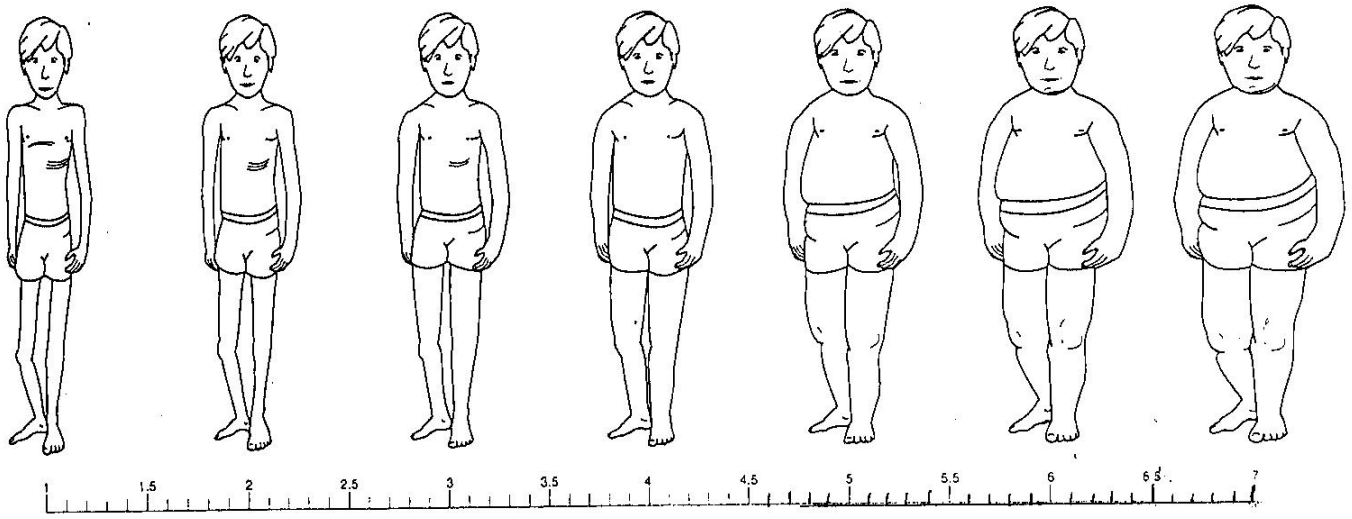
Orange Juice

4 ounces	8 ounces	16 ounces

15

ID # _____

Body Figure Perceptions

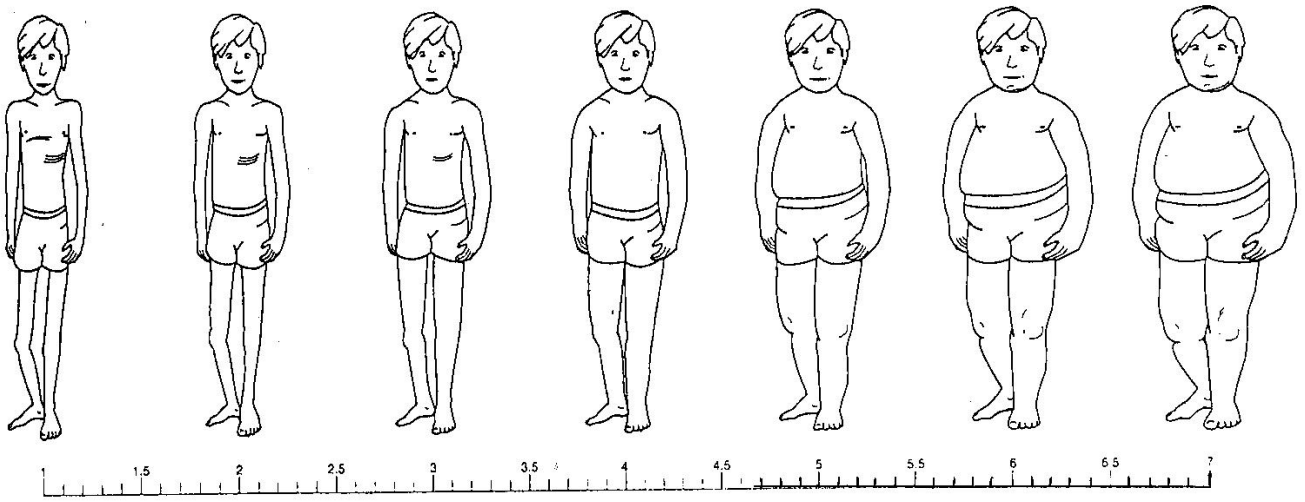


Most Looks Like You

The Children's Eating Lab, UCHSC & The Children's Hospital, Denver, CO

ID #_____

Body Figure Perceptions

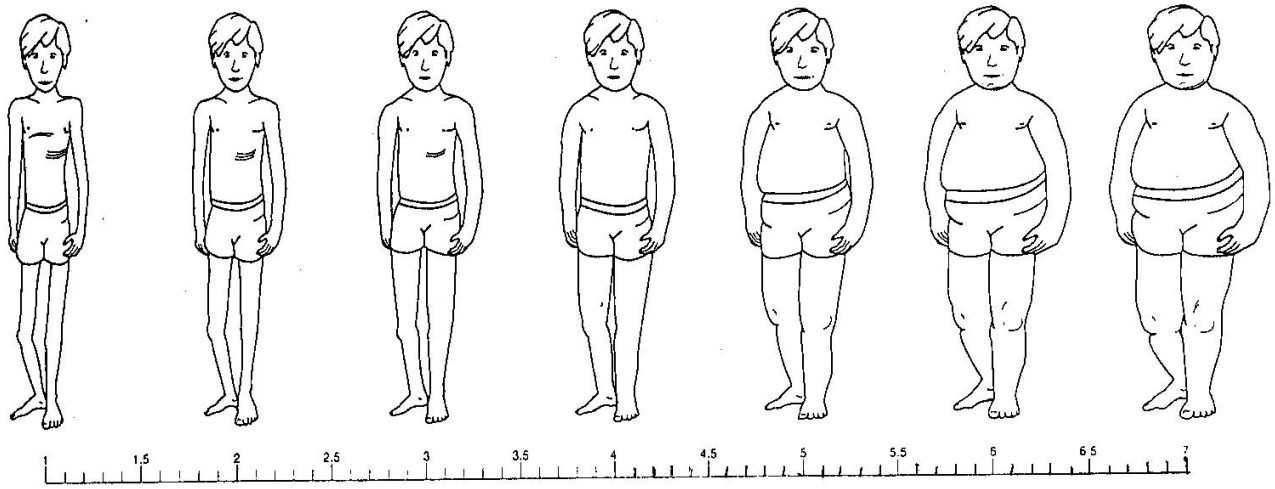


Looks Closes to your Favorite Body Shape

The Children's Eating Lab, UCHSC & The Children's Hospital, Denver, CO

ID #_____

Body Figure Perceptions



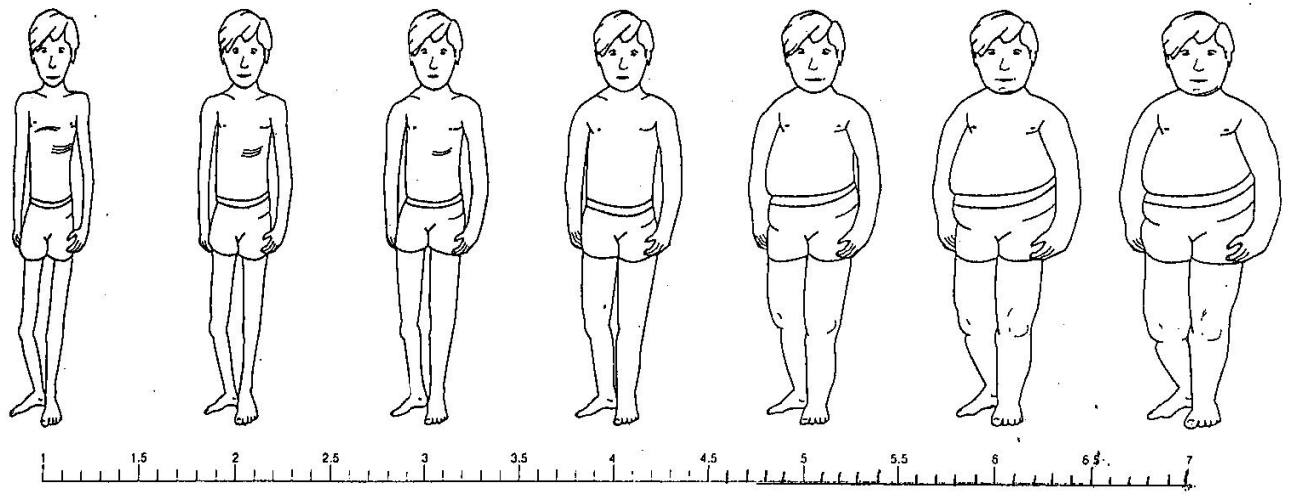
Looks the Healthiest

The Children's Eating Lab, UCHSC & The Children's Hospital, Denver, CO

Name _____

ID # _____

Body Figure Perceptions



