MALNUTRITION IN RAG-PICKER COMMUNITIES

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ABSTRACT

In densely populated slums of the developing world, illiteracy and malnutrition is common. Drawing upon the solid waste, health- care, educational and developmental literatures and coupling with an initial qualitative study, we propose linkages between slum characteristics and educational and health outcomes. The initial qualitative study is based upon evidence from rag-picker communities in the National Capital Region of India. This research links operating and living conditions to disease proclivity. In addition we identify the link between disease and the level of malnutrition and education. Furthermore, malnutrition affects the educational outcomes. Non-Governmental Organizations (NGOs) and government agencies can play an important role improving the operating and living conditions in the slums, by providing protection to workers, treating diseases, and making quality education accessible.

INTRODUCTION

Many rural citizens that migrate to cities, seeking a better life, create homes in informal settlements where there is no proper sanitation or access to safe and clean running water. Many of these informal settlements have high population densities, making conditions worse. Furthermore, many residents run small-scale businesses from these neighborhoods further exacerbating the environment where families reside in. This especially true of rag-picker *godown* colonies, where residents work and live within piles of solid waste. This research examines malnutrition rates and sanitation/environmental standards in the context of the informal solid waste sector. In large metropolitan cities of the developing world, approximately 30-50 % of the solid waste is left for the informal sector often collected by communities of "rag-pickers." (Cointreau-Levine, 1994). Many of these rag-pickers live and work in *godowns.* The environmental and sanitation conditions in these *godown*colonies are bleak. Most of the children are malnourished and illiterate.

In this research, we seek to answer three broad questions: 1. What is the level of malnutrition in rag-picker *godown* colonies 2. What is the correlation between sanitation and environmental conditions on malnutrition levels? 3. How does malnutrition level influence access to primary education?

The planned research is transformative. It will not only expand our knowledge within the solid waste management, health care, education, and developmental literatures; it will also provide important links between these fields.

Given that we propose to develop theory on novel phenomena, we shall rely on both qualitative and quantitative empirical methods with firm epistemological bases (Hohenthal, 2006) and validity (TashakkoriandTeddlie,, 2003). Through this study, it will be possible to develop a model to help reduce malnutrition and improve literacy among rag-picker communities. This model could perhaps be generalized to slums in India and other developing countries around the world.

In the following sections, we will explore the relevant literatures on rag-picker communities in relationship to sanitation/environment, malnutrition and literacy. Furthermore, we will describe our research method. Finally, we will discuss how such findings maybe useful for public policy and Non Governmental (NGO) interventions.

LITERATURE REVIEW

In this review we examine the relevant literatures on the informal solid waste sector in developing countries and the role of rag-pickers, the environmental/sanitation conditions in rag-picker communities, and malnutrition and education level among rag-picker children.

Informal solid waste sector in developing countries.

Recycling of waste by rag pickers is a major activity of waste management systems in developing countries. For example, in the study conducted by Scheinberg et al in (2010), the six developing cities researched (with a total population of 23 million) had approximately 73,000 recyclers handling 3 million tonnes per year. However, this is an activity that incurs little or no expenditure, as it is mostly the business of service providers existing outside the formal system, i.e., the city's municipality. Hence, the term 'informal sector' is normally applied to waste recyclers in the developing world. Wilson et al (2012) reports that material recovery rates by the informal sector in developing countries can be as high as 85%. In the recent years a number of studies have focused on building the capacity of the informal solid waste sector. A number of references that discuss the activities and scope of the informal sector in developing countries can be found in a recent paper by Scheinberg (2012). For a detailed bibliography related to the informal sector in solid waste management, refer to the website of German International Co-operation or GIZ, formerly known as German Technical Cooperation or GTZ (http://www.giz.de, 2012).

Such activity, especially in the organized informal sector tends to be financially quite lucrative (Prasad, Jain, Tata and Parthan, 2012) and as such it is unlikely that families will leave this sector. Unfortunately, the rag-picking way of life poses significant health and safety risk to individual family members, especially for the children.

Environmental/sanitation conditions within rag-picker communities.

Ragpicker communities are frequently exposed to health and safety risks due to poor environmental/ sanitation conditions when involved in waste picking. Based upon a number of cases, Cointreau (undated) lists the different types of risks associated with different rag-picking functions. In this research we organized these risks along the different stages of the rag-picker

supply chain process (Figure 1). Children working and living in these waste processing *godowns* tend to be more vulnerable then the adult population.

Based on a study conducted in an Indian city by Hunt (1996) rag picker children were two and a half times more likely to be ill than those children who also lived in informal settlements but were not involved in waste picking. In this research, based upon Eerd's (1996) work we identify and classify the frequency and type of diseases rag-pickers face (Table 1). Eerd's (1996) work is summary of four studies focusing on waste picking in developing countries and associated health impacts.

Malnutrition among rag-pickers' children.

