IMPACT OF DROP-IN CENTRES

THE IMPACT OF DROP-IN CENTRES ON THE HEALTH OF STREET CHIDLREN IN NEW DELHI, INDIA

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Lay Abstract

Street children in low- and middle-income countries (LMICs) experience poor health. Drop-in centres are one of most common interventions for street children; however, they have not been evaluated in LMICs. I aimed to understand how and how much drop-in centres influence the physical and mental health and substance use status of street children in New Delhi, India. Street children and drop-in centre staff members were interviewed about how they believed centres influenced the health and substance use habits of street children. Participants felt that drop-in centres improve children's health and substance use habits because the centres provided services in an environment tailored for street children. I also used questionnaires to evaluate the impact of drop-in centre attendance on 69 street children who regularly came to centres and 65 street children who did not come to centres. Quantitatively, centres may improve the physical health and substance use status of street children.

Abstract

Objectives: To understand how and to what extent drop-in centres are associated with the physical and mental health and substance use status of street children in New Delhi.

Methods: In a qualitative study, I interviewed 23 street children and two drop-in centre staff members in New Delhi. Subsequently, I conducted a cross-sectional study with 69 street children who attended centres and 65 street children who did not visit centres. I used questionnaires to assess their physical and mental health and substance use.

Findings: Participants believed that because street children regularly visited drop-in centres, their health outcomes improved. Street children participated in drop-in services because staff members were nonjudgmental, they were free to be a child, their daily struggles were lessened, they received protection, they were given moral direction and they had an opportunity for a better life. However, children continued to live on the streets because street life had become normal. Quantitative findings showed that street children who visited centres had better physical and mental health outcomes and engaged in less substance use than street children who did not visit centres ($p<0.01$). For every month of attendance, street children experienced 2.1% (95% CI 0% to 4.1%, $p=0.05$) fewer ill health outcomes per month and used 4.6% (95% CI 1.3% to 8%, $p=0.01$) fewer substances. Street children were also less likely to have been a current substance user than a never substance user for every additional month at a center (OR: 0.79, 95% CI: 0.66 to 0.96, $p=0.02$). Duration of attendance was not significant in predicting mental health.

Conclusion: According to participants, drop-in centres positively influence the physical and mental health and substance use status of street children by providing services in an environment tailored for them. Quantitatively, centres may improve the physical health of street children and reduce their substance use.

Preface

This thesis has been conducted as a *sandwich thesis* and consists of four individual manuscripts/papers. At the time of writing (January 2016 – June 2016), three of the four individual manuscripts (chapters two, three and four) have been submitted for publication in peer-reviewed journals. The journal to which each paper has been submitted has been specified in the beginning of each chapter. The studies reported in these manuscripts were performed during the author's Ph.D. program.

Ronita Nath was the principal contributor to the conception and design of the study, with the aid of her supervisors, Drs. Parminder Raina and Harry Shannon. The thesis involved the following work: developing the research questions, writing of the protocol, designing all study questionnaires, performing all study tasks e.g. pretesting of instruments, participant recruitment and consent, qualitative interviews, quantitative assessments, analytic steps, writing drafts of all the manuscripts, collaborating with Salaam Baalak Trust, and preparing manuscripts for final submission for publication. This also involved editing the submitted manuscripts to allow for full acceptance and publication. This work is principally the undertaking of Ronita Nath, with guidance from Parminder Raina and Harry Shannon and collaborative input from the larger research team. All studies were initiated in 2013 and research was conducted in 2014 and 2015.

Given the common focus on drop-in centres in low- and middle-income countries, the reader will encounter some degree of overlap between articles, particularly in the introduction and literature review sections of each chapter. Following the introduction, each paper is presented in a separate chapter focusing on a particular study. A concluding chapter will summarize the concepts of the author's thesis and will suggest directions for future research. Literature citations use the style of the journal to which each paper was submitted, and refer only

to the reference list within that paper. Elsewhere, references will adhere to the American Psychological Association (5th Edition) style, with citations appearing in the separate References section at the end of each chapter. Details relating to the instruments and results not described in the manuscripts will appear in the appendices.

Acknowledgements

I would like to thank my supervisors, Drs. Parminder Raina and Harry Shannon for their numerous years of support and guidance. Your insight into my research has been invaluable. Your words of encouragement helped me persevere in conducting research in the most difficult of circumstances in India. Most importantly, thank you both for taking on a student who was passionate about conducting research with street children in India, but who did not where or how to start. You patiently provided me with the tools and knowledge I needed to produce a valuable piece of research. I would like to extend my gratitude to the members of my supervisory committee, Drs. Kathy Georgiades and Wendy Sword, for their advice and direction that helped me focus and properly interpret my work.

Thank you to all the wonderful street children at the General Reserve Police Contact Point and Kishalaya Contact Point who willingly sacrificed their time to participate in this study. There is so much more to all of you than what has been captured within these pages. Thank you for accepting me into your lives and hearts from the day I walked into the centres. Together, we have learned, loved, laughed and cried. You will forever be my inspiration.

I sincerely thank all the caring staff and social workers at the contact points – Pramod Singh, Santosh Gupta, Mohini Sharma and Jyoti Bhoi. Your dedication and tireless efforts to help street children is humbling. You are the unsung heroes of the drop-in centre intervention. A big thank you to Salaam Baalak Trust (SBT) for giving me the permission to conduct my research with their organization. Thank you for making me a part of the SBT family since 2011. We need more organizations like SBT.

I would like to thank my parents, Satish and Usha Nath, for always believing in me. You have taught me to choose meaningful goals in life, to never give up, and to aim for the stars. But most importantly, thank you for catching me whenever I fell.

Finally, there are no words to express my love and appreciation to my husband and partner of 12 years, Alan Cheuk. Throughout this journey, you have always been by my side – from Vancouver to Hamilton and New Delhi. In India, you diligently ensured my safety by personally dropping me to my auto-rickshaw each morning so that I could collect data without any problems. You have been my editor, my cheerleader when I struggled to make it through, and my doctor when gastroenteritis knocked me out regularly in Delhi. Thank you for all the love and support you have shown me. I am incredibly lucky to have you in my life.

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List of Abbreviations

BMI: Body mass index

CI: Confidence interval

CIPF: Cornell Interview for Peers and Friends

CPITN: Community periodontal index of treatment needs

CWC: Child Welfare Committee

DAP: Draw a Person

DMFT: Decayed, missing and filled teeth

ETOH: Ethyl alcohol

HBcAB: Hepatits B Core Antibody

HBsAG: Hepatitis B Surface Antigen

HIV: Human Immunodeficiency Virus

IQ: Intelligence Quotient

K-SADS: Kiddie-Schedule for Affective Disorders and Schizophrenia

LMIC: Low- and middle-income country

M: Mean

MQF: Mood and Feelings Questionnaire

NCHS: National Center for Health Statistics

NGO: Non-governmental organization

OCHS: Ontario Child Health Study

OR: Odds ratio

SBT: Salaam Baalak Trust

SD: Standard deviation

SDQ: Strengths and Difficulties Questionnaire

STI: Sexually transmitted infection

TB: Tuberculosis

UN: United Nations

UNICEF: United Nations Children's Emergency Fund

WHO: World Health Organization

Declaration of Academic Achievement

Ronita Nath was the main contributor and the first author of all the manuscripts/documents contained in this thesis. Thesis committee members contributed to all the manuscripts/documents. The thesis committee consisted of Ms. Nath's co-supervisors, Harry Shannon and Parminder Raina, as well as Kathy Georgiades and Wendy Sword. All of the members conceived the study. Ms. Nath conducted the entire data collection and analysis, and wrote the first draft of the thesis. All of the members contributed to revising drafts. Harry Shannon and Parminder Raina provided guidance in all aspects of the thesis. Kathy Georgiades provided specific guidance in the substance use and mental health components of the quantitative study. Wendy Sword has extensive experience in conducting qualitative studies, and she provided guidance for the qualitative study.

Chapter 1: Introduction

This thesis discusses the design, methodology and results of two studies that investigated the manner and the extent to which drop-in centres, known as contact points, are associated with the physical health, substance use status and mental health of street children in New Delhi, India.

According to the United Nations Children's Fund (UNICEF), there are tens of millions of street children in the world (2006). This number is rising due to population growth, increased urbanization, and decline of economic opportunities in rural areas (UNICEF, 2006). India has the largest population of street children in the world (Sen, 2009). Some have given the number of Indian street children as 18 million (Sen, 2009) while others have said that it may be as high as 47 million (Khurana, Sharma, Jena, Saha, & Ingle, 2004). Although the definition of the term "street child" is widely disputed among different groups (Thapa, Ghatane, & Rimal, 2009), United Nations' definition for street child is used in this thesis. The United Nations defines a street child as "any boy or girl…for whom the street in the widest sense of the word… has become his or her habitual abode and/or source of livelihood, and who is inadequately protected, supervised, or directed by responsible adults" (Panter-Brick, 2002, p. 149).

UNICEF divides street children into four categories: *Children at risk*: those who live with their families but supplement their income by working on the streets; *children on the streets*: those who spend a portion of their time on the streets but still have a place of residence with some family support; c*hildren of the street*: those who maintain minimal relations with their families and spend the majority of their lives on the streets; and *abandoned children*: those who live completely on their own on the streets without any adult supervision (UN Dept. of Economics, 1986).

Based on an initial look at the literature, street children in low- and middle-income countries (LMICs) experience very poor health. Many studies have documented the ill health outcomes experienced by street children in LMICs, which include skin infections, respiratory diseases, injuries, tuberculosis, and sexually transmitted infections (Ali & Muynck, 2005; Ayaya & Esamai, 2001; Kudrati, Plummer, & Yousif, 2008; Morais, Morais, Reis, & Koller, 2010). Street children in these countries also commonly engage in substance use, including drinking alcohol, sniffing glue, chewing tobacco and smoking cigarettes (Gupta, Khandekar, & Gupta, 2013; Souza, Porten, Nicholas, & Grais, 2011). In addition, street children in LMICs experience poor mental health outcomes (Hammouda et al., 2011; Meyer, Madu, & Maku, 2002). The next chapter is a systematic literature review that examines in greater detail the health status of street children in LMICs. Publications that have examined health-related interventions for street children in LMICs, such as drop-in centres, are also explored in the review.

Drop-in centres are one of most common interventions for street children around the world (Coren et al., 2013). Drop-in centres typically provide street children with an array of services, including non-formal education, free lunches, recreational activities, preventative health services and basic medical care at strategic locations such as near railway stations and busy market areas for a few hours on most days of the week (Salaam Balaak Trust, 2015; War Child, 2014). For instance, a drop-in centre run by social workers, psychologists, and monitors in Porte Alegre, Brazil provided street children with recreational and educational activities at two times during the day (Morais et al., 2010). The staff members reported that these centres were necessary to the survival of street children because they ensured access to food, hygiene, health care and a space for the children to feel they belonged. In their study in Honduras (n=400), Souza et al. (2011) found that the drop-in centre was a key factor in facilitating access for street

children to social services and services provided in health facilities that were often refused to this population.

