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Evaluation Of Effectiveness Of Classroom-Based Nutrition Intervention On Changes In Eating Behavior In African American Parents/caregivers And Their Children.

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Evaluation of effectiveness of classroom-based nutrition intervention on changes in eating behavior in African American parents/caregivers and their children.

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DEDICATION

I dedicate my work to my parents: Nemer & Hamida Akil, my entire family, my lovely son: Ali, my brother: Dr. Khodr Akil for his impressive personality, help, and unlimited support, and to my sister: Abir and her family for their constant encouragement and love.

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Chapter 1 Introduction

Obesity/overweight is an epidemic health concern that impacts the lives of millions of people. In 1999-2004, the prevalence of overweight and obesity was 17.1% of the children and adolescents, and 32.2% of the adults [1]. Obesity rates have increased steadily over the past 20 years in the US [2]. A 2006 report by Ogden et al showed that the obesity rate is expected to continue to rise, with 13.9% of children age 2 to 5 years considered overweight. However, 26.2% were considered at risk of becoming overweight [1]. The above results offset the objectives of healthy people 2010, in which their overall aim was to decrease the prevalence of obesity to 15% in adults and 5% in children [3].

Research studies have shown that obese children are susceptible to various chronic diseases such as type 2 diabetes mellitus, coronary heart disease (CHD) and stroke, osteoarthritis, and some types of cancers such as colon cancer and postmenopausal breast cancer [4-8]. Pontiroli et al study reported that the chronic diseases used to be restricted in adulthood, they became more common in young children [9]. This is most likely because overweight/obesity is an essential risk element in developing such diseases [10]. Studies have also shown that there is a close relationship between overweight/obesity status during childhood and the high risk of developing cardiovascular diseases in adulthood [11, 12]. Furthermore, obesity causes shortening in life expectancy of the US twenty first century generation [13].

Obesity not only causes long term compromised health status but also puts a great burden on health care costs. In the US, 10% of the total medical expenditures were related to obesity and overweight problems [14, 15]. Between 2001 and 2005, childhood obesity related costs inflated from $125.9 million to $237.6 million. [16].

Among all the ethnic populations, African Americans have the highest obesity rate, being 39.2% for non-Hispanics black women and 31.6% among non-Hispanics black men [17]. Another study showed an increase in the overweight prevalence rate from 8.5% in 1983 to 10.2% in 1995, for preschoolers from low socio-economic groups in the US [18]. Several studies stressed that such an increase, in the prevalence of obesity rate, requires an initiation in the prevention activities or strategies at an early age among the African American preschoolers, for being at high risk for overweight and obesity [19-21].

There are several risk factors associated with obesity ranging from child to family and to community level factors. However, only the family influences on obesity will be presented in this study. Davison et al mentioned that the parents/caregivers impact obesity in various ways, such as their attitudes toward healthy eating, physical activity, food preferences, feeding practices, parental monitoring of food intake, and sedentary behaviors [22].

The main drive behind parental involvement in the nutrition intervention is to increase their nutrition knowledge as well as their skills in terms of preparing or cooking healthy food. The parents/caregivers are the key players for developing their children's healthy or unhealthy eating habits since they are the specific determinants of food selection, serving structured meals and being the role models to their children by eating the same food offered themselves.

This reflects the parents' significant roles and effectiveness in building children's positive or negative eating habits by being in charge of what their young children eat. Studies revealed that young children's repeated exposure to nutritious foods such as fruits and vegetables is the key for accepting, liking, or eating more healthy foods over the long term [23].

The above study also showed that developing a long term healthy lifestyle originates from the eating habits acquired through infancy and early childhood [23]. Therefore, the parents/caregivers are the main contributors for determining their children's weight status of being normal to overweight or obese [24]. Epstein et al. showed a significant decrease in the percentage of overweight children when children were encouraged to consume more fruits and vegetables than the group of children who were asked to decrease their fat and sugar intakes [25]. Children at an early age imitate their parent's eating habits and consume food that is available at home [26]. Another study showed that the availability of sweetened beverages and its high consumption by preschoolers increase the risk for being overweight [27].

According to Dietz and Stern, the parent/caregiver should divide eating responsibilities with their children by understanding each other's roles. The parent's/caregiver's job or role is to decide what kind of food to offer and when food is offered. However, the children's role is to choose whether to eat or not as well as to what and how much to eat from the food offered [28].

The long-term compromised health status caused by obesity needs immediate attention from the health care providers and researchers. Intervention to increase the parent/ caregiver's knowledge about the importance of child nutrition in terms of healthy foods and food portions is urgently needed. Such knowledge is critical due to its lifetime impact on the growth and development of young children and the resulting influences on their children's eating behaviors.

The aim of this study is to examine the effectiveness of implementing a school-based nutrition intervention program for the preschoolers and their parents/caregivers on changing in children's eating behaviors. The long term goal of this project is to establish healthy eating habits in preschoolers to prevent obesity later in life, especially in African American preschoolers, for they are at high risks for overweight and obesity. Our hypothesis is that incorporating parents/caregivers in nutrition intervention program, by increasing their knowledge of and preference for healthy foods will enhance their healthy eating practices and lead to a positive influence on their children's eating behavior.

Chapter 2 Material and Method

Subjects:

Six sites of the United Children and Family Head Start (HS) in Detroit, Michigan were randomly chosen to be involved in this study. The parents or the caregivers (CGs) of preschool age children, between the ages of 3 and 5 years, enrolled in Head Start program, were our target participants. At the baseline data collection, 220 participants were involved. At the post intervention data collection, 140 participants stayed in the Head Start Program. The overall retention rate was 63.6%. The recruiting process of the parents or the CGs was done by investigators who met with the parents/caregivers during their scheduled school's parent orientations. During the orientation, the investigators gave parents and CGs a brief overview about the nature of the study such as the goals, benefits and risks, the confidentiality of information as well as the incentives. Participants received $20.00 after completing the baseline food questionnaire at the very beginning of the study and another $20.00 after completing the same questionnaire at the completion of the study or post intervention. Finally, all the participants' questions and concerns were answered. The participants were free to choose either to participate by signing a paper consent form for themselves as well as for their children or not to participate in this study. After the parental consent was obtained, the process of gathering baseline data started. The drop off or pickup time at Head Start school were the time used by the investigators to meet with the parents and have them answer the food frequency questionnaire.

Study design:

The six participant schools were randomly assigned into one of the three groups: control, or one of the two intervention groups. The two intervention groups were group A and group B. Two HS centers were assigned randomly for each of these intervention groups.

The control group followed ordinary HS curriculum without child or parent involvement in the intervention plan. Intervention group A involved only the children in the intervention plan along with the typical HS curriculum program. For the intervention group B, both the parent/CG and the children were involved in the intervention strategy. The parents/CGs + kids group was our main focus in this study and data are presented in this thesis.