Human waste coupled with industrial effluent creates a toxic environment, adversely affecting the children living in these communities. These children tend to have high rates of infections and other diseases. Their bodies focus nutrients and energy primarily on fighting infection rather than growing. The first two years of life are critical for proper development. Being malnourished in the first two years of life can severely impair a child's growth and functioning; and potentially affect a child to access education.

Recent news in the media (Harris, 2014) indicates that malnutrition is more acute in India than in many sub-Saharan countries, in spite of the higher caloric intake on a per capita basis in India. The main culprit for severe/acute malnutrition in India has been correlated to the poor level of sanitation.

Malnutrition has been linked at an individual level to lack of mental development (Grantham-McGregor, 1995), infection rates (Guerrant, et al., 2008) and mortality rates (Pelletier, et al., 1995). A lack of mental development would reduce the motivation and success of a child academically.

Education level in rag-picker communities.

Literacy in India has now surpassed 74%(Office of the Registrar and Census Commissioner, 2011). However, beyond such an aggregate number hides great variation even in the National Capital Region (NCR) of India. Entire illiterate communities exist next to premier academic institutions. Depending on whether or not ragpickers work in a supportive organized network affects their quality of life (Wilson et al., 2006) which in turn impacts on their literacy

rates. Individual ragpickers are more vulnerable from exploitation along the recycling chain when compared to family type units. Ragpicking often prevents children from having any chance of a formal education. A supportive network could include NGOs, government entities or even extended family units. Family-organised activities may reduce vulnerability as other family members can cover for children that are attending school on certain days.

Malnutrition and education

Malnutrition can adversely affect brain development, which can drastically impair a child's cognitive functioning. Mental deficits yield learning disabilities and memory deficiency, which can affect school performance. For children in Latin America, those who had more than two years of formal education, scored higher on vocabulary tests when given a highly nutritional supplement (Brown and Pollitt, 1996). This suggests a high correlation between nutrition and intellectual ability. A study in Madagascar did a similar study. Inadequate nutrition had detrimental effects on academic enrollment and performance. The stunted children were often more likely to repeat a grade; the most malnourished children often left school before completing elementary education. These findings support the adverse effects of malnutrition on academia (Aubery, 2012).

India has the highest percentage of underweight children; therefore the improving malnutrition statistics can promote academic success among children in India. Chronic undernutrition seems to affect children's cognitive ability. Also, micronutrient deficiencies (zinc, vitamin A, iron and iodine) early in life could also affect a child's capacity to concentrate and retain information. (Neelam, 2010). Cognitive impairment is most reversible early in life. Children adopted young had higher IQ scores than those adopted later in childhood (Grantham-McGregor, 1995). Overall, malnourished children achieve less academic success so adequate nourishment can improve intellectual ability among the impoverished youth.

METHODS

Our investigation will follow Eisenhardt's (1989) process of building theory from case study research. We will start by defining the research questions, sampling, and developing the instruments and protocols. After field-based data collection, we will analyze the data, and specify new constructs and respective items to be used by the quantitative study to follow.

To identify possible relationship, we sample three *godown* colonies in the National Capital Region (NCR) of India located in Bhowapur, Indrapuram, and Noida sector 72.

Based on this analysis we develop a model and generate prescriptions to NGOs seeking to develop interventions in order to ameliorate the lives of informal sector dwellers. Furthermore, this analysis might help government officials create policy initiatives to address urban malnutrition.

MODEL DEVELOPMENT

Based upon the literature review and preliminary qualitative analysis we find the quality of clean drinking water and sanitation infrastructure, stage along the solid waste processing network, density of *godowns*, role of NGO or government entities constructs has an impact on the type and frequency of disease. This is then linked to malnutrition and education levels. It is possible to view these relationships in terms of independent, dependent, moderator and mediator variables. In Figure 2, we propose how environmental conditions in the informal solid waste supply chain process coupled with the density of population and quality of infrastructure directly contribute to a high degree of disease (type and frequency of occurrence). Disease in turn, moderates the level of malnutrition. Disease also moderates the level of education. We propose malnutrition acts as a mediator variable between disease and education. Finally, we underscore in this mode the role of NGOs and government entities that may play a critical role in influences the working and living condition, and directly providing access to education.

DISCUSSION

This research will have important implications in practice. The research identifies salient variables and relationship that may be parameterized in the future. With the relationships specified, it is then possible to create policies and interventions that would ensure a reduction in malnutrition and improved literacy. NGOs can modify the solid waste sorting process and provide basic sanitation and clean water. Government policy could provide recommendations in terms of density of habitation. Furthermore, given that we can now identify the disease type and frequency, agencies can devote resources in treating the most common aliments. As such we should seem reduced malnutrition and improve educational attainment.

In this research we propose a linear/static model. However, it is quite possible more complex and dynamic behaviors exist. For example, it is possible that improved education leads

to a reduction in diseases and thus malnutrition. Furthermore, the impact of certain variables might not only be non-linear (i.e. density) but also change over time. One approach in modeling such behaviors would be through systems thinking.

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