Despite the fact that drop-in centres are intended to improve the welfare of street children, and the majority of street children live in LMICs (Lieb, Meinlschmidt, & Araya, 2007), there have not been any sufficiently rigorous studies that have examined the impact of these centres on street children's health status in LMICs (Coren et al., 2013). I wanted to understand the manner and the extent to which drop-in centres in New Delhi were associated with the health and substance use status of street children. New Delhi was chosen because the city has a large number of street children, estimated at over 400,000 (Sen, 2009). Most of the street children in Delhi come from poor regions in north and central India (Sen, 2009). They leave home for various reasons including poverty and domestic violence (Sen, 2009).

There are many drop-in centres for street children run by non-governmental organizations (NGOs) throughout New Delhi. Salaam Baalak Trust is an NGO that runs 19 such centres in the city, which they refer to as contact points (Salaam Baalak Trust, 2016). I collected data at two of the Trust's drop-in centres. I did not collect data at the other centres because I was the only data collector and it was not feasible for one person to collect data at more than two centres. I sampled these particular two centres purposively because they provided services to more types of street children than the other 17 centres. They each provided services to two types of street children, together covering three of the four types of street children, according to UNICEF'S classifications (UN Dept. of Economics, 1986): *children of the street*, *children on the street*, and *abandoned children*, whereas the other 17 centres provided services only to *children on the street*.

One of the two sampled centres was the General Reserve Police (GRP) Contact Point, located at the New Delhi Railway Station. The New Delhi Railway Station is the busiest train station in India. This drop-in centre provided services mostly to *children of the street* and *abandoned children*. These street children worked in a variety of jobs at the railway station. Most of the children sold water bottles and newspapers that they found on the trains. The children also assisted shopkeepers. Nearly all of the children were involved in criminal activity to supplement their incomes. These activities included pick-pocketing, stealing cargo from trains, and selling drugs.

The second drop-in centre I sampled was the Kishalaya Contact Point. This centre was located in Connaught Place, also known as New Delhi's city centre or downtown. This drop-in centre provided services to *children on the street* and *children of the street*. Many of the street children in this area lived with at least one family member on the streets, but they were inadequately supervised. The family member was often addicted to drugs and involved in criminal activity. To generate income, the children sold items such as balloons and pens at busy intersections. Many of the children at this centre were pressured by family members to work on the streets.

Both the GRP Contact Point and the Kishalaya Contact Point were open to street children Monday through Saturday, from 10:00 am to 1:00 pm. The centres provided a range of services to the children, including non-formal education (NFE), free lunches, basic medical care, counselling, recreational activities, and clothing. Staff at the centres also referred the children to shelter homes, drug detoxification services or formal school if children were willing to enrol after counselling sessions. It is important to note that the primary objective of both the GRP Contact Point and Kishalaya Contact Point was to help restore runaway street children to their

families or to counsel the street children to live in a full-time residential care home. The process of returning children to their families or convincing them to living in shelter homes can take years and still, many children may decide to live on the streets rather than to return to their families (if they have one) or to live in a residential care home. Therefore, drop-in centres provide additional services for street children, such as medical care and free lunches, to support them while they are living on the streets. While the GRP and Kishalaya centres provided the same services to street children, drop-in centres in general can vary in the types of services they offer. Some may provide only free lunches to street children while others may function as a drop-in night shelter as well. However, they all provide essential services that street children would likely not receive otherwise.

I conducted two studies to understand how and how much New Delhi's drop-in centres were associated with the following three outcomes in street children: physical health, substance use status and mental health. Firstly, I wanted to understand how drop-in centres influence or do not influence the three outcomes. Therefore, I conducted a qualitative study using interpretive description methodology where I interviewed street children who regularly visited the centres and staff members who worked at the centres. I analyzed the data using constant comparative method. The themes that emerged from the analyses explained how drop-in centres influenced the health and substance use status of street children. I also used the qualitative study to characterize the main aspects of the "exposure", which was visits to the drop-in centre. Specifically, findings from the qualitative study suggested intermediary exposure variables related to the drop-centre, such as nutrition and health education, which may influence the outcomes of interest: physical health, substance use, and mental health. These aspects of the exposure were investigated in the subsequent quantitative study.

Following the qualitative study, I conducted a quantitative study to measure the extent to which drop-in centres were associated with the three outcomes in street children. Specifically, I conducted a cross-sectional historical study. Note that at the same time, I collected data for a longitudinal pilot study (Figure 1). This hybrid design combined elements of historical data collection, cross-sectional data, and longitudinal data. I conducted a longitudinal pilot study because I wanted to assess whether drop-in centres were associated with better health and substance use outcomes over time in street children. However, I anticipated that there would be challenges with collecting longitudinal data from the street child population in New Delhi; therefore, I wanted to assess the feasibility of doing such a study with the street child population. Although I intended for the pilot study to develop into a full-scale longitudinal study, I encountered several methodological challenges with this study that ultimately deemed the longitudinal study to be unfeasible.

Street children who "regularly" attended a drop-in centre for at least one month from February 2015 to July 2015 were eligible to be included in the quantitative study. Regular attendance was defined as at least five visits to a centre per month for at least an hour each. We designated T_0 as the first calendar month a street child regularly visited a drop-in centre during the study period; T_0 was thus the qualifying month. T_0 differed between participants. For instance, if a street child first entered the study in March and had at least five visits to a centre that month, their T_0 would be March. If another participant first entered the study in June and had at least five visits to a centre that month, their T_0 would be June. However, if a participant entered the study in April, for example, and visited a centre only four times that month, they did not meet the five-visit requirement per month and were therefore ineligible to participate. Participants were assessed for the outcomes after five visits in T_0. Similarly, children who

regularly attended a second month, T_1, were followed and their outcomes were assessed after five visits in T_1, and so on. This meant that the subset of this group who regularly attended more than one month had multiple assessments. For this subset, the cross-sectional study included the first assessment for each child rather than subsequent ones. The cross-sectional study and longitudinal study also used attendance records for the 12 months prior to data collection, which includes the qualifying month, to measure the number of months of regular attendance by members of the exposure group in the previous year.

We intended to use the subset of the exposure group with multiple assessments in a longitudinal study that would be done in addition to the cross-sectional study. Unfortunately, the sample size in the longitudinal study was not sufficiently large to conduct longitudinal analyses.

These outcomes of the children in the exposure group were compared to a comparison group of street children who did not visit a drop-in centre. The analyses controlled for age, education, and total time on the streets in the child's life. The comparison group was made up of children who did not attend the drop-in centres. They were each assessed once cross-sectionally because children in the comparison group were difficult to follow longitudinally.

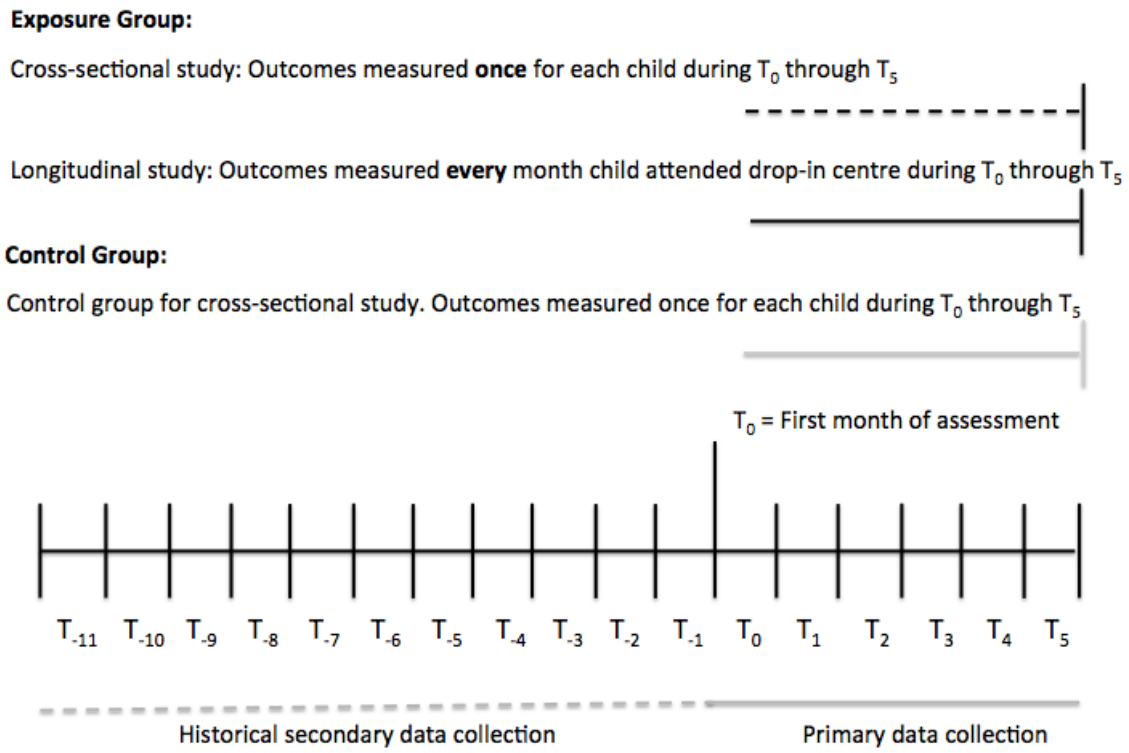

Figure 1. Quantitative hybrid study design: Cross-sectional historical study with a longitudinal study.

To date, very little has been published about drop-in centres in general, much less their impact on street children. The qualitative and quantitative studies of drop-in centres described in this thesis shed light on how drop-in centres work. Understanding how drop-in centres work is the first step to improving them to make them more beneficial to street children.

The following chapters describe the quantitative and qualitative studies in detail. I begin, though, with a systematic literature review of studies examining the health of street children in LMICs, paying particular attention to studies that have evaluated the impact of interventions on the health status of street children.

Dissertation Structure

To guide the reader through this thesis, I now provide a list of the titles of the documents comprising this thesis, along with a brief description of each of their contents.

Chapter 2 – *Systematic review of the health of street children in LMICs*. In this chapter, I present findings from a systematic review that identified manuscripts published in peer-reviewed journals that have examined the health of street children in LMICs. Among these studies, those assessing the impact of street child interventions on health are critically examined.

Chapter 3 – *The impact of drop-in centres on the health of street children in New Delhi: An interpretive descriptive study*. In Chapter 3, I discuss the design and findings of a qualitative study conducted to understand how drop-in centres influence or do not influence the health and substance use status of street children in New Delhi. I conducted this study using interpretive description methodology.

