African American Male Knowledge on Risk Factors Previously Associated Infant Mortality and Adverse Birth Outcomes

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ABSTRACT

Objectives: The objective of this study is to assess the knowledge of African American men pertaining to the importance of prenatal care, dietary intake and risky behavior choices for expecting families. **Methods:** A survey of African American men living in Pitt County, North Carolina was conducted. Regression analysis and cross tabulations were used to determine the frequencies of the men who agreed with risk factors that are known to influence adverse birth outcomes. Chi Square analysis was utilized for hypothesis testing. **Results:** 62% (n=18) of respondents with a high school diploma answered "not sure" when asked if a women's diet before pregnancy affects the unborn child's health. This value is compared to 50% (n=15) of those with a bachelor's degree who "strongly agreed" with the same question. **Conclusion:** Association exists between the educational levels of respondents and their knowledge of dietary risk factors being associated with infant mortality.

Introduction

The Center for Disease Control and Prevention reports that the African American (AA) population is suffering from disproportionately high rates of adverse birth outcomes such as low birth weight, preterm delivery and infant mortality.[1] African American infants are twice as likely to die during their first year of life compared to European American infants with the office of Minority Health revealing an increased rate of 2.3 times that of non-Hispanic whites.[1,3]

Risk factors for infant mortality include; low birth weight, smoking during pregnancy, exposure to second hand smoke during pregnancy, inadequate nutrition and insufficient intake of folic acid before and during pregnancy. Infant sleeping on his stomach, close spacing between pregnancies, and infections or drug use during pregnancy are also associated with these adverse birthing outcomes.[1] Numerous explanations are being explored within the literature to address the disparity of birth outcomes and infant mortality ranging from ethic differences, biological differences and different levels of stress experienced daily. One possible explanation for the infant health disparity is the prenatal knowledge gap of the male or significant other for African American women. A general lack of knowledge could lead to unhealthy behavior choices for both parents an increased stress during the birthing process for the mother. A unique approach to investigation is available by way of the male influence on female reproduction. More specifically on the risk factors associated with African American infant mortality to better gauge their knowledge on the topic area.

Men are a vital part of the family equation and their role is very important to Maternal and Child health and wellbeing.[2] Existing literature reveals the fathers' influence on child development and the lacking African American involvement within the household. Experts also attribute slavery and other historic discrimination events to the instability of African American

families.[2] With that being said, the opportunity to empower African American men and utilize them as an avenue to reiterate the important of preconception care for expecting mother. In order to accomplish this it is first necessary to gauge the current understanding of risk factors associated to infant mortality in general. Infant mortality rates in Eastern North Carolina have always been the worst in the state; they're currently three times higher than the state average of 7 deaths per 1,000 live births.[3] Where prior studies have laid the foundation for background knowledge surrounding social determinants of health, such as racial discrimination on stress and poor health outcomes, further research is needed geared towards the AA health disparity. The history of the role of men in pregnancy and childbirth has evolved with more fathers being willing to learn and participate in prenatal visits, antenatal classes, and childbirth. The level of involvement and quality of care the father will is predicted from their involvement during pregnancy.[8]

In this paper, male knowledge of risk factors that are directly associated with infant mortality and the disparity that the African American community faces are investigated. The focus is on whether or not African American men living in Pitt County, North Carolina are knowledgeable of the factors that increase the risk for adverse birthing outcomes, infant mortality, and ultimately the importance of the male role in female reproduction.

Risk Factors

Premature birth & LBW

In North Carolina, the State Center for Health Statistics reports low birth weight as one of the three leading causes of infant deaths for 2011. Low birth weight babies are referred to as such when they are born weighing less than five and a half pounds – weight that is too small to be healthy on a normal basis. Approximately 30 million low-birth-weight babies are born in the

United States each year representing 23.8% of all births.[1,2] These babies often face severe short- and long-term health consequences due to low birth weight serving as a major determinant of mortality, morbidity and frailty in infancy and early childhood.[4] Two of the main reasons for pregnancies resulting in low birth weight are premature birth and fetal growth restriction.[5] What is defined as premature birth has been found to vary widely with research publications. The World Health Organization defines premature birth as birth at less than 37 completed gestational weeks. Kramer et al. published a study on the contribution to mild and moderate preterm birth to infant mortality, which focuses on very preterm infants (birth at <32 weeks). The rationale behind the study was that infants born at 32 through 36 weeks are more common and their public health impact has not been well studied. In short, the results revealed that preterm birth infants are at high relative risk for death during infancy and are responsible for an essential part of infant deaths.[4, 5]

