A stylized, light brown graphic of a plant with several leaves and a cluster of small, round berries or buds, positioned on the left side of the slide.

Socioeconomic Factors Affecting Infant Sleep Related Deaths in St. Louis: A look at the data analysis

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**SAFE
KIDS**
ST. LOUIS

A red logo featuring a stylized sun or starburst design above the text "Cardinal Glennon".
Cardinal Glennon
SSM Cardinal Glennon Children's Medical Center

Back to Sleep Campaign - 1994

Caused an overall decrease in SIDS and unintentional suffocation cases

Disparity continues to increase

Behavioral factors associated with this increase:

- Continuation of prone sleep positioning
- Unsafe sleep surfaces
- Bedsharing

Socioeconomic factors:

- Race
- Poverty
- Maternal education
- Parity

Mortality Rate Comparisons

Nationally

African Americans have 1.9 times the SIDS mortality rate of Caucasians

St. Louis

SIDS: African American have 3.2 times the mortality rate of Caucasians

Bedsharing Deaths: African American have 1.9 times the mortality rate of Caucasians

Non-standard Sleep Surface Deaths: African American have 1.7 times the mortality rate of Caucasians

Problem Statement

Though researchers have analyzed and described various sociodemographic characteristics of SIDS and unintentional suffocation deaths in St. Louis, they have not simultaneously controlled for multiple risk factors which may contribute to racial disparity such as race, poverty, maternal education, and number of children birthed by the mother (parity).

Research Design and Approach

Quantitative case-control study

Analyzed secondary data collected by the Missouri Department of Health and Senior Services from January 1, 2005 through December 31, 2009.

Designed to determine if a relationship exists between poverty, race, maternal education level and parity (independent variables) and infant sleep related deaths (dependent variable).

Questions asked

1. Is there a relationship between the level of poverty of the mother and infant sleep related deaths?
2. Is there a relationship between the race of the mother and infant sleep related deaths?
3. Is there a relationship between the level of education of the mother and infant sleep related deaths?
4. Is there a relationship between the number of children born by the mother (parity) and infant sleep related deaths?

Human Subjects Protection

- Secondary data was to examine socioeconomic characteristics of infant sleep related deaths.
- The investigator had no direct contact with the infants or their mothers.
- Active informed consent for participation was not necessary.
- All data were housed on a password protected computer.
- The data were de-identified by the Missouri DOH prior to receipt by the researcher. No personally identifiable information, such as name or address, were coded for analysis.
- Approval was received from the Missouri DOH and from Walden University's Institutional Review Board

The Data of the Matter...

Target population: Mothers of infants who had sleep related deaths

A statistical analysis of a database of 26,211 mothers of infants younger than 1 year of age who resided in St. Louis at the time of their infant's birth, was obtained from the Missouri DHSS.

The database included information on the study's outcome variable (whether they had a sleep related death) and on various demographic independent variables, such as the mother's race, whether she received food stamps, years of education, and parity.

Quick statistics primer....

Probability value (p-value): The probability of getting a value of the test statistic as extreme as or more extreme than that observed by chance alone, if the null hypothesis, is true. The p-value is compared with the actual significance level of our test and, if it is smaller, the result is significant.

chi-square Statistic: The chi-square statistic is used to measure the agreement between categorical data and a multinomial model that predicts the relative frequency of outcomes in each possible category.

Two data approaches

Descriptive analysis completed on entire population

Then:

Case Population: The entire population of infants who had sleep related deaths within the study time frame (n=55)

Control Population: Determined by random sampling of the entire population of mothers of infants who were born within the study time frame and lived past their first year of life. (n= 26,156*)

* total births (26,211) minus total deaths (55).

Three analysis applications

1. Descriptive data analysis: Includes frequency distributions for each of the variables.
2. Chi-squared analyses for the 4 research questions*
3. Logistic regression analysis*

*conducted to determine whether each of the independent variables (race, poverty, maternal education, parity) could be used to predict infant sleep related deaths

Poverty and Race

- Birth certificate poverty indicators:
 - Medicaid, WIC, and/or enrollment in the Food Stamp program
 - WIC (54.8%).
 - Medicaid (63.2%)
 - Food stamps (45.2%).
- Race:
 - African American (60.2%).
 - Caucasian (35.8%)
 - Other ethnicities (3.9%)

Frequency Distribution of Poverty and Race Variables (n=26,111)

Variable	Frequency	Percent
Poverty		
Medicaid		
No	9518	36.8
Yes	16366	63.2
WIC		
No	11689	45.2
Yes	14172	54.8
Food Stamps		
No	11689	45.2
Yes	14172	54.8
Race		
African American	15789	60.2
White	9392	35.8

Descriptive Statistics of Parity and Years of Education (n=26,211)

Variable	Min	Max	M	SD
Mother's education	1	17	12.74	2.562
Parity	1	15	2.20	1.496

Parity is not recorded on the birth certificate, but is the total number of children from the *Now living* and *Now dead* categories of the Birth Certificates.