Chapter 4 – *The impact of drop-in centres on the health of street children in New Delhi, India: A cross-sectional study*. Here, I discuss the cross-sectional study to determine whether attendance at drop-in centres was associated with better physical health outcomes, mental health and substance use outcomes, when compared with street children who did not attend the drop-in centres.

Chapter 5 – *Special methodological challenges of a longitudinal study with street children in LMICs*. In Chapter 5, I provide the details of a longitudinal pilot study I conducted with the exposure group to assess the impact of drop-in centre attendance on the health and substance use outcomes of street children over time. I conducted this study as a pilot study to assess the feasibility of doing a longitudinal evaluation of the drop-in centre intervention with the street child population in New Delhi, India. I discuss the challenges that are particularly acute when conducting a longitudinal study with street children in New Delhi, India.

Chapter 6 – *Discussion*. I conclude the thesis with a discussion of all the studies.

Chapter 2: Systematic Review of the Health of Street Children

In this chapter, an author generated version of an article prepared for submission to *Children Youth and Services Review* on June 12, 2016 is presented (Nath, Raina, Pantich, Georgiades, Sword, & Shannon, 2016). The submission number for this manuscript is CYSR-D-16-00291. As an author generated version of a submitted manuscript, no copyright license documentation is required.

For this systematic review, Leah Pantich and I independently conducted the title and abstract screening, full text screening and data extraction. Lina Santiguida and I developed the risk-of-bias assessment tools. I rated the risk-of-bias for all the studies. Lina Santiguida rated the risk-of-bias for a sample of the studies. I wrote the paper, with guidance from Harry Shannon, Parminder Raina, Kathy Georgiades and Wendy Sword.

Context and Background

Many studies have documented the poor health outcomes of street children from various parts of the world. However, due to the lack of a rigorous literature review on the health of street children in LMICs, very little is known about the collective health of this group, especially in comparison to non-street children. My purpose in conducting this systematic review was to examine the health of street children in LMICs and to understand the impact of interventions for street children in these countries. Only if we understand the extent of ill health experienced by street children in LMICs, and the strengths and limitations of interventions that have been constructed for this group, can we then design better interventions to improve the health of street children.

Paper: Systematic Review of the Health of Street Children

Title: A systematic review of the health of street children in low and middle-income countries with a focus on health-related interventions.

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Abstract

Objectives: To examine the health of street children in low- and middle-income countries (LMICs), and to understand the impact of interventions for street children in these countries.

Methods: We conducted a literature search using systematic methods for peer-reviewed quantitative and qualitative publications that looked at the health of street children in LMICs. Studies that assessed the impact of street child interventions on health also were examined with respect to the effectiveness of the intervention.

Results: Fifty-three publications met the eligibility criteria, including four that were exclusively qualitative. Many of the studies (n=19) were conducted in South Asia and most were related to the physical health of street children (n=34). Street children in LMICs are susceptible to poor physical and mental health outcomes, and high rates of substance use. Street children fared worse than non-street children on most of the assessed indicators, except in cases of nutrition, where street children fared better than poor and rural non-street children. Only four of the studies evaluated the impact of health-related interventions for street children. Overall, there was moderate to high risk-of-bias among the studies.

Conclusion: Street children in LMICs are susceptible to poor health and high rates of substance use; however, there is a lack of rigorous, well-designed studies that evaluate health-related interventions for street children in LMICs. In particular, there is a need for studies that examine the impact of existing interventions on the health of street children in these countries.

Keywords: street children; health; substance use; developing countries; intervention

Background and Rationale

There are an estimated 100 million street children in the world – children living or working on the streets (United Nations Children's Fund [UNICEF], 2003). The United Nations describes a street child as "any boy or girl…for whom the street in the widest sense of the word… has become his or her habitual abode and/or source of livelihood, and who is inadequately protected, supervised, or directed by responsible adults" (Panter-Brick, 2002, p. 149). UNICEF further divides street children into the following classifications: *children at risk*: those who live with their families but supplement their income by working on the streets; *children on the street*: those who spend a portion of their time on the streets but still have a place of residence with some family support; c*hildren of the street*: those who maintain minimal relations with their families and spend the majority of their lives on the streets; and *abandoned children*: those who live completely on their own on the streets without any adult supervision (UN Dept. of Economics, 1986).

Street children, particularly those in low- and middle-income countries (LMICs), experience poor health, yet little is known about the extent of that poor health. To design interventions that improve the health of street children in LMICs, the first step is to examine the literature on the health of street children to understand the existing situation. The next step is to examine literature on health-related interventions for street children in these countries to guide future interventions and evaluations in this population.

Health Status of Street Children

The only systematic review to date that has examined the health status of street children in LMICs is by Woan, Lin and Auerswald (2013). Their review included 108 publications. However, their review had methodological limitations. They did not include exclusively

qualitative studies, nor did they include publications prior to 1994. Furthermore, Woan et al. (2013) failed to provide details on whether the title and abstract screening and the data extraction were conducted in duplicate, and they did not provide a risk-of-bias assessment, which are recommended according the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Moher, Liberati, Tetzlaff, & Altman, 2009). We avoided these limitations in this review. Woan et al. (2013) concluded in their review that street youths' behaviours and poor shelter have resulted in disproportionate morbidity among the group, particularly in the areas of infectious illness, psychiatric disease, reproductive health, and growth.

Interventions on Street Children's Health

Despite the poor health experienced by street children in LMICs and the existence of interventions that address street children's health (Salaam Balaak Trust, 2015; War Child, 2014), few studies have rigorously evaluated the impact of interventions on the health status of this group. The authors of a Cochrane review on the effectiveness of interventions for street children remarked, "We did not find any sufficiently robust evaluations conducted in LMICs despite the existence of many relevant programmes" (Coren et al., 2013, p. 2). Their eligibility criteria included randomized or quasi-randomized studies in all countries, but they did not find any such studies in low or middle-income countries. Similarly, Altena, Brilleslijper-Kater and Wolf (2010) conducted a systematic review evaluating the effectiveness of interventions for homeless youth, but the only studies that met their inclusion criteria were based in the United States.

Filling the research gap

The aforementioned systematic reviews did not adequately fulfill the steps noted earlier of firstly examining the literature on the health of street children in LMICs, and secondly, examining health-related interventions for street children in these countries. We aimed to meet

these objectives by firstly using rigorous methods to conduct a systematic search of peer-reviewed quantitative and qualitative publications that explored the health of street children in LMICs. Secondly, we aimed to review any studies assessing health-related interventions for street children in LMICs and examine their strengths and limitations.

Search Methods

The following electronic databases were searched from inception to July 2015: Embase, Global Health, Ovid MEDLINE, PsycINFO, CINAHL, and PubMed. The search was developed in the Ovid database host and adapted for use in the search engines of the other databases. The search we used with each database was: *street* or *homeless*, and *child* or *youth*, and *health*, and *intervention* or *research* or *program* or *service* or *study*.

Relevant articles from a Google Scholar search also were included. Three combinations of the above search terms were inputted into the Google Scholar search engine, and the first 30 results from each combination were included for screening, yielding a total of 90 records.

Eligibility Criteria

Relevant publications had to meet all of the following eligibility criteria. First, to screen out research with lower levels of rigor, the manuscript must have been published in a peer-reviewed journal. Second, the publication had to involve children who met the United Nations definition of a street child as previously described. For the findings to be applicable to street children in LMICs, we included publications that discussed any type of street child (i.e., children at risk, children on the street, children of the street and abandoned children). Third, the research in the publication must have taken place in a low- or middle-income country, as defined by the World Bank's classifications according to gross national income per capita (The World Bank, 2014). Fourth, the publication must have examined the health outcomes of street children. We

chose to look only at health outcomes and not other aspects of health, such as health behaviours or access to health care because we wanted to explore relevant literature that directly examined the health of street children. Finally, the publication had to be published in English.

Two reviewers (RN and LP) independently reviewed the title and abstract of each publication to determine whether each study should be included based on predetermined eligibility criteria. All citations that passed the first screening underwent a full text screening by both reviewers independently to confirm eligibility. If reviewers were uncertain whether or not a study was eligible during the title and abstract screening, they included the study for full-text screening. Discrepancies in the screening were resolved by joint review and consensus.

Data Extraction

The following data were extracted from each study included in the review: health focus (e.g., physical health, mental health or substance use), sample size, characteristics of study population, sampling method, study design, data collection method, and findings. In all cases, RN and LP independently extracted data, with discrepancies resolved by joint review and consensus.

Risk-of-Bias Assessment

The literature on the topic of street children's health had a variety of study designs. There is no suitable risk-of-bias tool that covered the full range of designs; therefore, we developed our own risk-of-bias tools. Because qualitative and quantitative designs are too different to be properly covered by one tool, we developed two risk-of-bias assessment tools – one to assess quantitative studies and one for qualitative studies. To ensure the rating tool would apply to the different types of study designs in the review, we consulted the literature on risk-of-bias for quantitative studies and qualitative studies (DiCenso, Guyatt, & Ciliska, 2014; Sanderson, Tatt,

& Higgins, 2007; Shamliyan et al., 2011). We chose to assess the biases that were relevant to the majority of qualitative or quantitative studies.

Our assessment tool for quantitative studies rated the risk-of-bias according to the following criteria: selection bias based upon whether the sampling strategy was random; a response rate of at least 80%; extent of bias in data collection, where data collection was considered unbiased if a study used standardized validated instruments, pretested questionnaires, data from medical records or registries or clinical exams, or trained interviewers; provision of reliability estimates; assessment of major confounders such as age, education, or time on the streets; and provision of follow-up data for at least 80% of the study participants.

Our assessment tool for qualitative studies rated the risk-of-bias according to whether the research methodology was appropriate for addressing the research question; whether the purposive sampling strategy was appropriate; whether comprehensive and appropriate data collection strategies were used to ensure collection of rich data; and whether rigorous and appropriate analysis was conducted using an accepted data analysis method.

RN rated the risk-of-bias for all the studies. A sample of the studies also was independently reviewed by a second rater (LS). RN and the second rater came together to discuss any discrepancies.

Results

The first search yielded 1,173 publications. Out of these, 53 publications met the eligibility criteria. The results of the systematic search and study selection process are summarized in Figure 1.