The Children's Eating Lab, UCHSC & The Children's Hospital, Denver, CO

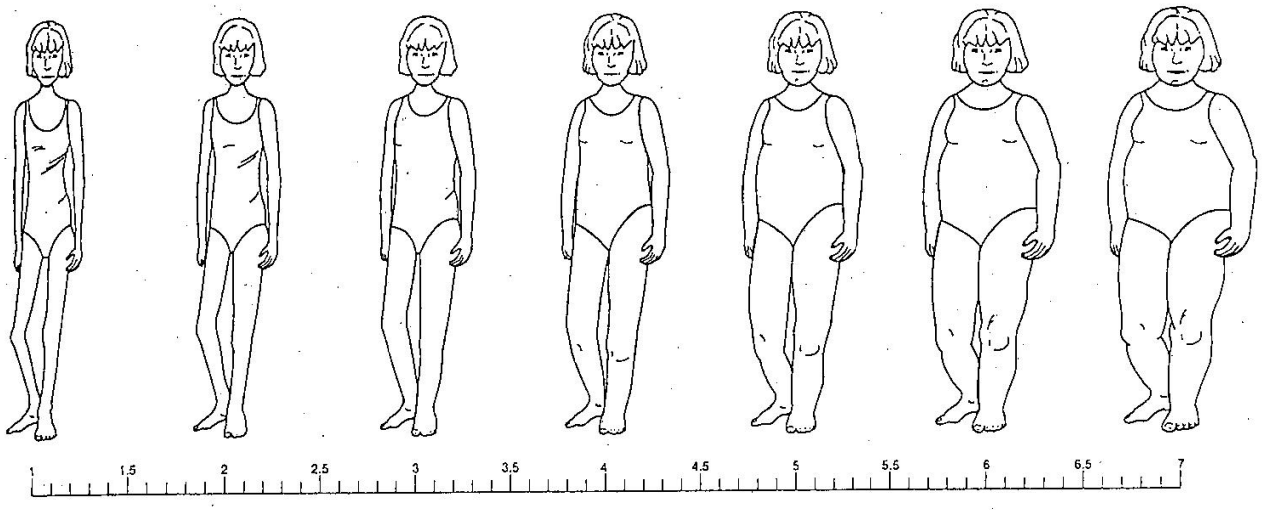
Personal View

Appendix F

Name _____

ID # _____

Body Figure Perceptions

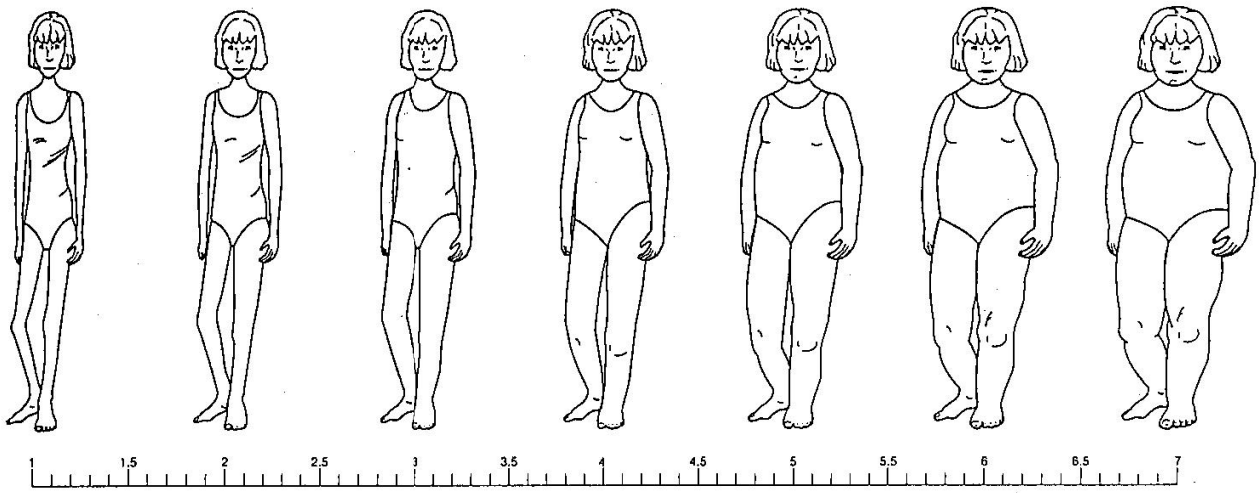


Looks Closes to your Favorite Body Shape

The Children's Eating Lab, UCHSC & The Children's Hospital, Denver, CO

ID # _____

Body Figure Perceptions



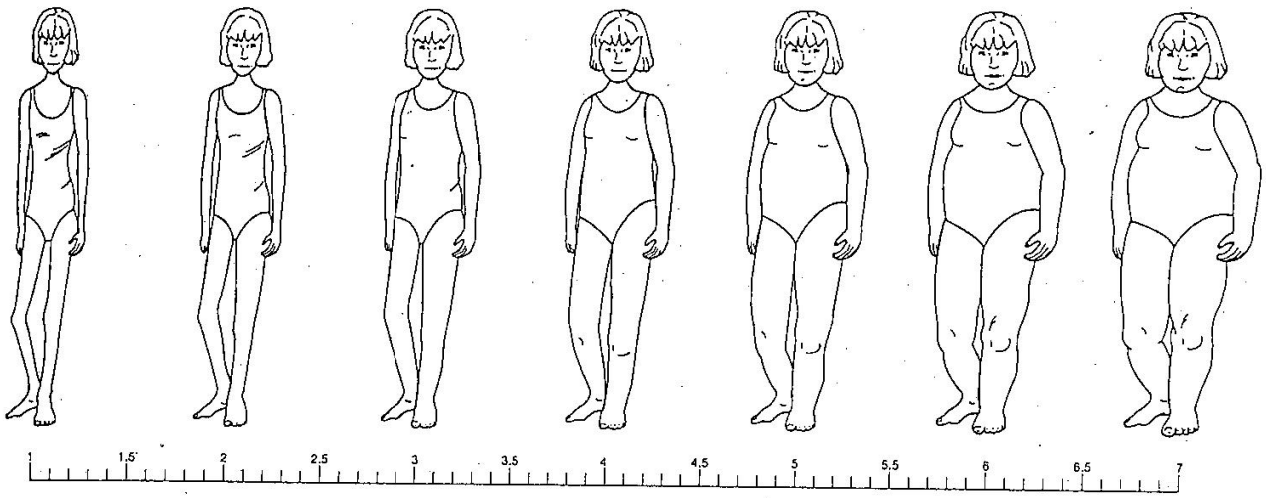
Looks the Healthiest

The Children's Eating Lab, UCHSC & The Children's Hospital, Denver, CO

Name _____

ID # _____

Body Figure Perceptions



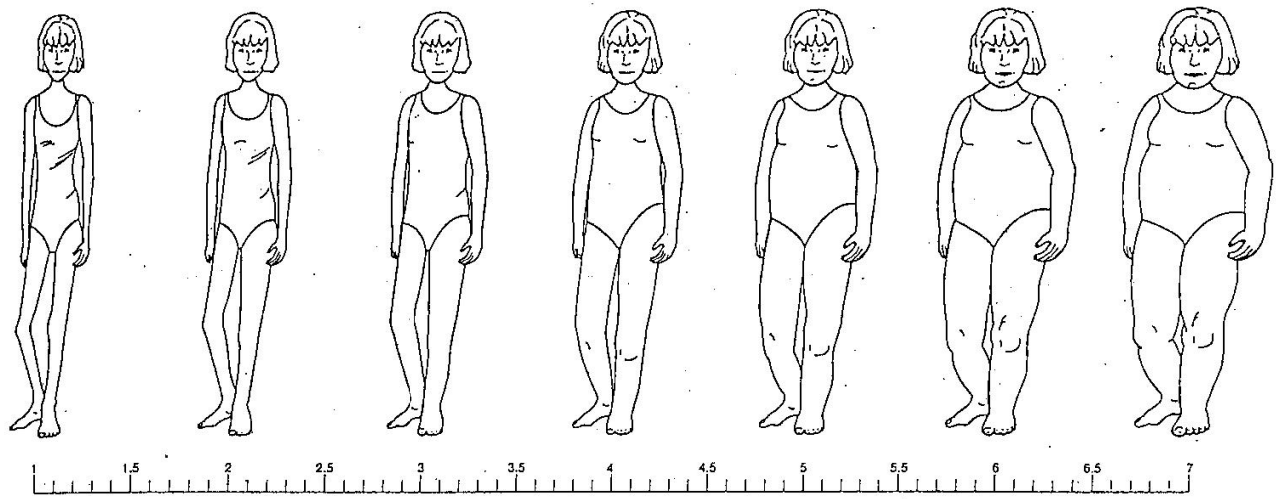
Most Looks Like You

The Children's Eating Lab, UCHSC & The Children's Hospital, Denver, CO

Name _____

ID # _____

