

HAP-719 (Advanced Statistics in Health Services Research)

(Project #1 - Report)

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Objective:

The objective of present study is to examine the effects of child's race, poverty level, gender, consistency of health insurance coverage, adverse life experiences, and the number of times children received preventive services in the last 12 months on the number of chronic health conditions among 3-5 year old children.

Introduction:

Adverse childhood life experiences are stressful events that have a wide range of effects on health, such as child abuse, household dysfunction or parental separation, neighbourhood violence, financial hardship, and so on. Almost half of all American children have faced received preventive health services in the last 12 months among 3-7 years age group, with children of race and those from low-income families faring the worst. Adult adversity survivors have a higher disease burden, which has been linked to altered access and utilization patterns in health care. Health insurance consistency is also important in maintaining children's health, and lack of insurance has a negative impact on their health; according to recent statistics, 3.3 million children under the age of 18 are uninsured in the United States. Children without health insurance have poorer health outcomes and less access to preventive health care than those who do. When compared to other racial or ethnic groups of children, minorities have higher rates of suboptimal dental and medical health, as well as no regular source of care.

Materials and Methods:

Data:

This data set is a subsample (sample size (n) =15,910) of a larger data set called the 2011/2012 National Survey of Children's Health (NSCH), which was conducted by the Centers for Disease Control and Prevention (CDC) and the National Center for Health Statistics. This survey included approximately 95,000 children aged 0 to 17 years old, and its purpose was to assess children's health status, insurance coverage, parental health, and a variety of other factors. Only children aged 3 to 5 are included in the subsample.

Variable type and description:**Dependent Variable:**

Chronical Health Conditions is a continuous dependent variable defined as the child having any of the following conditions: asthma, diabetes, epilepsy, hearing and vision problems, bone/joint/muscle problems, brain injury, or concussion.

Independent Variables:

Preventive Health Services is a continuous independent variable defined as the number of times a child visited a doctor/nurse/healthcare provider for preventive medical care such as a physical exam or well-child checkups in the previous 12 months.

The race of the child is an independent variable that is divided into whites and non-whites.

Poverty level 1 is an independent variable that is divided into two categories based on the federal poverty level: low poverty level (greater than or equal to 200 percent of the federal poverty level) and high poverty level (less than or equal to 199 of federal poverty level).

Gender is an independent variable that is classified as male or female based on the gender of the child.

Consistency of health insurance coverage is an independent variable classified as consistently insured throughout the previous year and currently uninsured or periods with no coverage during the year based on the children's consistency of insurance coverage over the previous 12 months.

The number of adverse life experiences is a continuous variable that can be defined as the number of stressful events in children's lives such as child abuse, household dysfunction or parental separation, neighbourhood violence, and financial hardship.

Statistical Study and tests used:

The purpose of this study is to see if independent variables like a child's race, poverty level, gender, consistency of insurance coverage, adverse life experiences, and the number of times a child received preventive services in the previous 12 months are significant predictors of the dependent variable, the number of chronic health conditions among 3-5 year old children.

In this study, to analyse the data and draw conclusions about the research topic, descriptive statistics, ANOVA techniques, correlation analysis, and multiple regression analysis at an alpha value of 0.05 techniques are used to determine the effect of independent variables on dependent variable.

Statistical Analysis Software:

STATA17 statistical software was used to perform the statistical analysis for this project.

Analysis of Descriptive Statistics:

Table 1 displays the descriptive statistics for the study sample. There are 15,910 people in the sample, with 9548 whites (61.69 percent) and 5929 non-whites (38.31 percent). Males make up 51.20 percent of the population (8140), while females make up 48.80 percent (7757). The poor constitute 62.30 percent (9912) of the population, while the impoverished constitute 37.70 percent (5998). The vast majority of children, 91.30 percent (14,454), have been consistently insured for many years, while 8.70 percent (1378) are currently uninsured. The mean for children with a number of chronic conditions is 0.325, with a standard deviation (SD) of 0.970. The number of children who had adverse life experiences was 15,710, with 0.667, 1.142 mean and SD values. There were 14515 people who received preventive health services, with a mean and standard deviation of 2.015 and 1.997.