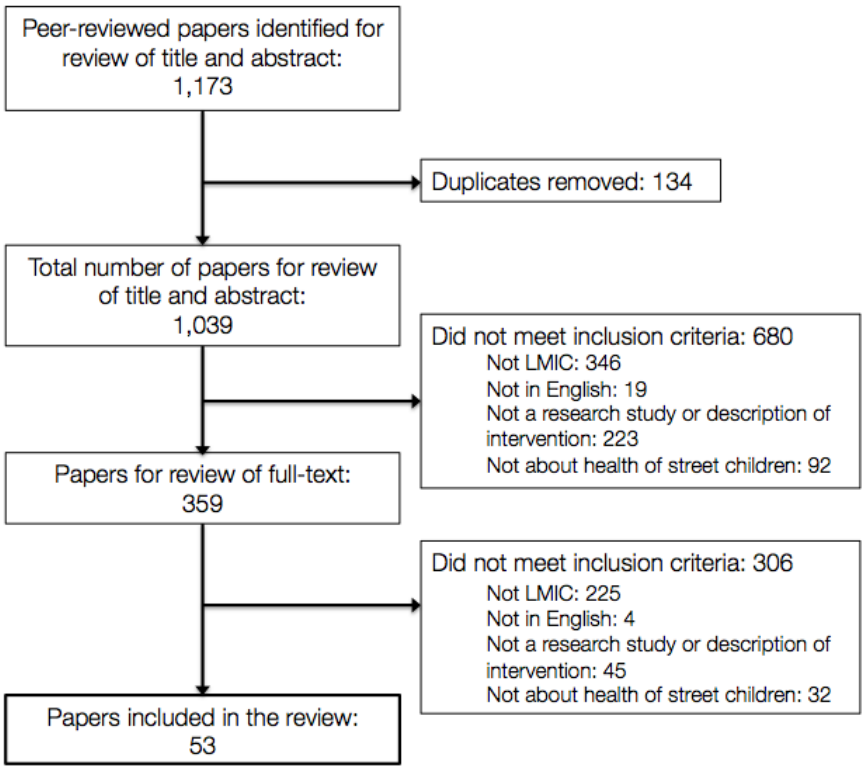

*Figure 1***.** Flow diagram of literature search screening process.

Description of Studies

The characteristics of the studies in the review are provided in Table 1. The majority of the studies were cross-sectional in design (n=46). Of these 46 cross-sectional studies, 9 had at least one comparison group; the other 37 did not. Seven of the latter also included a qualitative component. Of the remaining seven non-cross-sectional studies, four were exclusively qualitative and three were longitudinal.

The studies were conducted across a range of low- and middle-income countries in South Asia (n=19), Africa (n=13), South America (n=10), the Middle East (n=4), and Eastern Europe (n=3). A few studies were also conducted in the countries of Honduras (n=3), and Mexico (n=1). The studies covered a variety of topics related to the health of street children; however, we found that the studies could be grouped into one of three categories: studies that focused on physical

health outcomes, substance use outcomes, or mental health outcomes. Thirty-four of the studies focused on the physical health outcomes of street children, 28 studies looked at substance use, and 15 studies explored the mental health of street children. Only four studies evaluated a specific intervention for street children with respect to their health (Hosny, Moloukhia, Abdel Elsalam, & Abdel Latif, 2007; Morais, Morais, Reis, & Koller, 2010; Scivoletto, da Silva, & Rosenheck, 2011; Souza, Porten, Nicholas, & Grais, 2010).

Physical Health

Many of the studies found that street children are highly susceptible to several adverse physical health outcomes (Ayaya & Esamai, 2001; Huang, Barreda, Mendoza, Guzman, & Gilbert, 2004). Researchers found that skin infections, respiratory diseases, injuries, tuberculosis, and sexually transmitted infections (STIs) are among the most common physical health problems among street children (Ali & Muynck, 2005; Anjali, 2012; Ayaya & Esamai, 2001; Morais et al., 2010; Senanayake, Ranasinghe, & Balasuriya, 1998).

Sorsa, Tesfaye, and Lopiso (2012) reported that 55% of street children (n=479) in Awassa, Ethiopia experienced one or more health problems in the previous six months. A cross-sectional study in Nepal (n=48) found that all the street children in the study had at least one health problem (Thapa, Ghatane, & Rimal, 2009). Kerfoot et al. (2007) found that among their sample of 97 street children in Ukraine, 78% reported current health problems, of which 43% were described as persistent or severe.

Street children have a higher prevalence of disease than non-street children. For example, a comparative cross-sectional study in Eldoret, Kenya found that children of the street (n=47) had the highest the prevalence of disease (83%), while children who lived in shelters (n=56) had the lowest disease prevalence (47%) (Ayaya & Esamai, 2001). Similarly, Huang et al. (2004)

reported that compared to orphanage children (n=34), street children in La Paz (n=124) had a higher prevalence of serious medical problems (53% versus 20%).

The environment plays a role in street children's poor health. Anjali (2012) reported that street children in Delhi (n=100) suffered from cough and throat infections due to constant exposure to dirt. Pinto et al. (1994) found that the most frequent physical health issues were related to poor living conditions and tended to appear more often among street youth (n=195) than among youth living at home with their families (n=199).

Many street children experience or have experienced physical abuse, as reported in six studies. Celik (2009) found that 50% of street children (n=40) had been physically abused on the streets. Among a sample of 351 street children in Sao Paulo, Brazil, 58% reported experiencing either physical or sexual abuse (Scivoletto et al., 2011). Of 150 street children in Delhi, 38% reported being physical abused (Khurana, Sharma, Jena, Saha, & Ingle, 2004), and 45% of street children (n=857) in an Egyptian study reported physical abuse and violence (Nada & El Daw, 2010). Mathur, Rathore, and Mathur (2009) described the prevalence, type and intensity of abuse in street children in Jaipur, India (n=200). They specifically looked at general abuse, health abuse, verbal abuse, physical abuse, and psychological abuse. Street children experienced all five types of abuse. A majority of children (62%) scored in the "moderate" category of abuse while 37% indicated abuse in the "severe" and "very severe" categories. In a qualitative study conducted by Moolla, Myburgh, and Poggenpoel (2008), 16 male street children in South Africa described being physically abused by the police.

Six studies explored the nutritional status of street children. All of the studies reported substandard nutritional status among street children; however, findings from four of the studies found that street children may still fare better than poor non-street children. For instance, Ayaya

and Esamai (2001) found that compared to children of the street (n=47), children living in shelters (n=56) had higher rates of stunting (49% versus 13%) and undernourishment (45% versus 16%). Similarly, in Honduras, children who worked as vendors on the streets but maintained some contact with their families (n=910) were more malnourished than children of the street (n=110) (Wright, Kaminsky, & Wittig, 1993). Furthermore, Panter-Brick, Todd and Baker (1996) found that although street children may be more stunted or wasted than their richer counterparts, they fared better than poor urban and rural non-street children. Gross et al. (1996) reported that street children in Jakarta weighed more and were taller than socio-economic peers who lived in slums.

Street children also experience varying degrees of oral health problems. In a study in Turkey with 260 street children and 192 school attending boys who served as the control, Doğan et al. (2006) concluded that street children commonly faced oral health problems, particularly periodontal problems. While decayed, missing, filled teeth (DMFT) scores of street youth were significantly lower than the control group, they had higher community periodontal index of treatment needs (CPITN) ($p \leq 0.001$). A possible explanation for the lower DMFT scores may be that street children in the sample had one meal a day and did not consume sweets or sugar. However, a Mexican study (n=310) found that street children had a high prevalence of caries (95%) according to the authors (Contreras-Bulnes, Reyes-Silveyra, Fuentes-Alvarez, Escamilla-Rodriguez, & Rodríguez-Vilchis, 2008).

Street children commonly face sexual health issues. Three studies explored human immunodeficiency virus (HIV) prevalence among street children and six studies examined other STIs among the group. Bolivian street youth over the age of 15 (n=313) had an overall HIV prevalence of 3.5% (Lambert et al., 2005). Bal, Mitra, Mallick, Chakraborti, and Sarkar (2010)

reported that the seroprevalence of HIV was 1% in a group of 554 street children in Kolkata, India. In contrast, among their sample of 300 orphaned and homeless youth in Ukraine, one in four were HIV infected (Hillis et al., 2012).

STIs other than HIV were reported more commonly among street children. For instance, Bal et al. (2010) found that the prevalence of STIs was 4% in their sample. Patel and Bansal (2010) found that 50% of street children who have had sex (n=95) also had symptoms suggestive of STI infections during the past six months. In Honduras, 85% of sexually active street children (n=47) had been treated for sexually transmitted diseases at least once (Wright et al.,1993). Among Filipino street children (n=179), 8% had Hepatitis B (Njord, Merrill, Njord, Pachano, & Hackett, 2008). Porto et al. (1994) found that children of the street had a higher Hepatitis B Virus (HBV) marker-positive rate than children on the street (Odds Ratio [OR]=4.1, 95% Confidence Interval [CI]=2.1-8.5); and higher HBV prevalence for those reporting sexual activity versus the group without sexual activity (OR=2.1, 95% CI=1.1-3.9). Whitworth Wittig, Wright and Kaminsky (1997) found that among street children, a greater portion of inhalant users compared to non-inhalant users had been treated for an STI (78% versus 55%).

In all seven quantitative studies that examined sexual abuse, its prevalence in street children was greater than 9%, sometimes much greater. For instance, 65% of street children in a study in Turkey (n=40) reported to have been sexually abused (Celik, 2009). Sixteen percent of street youth (n=122) in Brazil reported sexual abuse compared with 12% of youth who lived at home (n=89). In a qualitative study, street children in Johannesburg talked about being sexually abused by the police (Moolla et al., 2008).

The findings from studies that addressed physical health imply that street children commonly experience a range of ill health outcomes and abuse. Many of these problems are

severe. Findings from the few studies that did use comparison groups demonstrate that street children experience worse health and abuse than non-street children, except in the cases of nutrition, where street children tend to be less stunted and malnourished than poor non-street children.

Unfortunately, there were methodological issues with the studies presented in this section. The majority of the studies used cross-sectional designs without comparison groups. Although cross-sectional designs are appropriate for prevalence studies, studies without an appropriate comparison group do not have reliable baseline data with which to compare results. Therefore, we were unable to determine whether the prevalence of disease was contextually normal for children in LMICs. Furthermore, the risk-of-bias among this group of studies was high because the majority sampled their participants using non-probability sampling techniques. Most of the studies also failed to report the reliability of the outcomes, bringing into question the internal validity of the results. Additionally, many studies did not report the response rate. A low response rate could result in a biased sample. These potential biases may explain why differences were seen across studies examining oral health, STIs and sexual abuse.

Substance Use

The use of inhalants and alcohol are common among street children. (Abou-Hatab & Okasha, 2010; Auerswald et al., 2013; Khurana et al., 2004; Mathebula, Donald, & Ross, 2013; Nada & El Daw, 2010; Sherman, Plitt, Ul Hassan, Cheng, & Zafar, 2005; Souza et al., 2011; Thapa, Ghatane, & Rimal, 2009). Among the studies that examined substance use (excluding studies that only looked at injection drug use), the percentage of street children with a history of substance use ranged from 20% to 100%; in many of the studies, the history of having used substances was higher than 50%. For instance, Abou-Hatab and Okasha (2010) discovered that

100% of the street children in their study in Egypt (n=100) were using volatile substances. In Nigeria, Olley (2006) found that 69% of street youths had a history of alcohol abuse and 14% had a history of drug abuse (n=169).