Parent/Caregivers Food frequency questionnaire:

The food frequency questionnaire form is a Dietary Risk Assessment (DRA) survey. It was developed and validated by the University Of North Carolina Center Of Excellence for Training and Research Translation (Chapel Hill, NC). This DRA questionnaire consists of 32 questions. The purpose of using such a questionnaire was to assess the daily dietary intake in terms of how many servings consumed from different food groups and their sub groups. The different food groups were (1) vegetable; (2) fruit; (3) Bread, Grains, and Cereals; (4) red meat; (5) poultry and fish; (6) Beans and nuts; (7) milk and dairy foods; (8) toppings, oils, seasonings; (9) salt, sweets, snacks, and restaurant foods; and (10) beverages in an average day or week.

After intervention, the participants were asked to fill out the same questionnaire they filled out at the beginning of the study. This study involved a total of 12 classrooms from six different Head Start sites. Within each of the six sites, two classrooms, both morning sessions and evening sessions were randomly assigned by the site coordinator to participate in this study.

Child Nutrition Program:

The intervention plan for children was based on nutrition classes that were offered twice a week, thirty minutes each. The intervention plan started after the baseline data collection was completed and ended at the end of the school year before the post intervention data collection. It involved various nutrition topics and nutrition related activities. The different nutrition topics were fruits, vegetables, whole grains, meat/beans, and low fat milk/dairy products. However, the baseline and post intervention data for children only group (Intervention A) will not be presented in this thesis paper.

Parents/CGs Nutrition Program:

The Parents/CGs nutrition intervention program was conducted by dietetic students from the Coordinated Program in Dietetics (CPD) in the Department of Nutrition and Food Science under the supervision of Wayne State University faculty. The parents/CG's nutrition intervention program presented one-hour of nutrition education to participants every other week on a regular basis throughout the academic year (2008 September). Most of the nutrition topics were selected based on the participants' requests or what they were interested to know. Therefore, the nutrition classes included cooking demonstrations, using modified recipes such as lower fat recipes, fiber and whole grain recipes on well-known or highly consumed foods, food tasting, educating parents on the nutritional needs of their children and motivating them to present healthy food for

their children. The overall nutrition intervention programs consisted of 12 scheduled meetings along with phone calls or emails for weekly communication with parents/CGs throughout the academic year (2008).

Statistical analysis

Baseline and post intervention data were entered into the computer and analyzed by the SPSS 17.0 statistics software (SPSS, Chicago, IL). The difference between the reported daily intakes of different food groups between pre-and post-intervention period were calculated and analyzed using cross tab and chi square statistics to test whether the intervention improved the intake frequency and the number of servings consumed from common foods. The significance was set at $p < 0.05$.

Chapter 3 Results

Comparison of reported daily intakes of different food groups between pre- and post-intervention periods.

The frequencies of food consumption from all food groups as well as their subgroups were obtained pre and post intervention. The data then analyzed using the frequency statistics to test whether there were any differences between the reported food preferences or frequency of consuming healthy or unhealthy choices in baseline versus post intervention data. The comparison was based on the percentage of intake from all food groups as well as their sub groups within each food group. The major food groups were (1) vegetable; (2) fruit; (3) Bread, Grains, and Cereals; (4) red meat; (5) poultry and fish; (6) Beans and nuts; (7) milk and dairy foods; (8) toppings, oils, seasonings; (9) salt, sweets, snacks, and restaurant foods; and (10) beverages. Each one of these food groups was further detailed into more subgroups.

Within the vegetable group, intake of dark green or orange vegetable sub group increased ($P<0.004$) in the post intervention period compared to pre intervention period (40.5 vs. 29.7%) (**Table 1**). In the fruit group, the intake of "fruit canned in syrup" subgroup increased ($p<0.01$) in both rarely or never option (35.1% vs. 27.0%) and often option (8.1% vs. 2.7%) at post intervention compared to pre intervention period (**Table 2**).

With regard to bread, grains, and cereals group, only brown rice or whole grain pasta increased ($P<0.01$) in the intake frequency percentage at post intervention compared to pre intervention period, (13.5 vs. 10.8%) (**Table 3**). The increase in consumption of bread made with whole grain or whole wheat flour failed to reach significance ($p=0.067$).

Within the red meat group, the percentage of "trim fat or don't eat red meat" subgroup at post intervention was significantly increased (P<0.002) compared to pre intervention data, (40.5 vs. 29.7%). In the "type of ground beef consumed" question, the intake frequency percentage increased (P = 0.03) for both the extra lean ground beef and sirloin or no ground beef option (14.7 vs. 11.1%) and the ground beef or chuck option (64.7 vs. 52.8%) in post intervention compared to pre intervention period. Although there was no significant differences observed in other meat subgroups, consuming ≥ 3 servings (18.9 vs. 27.0%) of hotdogs or lunch meat tended to decrease (P=0.06) in post intervention period in comparison with the pre intervention period (**Table 4**).

A significant difference was detected between the pre and post intervention in the intake frequency of its "other fish "sub group like catfish, whitefish, or shellfish which was increased (P<0.01) in post intervention as compared to pre intervention period. The intake frequency percentage of consuming ≥ 3 servings and 2 servings in the "fish with healthy fat" subgroup tended to increase (P=0.053) in post intervention period as compared to the pre intervention period; whereas the intake frequency percentage of participants consuming 0~1 servings tended to decrease (P=0.053) in post intervention compared to pre intervention period (**Table 5**).

No differences were detected in the beans and nuts group (**Table 6**).

Intake of milk and dairy group was similar between the pre and post intervention periods, whereas the intake frequency percentage of ≥3 servings of mozzarella, cottage or light cream cheese subgroup tended to improve (P=0.06) in (**Table 7**).

For toppings, oils, seasonings, and salt group, the intake frequency percentage of sour or whipped toppings sub group increased ($P<0.03$) in the post intervention compared to pre intervention period (5.4% vs. 0%). However, there was a reduction ($P<0.01$) in the intake frequency percentage of ≥ 2 times a week of gravy or meat dripping subgroup (21.6% to 16.2%). For the kind of butter or margarine used sub group, the intake frequency percentage of regular tub margarine option decreased ($P<0.01$) in post intervention compared to pre intervention period (29.7% vs. 48.6%), whereas intake frequency percentage of trans-fat free margarine spread or no butter or margarine sub group increased ($p<0.01$) in post intervention group as compared to pre intervention period (29.7% vs. 10.8%). The kind of oil used for frying, baking, or vegetable was not different between the pre and post intervention periods. With respect to buying low sodium or no added salt food subgroup, no differences was detected between the pre invention and post intervention periods. For the frequency of salt shaker usage sub group, there was a reduction ($P < 0.002$) in the group chose all or most of the time option (**Table 8**).