Second-hand (Environmental) Smoke

Cigarette smoking is widely known as the leading preventable cause of disease and death in the United States. Tobacco exposures, both voluntary and involuntary, occur at all ages and come from multiple sources. As a result, those affected experience deposition and disposition of thousands of chemicals in the body, and causing detrimental effects on virtually every stage and aspect of development and survival of the neonate.[6] Environmental tobacco smoke, better known to many as second hand smoke, originates from the burning ends of cigarettes as well as from the exhalations of mainstream smoke by smokers.[6] The involuntary nature that results when second hand smoke exposure is occurring lessens the awareness and perceived severity of the practice. Women who are former smokers or significant partners of non-smoker women may be lead to think that since maternal smoking is not occurring that the mother is not at higher risk for the

health effects associated with smoking. In fact, second-hand (environment) smoke is classified by the Environmental Protection Agency as a "known human carcinogen."[12] Reductions in smoking in many environments have resulted in lowering of blood levels of cotinine, a marker of smoke exposure, by 70% in non-smokers from 1988–1991 through 2001–2002.[6]

John Rogers published a paper entitled "Tobacco and Pregnancy" that reviewed a meta-analysis of studies on the effects of secondhand smoke on birth outcomes. The paper documented associations of exposure with reduced birth weight (by 37–40 g), and a 20% increased risk of low birth weight delivery.[6] Findings of the epidemiological review concluded that secondhand smoke exposure was associated with LBW in both prospective studies (OR 1.25 [95% CI 1.00–1.56]) and retrospective studies (OR 1.21 [95% CI 1.08–1.36]).[6] Furthermore, secondhand smoke exposure was associated with a mean birth weight decrement of 37 g in prospective studies and 40 g in retrospective studies.

Measuring the paternal perception of the importance of secondhand smoke is vital because the exposure is still very common in America and the main source of exposure could generate from smoking fathers. On June 27th, 2006, the Surgeon General concluded that secondhand smoke causes disease and death in children and nonsmoking adults. The report also proclaimed that the home is becoming the predominant location for exposure of children and adults to secondhand smoke.[12]

Diet/Nutrition

Michael and Jessica Lu provide information on the link between maternal nutrition and infant mortality in a manual for the Joint Center for Political and Economic Studies.[7] The report states that "Most pregnant women in the U.S. start off pregnancy overweight or underweight,

and had inappropriate weight gain during pregnancy.[7] More African American women are entering into pregnancy without proper diet and nutrition compared to other racial-ethnic groups and only one in four are receiving the recommended daily allowances of iodine, calcium, magnesium, iron, zinc, vitamins A, B1, B2, B3, B6, B12, and vitamin C from food sources.[7] Case control studies, randomized clinical trials, and community-based interventions with vitamin supplements have revealed that the failure to consume folic acid supplements or folic acid-containing multivitamins increases the risk of having adverse birth outcomes by two-fold to eight-fold.[7]

Measuring the paternal perception of the importance of a balanced diet and adequate nutrition during pregnancy is important because every cell, organ, and system of the infant's body comes mostly from the mother's food intake before and/or during pregnancy. Educating African American men on this information can lead to better decision-making when it comes to pre- and interconceptional nutrition. Lu et al. recommends that federal and state governments should pass legislation to encourage family formation and remove disincentives for partner/father involvement through Temporary Assistance for Needy Families, the Earned Income Tax Credit, and child support programs.[2] This study is charged with answering the research question; Are African American men adequately informed about the many risk factors associated with African American infant mortality and adverse birth outcomes? It is my opinion that African American men are not as aware of the risk factors and the importance of their role as men as it relates to female reproduction. This study will measure the perceptions of men and gain better insight as to whether possible intervention should target educating the expecting fathers' on prenatal care.

