A QUANTITATIVE RESEARCH DESIGN INVESTIGATING ENVIRONMENTAL INJUSTICE AND CHILDREN'S HEALTH RISKS

Ningxin Li
Nova Southeastern University

ABSTRACT: Environmental injustice and health problems have been found detrimental to the quality of life in the West Bank. Insufficient water supply and unequal water distribution often lead to increased rates of communicable waterborne diseases and uncommunicable illnesses (World Health Organization, 2009). Access to safe water is not a reality for many children throughout the West Bank. Maintaining proper health is difficult for children living in disadvantaged areas with poor water quality (Baram & Cohen, 2015). Exposure to unclean water can also lead to adverse health risks, including diarrhea and other diseases. Groundwater is the primary source of water to the Palestinians and Israelis, and the competition over controlling water resources has caused ongoing conflicts for years (Waldman, 2018). To understand the scope of the information available in this region, the researcher will suggest how to collect data to assess the risk of drinking water contaminated with viruses or bacteria. The research purpose is to identify how environmental injustice impacts public health between two groups by using a quantitative study. By doing this, the researcher aims to illustrate how a lack of adequate sanitation and unequal distribution of water are significant contributors to childhood health problems. Also, this study will investigate the relationship between childhood death and illness, and the unsustainable patterns of environmental development and poverty. The researcher will provide reviews and critical ideas to help in filling gaps and exploring the truth.

KEYWORDS: Environmental Injustice, Waterborne Diseases, Quantitative Study, T-Test, Descriptive Analysis.

INTRODUCTION

Historical Background

After World War II, the United Nations passed a resolution to establish two states for Palestinians and Israelis, including the West Bank. It was estimated that there was a population of 2,747,943 Palestinians and about 391,000 Israeli settlers in the West Bank in 2017 (The World Factbook, 2018). Additionally, there were approximately 201,200 Israeli settlers near East Jerusalem (The World Factbook, 2018). The northwest quarter of the Dead Sea consists of a land area of 5,640 km² and a water area of 220 km². Palestinians are primarily located in the central area of the western half of the territory in the West Bank. Jewish settlements are found mainly in the northeast and north-central area of the West Bank and around Jerusalem (World Factbook, 2018). Israel transferred security and civilian responsibility for some Palestinian-populated areas of the West Bank and Gaza Strip to the Palestinian Authority under a series of agreements signed between 1993 and 1999, called the Oslo Accords (World Factbook, 2018). Around 60% of the West Bank remains under Israeli military control (World Factbook, 2018).
There is unequal access to water between children of Palestine and Israel (Baram & Cohen, 2015). Hundreds of thousands of children have suffered from a severe water shortage throughout the years. Environmental injustice caused by a disproportionate distribution of water has had an impact on the West Bank health system (Valdivieso & Allmen, 2001). The West Bank is also facing challenges because of political conflict and the group competition for resources. Fighting for borders and land resources may continue in the younger generations. The water shortage drastically affects the residents' health and children's well-being. In many communities, people are extremely poor (Valdivieso & Allmen, 2001). The families have to spend around 40 percent of their income on the essential commodities. Moreover, the losses of water in the network were estimated at 28% in the West Bank; maintenance of water infrastructures are also problematic (Baram & Cohen, 2015).

The groundwater is highly contaminated by leaked sewage. Many communities are still not connected to the water network, and people have to pay a high price and are dependent on water transported in water trucks (Chellaney, 2013). In these communities, especially in Area C of the West Bank which was under Israeli control, the average water consumption per day is about 20 liters per capita. There is a need to enhance the resilience and capacity of the community so that both parties can share resources equally and have good health (Marie, Hannigan, & Jones, 2016).

**Problem Statement**

**Definition of Environmental Injustice.** Environmental justice is the meaningful involvement of all people regardless of race, color, nationality, or income concerning the development and implementation of environmental regulations and policies (Valdivieso & Allmen, 2001). Inequitable distribution of resources will cause environmental risks and hurt children’s health (Valdivieso & Allmen, 2001). Protection from environmental and health hazards is essential to developing a healthy environment so that they can live, learn, and work together (U.S. Government Accountability Office, 1983). People should be treated fairly in environmental decision-making (Bullard, 2001).

**Measuring Child Poverty.** According to the World Health Organization, children are exposed to pumps or water sources that have been contaminated by waterborne bacterias (The United Nations, n.d.). Children with weak immune systems are the most likely to develop illnesses or infections after contact with polluted water. Water-related diseases account for over one-quarter of illnesses and are the primary cause of child morbidity in the West Bank (The United Nations, n.d.). Babies are suffering from dehydration, vomiting, and fever. There is also a growing interest in multidimensional in which poverty is not only a deprivation of income but also an insufficient coverage of various human needs (Streeten, 1981).

