Healthy Children, Healthy Family Program Evaluation

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Background & Introduction

Childhood obesity is an increasingly concerning issue in the United States. As overall obesity levels rise, the incidence of child obesity increases along with it, often at alarming levels. Obesity is defined in adults using a height-weight calculation called BMI; an adult is considered obese if they exceed a BMI of 35. Due to the constant growth in both height and weight in children, however, a different measure is needed. A BMI-for-age growth chart by the CDC is used to compare a child's BMI, and obesity is defined as at or above the 95th percentile in the age specific chart. If a child's BMI exceeded 120% of the 95th percentile BMI, they were considered affected by extreme obesity. According to NHANES data, since 1999, obesity in children has gone up from 13.9% in youth 2-19 years old to 17.2%.

Based on the CDC NCHS Data Brief, Hispanic populations represent the second highest overall prevalence of obesity but have the highest prevalence of youth obesity, particularly in males. 21.9% of Hispanic youth were deemed obese compared to the 19.5% of non-Hispanic black, 14.7% of non-Hispanic white and 8.6% non-Hispanic Asian youth. Among males in particular, there was a larger gap of 22.4% Hispanic male youth being obese compared to the next highest category of non-Hispanic black, at 18.4%.

Children in low-income families are far more likely to be obese as well. From data collected from the Special Supplemental Nutrition Program for Women, Infants and Children (WIC). Children who rely on the WIC program had an overall obesity prevalence of 14.5% in 2014 compared to the 8.9% of the national prevalence. Hispanic children in the WIC program also tend to have a higher prevalence of obesity compared to the average WIC participant, second only to black, non-Hispanic participants in obesity prevalence.

The precedence set by these statistics indicates some change is necessary to prevent further increases in childhood obesity and a reversal of the trend if possible. The target of the program *Healthy Children, Healthy Family* is the disproportionately obese youth described above: Hispanic, low income families. As these families contain youth who are the most affected by obesity, it is important to match the disproportionate prevalence of obesity with an equally relevant program.

Methods

Program Description:

The program, *Healthy Children, Healthy Family*, is to aid in the decrease of Mexican-origin childhood obesity in low-income families. The program also aims to: improve the nutritional knowledge of families, send a positive message about health to the community, and improve the economic resources to low-income families.

The program contains many components in order to meet the above-mentioned goals. The first component of the program is Nutrition. The Nutrition component plans to have two weekly meetings that teach parents healthy habits, which include: food handling, routines, and basic nutrition. These hour long meeting have hands on training with a food demonstration and recipe tasting. These lessons are meant to teach the families that healthy eating is possible and delicious.

The second component of the program is Physical Activity. This part of the program is partnered with the local schools and uses Sport Play and Active Recreation for Kids (SPARK). The target ages for this component are 3-8 years old. The goal of this component is to have children achieve 66 minutes of physical education a week.

The third and final component of the program is Economic. This part of the program aids with the economic situation of the low-income families. Each family that attends the weekly meetings or checks-in with the program staff attains a $25 fruit and vegetable voucher. Each voucher is valid for one month, and can be used at local grocery stores.

This program is made possible by various stakeholders. The school board provides education locations and makes sure that the program is implemented. Teachers/educators provide education for the families. In addition they are provided proper training in order to educate the families. Local grocery stores are involved and honor the voucher system. In addition, the grocery stores provide feedback on the efficacy of the voucher system. Other stakeholders are the program leaders, state representatives, and funders. These individuals are inputting time and money into the program in order to improve the problem of childhood obesity.

Program evaluation methods:

In order for the stakeholders and the program leaders to test that the *Healthy Children, Healthy Family* program is effective, a trial must be conducted first. The trial began by implementing the program on one community and then another community was chosen as a control. Both communities were chosen at random.

In order to measure the result of the program, specific measurements were taken from individuals participating in the program (Mexican-origin low-income families) using a quasi-experimental design. BMI and the frequency of consumption of fruits, vegetables, and fast food were recorded from the intervention community and the control community. These values were then recorded once again after two years. To collect data on how obesity is changing, BMI was recorded by specially trained personal at the school locations. The frequency of consumption of fruits, vegetables, and fast food was gathered by having the participants record their intake via food diaries.

In addition to the two main outcomes recorded, there was additional data that was recorded: The number of teachers/educators participating and completing the training, how many people participated in the program, the number of participating stores in the program, how many vouchers were used and which foods were purchased with the vouchers, how many students are participating in the

physical activity program, and how many people are attending the classes.

While collecting data there was the possibility of running into several cofounders. Physical activity could increase by the students joining sport teams. In addition the program could have biasedly chose people who are more likely to make a change, and would have been more willing to purchase produce. There may have also been participating families that were slightly better off economically, and have more money to spend on fresh produce.