Methods

Survey results are based on information taken from questionnaires administered to a local group of African American males aged 18 and older living in Pitt County, North Carolina. In order to be included in the analysis, men must self-identify as African American and report living in Pitt County, North Carolina. The county is divided into seventeen townships including; Arthur, Ayden, Belvoir, Bethel, Black Jack, Carolina (Stokes), Chicod, Falkland, Farmville, Fountain, Greenville, Grifton, Grimesland, Pactolus, Simpson, Swift Creek, and Winterville. The survey questions were designed and analyzed using the likert scale where participants, recruited from Pitt County, either chose that they strongly agree to strongly disagree with each question. These questions were designed with assistance from the primary professor. The survey (included in the appendix) was released in by one of two ways; the password protected East Carolina University Qualtrics survey software electronically as well as physical copies. Online surveys were distributed with a unique url and password that allowed participants to access the survey from their home computers. Faith based organizations and barbershops were areas of focus for demonstration. Pastor Rodney Coles, Sr., founder of the Churches Outreach Network in Pitt County distributed the electronic survey to African American men within the church outreach network.

Although the study did not involve more than minimal risk, active consent was provided electronically as well as in physical format for participants. Those who completed the physical forms were required to return a signed form stating that they were given consent. Other than for consenting purposes, the participants and their responses remained anonymous when the results were analyzed and reported. Those who took the survey via the electronic form were provided consent before the survey began. Students were also permitted to take the survey as long as they were over the age of 18 and everyone was permitted to decline to participate at any time before

or during administration. The questionnaire consisted of roughly 10 questions geared towards gathering demographic information such as age, race, occupational status, SES, marital status, etc. on participants. In addition to these questions, participants were asked to complete an additional 20 questions aimed as assessing perceptions of risk factors strongly associated with low birth weight and overall infant mortality. These risk factors include dietary intake, drug use, and prenatal care. Questions are designed to measure the participants' knowledge on the importance of external factors during female reproduction and how these factors may increase the risk for adverse birth outcomes. Finally, the participants answered questions to assess their knowledge on the importance of male involvement during female reproduction. The East Carolina University & Medical Center Institutional Review Board approved the study protocol (UMCIRB 12-002469).

Of the 400 community members who were targeted (i.e., African American men on the Church Outreach Network listserv and barbershops), 27% (108) responded to the survey. Of the respondent some preferred not to answer the questions (n=3). It is assumed that the remainder declined to participate in the study. No key independent variable was determined before the start of the study. Respondents were asked, "Do you have any children?" and "Have you lost a child after birth and before the age of 1?" Ninety-seven percent of respondents answered these questions.

Variables

Results of the distributed questionnaire, i.e. the perceptions surrounding risk factors increasing infant mortality rates, are utilized as the dependent variables for the study. The independent variables for the study will be the demographic information that is gathered at the beginning of each survey. Although this study is exploratory in nature, further research could

utilize the measured variable to compare to men of other races, ages, SES status etc. For the purposes of this study the race will act as the extraneous or controlled variable that is held constant throughout the experiment.

Statistical Analysis

Frequency analysis tables are used for each question within the questionnaire to determine the number and percentages of responses for each risk factor. A cross tabulation analysis is also utilized to categorize each response and monitor any correlations between independent variables and responses. A two way table and chi squared tests of association were used in bivariate comparisons to test the statistical significance of the cross-tabulation tables. These conclusions will allow for conclusions to be drawn on the associations of two or more variables.

Table 1 Demographic Information

Age Group	**Responses**	**%**	**SD**
18-28	31	30%	1.15
29-39	34	32%	
40-50	25	24%	
51-64	9	9%	
65+	6	6%	
Education			
< HS Diploma	1	1%	1.04
HS Diploma	29	28%	
Some College	30	30%	
Bachelor's Degree	30	30%	
Beyond Bachelor's	14	14%	
Income			
< $15,000	14	14%	1.04
$15,000-$35,000	16	16%	
$35,000-$55,000	56	54%	
$55,000-$75,000	9	9%	
> $75,000	8	8%	
Occupation			
Part-Time	22	21%	0.58
Full-Time	74	71%	
Not Working	6	6%	
Self-Employed	2	2%	
Total	105	100%	

Results

Across the sample, 32% (n=34) of the respondents were between the ages 29-39 years of age. Thirty percent (n=31) represented the 18-28 age group and 24% (n=25) represented the 40-50 year age group (table 1). Around two-third of the respondents reported having children of their own and 96% reported no infant mortality within their family. Close to thirty percent of respondents reported having a high school diploma and the same held true for those having some college and a bachelor's degree. Over half of the participants fell into the income range of $35,000 to $55,000 and 71% reported working full time. Of those reported being in a relationship, 47% were single and 40% were married, which gives a good representation between the two.