Four studies in the review compared the substance use habits of street children to non-street children. In Pinto et al.'s (1994) Brazilian study, street youth (n=195) were 7.8 times more likely to use drugs than youth who lived in homes with their family (n=199) (95% CI=4.9-12.7). Among Filipino children in Manila, street children (n=311) were two times (95% CI=1.7-2.3) more likely to smoke tobacco, 1.3 times (95% CI=1.2-1.5) more likely to use alcohol, 37 times (95% CI=16-82) more likely to use inhalants, and 5.5 times (95% CI=3.6-8.2) more likely to use illegal drugs than their non-street counterparts (n=528), after adjusting for age and sex (Njord, Merrill, Njord, Lindsay, & Pachano, 2010). Similarly, abandoned street children (n=124) in La Paz, Bolivia engaged in more alcohol use (88% versus 41%) and paint thinner use (58% versus 12%) than children living in orphanages (n=35) (Huang et al., 2004). Among the groups in Ayaya and Esamai's (2001) study, the prevalence of drug use was highest among children of the street (38%) and lowest among primary school children who lived with their families (5%).

Some of the studies examined the types of substances used by street children and factors correlated with substance use. Tobacco, alcohol and glue were the most commonly used substances in the review (Auerswald et al., 2013; Elkoussi & Bakheet, 2011; Embleton, Atwoli, Ayuku, & Braitstein, 2013; Khurana et al., 2004; Wright et al., 1993). For instance, in a Kenyan study (n=100), 78% of the street children reported substance use in the past three months (Auerswald et al., 2013). Forty-eight percent reported sniffing glue, 57% engaged in alcohol use, 42% used marijuana, 24% used kuber (a stimulant) and 22% used miraa (khat). Increasing age was associated with increased odds of alcohol use (OR=2.2, 95% CI=1.5-3.0) and marijuana use

(OR=2.1, 95% CI=1.2-2.9). Length of time living on the street was associated with increased odds of any substance use (OR=2.2, 95% CI=1.1-4.4). In a cross-sectional study in Delhi involving 242 street children, more than half (55%) of the respondents used substances (Pagare et al., 2004). The most commonly used substances were tobacco (49%), inhalants (19%), alcohol (17%), and marijuana (11%). Substance use was significantly associated with maltreatment of the child, after adjusting for domestic violence, nuclear family, runaway status and working status of the child ($p<0.05$). Khurana et al. (2004) found that 55% of the street children living in Delhi (n=150) had a history of substance use. Tobacco intake was reported by 50%, glue sniffing by 3% and marijuana use by 0.7%.

The reported prevalence of injection drug use among street children in LMICs varied substantially across studies. For example, low rates of injection drug use were reported by de Carvalho et al. (2006) (1.2%, n=161) and Pinto et al. (1994) (5% in street children (n=195) versus 1.5% in home-based youth (n=199)). In contrast, Busza et al. (2010) found that 16% of their sample (n=805) aged 10 to 19 years in Ukraine engaged in injection drug use.

The peer group may play a major role in the uptake of drugs among street children. In a qualitative study with 73 street children in Bombay, participants suggested that the influence of peers was the most important trigger for experimenting with tobacco, beedis, alcohol and drugs (Kombarakaran, 2004). There is evidence suggesting that street children are using substances despite being aware of the addictive properties of sniffing glue and other substances. In a study of 146 street children in Kenya, the majority of survey participants (85%) responded that glue was addictive and 68% thought that all drugs were addictive. In this sample, 62% of the participants currently were using substances (Embleton et al., 2013). This finding suggests that

educating street children about the addictiveness of substances may not be enough to reduce substance use.

Overall, street children have high rates of substance use, especially when compared to non-street children. Glue sniffing is a common drug of choice for many street children, possibly due to its accessibility. There was heterogeneity in the results for injection drug use among the studies, ranging from 1.2% to 16%. The heterogeneity can result from bias. This bias may come from selection bias because we found that two out of three of these studies had biased selection. This bias may also come from unreliable estimates of the outcomes because none of the three studies provided reliability estimates of the outcome.

Mental Health

Fifteen studies in the review discussed the mental health of street children. Collectively, these studies discussed and measured a variety of mental health conditions including psychological distress, psychiatric disorders, depression, intellectual and neurological functioning, behavioural and emotional difficulties, and overall mental health. Some of the studies reported poor mental health among street children. For instance, in Ukraine, Kerfoot et al. (2007) discovered that 70% of street children (n=97) had behavioural and emotional difficulties on the Strengths and Difficulties Questionnaire (Goodman, 1997) based on normative data for Russian children, and 74% had depression based on the Mood and Feelings Questionnaire (Angold, Costello, Pickles, Winder & Silver, 1987). Ahmadkhaniha et al. (2007) administered the Kiddie-Schedule for Affective Disorders and Schizophrenia (K-SADS) (Puig-Antich & Ryan, 1986) in 87 street children in Iran. In the sample, 26 girls (87%) and 27 boys (48%) suffered from depression, based on cut-off points validated for Iranian culture.

Other studies reported lower proportions of other mental health issues. In a study among Delhi street boys (n=150), 21% had high hopelessness, 8% had depression, and 2% revealed that they had attempted suicide at some time in their life (Khurana et al., 2004). Aptekar (1991) found that all of the Colombian street children in his sample (n=56) had an IQ within the normal range (85–100). The Bender-Gestalt Test (Bender, 1938) and the Goodenough-Harris Drawing Test (Goodenough & Harris, 1963) were used to obtain measures about the children's emotional and neurological functioning. Half of the sample was without pathology. Aptekar (1991) reported that the research suggested, "[M]ost street children were functioning adequately intellectually, neurologically, and emotionally" (p.328).

Only two of the studies on mental health used comparison groups; none of the comparison groups were non-street children. Whitworth Wittig et al. (1997) compared street children that were inhalant users to street children that were not inhalant-users. They found that inhalant users had worse mental health than non-inhalant users (29% versus 5.5%), according to assessments by educators. In a psychological and ethnographic study that compared the mental health of street girls and boys, Aptekar and Ciano-Federoff (1999) reported that the girls showed more evidence of developmental problems and psychological disturbance than the boys. The boys were significantly better adjusted than the girls on a measure of overall emotional well-being.

It was challenging to draw conclusions about the mental health of street children for several reasons. Firstly, none of the studies compared the mental health of street children to non-street children, making it difficult to understand the relative mental health conditions of street children. The mental health results also varied considerably among street children in the review. There may be many reasons for the heterogeneity, such as the different cultural norms where

these studies were conducted. For instance, we might see a higher prevalence of mental health symptoms in street children in Ukraine or Egypt than street children in India or Colombia because of different perceptions of what qualifies as a mental health issue. There may also have been biases in the studies, which led to the heterogeneity. For example, several studies in this sample were at risk for having unreliable estimates and also selection bias because they did not use probability sampling to sample participants, such as the studies by Ahmadkhaniha et al. (2007) and Khurana et al. (2004).

Interventions Studies

Four of the 53 studies in the review evaluated street child interventions. Three were longitudinal and one was qualitative. The interventions varied. There were two interventions from Brazil: a day shelter and health service for street children (Morais et al., 2010); and The Equilibrium Project, an interdisciplinary program providing health, recreational and professional services to street children (Scivoletto et al., 2011). The two Brazilian interventions targeted the complete physical health, mental health and substance use status of street children. The two other interventions were a multidisciplinary case management program in Honduras (Souza et al., 2011) and an environmental behavioural modification program in Egypt (Hosny et al., 2007). Both programs focused on improving street children's mental well-being and substance use status.

In the first Brazilian study, Morais et al. (2010) used qualitative methodology to evaluate the day shelter and health service for street children, interviewing nine staff members operating the day shelter. Participants were asked about four issues: 1. Purpose of the service and relationship with teens, 2. Conceptions of health and illness, 3. Adherence to treatment, and 4. Roles of institutions on lives of adolescents. One of the findings from the interviews was that the

staff regularly engaged in therapeutic conversation with kids, not just during activity time. The main difficulty staff reported was having the children comply with medical treatment. Regarding the role that institutions have in the lives of adolescents, participants emphasized that the daytime shelter "guarantee[s] aspects necessary for survival" for adolescents, particularly food, hygiene, easy access to consultations and medicines, and a "space of inclusion," where adolescents could develop their autonomy and reflect on life.

In the second Brazilian study, Scivoletto et al. (2011) evaluated The Equilibrium Project, a program offering health and other services to street children. The paper describes qualitative data and preliminary quantitative data collected over two years. Of the children served by the project (n=351), 58% reported physical or sexual abuse, 89% were diagnosed with a psychiatric disorder, and 40% used drugs. After 2 years of operation, 64% successfully completed or continued in treatment and 35% were reunited with their families.

The multidisciplinary case management program in Honduras delivered services to 400 street children at a drop-in centre over a period of four years, from March 2005 to January 2009 (Souza et al., 2011). The program consisted of mental health interventions, medical interventions, education on social services, health education and recreational activities. Significant reductions were found in psychological distress, substance abuse and social situation scores. The median follow-up time for the cohort was 18 months. Souza et al. (2011) identified loss to follow-up as a limitation in their study. Of 400 street children, 281 (71%) came to two or more sessions.

The study of the environmental behavioural modification program in Alexandria, Egypt had a small sample size of 35 street children (Hosny et al., 2007). The program ran from October 2001 to April 2003 and included seven main units: outdoors and recreational education, urban

and health education, heritage and museum education, moral and religious education, human rights and peace education, economic and civic education, and future and sustainable education. Data were collected from observational sheets of behaviour and conversation sessions before and after the intervention. The mean scores before and after the intervention were significantly improved in a number of behaviours, including helper behaviour, narcissist behaviour, and passive aggressive behaviour ($p \leq 0.05$). No significant differences were found for speech disorders and substance use.

It is difficult to determine the impact of the interventions because none of the studies used randomized intervention and control groups or even just comparison groups. While randomizing street children into intervention and control groups is probably not feasible because of adherence issues, it would have been feasible to recruit a comparison group of street children.

Aside from Souza et al. (2011), these studies did not use rigorous study designs. For instance, Morais et al. (2010) utilized a qualitative study, but did not interview the recipients of the intervention; Scivoletto et al. (2011) merely provided descriptive data of the participants who reported abuse, were diagnosed with psychiatric disorders and used substances without examining whether the children had improved in their outcomes. Hosny et al. (2001) measured the outcomes at baseline and then once again after the intervention in a follow-up, which did not allow for the observation or adjustment for any trends over time. The latter study also had a small sample size (n=35), bringing into question the applicability of the results to the greater street child population.

Overall Risk-of-Bias

Overall, the studies in the literature review had moderate to high risk-of-bias (Table 2). There was a high risk of selection bias among the studies. It is difficult to have an unbiased

sample without using probability-based sampling, and 90% of the quantitative studies (n=49) did not use probability-based sampling. Additionally, only 35% of the studies reported a response rate of at least 80% and only one longitudinal study out of the three had adequate follow-up data, i.e., at least 80% of the participants. These factors may have contributed to biased samples.