Body Figure Perceptions



* Personal View

The Children's Eating Lab, UCHSC & The Children's Hospital, Denver, CO

Appendix G

Oklahoma State University
Institutional Review Board

Protocol Expires: 6/30/2004

Date: Wednesday, July 02, 2003 IRB Application No HE0382

Proposal Title: ANTHROPOMETRICAL MEASUREMENTS, PORTION SIZES CONSUMED, AND BODY IMAGE PERCEPTIONS OF NATIVE AMERICAN CHILDREN

Principal Investigator(s):

Karen Rodgers
816 West 119th Place
Jenks, OK 74037

Deborah Norris
333G HES
Stillwater, OK 74078

Kathryn Keim
421 HES
Stillwater, OK 74078

Reviewed and Processed as: Expedited (Spec Pop)

Approval Status Recommended by Reviewer(s): Approved

Dear PI :

Your IRB application referenced above has been approved for one calendar year. Please make note of the expiration date indicated above. 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.

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.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. 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 this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved projects are subject to monitoring by the IRB. If you have questions about the IRB procedures or need any assistance from the Board, please contact Sharon Bacher, the Executive Secretary to the IRB, in 415 Whitehurst (phone: 405-744-5700, sbacher@okstate.edu).

Sincerely,

Carol Olson, Chair
Institutional Review Board

Appendix H

OKLAHOMA STATE UNIVERSITY

AFFILIATION AGREEMENT

between

Indian Health Care Resource Center of Tulsa

and

Oklahoma State University

This agreement is made this ____day of May, 2003, between the Indian Health Care Resource Center of Tulsa (IHCRC), hereinafter referred to as "Facility" and Oklahoma State University, hereinafter referred to as "University."

WHEREAS, Facility possesses the capability for providing learning experiences for University students and data collection; and

WHEREAS, University is currently conducting research involving Native American (NA) children desires to obtain the assistance of the Facility in furthering its educational and research objectives for students.