Within the sweets, snacks, and restaurant foods, the intake frequency percentage of sweets subgroup was significantly decreased ($P<0.01$) in group consuming ≥ 4 servings. The intake frequency percentage, of consuming ≥ 4 servings in the ice milk, sherbet, or frozen yogurt subgroup was significantly increase ($p<0.017$) in post intervention in comparison with pre intervention period. For buying snack foods and snack products that have no trans-fat sub group, the intake frequency percentage, of all or most of the time option, approached to be significant ($p<0.053$) in post intervention compared to pre intervention period. Similarly, the snack chips, crackers or pretzels subgroup the change failed to reach significance ($p<0.064$) (**Table 9**).

In the beverage group, the consumption of regular or non-diet sodas subgroup significantly increased ($P<0.001$) in the post intervention compared to pre intervention period. Fruit juices and bottled fruit drinks, sport or energy drinks sub group had no significant changes between pre and post intervention periods. With respect to the hot tea or coffee drinks sweetened with sugar sub group, the intake frequency percentage significantly decreased ($P<0.01$) in post intervention consuming ≥2 servings (10.8% vs. 24.3%) and 1 servings as well (21.6% vs. 29.7%). Similarly, there was a significant increase in participants consuming 1 serving from Kool-Aid or iced tea group (67.6% vs. 45.9%) (**Table 10**).

Chapter 4 Discussion

Studies have revealed that unhealthy eating habits acquired during childhood affect eating patterns later in life and may increase disease risks [29]. Another study showed that the deficit in the nutrition knowledge or in the healthy eating behaviours among parents/caregivers from low income families is considered one of the factors behind the increasing prevalence of overweight among the US low income children from 8.5% in 1983 to 10.2% in 1995 [18]. This highlights the need to involve parents in their children's nutritional education in order to help them make healthier food choices and understand the nutritional values associated with their food consumption. The results of the current study showed that school-based nutrition education intervention program did improve the nutrition knowledge of the participants. Following intervention, the study revealed that there were changes in the reported dietary frequencies of dietary intake and in the number of servings consumed daily or weekly. **Table 11** depicts the changes observed post-intervention either for better or for worse effects on health.

Table 11: Increased or Decreased for Better or Increased for Worse in the Food Consumption of the Selected Food Groups or Subgroups Post-Intervention

For better	For worse
Increased:	**Increased:**
Dark green or orange vegetables	Sour or whipped toppings
Brown rice or whole grain pasta	Ice milk, sherbet or frozen yogurt
Trimmed or drained fat	Regular or non-diet sodas
Extra lean ground beef or no ground meat	Ground beef or chuck
Catfish, whitefish or shellfish	Kool-Aid or iced tea sweetened with sugar
Decreased:	
Gravy or meat drippings-week	
Butter or margarine	
Salt shaker use at the table	
Sweets	
Hot tea or coffee drinks sweetened with sugar	

Whole grain group:

Studies have shown the importance of whole grain consumption on reducing the risk for heart disease, certain types of cancer, type 2 diabetes in addition to its importance in lowering body mass index [30]. According to the USDA's Continuing Survey of Food Intake by Individuals (CSFII) 1994-1996 data, the average whole grain intake of children and adults was one serving a day, which is estimated to be about one-third of the recommended intake [31, 32]. Healthy People 2010 objective recommends 3 servings of whole grain a day out of the total daily servings of grain. Previous studies presented that taste, appearance, cost, and texture were the common barriers against public consumption of whole grain [33, 34]. Another study identified that the limited consumer knowledge of the health benefits of whole grain and their restricted familiarity in identifying whole grain products at the time of purchase were considered barriers against whole grain consumption [35]. The result of our findings revealed significant increase in the reported consumption of "brown rice or other whole grain". The reasons that might contribute to this effectiveness are the intense intervention that focused on the health benefits of fiber and whole grain, availability of cooking recipes with such ingredients and allowing the participants to taste them. The above reasons demonstrated the intervention's powerful contribution to overcome the participant's barriers of consumption whole grain products.

Red Meat & Toppings, Oils, Seasonings, and Salt:

The baseline data of Alan et al's study [36] confirmed that African American's main sources of fat come from meat, poultry, and fish, as well as using high fat cooking methods, such as not trimming excess fat, etc.

The above study also showed positive intervention effects on African American's dietary patterns with respect to adopting low fat meat purchasing and low fat food preparation strategies. Our findings, compared to the above study, showed similar results.

The results of our findings suggest that the improvements in the parent's/caregivers knowledge of the above food groups as well as subgroups may have been attributed to their feeling the need to change their eating behaviours as well as their interest in the presented topics, which the parents picked themselves at the beginning of the study. Such an improvement in eating habits shows that nutrition education intervention had a positive influence on individual's food choices and frequency of consumption.

Regular or Non-Diet Soda or Sweetened Beverages:

Although the current study demonstrated positive changes in the whole grain as well as in red meat food groups, the result also revealed worsening in some un-healthy food consumption. In the "regular or non-diet sodas" subgroup, the intake frequency percentage was significantly increased in the post intervention compared to pre intervention period. Wyshak et al's study [37] demonstrated the adverse effects of soft drink consumption on bone mineral density in teenaged girls. Another study showed the same results in terms of the negative effect of soft drink consumption on bone mineral density in adolescents [38]. Other studies revealed the negative effects of consuming sugar sweetened drinks on body weight. David's et al study [39], for instance, considered consumption of high sugar containing drinks as one of the many factors that contribute to adiposity in children. Moreover, the findings of the above study revealed that the risk of becoming obese increases by 1.6 times for each or every additional can or glass consumed by children daily.

Consistent with our findings, Haerens et al's study [40] also showed no positive intervention effects on reducing the amount of soft drinks consumed in middle school students. The study by Jeong et al. [41] acknowledged the fact that raising the participant's awareness about the role of nutrition in prevention chronic diseases significantly decreased their total consumption of carbonated soft drinks, especially in regular soft drinks, in post intervention vs. baseline data. This indicates the need for more intense intervention or different strategies specifically designed to target the potential risks of carbonated soft drinks on health.

The presence of insignificant improvements in the reported intake of the above food groups as well as subgroups may be attributed to several factors. Perhaps, the teachers didn't present all the nutrition topics in the same excitement, encouragement and motivating ways to induce a change in the parent's eating behaviour or, the teachers may have focused on the nutritional values and health benefits of some food or sub groups but not others. On the other hand, the participants may feel overwhelmed by the amount of nutrition information that they received during a short intervention period. This may have led them to stick to their old eating patterns in some food groups.