The internal validity of the findings may have also been compromised because 90% of the quantitative studies did not provide any information about the reliability of the instruments used, the intra-rater reliability, or the inter-rater reliability. However, 80% of the quantitative studies employed unbiased methods for data collection and of the 25 quantitative analytic studies, 84% assessed major confounders in their analyses, such as age, education and total time on the streets.

Among the 11 studies with qualitative designs, six did not use qualitative methodology appropriate for the research question. Six studies also did not employ rigorous and appropriate analytic methods. However, nine qualitative studies used appropriate purposive sampling techniques and all 11 studies collected comprehensive data using appropriate data sources and a range of methods, including in-depth interviews, focus groups, and participant observation. Nonetheless, we felt that the majority of the qualitative studies lacked credibility because of the significant threats to bias that may have occurred as a result of not following appropriate qualitative methods.

Discussion

The studies in this review clearly show that street children in LMICs are susceptible to poor physical and mental health outcomes, and high rates of substance use. Street children appear to face worse health and greater substance use than non-street children, except in the case of nutrition, where street children fare better than poor and rural non-street children. Well-

designed research examining the effectiveness of interventions that aim to improve the physical health, mental health and substance use status of this group are needed considering the paucity of research in the area.

Only four of the studies reviewed evaluated the impact of health-related interventions for street children (Hosny et al., 2007; Morais et al., 2010; Scivoletto et al., 2011; Souza et al., 2011). It is likely that so few studies of this nature are conducted because street children are transient, making it difficult to observe them for even a short period of time in any intervention. Hosny et al. (2007) handled this challenge in their longitudinal study by including only street children who remained in the institution they were recruited from, a night shelter, for the entire duration of the study. As a result, they obtained a small sample of 35 children. This eligibility criterion of theirs likely created a selection bias because they did not include street children who did not sleep at the night shelter, whose outcomes may have differed from the sample's outcomes. Souza et al. (2011) conducted a well-designed longitudinal study. The study's large sample size of 400 children was recruited over four years, and staff members were dedicated to retaining participants. However, out of the 400 participants, only 281 (71%) came to more than one session.

The intervention studies showed positive results. However, it may not be practical from a practice and policy perspective to devote resources to street child programs that are focused only on substance use, for instance, because street children have poor outcomes across a variety of domains. Neither would it be practical to devote resources to expensive multidisciplinary case management programs with highly qualified staff members because it would be difficult to operate such programs in LMICs. It would be more practical and relevant for interventions to

address a wide set of health outcomes, administered in a way that could be easily operated and maintained in a LMIC.

Drop-in centres are interventions that address a wide set of health outcomes; however, they have not been evaluated for their impact on the health of street children in LMICs. In their Cochrane review, Coren et al. (2013) stated that there is a "need for research which considers the benefit of usual drop-in and shelter services, most particularly in low and middle income countries" (p. 2). The study by Morais et al. (2010) was the one that sought to evaluate drop-in centres for street children, and did so through a qualitative study. However, only staff members of the centre were interviewed; primary heath data were not collected from street children to evaluate if the centres had an impact on their heath. It was surprising that many of the studies in the review were conducted in drop-in centres or with the support of such centres, yet only one examined this intervention. For instance, Wright et al. (1993) recruited street children through *Proyecto Alternativos,* a health education and social services project for street children in Honduras. The program provided health education, food, informal education, recreational activities, and health care from six sites based in open-air markets and the city centre. De Carvalho et al. (2006), Panter-Brick et al. (1996), and Seth et al. (2005) similarly described drop-in centres in Brazil, Nepal and Delhi, respectively. Although all of these studies described drop-in centres, none of them evaluated the impact of these drop-in centres on the health of street children. Future studies should evaluate such centres using rigorous designs. Comparison groups should be used and participants should be recruited from centres with large numbers of street children to ensure adequate sample sizes.

One of the strengths of our review was its comprehensive nature. We included all types of research studies in our review, including studies without rigorous designs. We believe that the

inclusion of studies without rigorous designs was necessary to understand the health of street children in LMICs because there is little research in this area that is rigorous. Secondly, the topic of our review is highly relevant and necessary if action is to be taken to improve the health of street children globally. Most of the studies concluded by noting that more needs to be done to improve the health of street children. For instance, Busza et al. (2010) remarked that street youth need carefully designed harm reduction and child protection services. Souza et al. (2011) said that we must make it a priority to provide acceptable and effective services to street children in low-income countries to ensure that the most marginalized groups receive appropriate care. Implementing such solutions is possible only if we understand the extent of the problem. This review provides a comprehensive look into the problem because of the systematic search, which has looked at all the eligible literature. Secondly, we specifically reviewed evaluations of health-related interventions for street children in LMICs; this has not been done before.

There were some limitations to our review. Firstly, because there have not been any randomized controlled trials (RCTs) on this subject, we cannot categorically infer a causal link between the street child status and the experience of ill physical health outcomes, poor mental health and substance abuse. It would not be ethical to randomize children into street children and non-street children. Therefore, rather than RCTs, better observational, longitudinal studies that include an adequate comparison group are needed to determine if any causal associations exist between street child status and poor health and substance use outcomes. It is likely that street children experience poor health and substance use outcomes compared to non-street children considering the large amount of the information presented in this paper that supports this hypothesis. However, given the low quality of these studies, it important that more rigorous

studies are conducted to examine these outcomes among street children compared to non-street children.

Secondly, according to our risk-of-bias assessment, the literature on the health of street children in LMICs presents moderate to high threats of external and internal validity, particularly with respect to selection bias and reliable estimates of the outcome. Only 10% of the quantitative studies randomly sampled participants. However, it may be difficult to prevent selection bias when conducting research with street children. For example, Ayaya and Esamai (2001) found it difficult to sample street children, so they used snowball sampling. In snowball sampling, an initial participant is chosen at random and is then requested to provide information on subsequent participants who would be difficult to locate otherwise (Ayaya & Esamai, 2001). Anjali (2012) said that obtaining a proper scientific sample of street children was challenging because of the problems in determining the exact number of street children in the study area, making it hard to establish a valid sampling frame. Similarly, Ali et al. (2004) and Gross et al. (1996) found that non-probability sampling was the only option because of the absence of any census reports on street children.

Considering the threats to both external and internal validity, it is important to approach the findings in this review with caution. Furthermore, there is some heterogeneity among the results of studies that looked at similar outcomes, which could be explained by the potential biases we identified for each of the studies, including weaker designs, such as cross-sectional studies and longitudinal studies without comparison groups. The applicability of the findings is therefore compromised. However, it is important to acknowledge the difficulties of conducting studies with street children in LMICs. Depending on the circumstances, it may not be feasible to use more rigorous designs when studying this group. Another limitation of our review is that we

did not include non-English literature. This may have impacted our findings because we may have missed a portion of studies that were in another language. This is likely considering that we were looking only at studies conducted in LMICs.

Our review examined the same issue as the systematic review by Woan et al. (2013): the health status of street children in LMICs. Their review included 108 publications and our review had a total of 53 publications. We overlapped on 36 publications. Woan et al. (2013) did not include 17 of the studies in our review. We did not include 72 studies that were in their review because these publications failed to meet our eligibility criteria. For instance, 63 of the studies in their review did not to focus directly on the health outcomes of street children. Nine of the studies did not involve street children who lived or worked on the streets; rather, the participants in these studies lived in shelter homes. As well, Woan et al. (2013) did not conduct title and abstract screening and data extraction in duplicate, nor did they provide a risk-of-bias assessment for the studies. Neither of these limitations applies to our review.

The review by Woan et al. (2013) included more studies than ours (108 versus 53), even though we searched for publications over a longer timeframe and included exclusively qualitative studies. This is because we included only studies that focused directly on the health outcomes of street children. We were interested only in health outcomes. We did not look at studies that focused on access to care or risk behaviour because these issues would be reflected in the outcomes we chose. For instance, street children with risky sexual behaviours presumably have a greater incidence of sexual health problems and therefore more ill health outcomes than street children who practice safe sex. Therefore, our review was more focused than Woan et al.'s (2013).

Our review shows that there is a lack of published literature on street child interventions in LMICs. There is a clear need for more studies evaluating health-related interventions for street children. In particular, comprehensive, rigorous studies that look at the impact of drop-in centres, informed by street children are needed. A mixed methods design may facilitate the best examination of this intervention because it could inform the *extent* of the impact of such centres through a quantitative study, and also provide an examination of *how* centres work through a qualitative study.

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Table 1. Characteristics of studies included in literature review

Study	Focus	Setting	Sample characteristics	Sampling strategy	Data collection methods	Findings
Longitudinal Studies (n=3)						
Hosny et al., 2007	Substance use, mental health	Alexandria, Egypt	35 street boys, age range: 7-15 years	Purposive	Questionnaires, Weksler IQ test for intelligence, observations, medical examinations	100% smoked before intervention, 43% always used substances, 57% sometimes used, 0% never used; mean scores for behavioural items before and after the intervention were significantly improved in all areas, except speech disorders and substance use
Scivoletto et al., 2011	Physical, mental health, substance use	Sao Paulo, Brazil	351 street children, 68% male, age range: 12.47 ± 3.47 years.	Con-venience	Clinical interviews	58% reported physical/sexual abuse, 89% diagnosed with psychiatric disorder, 40% used drugs; after 2 years, 64% successfully completed/continued treatment, 35% reunited with their families
Souza et al., 2010	Mental health, substance use	Tegucigalpa, Honduras	400 street children, 38% female, mean age 17.5 years	Con-venience	Standardized questionnaire, Teen Addiction Severity Index	There were reductions in psychological distress and substance abuse and improvement in the social situation of street children; significant interaction of gender over time on improvements in levels of psychological distress; probability of remaining on substances at 12 months was 0.76 and 0.51 at 24 months; at 12 months, fewer females used substances compared to males
Cross-sectional Studies with Comparison Groups (n=11)						
Ayaya and Esamai, 2001	Physical health, substance use	Eldoret, Kenya	191 children ages 5-21: 38 type 1 on the street, 47 type 2 of the street, 56 type 3 abandoned children staying in a shelter, and 50 type 4 non-street children	Snowball	Structured questionnaires, clinical examinations	Cough (29%) was most common symptom; upper respiratory tract infection (12%) was most frequent diagnosis followed by skin disease (50.9%); most common drug was cigarettes (37.6%) and none of the school children was taking any drugs; prevalence of disease was 467 per 1000 children; type 2 street children had the highest prevalence of disease (833 per 1000 children); shelter children had the least disease prevalence (474 per 1000)
Doğan et al., 2006	Physical health	Adana, Turkey	260 school going street boys, control group of 192 street boys, range: 7-14 years, mean age: 9.2 years	Con-venience	Interviews with structured questions, oral examinations performed according to WHO criteria	Oral health behaviour of street children was significantly different from non-working children; DMFT and dmft scores of the street youths significantly lower than the control group, but they had higher CPITN scores