THEREFORE, IT IS MUTUALLY AGREED AS FOLLOWS:

1. **University**, through its designated representative, shall coordinate with Facility, through its designated representative, to make learning experiences available to enrolled students.

2. **University** acknowledges that its students shall be expected to comply with all current policies and procedures of the Facility.

3. **University** shall, as mutually agreeable to the parties, provide by the beginning of each term: (a) number of students and the dates and hours they will be assigned.

4. **University** shall provide a faculty member who will serve as liaison with Facility Representatives when necessary.

5. **University** shall provide and maintain the records and reports necessary for data collection.

6. **Facility** shall provide opportunities for data collection.

7. **Facility** shall provide orientation to the related University faculty and students to acquaint them with physical facilities, policies and procedure of the facility, and, where appropriate, to the needs of individuals and/or groups with which they will be working.

8. **Facility** shall provide, when necessary, available conference rooms, dressing rooms, and locker space for University students participating in this program.

9. **University** students shall be required to carry health insurance in accordance with the University's prevailing policies.

10. **University** and **Facility** shall not discriminate against anyone applying to or enrolled in the program contemplated under this agreement or employed by either party because of race, color, creed, sex, or national origin.

11. **University** faculty, together with **University** students shall respect and conscientiously observe the confidential nature of all the information which may come to either or all of them, individually or collectively, with respect to patients and individually identifiable health information, and shall be required to execute a Confidentiality Agreement provided by the **Facility. University**, its students, agents and employees (collectively, "University") acknowledges that it may have access to confidential information including, but not limited to, patient identifying information regardless of the type of media on which it is stored (e.g., paper, fiche, electronic, etc.) with which it may come into contact. **University** agrees that it will not use or further disclose patient identifying information other than as permitted by this Agreement or required by law. **University** shall comply with all applicable local, state, and federal laws and regulations, specifically including the privacy and security standards of the Health Insurance Portability and Accountability Act of 1966 ("HIPAA), as amended from time to time. To the extent required by HIPAA and the regulations, promulgated thereunder, **University** agrees to provide access to its books and records to the Secretary of Health and Human Services, governmental officers and agencies and **Facility. Univerisity** agrees to incorporate changes or amendments to protected health information when notified to do so by **Facility. University** will use best effort to ensure that all of its subcontractors and agents to which it provides protected health information pursuant to the terms of this Agreement shall agree to all of the same restrictions and conditions to which **University** is bound. **University** agrees to report to **Facility** any unauthorized use or disclosure immediately upon becoming aware of it. Upon termination of this Agreement, for whatever reason **University** agrees to return or destroy all protected health information.

12. This Agreement and/or rights, duties and obligations hereunder may not be assigned by either party.

13. This Agreement constitutes the entire Agreement between the parties and supersedes all prior agreements, arrangements and understanding relating to the subject matters hereof. Any modification hereto shall be valid only if set forth in writing and signed by all parties hereto.

14. This agreement period is June 15, 2003 through December 30, 2003 and may be terminated by either party. In the event this agreement is to be terminated, the terminating party shall send written notice to the other party delivered by registered mail thirty days in advance of termination.

This contract is executed in duplicate, each of which is to be regarded as an original by both parties, and this Agreement has been executed as of the day and year first above written.

IN WITNESS WHEREOF, the parties hereto have set their hands as of the date set forth above.

INDIAN HEALTH CARE RESOURCE CENTER OF TULSA

BY: Carolita Lewis
Name
Title

Date 5-19-03

OKLAHOMA STATE UNIVERSITY

BY: for Carol Olson
J.W. Alexander
Interim Vice President for Research

Date 6-4-03

Appendix I

IRB # 00000908
Principal Investigator: Janis E. Campbell, Ph.D. ; IHCRC of Tulsa Investigator: Nancy O'Banion
Department/Division: Oklahoma State Department of Health – Chronic Disease Service
Telephone number: (405) 271-4072 x-57129 (918) 382-1220 (Tulsa)

INFORMED CONSENT FOR PARTICIPATION IN RESEARCH ACTIVITIES
(Adults and Minors)
Oklahoma Racial and Ethnic Approaches to Community Health 2010 (REACH) Native American Project to Address Diabetes and Cardiovascular Diseases