The above findings substantiate the necessity for a follow-up dietary intervention study specifically designed to target the above specific food groups to induce a larger impact on eating behaviours. According to the School Health Education Evaluation Study [42], improvement in participant's nutrition knowledge normally takes place after 10 hours of nutrition intervention classes. However, it normally takes an average of 50 hours of education classes to cause change in behaviour. The overall nutrition education intervention classes that the parents/care givers received in this study were between 12 to 15 hours range.

The results from the current study showed that this amount of time was enough to cause positive changes in the participant's nutrition knowledge, and also motivated a change in certain behaviours based on their daily or weekly reported dietary intakes in post-intervention compared to pre-intervention data, although not all behavioural changes were in a positive direction. Apparently, some behaviour changes toward certain foods can be changed quickly, while it may take a longer period of time to change behaviours toward other food group. In consistent with the above findings, the Planet Health study [43] showed an increase in the fruit intake by 0.2 servings a day after 2 years of intervention. However, Haeren et al's study [40] showed only 0.1 servings per week increase in fruit consumption after 9 months intervention period.

Our study showed no positive nutrition intervention in fruit intake after 6 months of nutrition intervention. It is apparent that a longer intervention period is necessary in order to show the positive effects of intervention in fruit intakes. Giving that the participants are residents in Detroit, they are not choosing to eat enough fresh fruits and vegetables in their regular daily life, it may take longer time to get them acquainted with fresh fruits and vegetables before a change in before in behaviour can be expected.

It is noteworthy that one of the limitations of this study is that the outcomes were assessed based on the self-reported dietary intake, through a validated questionnaire given one month before the end of the school year. Therefore, there is a possibility that the answers on the reported dietary intake or reported serving sizes may be affected by what is called "socially desirable manner" [44]. Therefore, the internal validity of the results may be affected.

Conclusion:

In conclusion, the school based nutrition education intervention program, which focused on increasing the parent/caregiver's knowledge of child nutrition, healthy food choices, and food portion sizes, did improve the healthy eating habits of their children towards certain food groups. The overall nutrition knowledge of the parent/caregivers increased to an extent that may be used as a vital mechanism to motivate changes in their food preparation and their children's eating behaviour. It is speculated that if such improvements in eating behaviour are maintained, this may prevent obesity related diseases later in life.

A follow up study needs to be conducted to specifically target the topics or nutrition behaviours that weren't significantly impacted in this study, including a longer intervention period, or different techniques in introducing new foods to their children and menu planning. Lastly, long term studies may be encouraged to determine if the adapted healthy eating habits from the current nutrition intervention will be sustained in the future or will be translated to permanent dietary behavioural changes.

Table 1. Responses to Vegetable group in Dietary Risk Assessment questionnaire (frequency with percent in parenthesis)

	Baseline			Post-Intervention			P- value
Dark green or orange veg.	**0 servings**	**1 serving**	**2+ servings**	**0 servings**	**1 serving**	**2+ servings**	
	3 (8.1%)	23 (62.2%)	11 (29.7%)	3 (8.1%)	19 (51.4%)	15 (40.5%)	0.004
Starchy vegetables	**0~1**	**2**	**3+**	**0~1**	**2**	**3+**	
	21 (56.8%)	16 (43.2%)	0	18 (51.4%)	14 (40.0%)	3 (8.6%)	0.055
Other vegetables	**0**	**1**	**2+**	**0**	**1**	**2+**	
	6 (16.2%)	17 (45.9%)	14 (37.8%)	8(21.6%)	17 (45.9%)	12 (32.4%)	0.227

Table 2. Responses to Fruit group in Dietary Risk Assessment questionnaire (frequency with percent in parenthesis)

	Baseline			Post-Intervention			P-value
Fruit in unsweetened juice	**0~1**	**2**	**3+**	**0~1**	**2**	**3+**	
	11 (29.7%)	18 (48.6%)	8 (21.6)	19 (51.4%)	11 (29.7%)	7 (18.6%)	0.263
Fruit canned in syrup	**Rarely or never**	**Sometimes**	**Often**	**Rarely or never**	**Sometimes**	**Often**	
	10 (27.0)	26 (70.3%)	1 (2.7%)	13 (35.1%)	21 (56.8%)	3 (8.1%)	0.01

Table 3. Responses to Bread, Grains, & Cereals group in Dietary Risk Assessment questionnaire (frequency with percent in parenthesis)

	Baseline			Post-Intervention			P-value
Bread made with whole grain or whole wheat flour	**0**	**1**	**2+**	**0**	**1**	**2+**	
	1 (2.8%)	19 (52.8%)	16 (44.4%)	3 (8.1%)	12 (32.4%)	22 (59.5%)	0.067
Bread made with white flour	**0**	**1**	**2+**	**0**	**1**	**2+**	
	8 (21.6%)	26 (70.3%)	3 (8.1%)	9 (24.3%)	21 (56.8%)	7 (18.9%)	0.826
Brown rice or whole grain pasta	**0**	**1~2**	**3+**	**0**	**1~2**	**3+**	
	11 (29.7%)	22 (59.5%)	4 (10.8%)	11 (29.7%)	21 (56.8%)	5 (13.5%)	0.004
White rice or regular pasta	**0~1**	**2**	**3+**	**0~1**	**2**	**3+**	
	12 (32.4%)	15 (40.5%)	10 (27.0%)	10 (27.0%)	16 (43.2%)	11 (29.7%)	0.147
Cold or hot whole grain cereals	**0**	**1~2**	**3+**	**0**	**1~2**	**3+**	
	1 (2.7%)	25 (67.6%)	11 (29.7%)	5 (13.5%)	22 (59.5%)	10 (27.0%)	0.108
Regular cold or hot cereals	**0**	**1~2**	**3+**	**0**	**1~2**	**3+**	
	2 (5.4%)	26 (70.3%)	9 (24.3%)	6 (16.7%)	21 (58.3%)	9 (25.0%)	0.295
Biscuits or corn bread	**0**	**1~2**	**3+**	**0**	**1~2**	**3+**	
	7 (18.9%)	28 (75.7%)	2 (5.4%)	7 (19.4%)	26 (72.2%)	3 (8.3%)	0.254

Table 4. Responses to Red Meat group in Dietary Risk Assessment questionnaire (frequency with percent in parenthesis)