Children are a vulnerable group especially when they live in an environment without enough protection and attention from adults. The unsafe environment caused by unequal access to water between Palestinians and Israelis made this problem obvious (Bradley & Whiteside-Mansell, 1997). Many children are living in poverty in the West Bank, and they fail to meet the minimum living standard of the nation (U.N. General Assembly, 1989). Children who are living in poverty are those who experience deprivation of materials and lack emotional support. If they use contaminated drinking water in the preparation of food, they can get diseases through the consumption of the food (Chellaney, 2013). The waterborne disease can be caused by protozoa, viruses, bacteria, and intestinal parasites (Shaheen, n.d.). It is hard for them to...
achieve their full potential and enjoy equal rights as do other members of society (UNICEF, 2006).

**Research Questions and Hypotheses**

The goal of a quantitative research study helps to identify the relationship between one independent variable and another outcome variable (Healey, 2009). The researcher needs to understand the types of relationships that exist between disability, poverty, and ill health. The first aim of the research questions includes measuring child poverty of water and health in the West Bank, and testing which group was impacted more than another, as well as identifying how environmental injustice impacts public health between two groups. The second aim is to assess how people access to water in the Palestinian and Israeli settlements respectively, and explore whether residents have been diagnosed with any waterborne illnesses. The null hypotheses of this research are that there are no significant differences between the two groups in waterborne diseases. The alternative hypothesis is that there is a significant difference between the two groups in waterborne diseases. Poverty reduction is one of the significant challenges. Poverty is also an obstacle to well-being in the West Bank. The researcher will select quantitative data from the areas of the West Bank. A poverty index will also be constructed in the research process. Recommendations will be made for appropriate approaches according to the investigation of poverty.

**LITERATURE REVIEW**

The literature review will be completed by searching the US National Library of Medicine's PubMed database, the World Bank database, and the World Health Organization data. Children are particularly vulnerable when exposed to unhealthy environmental conditions, such as water pollution and inadequate water sanitation (WHO, n.d.). Contaminated water and lack of adequate sanitation are essential environmental risk factors for children (WHO, n.d.). There were 1.7 million deaths of children attributable to the environment in 2012, which included around 570,000 deaths from respiratory infections, 361,000 deaths from diarrhea, and 200,000 deaths from malaria (World Health Organization, 2009). According to the World Health Organization, in 2008, the rate of acute hepatitis is 23.7 per 100 000 in the West Bank (World Health Organization, 2009).

The Palestinian government in the West Bank experienced lack of international funds and organizational financial support. Diseases associated with poor environmental health are a public health threat to locals (Waldman, 2018). The health system was affected negatively — a lack of water management and distribution impacts the quality of children's living conditions (Marie, Hannigan, & Jones, 2016). Although the link between poverty and health has been asserted, very few research studies have investigated the links between environmental injustice, poverty, and children's health. There is also an absence of active children's mental health research in the West Bank, and a lack of detailed data and surveys relating to this research field (Starr, 2012). This research will be focused on investigating the effects of the insufficient distribution of water and poverty on children's health. A quantitative study gives people insight and helps to explain the extent to which people live under constant intense pressure.

**Human Needs Theory.** Human Needs Theory will be chosen to apply to this study. Theorist Galtung said that violence and conflict hurt the basic human needs (Galtung, 2007). Structural
violence causes direct violence and peace is the way to transform the conflict creatively and to maximize positive changes in human relationships. Balancing the needs of a large number of child populations in both Israeli and Palestinian settlements became a challenge (Rubin, 2017). Both Abraham Maslow and John Burton indicated that food, water, and shelter are essential for a human to survive. Also, for Burton, the Basic Human Needs Theory offered a possible method of conflict analysis and resolution. In Burton's view, the need for identity, recognition, security, and personal development can cause competition or ethnic struggles. Burton explained the need for safety and the need for belongingness and love, as well as the need for perusing freedom.

People have basic needs, such as security (Rubenstein, 2001). Security provides people with pleasure and comfort through self-defense. Children have the need for living in safety and the need for well-being. Burton indicated that culture makes parties manipulate the other parties. In this case, Israelis and Palestinians might identify themselves with a shared culture and history within their group and exclude another group's needs (Starr, 2012). Palestinian and Israeli children living in that situation might lack a sense of safety and need people to pay more attention to their basic needs.

Galtung (2007) addressed the relationship between structural violence and well-being. Childhood poverty could prevent people from being happy and comfortable. Additionally, all children, no matter who they are, Palestinians or Jews, should have the freedom to travel and have access to get clean water to meet their basic needs. However, a significant proportion of disease caused by water-related pathogens, such as typhoid and cholera, made more challenges to public health. People should look for building a long-term relationship and increasing financial support to manage children’s health situations (Chellaney, 2013). Government and international organizations can take actions and responsibility to implement performance to reduce barriers for reaching marginalized populations.