PURPOSE OF THIS RESEARCH STUDY: I have been asked to participate in this research study because there is a large disparity between American Indian and the general population of Oklahoma in areas of diabetes and cardiovascular disease morbidity and mortality. The purpose of this study is to implement physical activity intervention in 40 Indian communities across Oklahoma and evaluate their effectiveness in reduction of not just diabetes and cardiovascular disease morbidity and mortality but also risk factors such as sedentary lifestyle, hypertension, and obesity. My participation in this study is expected to last until September 30, 2004. There is a total of 3000 other Native Americans also participating in this study.

WHAT WILL BE DONE: I understand that clinical tests will not be used in this research study. I understand that participants are expected to engage in some moderate physical activities on a periodic basis and participate in evaluations that will include measures of height and weight, body fat percentages, waist to hip ratios, cardiovascular fitness, my journal of participation and accomplishments, and health status/history form. I understand that in order to participate in the study, I will be required to undergo a basic physical exam. If I choose to have this exam performed at Indian Health Care Resource Center, the exam will be performed at no charge.

POSSIBLE BENEFITS: Even though there might not be any direct benefit to me, possible benefits of physical activity have been documented through scientific research. Those include improvements in health and quality of lifestyle, reduction in diabetes and cardiovascular disease mortality, reduction of hypertension and cholesterol levels, improvements in glucose tolerance, and finally fat loss.

POSSIBLE RISKS AND DISCOMFORTS: I understand that risks that are involved with engaging in physical activities primarily affect muscles, joints, bones, tendons, and ligaments but are not limited to those. Injuries, pains, or discomforts range from muscle tightness to sprains, ligament separations or tears and broken bones. Engaging in mild or moderate physical activity usually carries less risk as compared to vigorous activities or competitive contact sports. Anyone engaging in physical activity, particularly those persons who are at risk of diabetes or cardiovascular disease or who have already been diagnosed with those conditions and who have not been routinely involved with an exercise program, are at increased risk of more serious adverse events such as stroke, heart attack and possible sudden death. I understand that I should consult my physician before engaging in physical activity.

ALTERNATIVES TO THIS PROJECT: I understand that persons who are interested in participating in physical activity and do not wish to be involved with this project can always engage in any type of physical activity on their own or through other community organizations that provide this type of services.

CONFIDENTIALITY OF RECORDS: Any information learned from this study in which I might be identified will be maintained as confidential and will be disclosed to those not associated with this study only with my permission. By signing this form, however, I allow the research study investigator to make my records available to the Institutional Review Boards (IRB) reviewing this study and regulatory agencies as required by law. The results of this study may be published or presented at medical meetings: however, individual participants will not be identified by name or any other marker through which they could be identified. I UNDERSTAND THAT MY MEDICAL RECORDS MAY CONTAIN INFORMATION THAT INDICATES THAT I HAVE A COMMUNICABLE OR VENEREAL DISEASE WHICH MAY INCLUDE, BUT IS NOT LIMITED TO, DISEASES SUCH AS HEPATITIS, SYPHILIS, GONORRHEA, OR THE HUMAN IMMUNODEFICIENCY VIRUS, ALSO KNOWN AS ACQUIRED IMMUNE DEFICIENCY SYNDROME (AIDS). With this knowledge, I give my consent to the release of information in my medical records pertaining to my physical fitness and records of participation in this study to researchers and others associated with this study.

NOTICE TO PATIENTS: Information in your medical record that you have a communicable or venereal disease is made confidential by law and cannot be released without your permission except in limited circumstances including disclosure to persons who have risk exposures, release pursuant to a court order or the Department of Health, release among health care providers or release for statistical or epidemiological purposes. When such information is released, it cannot contain information from which you could be identified unless release of that identifying information is authorized by you, by an order of the court or the Department of Health, or by law.