Educational attainment of the respondents seemed to have the biggest influence on whether or not they agreed with the importance of good diet and nutrition for expecting mothers. Survey results revealed that of those with a high school diploma, 62% (n=18) of respondents answered "not sure" when asked if a women's diet before pregnancy affects the unborn child's health. This value is compared to 50% (n=15) of those with a bachelor's degree who "strongly agreed" to the exact same question. Eighty-five percent (n=12) of respondents with a degree beyond a bachelor's degree also "strongly agreed" to this question. No other apparent associations were found for any of the independent variables compared to the risk factors. Multivariate analysis did not reveal any association. Table 2 shows the percentage of each respondent and categorizes the responses based on the educational level reported. This contingency table reports both the frequency as well as the percentage of respondents at each category. For example, of the participants who reported having a high school diploma, 18 or 62% of them also reported being unsure if a women's diet before pregnancy affects the child's health.

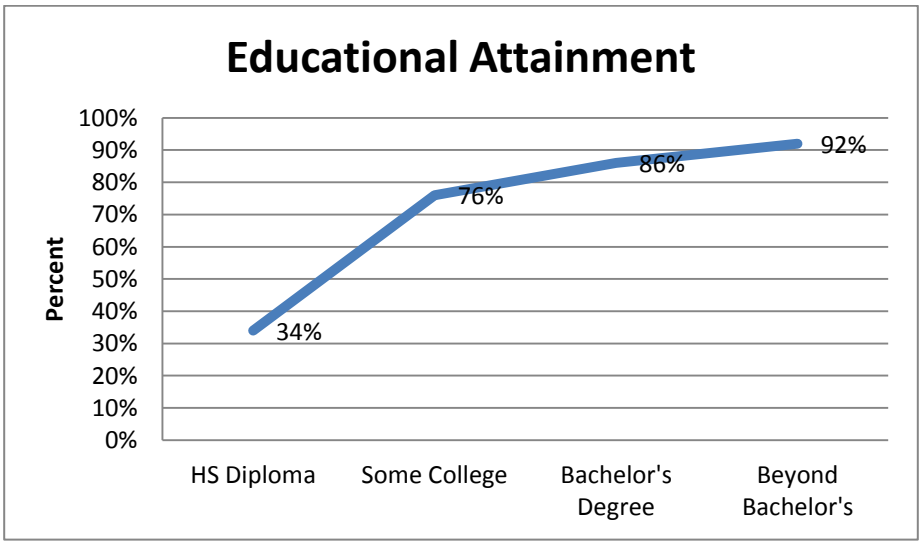
Graph 1 illustrates the percentages of respondents who agreed that a women's diet before pregnancy affect the child's health outcome.

Table 2. Diet/ Nutrition (A women's diet before pregnancy affects the child's health)

	< HS Diploma	HS Diploma	Some College	Bachelor's Degree	Beyond Bachelor's
Strongly Disagree	0	1 (3.4%)	0	2 (6.6%)	0
Disagree	0	0	1 (3.3%)	1 (3.3%)	0
Not Sure	0	18 (62%)	4 (10%)	3 (10%)	1 (7.1%)
Agree	1 (100%)	8 (27.6%)	23 (76.7%)	9 (30%)	1 (7.1%)
Strongly Agree	0	2 (6.9%)	2 (10%)	15 (50%)	12 (85%)
Total	1 (100%)	29 (100%)	30 (100%)	30 (100%)	14 (100%)

Percentages were significantly different across the five categories with $p<0.001$

Graph 1. Diet/ Nutrition (A women's diet before pregnancy affects the child's health)



Percentages were significantly different across categories

Finally the results were truncated into a two way table that pitted high and low education versus agreement or other (answering "not sure" or disagreeing that diet/nutrition affects pregnancy.) Table 3 reveals how the observed values are so far from the expected that there is most likely a significant association between the education level and agreement. The "low" category includes participants who reported having a high school diploma or less while the "high" category included those reported some college or more. Respondent who either agreed or

strongly agreed with the question were placed in the “agree” category while everyone else fell in the “other” group. Expected values, if the null hypothesis held true, are shown in red.