The sample size of the intervention group was 173 participants. The BMI baseline for this group was 17.6 (+/-1.08), with an endline of 18.7 (+/-3.01). The baseline prevalence of obesity for the intervention group was 19%. By the endline of the two-year study, the prevalence for obesity was 22%.

The intervention group's baseline for total fruit and vegetable score was 11.7 (+/-3.27), with an endline of 11.4 (+/-2.64). The frequency of fast food consumed by the intervention group at baseline was 16.7 (+/-3.96), with an endline of 15.0 (+/-3.56).

The sample size of the control group was 103 participants. The BMI baseline for this group was 17.8 (+/-3.37), with an endline of 18.5 (+/-3.76). The baseline prevalence of obesity for the control group was 21%, with an endline of 25%. The control group's baseline for total fruit and vegetable score was 11.3 (+/-2.97), with and endline of 11.1 (+/-3.55). The frequency of fast food consumed by the control group at baseline was 17.2 (+/-4.24), with an endline of 17.0 (+/-4.04).

Program Impact Pathway:
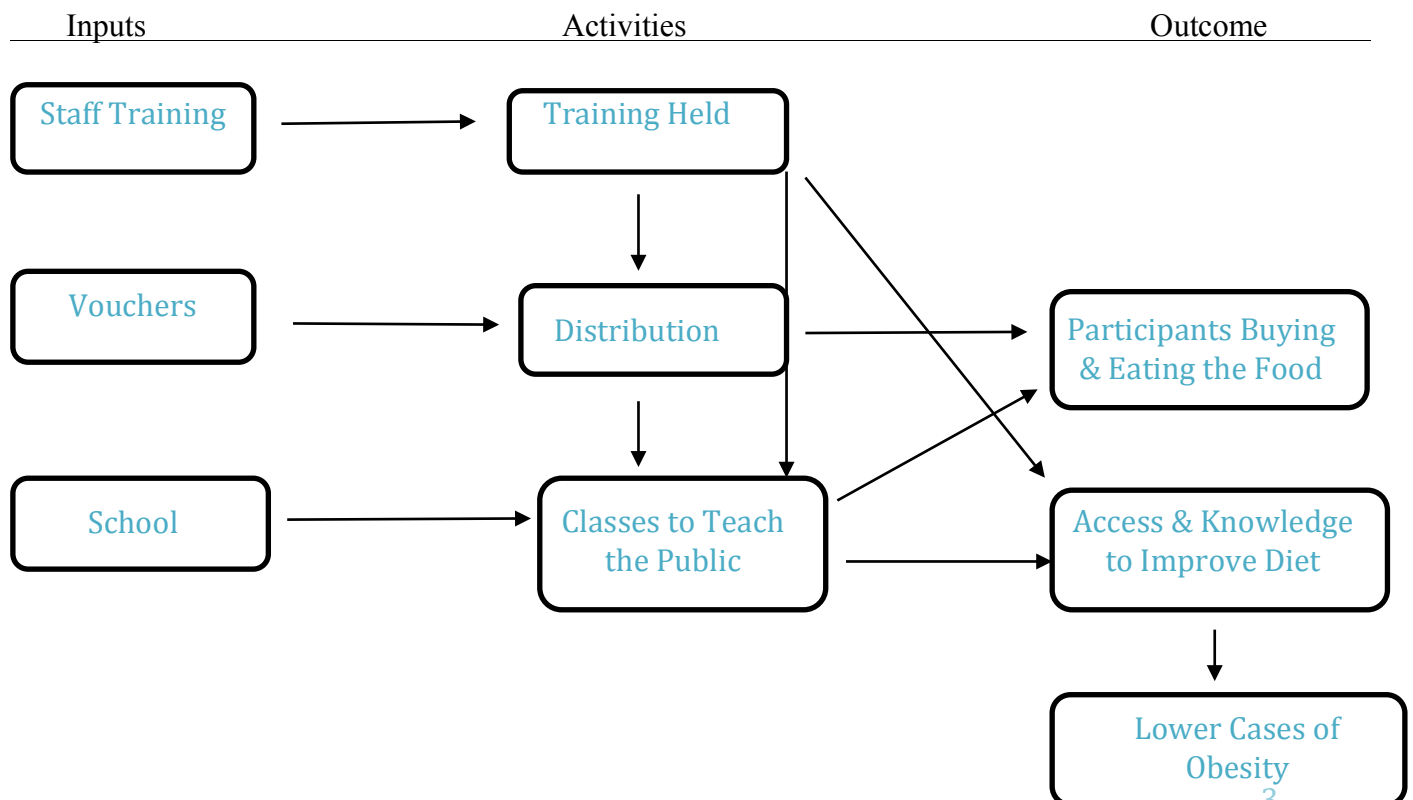
Results

After delivery of the protocol, data was taken from each member of the sample and analyzed. At baseline, the both the intervention and control groups were fairly similar. As seen in Table 1, the main difference between the intervention and control groups was the primary sex and the household income. The primary sex for the intervention group had higher percentage of males and compared to the control group, where there were predominately more female. The intervention group also made more money per month compared to the control group at $1960.0 and $1743/mo., respectively. The children averaged about 5.7 years old during this study. At this time of their lives, they are going through massive growth spurts. They may either be growing taller or could be growing wider. Eventually, their weight and height will balance out.