Descriptive statistics on years of education and parity by group (n=110)

Sleep Related Infant Death				
	No		Yes	
	M	SD	M	SD
Mother's Education	12.53	2.51	12.19	2.10
Parity	2.58	1.82	2.62	1.13

Frequency Distribution of Demographic Variables by Group (n = 110)

		Sleep Related Infant Death			
		No		Yes	
Variable		Count	Column N %	Count	Column N %
Medicaid	No	18	32.7%	12	22.2%
	Yes	37	67.3%	42	77.8%
WIC	No	22	40.0%	15	27.8%
	Yes	33	60.0%	39	72.2%
Food Stamps	No	35	63.6%	18	33.3%
	Yes	20	36.4%	36	66.7%
Mother's Race	Black	27	49.1%	45	81.8%
	White	26	47.3%	9	16.4%
	Other	2	3.6%	1	1.8%

Mothers in the “Infant Death” group were generally more likely to be enrolled in Medicaid and food stamp programs, more likely to receive WIC, and more likely to be African American (81.8% vs. 49.1% for the control group).

Cross-tabulation analysis between Poverty and Infant Death (n = 110): *Research question 1*

		Sleep Related Infant Death	
Poverty		No	Yes
No	Count	17	7
	% within Poverty	70.8%	29.2%
Yes	Count	38	47
	% within Poverty	44.7%	55.3%

55.3% of poor mothers experienced infant death, compared to 29.2% of non-poor mothers. This difference was statistically significant (Chi-squared(1) = 5.111, $p = .024$).

Cross-tabulation analysis between Mother's Race and Infant Death: *Research question 2*

		Sleep Related Infant Death	
Mother's Race		No	Yes
Black	Count	27	45
	% within Mother's Race	37.5%	62.5%
White	Count	26	9
	% within Mother's Race	74.3%	25.7%
Other	Count	2	1
	% within Mother's Race	66.7%	33.3%
Note. N= 110. Chi-squared(2) = 13.090, p = .001.			

African American mothers had a higher likelihood of experiencing sleep related infant death (62.5%) than Caucasian mothers (25.7%) or mothers of Other ethnicity (33.3%). This difference was significant at the .05 level (Chi-squared (2) = 13.090, p = .001).

Results of Binary Logistic Regression Analysis of Level of Maternal Education: *Research Question 3*

Variable	B	S.E.	Sig.	OR
Years of Education	-.065	.084	.439	.937
Constant	.785	1.055	.457	2.191
Note. Chi-squared (1) = .604, $p = .439$				

The relationship between the mother's education level and the occurrence of infant death was not significant ($p = .439$).

Results of Binary Logistic Regression Analysis of Parity: *Research Question 4*

Variable	B	S.E.	Wald	Sig.	OR
Parity	.016	.127	.016	.899	1.016
Constant	-.042	.381	.012	.913	.959
Note. Chi-squared(1) = .016, p = .899.					

The relationship between the mother's parity and the occurrence of sleep related infant death was not significant ($p = .899$).

Results of Binary Logistic Regression Including all Independent Variables Simultaneously

Variable	B	S.E.	Wald	Sig.	OR
Years of Education	.033	.106	.096	.756	1.033
Parity	-.117	.149	.615	.433	.890
Race = White	-1.476	.523	7.974	.005	.228
Race = Other	-1.054	1.330	.629	.428	.348
Poverty	.486	.652	.554	.457	1.625
Constant	-.025	1.742	.000	.988	.975

Note. Race = Black was used as reference category. Chi-squared (5) = 14.303, $p = .014$

Results of Binary Logistic Regression Including all Independent Variables Simultaneously

- The overall model was significant ($\text{Chi-squared}(5) = 14.303, p = .014$).
- Consistent with the previous results, it was found that Caucasian mothers were significantly less likely than African American mothers (by a factor of $\text{OR} = .228, p = .005$) to experience sleep related infant death.
- No significant relationships between the likelihood of sleep related infant death and mother's education and parity were found.
- Although poverty was significant in the Chi-squared analysis, it was not significant in this logistic regression.

Study Limitations

- Potentially limited generalizability because the data will be collected in a primarily African American population.
- Small sample size
- Potentially limited by accuracy in a variety of areas including the diagnosis of cause of death, and the fact that deaths with undetermined causes are usually classified as SIDS, even though death may be caused by other variables

Recommendations for Action

- Sleep related infant death disparity occurs in St. Louis, Missouri at higher levels than the national average and similar levels in previous local studies.
- Though the data is illustrated in numbers, the numbers represent the tragedy of unnecessary infant deaths.
- This is undoubtedly a crisis that warrants the attention of health and public health professionals as well as policy makers.
- It is my hope to disseminate the results of this study to public health officials at state and local levels to be used by them to promote policies and programs with the intent of reducing disparity in infant sleep related deaths.

Questions?

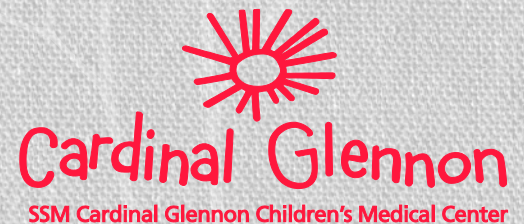
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