Table 3. Chi Square Test

	Other	**Agree**	**Total**
Low	19 (9)	11 (22)	30
High	11 (22)	63 (55)	74
Total	30	74	104

		Diet/Nutrition
Education	Chi-Square	23.3
	df	1
	P-value	<0.001

If women of childbearing age take 400 micrograms of folic acid every day before and during early pregnancy, it may help reduce their baby’s risk for birth defects of the brain and spine called neural tube defects (NTDs).[9] Study results revealed that educational levels were associated with a decreased understanding of the importance of folic acid intake in women with p-value < 0.001.

Discussion

Findings suggest a possible relationship between the educational attainment of African American men living in Pitt County, NC, and their perception of the importance of healthy weight and nutritional intake for women during pregnancy. When asked if the respondents agreed that diet and nutrition would affect the birthing outcome of infants, those with higher education levels and income agreed at significantly higher percentages compared to those with

lower attainment who may have disagreed or responded "not sure." The findings held true for agreeing with the importance of a balanced diet with folic acid for women before and during pregnancy for optimal health outcomes. If men are only learning about health reproduction at higher levels of educational attainment then there is a very large group uneducated on the importance of prenatal diet and how they can impact pregnancy.

The personal relationship between the mother and father is very important, but what is more important is the piece of the puzzle that only the male can fill in the family equation. It is well known that education does not equal behavior change, however, improving awareness through education is vital to empowerment for change. With only 28% of the Pitt County population receiving a bachelor's degree or higher[10], there may be an optimal opportunity to educate fathers and use them to enforce healthy behavior choices both before and during pregnancy for their families. This issue is magnified with the growing childhood obesity epidemic in America.

There are limitations to the findings of this study that should be taken into consideration. First, due to the low response level, the survey was sent to ECU students and over a faith based listserv, which took away the randomization of the distribution and introduced selection bias. As a result, the external validity is low and results are highly unlikely to be considered generalizable to the larger Pitt County population. It is possible that underlying factors, such as respondents being mostly East Carolina University students, may lead to more respondents having higher education attainment and only a few respondents of lower attainment. In addition, educational attainment is associated with many behavior variables that may lead to risky health behavior. Expanding the survey to compare racial groups may help to reveal any disparities. The survey was also distributed to a large group and the responses were self -reported electronically.

However, there is no reason to believe that respondents would give any other answers than their own perceptions. Henceforth, there is no a posteriori reason to expect that African American men are less knowledgeable about risk factors associated to infant mortality. There is a large group of African American men who were not reached during distribution techniques for most respondents were either a student at East Carolina University or a member of the Church Outreach Network.

There is increasing interest in the impact of male involvement in the family equation; however, most of the focus has been placed on how it effects child development. This pilot study is one of the first of its kind and may lay the foundation for groundbreaking research on the paternal influence on maternal and child health. The findings are not meant to point out a lack of education for African American men, but to rather reveal an avenue to improve family planning for the African American community. Subsequent surveys should target multiple racial and ethnic groups to see if African American men are less educated in Pitt County and if those of different racial groups show the same educational association.[11] Future plans for the study include surveying a larger sample of African-American men from Pitt County and also surveying 2 other racial groups for comparison. The next step is to note if African American men are reported as less knowledgeable than other groups. It is my opinion that social stressors and father absenteeism will result in less involvement in general and less understanding on risk factors associated with infant mortality for African American fathers. Working to reverse this hypothesis could result in substantial change within the household and family planning decisions within the African American household.

Principal results for this study suggest that, for African American men living in Pitt County North Carolina, there is a significant association between educational attainment levels

and agreement of the importance of diet and nutrition for female reproduction health. This avenue could be unique in that intervention efforts to educate the fathers could result in better family preparation for expecting families.

Conclusion

The United States infant mortality rate ranks among the highest for developed countries. The North Carolina infant mortality rate exceeds the national average and the rate in Eastern, North Carolina is among the highest region in the state. Given our current knowledge of infant mortality, it is possible to argue that the emphasis that should be placed on paternal involvement is lacking in maternal and child health. Raising awareness and educating fathers on potential risk factors is essential to increase the understanding of the role expectant fathers may play in making healthy family choices and improving birthing outcomes. Future research should compare the roles of fathers of different racial and ethnic groups. The ways in which data and information on father involvement are collected needs to be improved. This study should open the door for more research focusing on adding the father to the family reproduction equation and lead to interventions that use them as an avenue to reinforce healthy lifestyle choice to the mothers.