Table:1 Descriptive statistics of study sample

Characteristics	No. of Observations (n = 15910)	Proportion (%)	Mean	SD
Child's Race				
Whites	9548	61.69		
Non-whites	5929	38.31		
Gender				
Male	8140	51.20		
Female	7,757	48.80		
Poverty Level				
Low poverty level (≥ 200)	9912	62.30		
High poverty level (≤ 199)	5998	37.70		
Insurance coverage consistency				
Consistently insured through past years	14,454	91.30		
Currently uninsured or periods w/ no co	1378	8.70		
Number of Chronic Conditions	15910		0.325	0.970
Number of Adverse life experiences	15710		0.667	1.142
Preventive Health Services	14515		2.015	1.997

Table:2 Distribution of independent variables over outcome variable

Independent Variable	Number of Chronic Conditions Mean (SD)	Beta Coefficient	t-test	F-test	P-value
Child's Race		0.067	4.23	17.93	0.000
Whites	0.299 (0.926)				
Non-Whites	0.367 (1.03)				
Gender		-0.181	-11.84	140.11	0.000
Male	0.413 (1.09)				
Female	0.232 (0.803)				
Insurance Consistency		0.046	1.69	2.84	0.020
Consistently insured	0.321 (0.953)				
Currently uninsured	0.367 (1.129)				
Poverty Level		0.174	11.03	121.63	0.000
Low poverty lvl	0.259 (0.846)				
High poverty lvl	0.433 (1.138)				
Number Of Chronic conditions		0.429	26.14	683.22	0.00
No Of adverse life experience		0.204	14.13	199.70	0.00

Analysis of t-test and regression:

According to the regression table, the t-value is 4.23 with a p-value of 0.0, indicating a 0.05 difference in the average number of chronic conditions between whites and non-whites. Non-white children have 0.367 more chronic conditions than white children (0.299). The t-value for Gender is -11.84, with a p-value of 0.0, indicating a 0.05 difference in the average number of chronic conditions between males and females. Males have 0.4136 more chronic conditions than females. The t-value for InsuranceConst is 1.69, with a p-value of 0.092, both greater than 0.05, implying that there is no significant difference in the average number of chronic conditions between children who have been consistently insured in the past and those who are currently uninsured. According to the table, the current average mean for children without insurance is 0.3671988, the highest number of chronic conditions ever reported, compared to 0.3210876 for children who had insurance in the previous 12 months, the lowest number of chronic conditions ever reported. The current no insurance child ratio

with chronic problems is the highest at 1.12997, compared to the consistently insured child ratio of 0.9539611. The t-value for Povertlevel1 is 11.03, with a p-value of 0.0, indicating a significant difference in the average number of chronic conditions between children from low and high poverty levels. With an average of 0.4338, children from high poverty have significantly more chronic conditions than children from low poverty (0.2594).

Correlation between dependent variable and independent variables:

```
. pwcorr NumChronicCond ChildRaceEthn PovertyLevel1 Gender
InsuranceConst NumAdverseExp PrevHealthServ
```

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> , sig star (0.05)
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	NumChr~d	ChildR~n	Povert~1	Gender	Insura~t	NumAdv~p	PrevHe~v
NumChronic~d	1.0000						
ChildRaceE~n	0.0340*	1.0000					
	0.0000						
PovertyLev~1	0.0871*	0.2569*	1.0000				
	0.0000	0.0000					
Gender	-0.0935*	-0.0010	-0.0024	1.0000			
	0.0000	0.9015	0.7612				
InsuranceC~t	0.0134	0.0762*	0.1518*	-0.0033	1.0000		
	0.0920	0.0000	0.0000	0.6764			
NumAdverse~p	0.1708*	0.0881*	0.2921*	-0.0007	0.1310*	1.0000	
	0.0000	0.0000	0.0000	0.9296	0.0000		
PrevHealth~v	0.2120*	0.0982*	0.1283*	-0.0194*	0.0258*	0.1172*	1.0000
	0.0000	0.0000	0.0000	0.0194	0.0019	0.0000	

Pearson product-moment correlation was used to determine whether there are any significant associations between the number of chronic health conditions experienced by 3-5-year-old children in the previous 12 months and the independent variables. There were significant correlations between the number of chronic health conditions and the child's race, poverty level, gender, consistency of health insurance coverage, adverse life experiences, and the number of times the child received preventive services. Except for insurance coverage, the number of chronic conditions is significantly correlated ($r = 0.09$ to $r = 0.21$, $p\text{-value} = 0.05$).