**Relative Deprivation Theory.** Relative Deprivation Theory of Migration can help in analyzing the settlement conflict in the West Bank and the causes of inequality and injustice phenomena which leads to poorer health outcomes (Smith & Huo, 2014). Relative Deprivation Theory reveals essential consequences for both behaviors and motivations, including feelings of stress and political attitudes (Smith & Huo, 2014). It links inequality to poorer mental or physical health. Relative Deprivation Theory can also help in explaining the reasons why the lack of resources has a significant impact on individuals. Stark (1984) theorized the relative deprivation concept in migration studies. This theory was also studied by Stark and Yitzhaki (1988), who said that both social inequality and poverty might incentivize people to migrate to other settlements and compete over resources with different groups (Bernstein & Crosby, 1980). Moreover, Pickett and Wilkinson (2015) provided evidence that inequality could cause poor health outcomes. However, further research is required to determine if subjective feelings of personal relative deprivation relate to children’s poor health.

**Research Design**

The researcher suggests to use the descriptive study method, and it will help to gather, analyze, and interpret the results. A descriptive study helps to establish associations between different variables and ensures there will be a valid estimate between variables (Healey, 2009). To assess children’s health and waterborne diseases, questionnaires and surveys will be used in this study. Demographic data will be assessed, and it will detect changes in people’s perceptions. A descriptive analytic study will be carried out to determine the most significant problems. The
The researcher has concerns about the quality of drinking water and the risks of infectious diseases of Israeli and Palestinian children. The researcher has to document and quantify the health risks resulting from microorganisms in water and assess evidence for waterborne-based outbreaks. Estimating the causes of infection and the ratios of variables is essential to do a quantitative risk assessment (National Research Council, 2004). Also, the quantitative study provides details for assessing results. It describes how each objective of this study will be achieved. Data collection is an essential step in the quantitative study. It will help to identify the variables and help to analyze the data by using the computer software. Data collection will also help to test if anxiety, fear, lack of feelings of security, psychological stress, hopelessness, and physical fatigue are caused by a lack of access to clean water and environmental injustice (Chellaney, 2013). Additionally, data coding will be conducted in the research process. The researcher will measure nominal, ordinal, interval, and ratio scale variables respectively. These variables will be developed by the researcher and will be reviewed by local psychologists and mental health experts.

**Search Variables and Collect Surveys.** Gathering data from Palestinian children and Israeli children is important to detect their health situation. For example, religion will be selected as one variable. The Muslim Palestinian population is over 80%, the Jewish population is around 12-14%, Christian is from 1% to 2.5%, and other unspecified contains less than 1% (National Research Council, 2004, n.d.). Age will be included in the survey and will categorize children who are from 0 to 15 years old. Infant mortality rate will be gathered in this study. This variable will give the number of deaths of infants under one-year-old in a given year. This rate is used as an indicator of the level of health in the West Bank. The life expectancy variable contains the average living number of years of a group from 0 to 15 years who were born in the same year. Life expectancy is also a measure of the overall quality of a child's life. Additionally, the birth rate will be collected. The birth rate is the factor in determining the rate of population growth. The information for a mortality rate of infants showed that infant rate is 1,000 per live births in West Bank in 2016 (The World Factbook, 2018). Also, the suicide mortality rate is the number of suicide deaths of a population (World Health Organization, n.d.).

Additionally, the researcher will also collect a dataset on death rate. Population growth rate and the poverty rate of male and female children will also be investigated. This research will determine how many children (0-15) are living in poverty, and identify how many of their family members are living below the poverty line (Patricia, Baunsgaard, & Allmen, 1999). The poverty line is an essential variable to test. National standards for Palestine are $637 per month for a whole family of adults and children as set in 2011. The line is based on the average consumption of essential food, housing, housekeeping, and health care. The most recent data showed that over 25% of Palestine’s population lives in poverty and one out of 12.9% of individuals live in deep poverty (Palestinian Central Bureau of Statistics, 2014). Children and their families are living on a monthly income of U.S. $509 or less per month (Palestinian Central Bureau of Statistics, 2014).

Additionally, people were experiencing violent attacks, anxiety disorders, depression, and psychological distress, especially in the Palestinian settlements. The survey and interview will be conducted to analyze data such as chronic stress, traumatic experiences, intense fear, and loneliness to identify if any damage caused long-term health impacts on children's health. There has been a growing awareness of noncommunicable diseases in the population of children.
Detecting the rate of diabetes among children from 0 to 15 years old is essential (World Health Organization, 2009). Moreover, post-traumatic stress and behavioral disorders are a consequence of exposure to traumatic events. The chronically harsh living conditions, such as political instability and violence, will cause children long-term post-traumatic stress. Variables of post-traumatic stress will help to determine and compare how many children have difficulty concentrating and eating, or have sleeping disorders.