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Appendix 1: Professional Paper Questionnaire

Please complete the following questions to the best of your ability by checking a circle for each question. These answers are confidential and will not be used for anything other than research purposes.

Name: _____

What is your age? (circle correct answer)	18-28	29-39	40-50	51-64	65 +
What is your highest level of education completed? (fill in correct answer)	Less than High School 0	High School Diploma 0	Some College 0	Bachelor's Degree 0	Beyond Bachelor's 0
What is your income range? (fill in correct answer)	Less than $15,000 0	$15,000-$35,000 0	$35,000-$55,000 0	$55,000-$75,000 0	More than $75,000 0
What is your occupation status? (fill in correct answer)	Part-time 0	Full-Time 0	Not Working 0		Other 0
What is your relationship status (fill in correct answer)	Single 0	Cohabiting 0	Married 0	Divorced/Separated 0	Widowed 0
Do you have any children? (fill in correct answer) (If so, please answer next question)	Yes 0		No 0		
Have you had a child who lost their life during the 1st year of their life?	Yes 0		No 0		

Please provide any additional comments below (use back of page if necessary):

_____

_____

_____

Please circle the number of your choice	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
1. Smoking can affect a women's pregnancy.	1	2	3	4	5
2. Second hand smoke can affect a women's pregnancy.	1	2	3	4	5
3. Alcohol consumption can affect a women's pregnancy.	1	2	3	4	5
4. If a women works with toxic substances, she can continue to work during early stages of pregnancy.	1	2	3	4	5
5. Drug use can affect a women's pregnancy.	1	2	3	4	5
6. Prior medications should be monitored during pregnancy.	1	2	3	4	5
7. A women's diet before pregnancy affects the child's health outcome.	1	2	3	4	5
8. Folic acid intake is important for women before and during pregnancy.	1	2	3	4	5
9. Infants should be allowed to sleep on their stomach.	1	2	3	4	5
10. Sexually transmitted diseases can affect a women's pregnancy.	1	2	3	4	5
11. Stressful life events during pregnancy can affect a mother's pregnancy.	1	2	3	4	5
12. A women's weight can affect her pregnancy outcome.	1	2	3	4	5
13. Prenatal care is important for women during pregnancy.	1	2	3	4	5
14. A lot of undue stress can affect a women's pregnancy.	1	2	3	4	5
15. Babies dying before age one is a big issue in America for blacks.	1	2	3	4	5
16. Infant mortality rates are higher than the national average in NC.	1	2	3	4	5
17. Infant mortality rates are higher than the state average in Eastern, NC.	1	2	3	4	5
18. Being born early in the pregnancy can affect an infant's birth outcome.	1	2	3	4	5
19. The male partner plays an important role in a women's reproductive health.	1	2	3	4	5
20. Men influence women to take good care of them self during pregnancy.	1	2	3	4	5
21. African American men are less likely to be involved with their partner during pregnancy compared to other races	1	2	3	4	5

Appendix 2: Professional Paper Informed Consent

Script for Written Informed Consent

Infant Mortality Study

Lorenzo Hopper

This research study is being completed in order to get a better understanding of what is most important during pregnancy from the male perspective, with special emphasis on: risk factors previously associated with female reproduction.

You are being invited to take part in this study because you have identified yourself as an African American man residing in Pitt County, NC. If you volunteer to take part in this study, you will be one of about 100 individuals to do so throughout the county. The survey should take about ten to fifteen minutes and is on a purely voluntary basis. You will be asked to answer a number of questions regarding your view on female pregnancy and infant mortality.

This research is part of Lorenzo's graduate studies and will be used to support his professional paper. The data gathered will be prepared for presentation and/or publication. Identification of individuals will not occur due to de-identification and aggregation of data prior to the release of the information.

If at any time and for any reason, you would prefer not to answer any questions, please feel free not to and leave the field blank. Lorenzo will keep all completed surveys at all times.

If you have questions later, you may contact Lorenzo Hopper at 252-744-4033

Please sign name Date