Forster et al., 1996	Substance use	Porto Alegre, Brazil	48 children on the street, mean age: 11.8, age range: 6-18 years; 31 children of the street, mean age 12.1, age range: 7-16 years; 26 children living with family and going to school, mean age: 11.1, age range: 8-18 years	Con-venience	Structured questionnaire	Tobacco most frequently used, followed by alcohol; higher prevalence of alcohol and tobacco use among children of the street; children of the street: >25% used alcohol, 58% used tobacco, 40% regularly abuse inhalants, 26% use marijuana; children living with family and going to school: <12% used illicit drugs, 4% sniffed solvents regularly, 4% used marijuana regularly
Greksa et al., 2007	Physical health	Dhaka, Bangladesh	142 street children and 150 poor children, age range: 7-14 years	Con-venience	Survey, anthropometric measurements, physical examination	No wasting in either group; majority in both groups were stunted and underweight, but no significant differences ($p>0.05$); prevalence of disease symptoms slightly higher in street children than slum children, but few of the differences were statistically significant ($p<0.05$)
Huang et al., 2004	Physical health, substance use	La Paz, Bolivia	124 abandoned street children, age range: 3 -18 years; 35 orphanage children	Con-venience	Standardized questionnaires, field observations	Street children differed from orphanage children in their higher risk of police abuse (95% versus 38%), paint thinner use (88% versus 41%), alcohol use (58% versus 12%), and serious medical problem (53% versus 20%); risks for street children increased rapidly with age
Njord et al., 2010	Substance use	Manila, Philippines	311 street children and 528 non–street children, age range: 13- 17 years	Multistage con-venience and random	Questionnaire	Street children with little or no contact with families were 2.0 (95% CI = 1.7-2.3) times more likely to smoke tobacco, 1.3 (95% CI = 1.2-1.5) times more likely to use alcohol, 36.7 (95% CI = 16.4-82.0) times more likely to use inhalants, and 5.5 (95% CI = 3.6-8.2) times more likely to use illegal drugs than non–street children; street children who had contact with families, compared with non–street children, were 8.7 (95% CI = 3.9-19.4) times more likely to use inhalants and 2.8 (95% CI = 1.7-4.6) times more likely to use illegal drugs
Panter-Brick et al., 1996	Physical health	Nepal	307 boys, age range: 6-14 years; 111 homeless, 62 squatter, 82 privileged school going and 52 village boys	Con-venience	Anthropometric measurements, interviews, observations, self-reports	Village, squatter and homeless boys were moderately stunted (<-2 SD), school boys were mildly stunted (<-1 SD); all children showed adequate values for weight-to-height (wasting); 9% school-boys, 23% homeless boys, 34% squatter boys and 51% of village boys were

						severely stunted
Pinto et al., 1994	Physical health, substance use	Belo Horizonte, Brazil	394 youths: street-based (n=195), home-based (n=199), both groups of similar ages, higher percentage of street-based youths were male (80% vs. 62%)	Con-venience	Standardized questionnaire, reading test, physical examinations, collection of blood and stool specimens	Street based youths reported earlier onset and higher rates of sexual activity, sexual abuse, and sexually transmitted diseases; street-based youths 7.8 times more likely to use drugs than home-based youths; inhalants and marijuana were the more commonly used drugs. Intravenous drug use was low among drug-users: 7 % in street children vs. 5% in home-based youth
Whit-worth Wittig et al., 1997	Physical, mental health, substance use	Tegucigalpa, Honduras	1,244 street children: 1,084 children on the street, 160 children of the street; mean age for on the street children is 10 years, 53% are boys and 47% are girls; mean age for street children is 13 years, 95% boys	Purposive, snowball	Survey	Children of the street more likely than children on the street to report use of inhalants (53.2% vs. .8%); ETOH (43.1% vs. 3.9%); cigarettes (56.7% vs. 4.9%); among of the street children, inhalant users more likely than non-inhalant users to: report use of ETOH (76.5% vs. 5.6%), tobacco (90.2% vs. 16.9%), and marijuana (29.3% vs. 1.4%); be in "fair" or "poor" physical health (27.8% vs. 17.8%), nutritional status (28.9% vs. 20.5%), and mental health (28.9% vs. 5.5%); have been treated for an STI (78.2% vs. 54.5%)
Cross-sectional Studies without Comparison Groups (n=30)						
Abou-Hatab and Okasha, 2010	Substance use	Egypt	100 street children, age range: 9-17 years	Con-venience	Interview, Inhalant Dependence and Intoxication Checklist and diagnostic criteria, urine screen	100% used volatile inhalants; 25% in combination with nicotine and hashish and 15% in combination with oral drugs; inhalant dependence and intoxication were reported among all participants
Ahmadkha niha et al., 2007	Physical, mental health	Tehran, Iran	87 street children, 56 males, 31 females, mean age 11 ± 2.3 years, age range: 6-17 years	Con-venience	Kiddie-Schedule for Affective Disorders and Schizophrenia (K-SADS), clinical interview	21% had been sexually abused; depressed children were 3.2 times more likely to be sexually abused than non-depressed children; 87% of girls and 48% of boys suffered from depression
Aptekar, 1991	Mental health	Bogota, Colombia	56 street children, age range: 7-16 years	Con-venience	Kohs Block Design Test for intelligence, Bender-Gestalt Test and Goodenough-Harris Drawing Test for emotional and neurological function	Mean IQ score (88.38) was within the normal range (85-100); no more examples of mental retardation than what would be expected in the normative population (3.6% instead of 3%); a quarter of sample scored within pathological range, but nearly half were without pathology

Auerswald et al., 2013	Substance use	Kisumu, Kenya	300 street children, mean age 17, age range: 13-21 years, 299 male	Con-venience	Computer-assisted, interviewer-administered survey	78% reported substance use in preceding three months; 48% sniffed glue, 57% used alcohol, 42% used marijuana, 24% used kuber use and 22% used miraa; increasing age was associated with increased odds of alcohol use (OR: 2.2, 95% CI: 1.5-3.0) and marijuana use (OR: 2.1, 95% CI: 1.2-2.9)
Bal et al., 2010	Physical health, substance use	Kolkata, India	554 street children, 50% in age range 11-15, 362 males	Cluster	Questionnaire, blood sample	Prevalence of substance use 52%; 9% sexually abused; seroprevalence of HIV 1% and STIs was 4%
Busza et al., 2010	Substance use	Kiev, Donetsk, Dnepropetrovsk and Nikolaev in Ukraine	805 street children, age range: 10-19 years	Location-based network, con-venience	Standardized questionnaires	Injection drug use was 15.5% of the sample
Contreras-Bulnes et al., 2008	Physical health	Toluca, Mexico	310 street children, 194 males, 116 females, age range: 0-17 years, 79.2% street working children, 19.1% children at risk	Con-venience	Oral examination collected on DMFT and deft recording forms, caries and treatment needs recorded according to 1997 WHO criteria	Caries prevalence was 95%, mean DMFT was 6.0 ± 4.6 (5.8 decayed), deft was 3.5 ± 3.7 (3.4 decayed)
de Carvalho et al., 2006	Substance use	Porto Alegre, Brazil	161 street children, median age 14 years, 79% male	Con-venience	Structured face-to-face interviews	39% reported illicit drug use in the last year; only 1.2% reported injection drug use
Elkoussi & Bakheet, 2011	Substance use	Assiut, Egypt	120 street children, 117 males, mean age: 14.6, age range: 10-18 years	Random	Questionnaire and laboratory analysis	Nearly 91% misused products containing volatile substances; 34% reported inhaling “Kolla,” a commercial glue
Fallah et al., 2008	Physical health	Tehran, Iran	203 street children, age range: 7-18 years, 196 boys	Con-venience	Questionnaire, serology, clinical examination	3% HBsAg positive, 27% HBsAb positive 8% HBc-Ab positive; 3.5% HCV Ab positive; all positive cases were boys
Gross et al., 1996	Physical health	Jakarta, Indonesia	89 street children, age range: 8-15 years, 11 female	Con-venience	Structured interviews, anthropometric measurements	52% stunted, 7% wasted; street children weighed more and were taller than socio-economic peers
Hillis et al., 2012	Physical health,	Odessa, Kiev,	929 orphaned and homeless youth, age	Time-location	Interviews, HIV testing, clinical,	One of four youths who were both homeless and orphaned was HIV infected; these youths

	substance use	and Donetsk, Ukraine	range: 15-24 years		immunological and virological evaluations	significantly more likely to be HIV infected and to report injection drug use than those with adequate housing and living parents
Hixon, 1993	Physical health	Manila, Philippines	150 street children, age range: 6-18 years	Stratified, purposive	Anthropometric data, interviews	All children were underweight and underheight by international and Filipino standards (mean weight/age z score = -1.50, mean height/age z score = -2.02, NCHS)
Kerfoot et al., 2007	Physical, mental health	Kyiv, Ukraine	97 street children, 72 boys and 25 girls, age range: 6–17 years, mean age 12.8 years	Con-venience	Interviews: the Kyiv Street Safe Interview Schedule (KSSIS), the Strengths and Difficulties Questionnaire (SDQ), and the Mood and Feelings Questionnaire (MFQ)	70% had behavioural and emotional difficulties on SDQ, 74% scored for depression on MFQ; current health problems reported by 78%, with 43% described as persistent or severe
Khurana et al., 2004	Mental health, substance use	Delhi, India	150 street boys, age range: 10- 16 years	Con-venience	Schedule to measure: identification data, hopelessness scale for children by Kazdin, Beck depression inventory, Psychological survey questionnaire and RUTTER-B2 scale	55% had history of substance use, 50% had used tobacco, 3% glue, 1% marijuana; 21% had high hopelessness, 8% depression, 2% attempted suicide; 8% of depressed children gave history of suicidal attempts; 38% of children gave history of physical abuse, 15% of sexual abuse; 69% had behavioural problems, 81% had antisocial behaviour, 8% were neurotic and 11% remained undifferentiated
Lambert et al., 2005	Physical health	Bolivia	536 street youth, 129 females (24.1%; median age 15 years), 407 males (75.9%; median age 18 years)	Con-venience	ELISA tests to ascertain HIV status confirmed by Western blot, questionnaires	Street youth below 15 were not HIV positive; among street youths over 15, overall HIV prevalence was 3.5%, higher among those recruited in the street, lower among those recruited in centres for homeless
Mathur et al., 2009	Physical, mental health	Jaipur, India	200 street children: 100 boys, 100 girls, equally split in two age groups 10–14 and 14–18 years	Purposive random, snowball	Interviews	Street children reported experiences of abuse in all the five areas under study; 62% had "moderate" category of abuse, 37% "severe" and "very severe"; highest mean scores obtained on the "verbal" and "psychological" abuse; boys more abused than girls
Mora-kinyo & Odejide, 2003	Substance use	Ibadan, Nigeria	180 street children, 174 males, mean age 14.6; age range: 8-18 years	Multistage con-venience and	Questionnaire	Alcohol had the highest lifetime (30.6%) and current (23.9%) use, followed by kola nut (16.7 and 13.9%), tobacco (14.4 and 10%) and cannabis (10 and 7.8%); 45% admitted to either lifetime or