A random sample of children who have waterborne diseases will be identified in the West Bank. Waterborne infectious diseases such as HIV/AIDS, Tuberculosis, and Malaria will be gathered. Bacterial infections like Cholera, Vibrio cholerae bacteria, Typhoid, Salmonella typhi bacteria, Dysentery, and Legionellosis data are essential for this research. Moreover, viral Infections such as Hepatitis, gastrointestinal infection, waterborne Polio, Astroviruses, as well as eye diseases, blindness, and corneal leucoma will be investigated. Other diseases, such as vomiting and neurological disorders, will also be chosen as potential testing variables.

Studies showed that over 90% of children felt like they were under stress and living with fears. Surveys will be sent to children's parents and their family if the respondent is too young to answer the questions. The respondents or their parents will be asked for their city of residence, the religion they practice, such as Christianity, Islam, Judaism, Druze, Buddhism, or None, how they identify their ethnicity, such as Palestinian or Israeli, and if their drinking water has an unpleasant taste. Moreover, respondents have to identify how they regularly access water in their home. Choices for this question in the survey will include: well, water tank, government regulated water supply, without directly running water at home, or unknown. Choices for the question of how they perceived water quality include: very bad, bad, right, or very good.

**Population and Sampling.** Simple random sampling is the sampling technique where the researcher can select a group of a sample for study from a population (Babbie, 2013). The researcher should choose Palestinian and Israeli children respectively to do random sampling research. Each child will be chosen by chance, and each member of the population has an equal chance in the sample. The researcher will list all the names of the individuals in the population, then draw the complete collection of names. Also, timing considerations will be addressed based on how this research will be conducted in a different month, the day of the week, and time of day. The researcher will mail the surveys to the children's home, and the timing of data will be collected according to the research design plan.

**Error Calculation.** During data entry, missing values will be detected to reduce the likelihood of errors occurring, and to prevent distorted findings which may result in wasted searching. Missing values will be considered in the research process because respondents may not answer specific questions if they are not comfortable or they are sensitive to the questions.

**Data Collection.** Also, respondents may be investigated several times. Variables such as race, ethnicity, and primary language will be involved in data collection. Data should be collected on the consequences, frequency, and the impact of conflict, and data should also be collected from literature reviews, historical documents, and government resources.

**Descriptive Statistics Analysis.** Descriptive statistics are applied to analyze data, frequencies, and percentages. The researcher can describe statistics including the mode, median, and mean, as well as a central tendency (Kranzler & Moursund, 1999). Also, the researcher suggests running a T-test to compare means, and to calculate the effect size by comparing Boxplots, histograms, and descriptive statistics. With a T-test, data includes one independent variable and
one dependent variable (Kranzler & Moursund, 1999). The researcher needs to know how significant the differences between the means of the two groups and how much overlap exists between the groups. These statistics may help in managing the data and in comparing records of Israeli and Palestinian children respectively. Additionally, the mapping can help to identify the quantity of water delivered to communities and how it is exposed to chemical and microbiological contaminations (Babbie, 2013). This research will also use the geographical information system map to identify how many communities were impacted, as well as use non-governmental organization and government sources.

**Interpretation of Results.** The researcher must describe the research trends and implications by comparing the two groups’ variables and explaining insignificant statistical findings (Donovan & Hoover, 2014). Recommendations for improving water quality and health policy will be provided to reduce children’s health risks. Drinking water can be used as a transmission vehicle for a variety of diseases. The researcher needs to discuss the infection risk and give risk assessment. Risk management will be recommended for individuals to take actions in order to reduce the risk for children (NRC, 1983), and create new opportunities to live peacefully and healthily, as well as to provide sustainable protective plans.

**CONCLUSION**

People should focus on areas, such as communities and schools, to think about how to create a fair environment for children to pursue well-being and live in healthy conditions. The waterborne disease should be decreased by improving water quality and sanitation infrastructures. The international community should focus on gaining the understanding of the severe situation of how children were suffering and the impact of environmental injustice and poverty. International humanitarian and foreign aid assistance should be conducted to help children get enough access to clean water in the West Bank. Moreover, organizations should also help to build a supportive environment for the infant to improve their health and nutrition. Measures can be taken to reduce health risks before it gets worse. For instance, organizations and the government should cooperate to enhance equal distribution of water in both Israeli and Palestinian settlements. Safe usage of water at different communities will keep them away from being exposed to polluted resources and ensure them in having an opportunity to live healthily and to eliminate poverty.

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