	Baseline			Post-Intervention			P-value
Bacon or sausage	**0**	**1~2**	**3+**	**0**	**1~2**	**3+**	
	0	26 (70.3%)	11 (29.7%)	4 (10.8%)	26 (70.3%)	7 (18.9%)	0.335
Hotdogs or lunch meat	**0~1**	**2**	**3+**	**0~1**	**2**	**3+**	
	14 (37.8%)	13 (35.1%)	10 (27.0%)	13 (35.1%)	2 (45.9%)	7 (18.9%)	0.058
Red meat	**0~2**	**3~4**	**5+**	**0~2**	**3~4**	**5+**	
	21 (56.8%)	12 (32.4%)	4 (10.8%)	28 (75.7%)	8 (21.6%)	1 (2.7%)	0.421
Trimmed or drained fat	**Yes, or don't eat red meat**	**Sometimes**	**No**	**Yes, or don't eat red meat**	**Sometimes**	**No**	
	11 (29.7%)	20 (54.1%)	6 (16.2%)	15 (40.5%)	16 (43.2%)	6 (16.2%)	0.002
Is the portion smaller, the same as, or larger than a deck of cards	**Smaller or do not eat red meat**	**the same**	**larger**	**Smaller or do not eat red meat**	**the same**	**larger**	
	9 (24.3%)	22 (59.5%)	6 (16.2%)	9 (24.3%)	21 (56.8%)	7 (18.9%)	0.164
What type of ground beef do you usually eat	**Extra lean ground beef or sirloin or no ground beef**	**Lean ground beef or ground round**	**ground beef or chuck**	**Extra lean ground beef or sirloin or no ground beef**	**Lean ground beef or ground round**	**Ground beef or chuck**	
	4 (11.1%)	13 (36.1%)	19 (52.8%)	5 (14.7%)	7 (20.6%)	22 (64.7%)	0.025

Table 5. Responses to Poultry & Fish group in Dietary Risk Assessment questionnaire (frequency with percent in parenthesis)

	Baseline			Post-Intervention			P-value
Chicken or Turkey, ground or sliced- week	**0~1**	**2**	**3+**	**0~1**	**2**	**3+**	
	4 (10.8%)	14 (37.8%)	19 (51.4%)	8 (21.6%)	14 (37.8%)	15 (40.5%)	0.129
Fish with healthy fats	**0~1**	**2**	**3+**	**0~1**	**2**	**3+**	
	22 (59.5%)	13 (35.1%)	2 (5.4%)	19 (51.4%)	14 (37.8%)	4 (10.8%)	0.053
Catfish, whitefish or shellfish	**0~1**	**2**	**3+**	**0~1**	**2**	**3+**	
	24 (64.9%)	9 (24.3%)	4 (10.8%)	25 (67.6%)	4 (10.8%)	8 (21.6%)	0.005

Table 6. Responses to Beans & Nuts group in Dietary Risk Assessment questionnaire (frequency with percent in parenthesis)

	Baseline			Post-Intervention			P-value
Beans or peas	**0**	**1~2**	**3+**	**0**	**1~2**	**3+**	
	14 (37.8%)	20 (54.1%)	3 (8.1%)	9 (24.3%)	24 (64.9%)	4 (10.8%)	0.197
Peanut or other nut butters	**0~1**	**2**	**3+**	**0~1**	**2**	**3+**	
	22 (59.5%)	10 (27.0%)	5 (13.5%)	20 (54.1%)	9 (24.3%)	8 (21.6%)	0.377

Table 7. Responses to Milk & Dairy Foods group in Dietary Risk Assessment questionnaire (frequency with percent in parenthesis)

	Baseline			Post-Intervention			P-value
Whole milk whole milk yogurt	**0**	**1**	**2+**	**0**	**1**	**2+**	
	6 (16.2%)	14 (37.8%)	17 (45.9%)	7 (18.9%)	10 (27.0%)	20 (54.1%)	0.404
skim low fat milk & yogurt buttermilk or soy milk	**0**	**1**	**2+**	**0**	**1**	**2+**	
	14 (37.8%)	10 (27.0%)	13 (35.1%)	13 (35.1%)	14 (37.8%)	10 (27.0%)	0.095
Heavy cream or half & half	**0~1**	**2**	**3+**	**0~1**	**2**	**3+**	
	32 (86.5%)	3 (8.1%)	2 (5.4%)	31 (83.8%)	3 (8.1%)	3 (8.1%)	0.207
Hard cheeses or cream cheeses	**0**	**1**	**2+**	**0**	**1**	**2+**	
	6 (16.7%)	18 (50.0%)	12 (33.3%	9 (24.3%)	19 (51.4%)	9 (24.3%)	0.59
Mozzarella, cottage cheese or light cream cheese	**0~1**	**2**	**3+**	**0~1**	**2**	**3+**	
	24 (64.9%)	13 (35.1%)	0	26 (70.3%)	8 (21.6%)	3 (8.1%)	0.061

Table 8. Responses to Toppings, Oils, Seasonings, & Salt group in Dietary Risk Assessment questionnaire (frequency with percent in parenthesis)

	Baseline			Post-Intervention			P-value
Sour or whipped toppings	**0**	**1~2**	**3+**	**0**	**1~2**	**3+**	
	24 (64.9%)	13 (35.1%)	0	25 (67.6%)	10 (27.0%)	2 (5.4%)	0.03
Gravy or meat drippings-week	**Hardly ever or never**	**Once a week**	**Two or more times a week**	**Hardly ever or never**	**Once a week**	**Two or more times a week**	
	14 (37.8%)	15 (40.5%)	8 (21.6%)	14 (37.8%)	17 (45.9%)	6 (16.2%)	0.005
Butter or margarine	**Trans-fat-free margarine spread or no butter or margarine**	**Regular tub margarine**	**Butter or stick margarine**	**Trans-fat-free margarine spread or no butter or margarine**	**Regular tub margarine**	**Butter or stick margarine**	
	4 (10.8%)	18 (48.6%)	15 (40.5%)	11(29.7%)	11 (29.7%)	15 (40.5%)	0.0001
Oil or seasoning for frying	**Veg oil or trans-fat-free margarine spread or do not fry**	**Regular tub margarine**	**Meat fat, veg shortening, Butter, or stick margarine**	**Veg oil or trans-fat-free margarine spread or do not fry**	**Regular tub margarine**	**Butter or stick margarine**	
	25 (67.6%)	5 (13.5%)	7 (18.9%)	24 (64.9%)	6 (16.2%)	7 (18.9%)	0.395
Oil or seasoning for baking	**Veg oil or trans-fat-free margarine spread or do not bake**	**Regular tub margarine**	**Lard, veg shortening, butter or stick margarine**	**Veg oil or trans-fat-free margarine spread or do not bake**	**Regular tub margarine**	**Lard, veg shortening, butter or stick margarine**	
	21 (58.3%)	8 (22.2%)	7 (19.4%)	22 (64.7%)	7 (20.6%)	5 (14.7%)	0.117