Before and after the intervention, BMI, BMI for age z-score, and obesity prevalence were taken to see the affect of the program. After the program was finished, the BMI of both the intervention and control groups increased. On average the intervention group increased by 1.1, and the control group increased by 0.7 (Table 2). The BMI for age z-score for the intervention group did not change, and the control group changed insignificantly at 0.1. The prevalence of obesity for both groups increased after the administration of the program. The incidence group went from 19 to 22%, while the control group went from 21 to 25% (Table 2). The odds ratio at baseline when comparing obese to non-obese was 0.87. The odds ratio at end line was 0.88, meaning that the exposure was negatively related to the disease.

During this program, the nutrition messages focused on increasing the consumption of fruits and vegetables and reducing fast food consumption. At baseline, the intervention group scored an 11.7 and the control group scored 11.3 for total fruit and vegetable consumption. After the administration of the program, the scores were 11.4 and 11.1 for the intervention and control groups, respectively. Thus, both groups showed a decrease in consumption of fruits and vegetables during this time of the intervention. As shown in Table 3, the total fast food score for intervention and the control groups were 16.7 and 17.2. At the end of this program, the intervention group scored a 15.0 and the control group scored 17.0. Hence, both groups decreased the total consumption of fast foods over this time period. For the purpose of this program, we hoped to see a decrease in fast food and an increase in fruit and vegetable consumption. Both groups decreased both of these food groups, showing no apparent differences in dietary patterns between the two groups.

One process of program implementation was the parent education sessions. In this case, since the control group was not involved with the program, they didn't' have any parents attend the education session. On average, each parent for the intervention groups attended about 10.5 parent education visits. This data only partially suggests that it was reaching its target participants. Since some parents only showed up 1 or 2 times, they probably did not get as much information and education about the program and healthy living as the program

would have hoped for. However, some parents did attend multiple times (some came 22 times), which suggests that these parents and children received the information they were presented with.

Discussion

Conclusions

Based on the data we have recovered from the *Healthy Children, Healthy Family* program evaluation, our results indicate an increased prevalence of obesity in the intervention group. According to our data, obesity prevalence and BMI did in fact increase in both the control and intervention groups, and this increase is seemingly unaffected by the implementation of the *Healhty Children, Healthy Family* program. The primary goal of this program was to decrease the childhood obesity rates of children in the intervention program. Overall prevalence of obesity increased in both groups, along with an increase in total BMI rates. These results, compared to our control group, indicate that the program was not effective in reaching our primary goal.

Despite the primary goal not being met, there is room to speculate that the program did have some positive effects on the children and families in the program. The program also aimed to improve the nutritional knowledge of families, send a positive message about health to the community, and improve the economic resources to low-income families. As far as improving nutritional knowledge of families, our results, based on our food consumption frequency table (table 3), show a decrease in overall fast food intake. However, while this correlation is definitely a positive outcome,

there was also an overall decrease consumption of total fruit and vegetable intake scores, based on baseline and endline comparisons. A positive message about health in the community could have been beneficial for the individuals who chose to participate in the family night informational programs, but, based on our data, the impact would have been minimal. While there was an economic incentive to attend the informational programs to receive fruit and vegetable vouchers, there is no data to show that the vouchers were in fact used for their purpose, and could have easily been used for other grocery store purchases. The vouchers could have also allowed for the purchase of the usual fruits and vegetables consumed prior to the study, while also allowing for an additional $25 a month to be spent on less nutritionally valued foods.

Limitations

There are some potential limitations to the *Healhty Children, Healthy Family* program. As listed above, the use of the vouchers may not fulfill their intended purpose, and may infact just allow for greater consumption of unhealthy foods. Another limitation is in regards to the stage of life that most of these children are currently in. The program focuses on chidren from ages 3-8 for a span of 2 years. This age group goes through a lot of developmental changes, growth development, physical changes, and hormonal changes throughout these years. There is potential that some of these changes could be due to an increase in weight gain prior to the corresponding changes in height that children experience during this period. The increased weight to height ratio, prior to a growth spurt,

would put a lot of these children in the higher BMI ranges than they normally would be, or that they could potentially grow out of. Lastly, the use of food diaries and recall for any person can be a dfficult task, but especially for children of such a young age. There is definiety a potential source of bias in the ability for these kids to recall the types of foods they have consumed, and the amount at which they have consumed them. In addition to being unable to perfectly recall consumption, these kids are likely to experience social desirability bias. These recalls could greatly skew the reults of our food frequency consumption data.