Analysis of Multiple Linear Regression:

```
. regress NumChronicCond ChildRaceEthn PovertyLevel1 Gender
InsuranceConst NumAdverseExp PrevHealthSer
```

Source	SS	df	MS	Number of obs
Model	1072.66909	6	178.778182	14,077
Residual	12623.7506	14,070	.897210419	
Total	13696.4197	14,076	.97303351	

F(6, 14070) = 199.26

Prob > F = 0.0000

R-squared = 0.0783

Adj R-squared = 0.0779

Root MSE = .94721

Variable	Coefficient	Std. err.	t	P> t	[95% conf. interval]
ChildRaceEthn	.0006726	.0170996	0.04	0.969	-.0328449 .03419
PovertyLevel1	.0589078	.0181448	3.25	0.001	.0233416 .0944739
Gender	-.1815839	.0159769	-11.37	0.000	-.2129008 -.150267
InsuranceConst	-.0306157	.0302052	-1.01	0.311	-.0898218 .0285904

NumAdverseExp		.1290067	.0073717	17.50	0.000
.1145572		.1434563			
PrevHealthServ		.0937231	.0040832	22.95	0.000
.0857195		.1017266			
_cons		.3120586	.027408	11.39	0.000
.2583352		.3657821			

In conjunction with the independent variables, multiple linear regression analysis is used to evaluate predictors of the number of chronic conditions. According to the regression results, the regression model is overall significant ($F(6,14070) = 199.26$, $p = 0.000$) with an R-squared value of 0.0779. This model accounted for 7.7% of the variation in the number of chronic conditions. Poverty level ($t = 3.25$, $p\text{-value} = 0.001$), gender ($t = -11.37$, $p\text{-value} = 0.00$), adverse life experience ($t = 17.50$, $p\text{-value} = 0.00$), and prior preventive health services ($t = 22.95$, $p\text{-value} = 0.00$) all significantly predicted the number of chronic conditions. In contrast, child race ($t = 0.04$, $p\text{-value} = 0.96$) and insurance coverage ($t = -1.01$, $p\text{-value} = 0.31$) are not significant predictors.

Table:3 Multiple linear regression

Variables	b-coefficient	Standard errors	t-test	p-value
constant	0.312	0.027	11.39	0.000
Child race	0.00067	0.017	0.04	0.969
Poverty level	0.058	0.018	3.25	0.001
Gender	-0.181	0.015	-11.37	0.000
Insurance coverage	-0.030	0.030	-1.01	0.311
Adverse life experience	0.129	0.007	17.50	0.000
Previous preventive health services	0.093	0.004	22.95	0.000

Adjusted R-squared value = 0.0779

f-test for overall model $f(6,14070) = 199.26$

Discussion:

The findings of this study demonstrate the importance of gender and poverty level in the emergence of chronic diseases. This experiment demonstrates how gender and income level influence how much money is allocated to the health care system. The lower income level is determined by an individual's lifetime risk of developing chronic diseases as well as the quality of care they receive. Work must still be done in large quantities in the future. We must close the healthcare space gap in order to improve the overall health of the community. We need to figure out how to provide consistent care across all components. This could imply

putting in place an anonymous health insurance plan that forbids doctors from refusing treatment solely on the basis of insurance. While still receiving payment for his or her services, the doctor will provide excellent care.

Limitations, the healthcare system frequently prevents from being referred to less trained doctors, and patients are rarely provided with the necessary care that could prevent chronic diseases. Preventive health is another factor to consider when looking for ways to improve children's health.

Conclusion:

At the time the original data was collected, the proportion of children without insurance was low, at 8.7 percent of the total population. The child was 51.2 percent male and 48.8 percent female. When measuring poverty at ≥ 200 , 62.3 percent are ≥ 200 , while the remaining 37.7 percent are ≤ 199.61 . White children made up 61.69 percent of the population, while non-white children made up 38.31 percent. Few children had negative experiences or chronic illnesses. According to research, children from extremely low-income families are more likely to develop chronic illnesses than children from higher-income families. We also know that insurance does not cause chronic illness. The findings show a significant difference between non-whites and whites, implying that race must be considered when developing chronic diseases. These variables have a significant impact on the person's level of care.

References:

1. US Census Bureau. (n.d.). *National Survey of Children's Health (NSCH)*.
Census.Gov. <https://www.census.gov/programs-surveys/nsch.html>
2. *NCBI - 2011/12 National Survey of Children's Health*. (n.d.). NCBI.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5941257/>
3. *NCBI - Adverse childhood experiences and mental health, chronic medical conditions*. (n.d.). NCBI. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4562867/>
4. 2011/12 National Survey of Children's Health. (n.d.). Health Status.
<https://health.hawaii.gov/fhsd/files/2018/06/health-status-of-children-in-hawaii-report.pdf>

THANKYOU