OFFER TO ANSWER QUESTIONS AND RESEARCH INJURY NOTIFICATION: The principal investigator, Dr. Janis E. Campbell who is responsible for this research study, has offered to and has answered any and all questions regarding my participation in this demonstration study. She can be reached at 405-271-4071 ext. 57129. If I have any further questions or in the event of a research related injury, I can contact Shari Kinney, the Oklahoma State Department of Health Institutional Review Board Administrator at 405-271-6617 ext. 56738.

SPONSOR /RESULTS: Centers for Disease Control and Prevention from Atlanta, GA is funding this demonstration study. Participants will be informed about research findings from educational materials provided by Chronic Disease Service (Central Coordination Organization) through tribal project coordinators.

COST TO THE SUBJECT / PAYMENT TO SUBJECT FOR PARTICIPATION: I understand there will be no cost to me to participate in this study.

PROVISION OF TREATMENT AND COMPENSATION FOR INJURY: If I suffer from an injury as a direct result of this research, medical care may be obtained by me in the same manner as you would ordinarily obtain medical treatment. No provision has been made for financial payments or other forms of compensation (such as lost wages, medical cost reimbursement, lost time or discomfort) with respect to such injuries. However, I do not waive any legal rights by signing this consent form and the copy of this consent form will be given to you.

VOLUNTARY PARTICIPATION WITH RIGHT OF REFUSAL: I have been informed that my participation in this research study is voluntary. I am free to withdraw my consent for participation in this study at any time without penalty or loss of benefits to which I may otherwise be entitled.

IRB REVIEW AND IMPARTIAL THIRD PARTY: This study has been reviewed and approved by the Oklahoma State Department of Health Institutional Review Board (IRB). A representative of that Board, Shari Kinney, is available to discuss the review process or my rights as a research subject. The telephone number of the IRB Office is (405) 271 6617 ext. 56738.

SIGNATURE FOR CONSENT: The above-named investigator has answered my questions and I agree to be a participant in this study.

Print Subject's Name: _____ Date: _____

Subject's Signature: _____ Date: _____
(parent or guardian if subject is a minor)

Parent or Guardian's Signature: _____ Date: _____
(if applicable)

Witness's Signature: _____ Date: _____

IHCRC of Tulsa Investigator's Signature: _____ Date: _____

(If applicable) I have translated this form into the _____ language.

Translator's Signature: _____ Date: _____

IRB #_____

Principal Investigator: Janis E. Campbell, Ph.D., IHCRC of Tulsa Investigator: Nancy O'Banion
Department/Division: Oklahoma State Department of Health – Chronic Disease Service
Telephone number: (405) 271-4072 x-57129

Written Child Assent Form (Children)

Oklahoma Racial and Ethnic Approaches to Community Health 2010 (REACH)

Native American Project to Address Diabetes and Cardiovascular Diseases

I have been informed that my parent(s) have given permission for me to participate, if I want to, in a study concerning involvement in physical activity that can potentially benefit my overall well being. My participation in this project is voluntary and I have been told that I may stop my participation in this study at any time. If I choose not to participate it will not affect me in any way.

NAME:_____

VITA

Karen Renee Rodgers

Candidate for the Degree of

Master of Science

Thesis: ANTHROPOMETRIC MEASUREMENTS, PORTION SIZES USUALLY CONSUMED AND BODY IMAGE PERCEPTION OF NATIVE AMERICAN CHILDREN

Major Field: Nutritional Sciences

Biographical:

Education: Graduated from Union High School, Tulsa, Oklahoma, in May 1992; received Bachelor of Science degree in Nutritional Sciences with Dietetics Option from Oklahoma State University in May 1998. Completed Dietetic Internship from Oklahoma State University in May 1999. Completed the requirements for the Master of Science degree with a major in Nutritional Sciences at Oklahoma State University in July 2004.

Experience: Worked as a clinical dietitian for Indian Health Care Resource Center of Tulsa from May 2000 to present. Worked as a graduate assistant for Dr. Barbara Brown at Oklahoma State University from May 1998 to December 1998.

Professional Memberships: Northeastern Oklahoma Diabetes Educators, American Association of Diabetes Educators, American Dietetic Association, Oklahoma Dietetic Association