Oil or seasoning for vegetable	**Veg oil or trans-fat-free margarine, vinegar or lemon juice, low sodium bouillon, herbs, spices, dash of salt, and pepper or nothing**	**Regular tub margarine or lean ham**	**Fat back, bacon, side meat butter, or stick margarine**	**Veg oil or trans-fat-free margarine, vinegar or lemon juice, low sodium bouillon, herbs, spices, dash of salt, and pepper or nothing**	**Regular tub margarine or lean ham**	**Fat back, bacon, side meat butter, or stick margarine**	
	16 (43.2%)	12 (32.4%)	9 (24.3%)	24 (64.9%)	5 (13.5%)	8 (21.6%)	0.172
Buy low sodium or no added salt foods	**All or most of the time**	**Sometimes**	**Rarely/ never**	**All or most of the time**	**Sometimes**	**Rarely/ never**	
	4 (10.8%)	23 (62.2%)	10 (27.0%)	7 (19.4%)	21 (58.3%)	8 (22.2%)	0.722
Salt shaker use at the table	**Rarely or never**	**Sometimes**	**All or most of the time**	**Rarely or never**	**Sometimes**	**All or most of the time**	
	20 (54.1%)	13 (35.1%)	4 (10.8%)	20 (54.1%)	14 (37.8%)	3 (8.1%)	0.002

Table 9. Responses to Sweets, Snacks, & Restaurant Foods group in Dietary Risk Assessment questionnaire (frequency with percent in parenthesis)

	Baseline			Post-Intervention			P-value
Sweets	**0~1**	**2~3**	**4+**	**0~1**	**2~3**	**4+**	
	19 (51.4%)	16 (43.2%)	2 (5.4%)	20 (54.1%)	16 (43.2%)	1 (2.7%)	0.0001
Regular ice cream	**0**	**1**	**2+**	**0**	**1**	**2+**	
	10 (27.0%)	21 (56.8%)	6 (16.2%)	11 (29.7%)	23 (62.2%)	3 (8.1%)	0.393
Ice milk, sherbet, or frozen yogurt	**0~1**	**2~3**	**4+**	**0~1**	**2~3**	**4+**	
	26 (72.2%)	8 (22.2%)	2 (5.6%)	25 (69.4%)	11 (30.6%)	0	0.017
Snack chips, crackers or pretzels	**0~1**	**2~3**	**4+**	**0~1**	**2~3**	**4+**	
	13 (35.1%)	20 (54.1%)	4 (10.8%)	12 (32.4%)	22 (59.5%)	3 (8.1%)	0.064
Buy snacks that have no trans-fat	**All or most of the time**	**Sometimes**	**Rarely/ never**	**All or most of the time**	**Sometimes**	**Rarely/ never**	
	5(13.9%)	23 (63.9%)	8 (22.2%)	8 (22.2%)	20(55.6%)	8(22.2%)	0.053
Restaurant meals-week	**0~1**	**2~3**	**4+**	**0~1**	**2~3**	**4+**	
	20 (54.1%)	15 (40.5%)	2 (5.4%)	25 (67.6%)	7 (18.9%)	5 (13.5%)	0.257
Deep fried or fried foods at restaurants	**0**	**1~2**	**3+**	**0**	**1~2**	**3+**	
	3(8.1%)	27(73.0%)	7(18.9%)	3(8.1%)	26(70.3%)	8(21.6%)	0.098

Table 10. Responses to Beverages group in Dietary Risk Assessment questionnaire (frequency with percent in parenthesis)

	Baseline			Post-Intervention			P-value
Regular or non-diet sodas	**0**	**1**	**2+**	**0**	**1**	**2+**	
	16(43.2%)	12(32.4%)	9(24.3%)	16(43.2%)	11(29.7%)	10(27.0%)	0.001
Bottled fruit drinks, sports or energy drinks	**0**	**1**	**2+**	**0**	**1**	**2+**	
	7(18.9%)	19(51.4%)	11(29.7%)	8(21.6%)	11(29.7%)	18(48.6%)	0.28
Kool-Aid or iced tea sweetened with sugar	**0**	**1**	**2+**	**0**	**1**	**2+**	
	9(24.3%)	15(40.5%)	13(35.1%)	8(21.6%)	16(43.2%)	13(35.1%)	0.011
Hot tea or coffee drinks sweetened with sugar	**0**	**1**	**2+**	**0**	**1**	**2+**	
	17(45.9%)	11(29.7%)	9(24.3%)	25(67.6%)	8(21.6%)	4(10.8%)	0.001
Fruit juices	**0~1**	**2**	**3+**	**0~1**	**2**	**3+**	
	7(18.9%)	15(40.5%)	15(40.5%)	12(32.4%)	10(27.0%)	15(40.5%)	0.519

APPENDIX A

Dietary Risk Assessment (DRA) Questionnaire

Vegetables & Fruits

On an average DAY, how many servings of VEGETABLES do you eat?
(A serving is 1/2 cup cooked vegetables or 1 cup green leafy vegetables.)

1.	**Dark-green** or **orange vegetables** like collard greens, broccoli, tossed salads made with dark-green leafy lettuces, sweet potatoes, butternut squash, or carrots	☐ 2+	☐ 1	☐ 0	goals ↓
2.	**Starchy vegetables** like corn, green peas, lima beans, or white potatoes	☐ 0-1	☐ 2	☐ 3+	
3.	**Other vegetables** like okra, zucchini, turnips, onions, cabbage, green beans, or tomatoes (including tomato sauce)	☐ 2+	☐ 1	☐ 0	

On an average DAY, how many servings of FRUIT do you eat, not including fruit juice?
(A serving is one small piece of fruit, 1/2 cup cut-up fresh or canned fruit, or 1/4 cup dried fruit.)

4.	Fresh, canned, or frozen fruit in unsweetened juice, or dried fruit like raisins	☐ 3+	☐ 2	☐ 0-1	goals ↓
5.	Do you eat fruit canned in syrup?	☐ Rarely or never	☐ Sometimes	☐ Often	

See Vegetable and Fruit Tips, page A-11.

score

Breads, Grains, & Cereals

On an average DAY, how many servings of BREAD do you eat?
(A serving is 1 slice of bread, 1 small tortilla, or 1 roll.)

					goals
1a.	Bread, rolls, or tortillas (wheat or corn) made with **whole grain** (label will list "whole grain" or "whole wheat flour" first)	❑ 2+	❑ 1	❑ 0	↓
b.	Bread, rolls, or tortillas made all or mostly with **white flour** (label will usually list "enriched wheat flour" or "wheat flour" first)	❑ 0	❑ 1	❑ 2+	

Now, think about things you eat every week. In an average WEEK, how many servings of GRAINS or CEREALS do you eat?
(A serving is 1/2 cup of rice, pasta, or oatmeal; 1 biscuit; or one 2" square slice of cornbread. Serving sizes for cereals are usually between 1/2 cup and 1 cup, depending on the cereal.)