Confounding Factors

A factor that may contribute to the limited changes in the intervention group, compared to the control group, is within the realm of physical activity. If the control group is also increasing the amount of physical activity the children are given during the same time frame that the intervention program has increased physical activity, changes in one group wont be reflected properly. In addition, families who are more economically stable will also be more likely to buy produce and healthful foods, which could impact results for some children better than others.

Lastly, the number of parental figures in a family could have a large impact on the ability for them to invest in the nutritional education side of the program, and also the time needed to make home cooked meals, and shop for more healthful foods. While these tasks could be easy for a two parent family, it may be more difficult for single parent tryig to balance work, family life, and other responsibilites

Conclusion & Recommendations

While the overall idea of this program is within good nature, we would not currently recommend the use of this program in other schools. There is a lot of time, money, and resources invested in the training of program leaders, teaching of nutrition education programs, implementation of increaaed physcial activity, and cost of vouchers for parents, to have received the outcomes we have from the study. Given that there is little to no significant differnce between the control and the intervention groups, this program should not be implemented at this time.

References

1. Childhood Obesity Facts. Retrieved November 29, 2016, from Centers For Disease Control and Prevention: Overweight & Obesity, https://www.cdc.gov/obesity/data/childhood.html
2. Child Obesity. Retrieved November 29, 2016, from Harvard School of Public Health, https://www.hsph.harvard.edu/obesity-prevention-source/obesity-trends/global-obesity-trends-in-children/
3. Pan L, Freedman DS, Sharma AJ, et al. Trends in Obesity Among Participants Aged 2–4 Years in the Special Supplemental Nutrition Program for Women, Infants, and Children — United States, 2000–2014. MMWR Morb Mortal Wkly Rep 2016;65:1256–1260. DOI: http://dx.doi.org/10.15585/mmwr.mm6545a2
4. Ogden CL, Carroll MD, Fryar CD, Flegal KM. Prevalence of obesity among adults and youth: United States, 2011–2014. NCHS data brief, no 219. Hyattsville, MD: National Center for Health Statistics. 2015.

Tables and Figures

	Intervention	Control
Sample Size (n)	173	103
Age (years)	5.7 (+/-1.27)	5.7 (+/-1.17)
Sex		
Male (%)	53%	38%
Female (%)	47%	62%
Household Size	4.9 (+/-1.43)	5.0 (+/-1.18)
Maternal Age (years)	34.5 (+/-6.87)	33.1 (+/-6.29)
Maternal BMI (kg/m2)	30.5 (+/-5.62)	31.9 (+/-7.34)
Household Income ($/mo.)	1960 (+/-1109.11)	1743 (+/-792.29)
SNAP Participation	42%	50%

Table 1: Characteristics of intervention and control communities at baseline

	Intervention	Control
BMI for Age z-Score		
Baseline	1.1 (+/-1.08)	1.1 (+/-1.22)
Endline	1.1 (+/-1.11)	1.0 (+/-1.11)
Change	0 (+/-0.77)	0.1 (+/-0.92)
BMI		
Baseline	17.6 (+/-2.42)	17.8 (+/-3.37)
Endline	18.7 (+/-3.01)	18.5 (+/-3.76)
Change	0.5 (+/-5.86)	2.0 (+/-6.99)
Prevalence of Obesity		
Baseline	19%	21%
Endline	22%	25%
Odds Ratio for Obesity		
Baseline	0.87	Ref.
Endline	0.88	Ref.

Table 2: BMI for age z-score at baseline and endline

	Intervention	Control
Total Fruit & Vegetable Score		
Baseline	11.7 (+/-3.27)	11.3 (+/-2.97)
Endline	11.4 (+/-2.64)	11.1 (+/-3.55)
Change	-0.26 (+/-2.77)	-0.69 (+/-3.51)
Total Fast Food Score		
Baseline	16.7 (+/-3.96)	17.2 (+/-4.24)
Endline	15.0 (+/-3.58)	17.0 (+/-4.04)
Change	-1.64 (+/-4.33)	-0.56 (+/-3.96)

Table 3: Frequency of consumption of fruits, vegetables, and fast food at baseline and endline

Shu Zheng was responsible for the Background and Introduction. Yvette Servin was responsible for Methods. Bailey Peterson was responsible for Results and Tables. Kaitlyn Grim was responsible for Discussion, Conclusion, and paper formatting.