					goals
2a.	Brown rice, whole grain pasta, or other whole grains, like barley	❑ 3+	❑ 1-2	❑ 0	↓
b.	White rice or regular pasta, like noodles, spaghetti, or macaroni	❑ 0-1	❑ 2	❑ 3+	
3a.	Cold or hot whole grain cereals, like bran flakes or oatmeal	❑ 3+	❑ 1-2	❑ 0	
b.	Regular cold or hot cereals, like sugar frosted flakes, cocoa cereals, grits, or cream of wheat	❑ 0	❑ 1-2	❑ 3+	
4.	Biscuits (including canned) or cornbread	❑ 0	❑ 1-2	❑ 3+	

See Bread, Grain and Cereal Tips, page A-13.

score

Red Meat

In an average WEEK, how many servings of BREAKFAST and LUNCH MEATS do you eat?
(A breakfast serving is 2 strips of bacon or 2 sausage patties or 2 sausage links. For lunch meats, a serving is 2 slices of bologna or other lunch meats, or 1 hot dog.)

1.	Bacon or sausage	❑ **0**	❑ **1-2**	❑ **3+**	**goals** ↓
2.	Hot dogs or lunch meats like bologna, salami, or Spam	❑ **0-1**	❑ **2**	❑ **3+**	

In an average WEEK, how many times do you eat RED MEAT? This means cuts like roasts, steaks, stew meat, ribs, chops, BBQ, or ham; or hamburger, either alone or in dishes like meatloaf and spaghetti sauce.
(A serving is 3 ounces—about the size of a deck of cards.)

3a.	Red meat	❑ **0-2**	❑ **3-4**	❑ **5+**	**goals** ↓
b.	Is the **fat** usually **trimmed** or **drained**?	❑ Yes, or do not eat red meat	❑ Sometimes	❑ No	
c.	Is your **portion** smaller, the same as, or larger than a deck of cards?	❑ Smaller, or do not eat red meat	❑ The same	❑ Larger	
4.	What type of **ground beef** do you usually eat?	❑ Extra lean ground beef or sirloin (10% or less fat) or no ground beef	❑ Lean ground beef or ground round (11%-19% fat)	❑ Ground beef or chuck (20%+ fat)	

See Red Meat Tips, page A-14.

score

Poultry & Fish

In an average WEEK, how many servings of CHICKEN or TURKEY do you eat?
(A serving is 3 ounces—about the size of a deck of cards.)

1.	Chicken or turkey, including ground or sliced	❑ 3+	❑ 2	❑ 0-1	goals

In an average WEEK, how many servings of FISH or SHELLFISH do you eat?
(A serving is 3 ounces—about the size of a deck of cards.)

2a.	Fish with higher amounts of **healthy fats**, like canned light tuna, sardines, herring, salmon, or lake trout (including fresh, frozen, or canned)	❑ 3+	❑ 2	❑ 0-1	goals ↓
b.	Other fish (like catfish or whitefish) or shellfish (like shrimp)	❑ 3+	❑ 2	❑ 0-1	

See Poultry and Fish Tips, page A-15.

score

Beans & Nuts

In an average WEEK, how many servings of dried or canned BEANS or PEAS do you eat?
(A serving is 1/2 cup cooked beans.)

1.	Beans or peas like pinto beans, kidney beans, lentils, or black-eyed peas	❑ 3+	❑ 1-2	❑ 0	goals

In an average WEEK, how many servings of NUTS do you eat?
(A serving of nuts is 1 ounce or a small handful (1/4 cup). For peanut butter or other nut butters, a serving is 2 tablespoons.)

2.	Peanut or other nut butters or whole plain nuts (like peanuts, almonds, pecans)	❑ 3+	❑ 2	❑ 0-1	goals

Milk & Dairy Foods

Now, think about what you eat every day. On an average DAY, how many servings of these foods do you drink or eat, including on cereal?
(A serving of milk or yogurt is 1 cup (8 ounces); a serving of heavy cream or half & half is 1 tablespoon.)

					goals
1a.	Whole milk, regular sweet milk, or whole milk yogurt	❑ 0	❑ 1	❑ 2+	↓
b.	2%, 1%, 1/2% or skim (nonfat) milk, buttermilk, low-fat/nonfat yogurt, or soy milk	❑ 2+	❑ 1	❑ 0	
c.	Heavy cream or half & half (for example, in coffee)	❑ 0-1	❑ 2	❑ 3+	

On an average DAY, how many servings of CHEESE do you eat (either plain or in foods like sandwiches, pizzas, or casseroles)?
(A serving of hard cheese is 1 ounce (1/3 cup grated or 1 slice processed cheese); cottage cheese is 1/2 cup; ricotta cheese is 1/4 cup; cream cheese is 2 tablespoons.)

					goals
2a.	Hard cheeses (like cheddar, swiss, or jack) or cream cheese	❑ 0	❑ 1	❑ 2+	↓
b.	Mozzarella, cottage cheese or light cream cheese	❑ 0-1	❑ 2	❑ 3+	

See Milk and Dairy Food Tips, page A-16.

score

Toppings, Oils, Seasonings, & Salt

Now, let's go back to weeks. In an average WEEK, how many servings of SOUR CREAM or WHIPPED TOPPINGS do you eat?
(A serving is 2 tablespoons.)

1.	Sour cream or whipped toppings	❑ **0**	❑ **1-2**	❑ **3+**	**goals**
How many times a WEEK do you eat GRAVY or meat drippings?					
2.	Gravy or meat drippings	❑ Hardly ever or never	❑ Once a week	❑ Two or more times a week	**goals**
What BUTTER or MARGARINE do you usually use?					
3.	Butter or margarine	❑ Trans-fat-free margarine spread or no butter or margarine	❑ Regular tub margarine	❑ Butter or stick margarine	**goals**
What kind of OIL or SEASONING do you usually use at home:					
4.	For **frying**	❑ Vegetable oil or trans-fat-free margarine spread or do not fry	❑ Regular tub margarine	❑ Meat fat, vegetable shortening, butter, or stick margarine	**goals** ↓
5.	For **baking**	❑ Vegetable oil or trans-fat-free margarine spread or do not bake	❑ Regular tub margarine	❑ Lard, vegetable shortening, butter, or stick margarine	
6.	For **vegetables** such as greens or potatoes	❑ Vegetable oil, trans-fat-free margarine, vinegar or lemon juice, low sodium bouillon, herbs, spices, dash of salt and pepper, or nothing	❑ Regular tub margarine or lean ham	❑ Fatback, bacon, side meat, butter, or stick margarine	
When you buy foods like canned soups or beans, bottled salad dressings, or crackers, do you usually get products that are LOW-SODIUM or have NO ADDED SALT?					
7a.	Buy low-sodium or no added salt foods	❑ All or most of the time	❑ Sometimes	❑ Rarely/never	**goals** ↓
b.	How often do you use the salt shaker at the table?	❑ Rarely/never	❑ Sometimes	❑ All or most of the time	

See Topping, Oil, Seasoning, and Salt Tips, page A-17.

score

Sweets, Snacks, & Restaurant Foods

In an average WEEK, how many servings of non-frozen SWEETS do you eat?
(A serving is 1 doughnut, 1 sweet roll, 1 small slice of cake or pie, 4 small cookies, or 1 regular candy bar.)

1.	Doughnuts, sweet rolls, pies, cakes, cookies, candy bars, chocolate, or other sweets	❑ **0-1**	❑ **2-3**	❑ **4+**	**goals**

In an average WEEK, how many servings of FROZEN DESSERTS do you eat?
(A serving is 1/2 cup ice cream, sherbet, or frozen yogurt.)

2a.	Regular ice cream	❑ **0**	❑ **1**	❑ **2+**	**goals** ↓
b.	Ice milk, sherbet, or frozen yogurt	❑ **0-1**	❑ **2-3**	❑ **4+**	

In an average WEEK, how many servings of processed SNACK FOODS do you eat?
(A serving is a small handful.)

3a.	Snack chips (like potato chips, corn chips, tortilla chips, or cheese puffs), crackers (like "Nabs" or other butter crackers), or pretzels	❑ **0-1**	❑ **2-3**	❑ **4+**	**goals** ↓
b.	Do you try to buy snack products that have **no trans fat**?	❑ All or most of the time	❑ Sometimes	❑ Rarely/never	

How many times a WEEK do you eat out at RESTAURANTS or eat restaurant CARRY-OUT at home? Include food from fast-food restaurants.

4a.	Restaurant meals	❑ **0-1**	❑ **2-3**	❑ **4+**	**goals** ↓
b.	How many times a week do you eat deep-fried or fried foods (like hush puppies, french fries, or chicken nuggets) at restaurants?	❑ **0**	❑ **1-2**	❑ **3+**	

See Sweets, Snacks, and Restaurant Food Tips, page A-19.

score

Beverages

On an average DAY, how many 8-oz servings of sugar-sweetened beverages do you have with meals or in between meals?
(A beverage serving is 8 ounces. A canned drink is usually 1 1/2 servings (12 ounces). A bottled or medium-size drink is often more than 2 servings.)

1a.	Regular non-diet sodas like Coke™, Pepsi™, or Sprite™	❑ 0	❑ 1	❑ 2+	goals ↓
b.	Bottled fruit drinks (like Snapple™, lemonade, or fruitade), sports or energy drinks	❑ 0	❑ 1	❑ 2+	
c.	Kool-Aid™ or iced tea sweetened with sugar	❑ 0	❑ 1	❑ 2+	
d.	Hot tea or coffee drinks sweetened with sugar	❑ 0	❑ 1	❑ 2+	

On an average DAY, how many 8-oz servings of 100% fruit juice, like orange, apple, grapefruit, or grape juice, do you have?

2.	Fruit juices	❑ 0-1	❑ 2	❑ 3+	goals

See Beverage Tips, page A-20.

score

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ABSTRACT

Evaluation of effectiveness of classroom-based nutrition intervention on changes in eating behavior in African American parent/caregivers and their children.

by

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Although obesity rate has increased steadily over the past 20 years in the US, a 2006 report showed that the obesity rate is expected to continue to rise, with 13.9% of children between the ages of 2 to 5 years are considered overweight. However, 26.2% were considered at risk of becoming overweight. The parents/caregivers are the key players for developing their children's healthy or unhealthy eating habits since they are the specific determinants of food selection, serving structured meals and being the role models to their children by eating the same food offered themselves. This reflects the parents' significant roles and effectiveness in building children's positive or negative eating habits by being in charge of what their young children eat. Obviously, this leads to an increase in their children's early exposure to healthy food.

Early in life behavioral changes are more likely to persist into adulthood and may have long-lasting health benefits. Our hypothesis is that incorporating parents/caregivers in nutrition intervention program, by increasing their knowledge of and preference for healthy foods, will enhance their healthy eating practices and lead to a positive influence on their children's eating behavior.

Study design: The parents/caregivers and preschoolers were involved in this study. The parents and the preschoolers received separate nutrition educational classes. The parents were asked to fill out a food frequency questionnaire regarding food frequency and the number of servings consumed daily or weekly, from selected food groups and subgroups, pre and post intervention, to evaluate the effectiveness of nutrition education on changing the participant's dietary habits. At the end of the nutrition intervention period, pre and post intervention data were evaluated to assess the effectiveness of nutrition intervention on behavioral change in African American parent/ caregiver, and their kids.

The result showed that nutrition education intervention increased or decreased for better or increased for worse, in the food consumption of the selected food groups or subgroups post-intervention. The food groups & sub groups that increased for better were; dark green or orange vegetables, brown rice or whole grain pasta, trimmed or drained fat, extra lean ground beef or no ground meat, catfish, whitefish or shellfish. The food groups and their subgroups that were decreased for better were gravy or meat dripping, butter or margarine, salt shaker use at the table, sweets, and hot tea or coffee drinks sweetened with sugar. However, the food groups and their subgroups that increased for worse were; sour or whipped toppings, ice milk, sherbet or frozen yogurt, regular or non-diet sodas, ground beef or chuck, and Cool-Aid or iced tea sweetened with sugar. Finally, not all food groups showed an improvement in consumption, no significant

differences were detected in all the selected food groups as well as their sub groups. This study did show an improvement in nutrition knowledge, eating behavior in African American parent/caregiver and kids group after 6 months of nutrition education/ intervention.

AUTOBIOGRAPHICAL STATEMENT

Nesrine Akil, graduated from Wayne State University in Detroit, MI, in 2004, with a Bachelors of Science in Biology. Between 2007-2008, Nesrine worked for the Arab Community Center for Economic and Social Services in Dearborn, MI., as a coordinator for the "Personal Action toward Health program" (PATH), in partnership with Southeast Michigan Diabetes Outreach Network and the National Kidney Foundation, aiming for educating community members with long-term health problems. She has also worked as a "Volunteer Health Educator" in Healthy Kids program to provide nutritional education to students in classrooms at elementary school levels, and deliver health- related presentations to refugees. The author was a member of the research team in the "Head Start: healthy kids healthy live" program from 2008 to 2009.

In 2010-2011, Nesrine graduated from the Coordinated Program in Dietetic whilst acquiring a Master of Science degree in Nutrition and Food Science. Currently, Nesrine is working for Detroit Urban League of Detroit / WIC as a Registered Dietitian.