				random		current use of at least one psychoactive substance; Length of stay on the street significantly predictive of current psychoactive substance use
Nada and El Daw, 2010	Physical health, substance use	Greater Cairo and Alexandria, Egypt	857 street children, 463 children from Greater Cairo and 394 from Alexandria, age range: 12-17 years	Time-location	Interviews	93% had faced harassment or abuse typically by police and other street children, 62% had used drugs, 53% of girls in Greater Cairo and 90% in Alexandria had been sexual abused
Njord et al., 2008	Physical, mental health, substance use	Manila, Philippines	179 street children, 107 males, 72 females, age range: 8-17 years	Con-venience	Laboratory tests, anthropometric measurements, standard vital signs, chest x-rays, clinical evaluations	Most frequent problem was coughing, then fever, dyspnea, diarrhea, and blood in the stools; among males: 65% current smokers, 52% have consumed alcohol; females: 37% current smokers, 67% consumed alcohol; 7.9% had hepatitis B, 12.3% pneumonia, and 25.5% had ascariasis; both groups experienced depression and anxiety
Pagare et al., 2004	Substance use	Delhi, India	115 street children, age range: 6-16 years	Con-venience	Self-developed, semi-structured questionnaires	57% indulged in substance use before coming to observation home; agents consumed were nicotine (45%), inhalants (24%), alcohol (22%), cannabis (26%)
Patel and Bansal, 2010	Physical health	Surat, India	326 street children	Con-venience	Interviews	51% had history suggestive of STI infections in past six months among the 95 children who had history of having sex
Pinzon-Rondon et al., 2009	Physical health	Bogotá, Colombia; Lima, Peru; Quito, Ecuador; and São Paulo, Brazil	584 street children, age range: 5–17 years	Con-venience	Questionnaire	40% of the child street-labourers reported injury while working on the streets: scratches (20%), cuts/lacerations (16%), burns (8.6%), car accidents (8.9%), sprains (4.6%), and amputations (0.3%); working a high number of daytime hours and performing on the street predicted greatest risk of injury; each additional hour of work increased the risk of injury by 1.4%
Porto et al., 1994	Physical health	Goiania, Brazil	496 street youth, 20% children of the street, age range: 9-20, 93% males	Con-venience	Standardized questionnaire, blood samples	13.5% were HBV marker-positive (anti-HBc), 2.0% had antigenemia, children of the street had higher HBV marker-positive rate compared to children on the street (OR = 4.1, 95% CI: 2.1-8.5); higher HBV prevalence for those reporting sexual activity versus the group without sexual activity (OR = 2.1, 95% CI: 1.1-3.9)
Salem and Abdel Latif,	Physical health	Alexandria, Egypt	100 street boys, mean age of 13.7 years, age range: 7 - 16 years	Purposive	Interviews; medical examinations, urine, stool and blood	98% had schistosomiasis, 92% had parasitic infection, 83% had malnutrition, 78% were anaemic, 66% had scabies, 48% lice, 21%

2002					analysis	hepatitis, 20% tinea corporis, and 16% with symptoms indicative of TB
Sena-nayake et al., 1998	Physical health, substance use	Colombo, Sri Lanka	50 street children, mean age 10.5 years, age range: 4-17 years, 64% male	Con-venience	Interviews, physical examinations, laboratory investigation	16% sexually abused, 20% tobacco smokers; respiratory, skin infections, and injuries were main causes of morbidity
Sherman et al., 2005	Substance use	Lahore, Pakistan	347 street children, 96% boys, median age of 13 years	Con-venience	Registration form	17% never used drugs, 16% former drug users, and 67% used drugs in the month before registration
Sorsa et al., 2002	Physical health	Awassa, Ethiopia	479 street children, 435 male, 44 female, 52.8% aged 15-17 years	Systematic	Questionnaire	280 of the street children and women reported one or more previous health problems; malaria -like febrile illness (41%), respiratory tract illnesses (32%) and diarrheal diseases (4%) were the major health problems; about half of the children reported using one or more substances
Thapa et al., 2009	Physical health	Dharan, Nepal	48 street children, 46 male, 33 11-15 years of age, 37 on the street and 11 of the street	Snowball	Interviews, physical examinations, laboratory investigations	100% had at least one or more health problems; 88% smoked cigarettes, 50% used alcohol, 73% took drugs; common health problems were head lice (81%), headache (67%), cut injury (60%), common cold (52%), dental caries (52%), burning micturition (48%), cough (48%)
Wright et al.,1993	Physical, mental health, substance use	Honduras	910 children on the street and 110 children of the street, age range: 1-22 years, mean age: 11 years, 94.5% children of the street were male compared to 53.9% children on the street	Con-venience	Data from baseline protocols completed for clients by project case workers; data from notes taken by case worker from several interviews	13% had fair to poor mental health, 28% fair to poor physical health, and 35% had significant nutritional problems; 2nd- and 3rd-degree malnutrition only in children on the street and not children of the street; among children of the street, 57% sniff glue, 43% drink alcohol, 57% smoke tobacco, 19% smoke marijuana; skin ailments, respiratory infections, trauma, and dental problems leading causes of morbidity
Cross-sectional with qualitative component (n=7)						
Ali and De Muynck, 2005	Physical health	Rawalpindi and Islamabad, Pakistan	40 street children, 80% male, mean age 9 years (SD ± 2), age range: 5–13 years	Con-venience	Individual, semi-structured interviews; three focus group discussions; physical examinations	Youth highly susceptible to adverse health outcomes; common ailments were injuries, respiratory and skin infections
Ali et al., 2004	Physical health	Rawalpindi and Islamabad, Pakistan	108 street children: 101 on the street, 7 of the street, 81% male, mean age at beginning life on	Purposive	Anthropometric measurements, in-depth interviews, direct observations,	Important issues were parental exploitation, police harassment, abuse, and the impact of other street peers in their lives; 20% stunted; 12% had wasting; wasting equal between sexes; fewer girls

			street under 10		focus group discussions and key-informant interviews	than boys were stunted
Anjali, 2012	Physical health	Delhi, India	100 street children, 84% boys, 16% girls, age range: 5-16 years	Con-venience	In-depth interviews, observations, case studies	Most children suffered from fever, often followed by dysentery; common illnesses: skin diseases (38%), fever (20%), diarrhea (13%), cold (12%)
Aptekar and Ciano-Federoff, 1999	Mental health	Nairobi, Kenya	61 street children, 42 male, 19 female, age range: 8-17 years, mean age 12.7 years (SD=2.17)	Random time, con-venience	Psychological tests: Bender-Gestalt, Draw A Person, Raven's Progressive Matrices. Ethnography: interviews, observations	Street boys performed significantly better than street girls on the Draw A Person (DAP), Man test, $F(1,451 = 4.13, p < .05.)$; boys and girls did not differ significantly in intellectual functioning, on one test of emotional well-being, or neurological functioning
Celik, 2009	Physical health	Ankara, Turkey	40 street children, 38 males, age range: 13-17 years	Con-venience	Focus groups	Children working on the street were subjected to verbal, physical and sexual abuse (50%, 50% and 65%, respectively)
Embleton et al., 2013	Substance use	Eldoret, Kenya	Quantitative: 146 street children, age range: 10-19 years, 98 of the street (85% male), 48 on the street (65% male), median age 14 years. Qualitative: 30 participants.	Purposive	Surveys and five focus groups	85% said glue was addictive and 68% thought that all drugs were addictive; the powerful ''thirst'' to sniff glue was described by many participants
Olley, 2006	Substance use	Ibadan, Nigeria.	Quantitative: 169 youth, 89.3% male, mean age 18.4 years. Qualitative: 20 boys and 2 community leaders	Snowball	Quantitative: interviews. Qualitative: Two focus group discussions, two in-depth interviews	69% had history of alcohol abuse, 14% of drug abuse; females more likely to engage in antisocial behaviours than males
Qualitative Studies (n=4)						
Kombara-karan, 2004	Mental health, substance use	Bombay, India.	73 street boys, age range: 10-18 years, 5 agency social workers, 3 street workers	Purposive	Semi-structured in-depth interviews, focus group discussions, informal interviews and case study	Children face several challenges in their search for food, safety, employment, shelter and medical care; they commonly depend on their peers, non-governmental agencies, and their own resourcefulness to survive on the streets; while majority use positive mechanisms to cope with their daily stresses, some children also employ maladaptive strategies such as using alcohol, drugs, and visiting prostitutes

Moolla et al., 2008	Physical, mental health	Johannes-burg, South Africa	16 black male street children, age range: 13-19 years	Purposive	Individual interviews, picture drawings, group interviews	Street children experienced aggression during interactions with police, which included physical abuse, verbal abuse accompanied by threats, and sexual abuse; they associated these experiences with negative feelings
Morais et al., 2010	Physical, mental health	Porte Alegre, Brazil	5 health professionals and 4 teachers, mean age = 36 years (SD = 9.75), age range: 23-49 years	Purposive	Interviews	Staff found it difficult to have children comply with medical treatment; they felt that the daytime shelter was necessary for the survival of adolescents
Seth et al., 2005	Substance use	Delhi, India	45 street children, age range: 9-18 years, median age 13 years	Purposive, snowball	Forty-five in-depth interviews and three focus group discussions	Close friends/peer group were the major source of information about drug use and responsible for initiation of drug use; initiation trends could be explained by social dynamics or friendship among other rag pickers/street children

Table 2. Risk-of-bias

Quantitative studies	Unbiased selection	Unbiased data collection	Comparison group	Reliability estimates	Major confounders assessed	Response rate ≥ 80%	Follow-up ≥ 80%
Abou-Hatab and Okasha, 2010	No	Yes	No	No	NA	Cannot tell	NA
Ahmadkhaniha et al., 2007	No	Yes	No	Yes	Yes	Yes	NA
Ali and De Muynck, 2005*	No	No	No	No	NA	Cannot tell	NA
Ali et al., 2004*	No	Yes	No	No	NA	Cannot tell	NA
Anjali, 2012*	No	No	No	No	NA	Cannot tell	NA
Aptekar and Ciano- Federoff, 1999*	No	Yes	No	No	Yes	Cannot tell	NA
Aptekar, 1991	No	Yes	No	No	NA	Cannot tell	NA
Auerswald et al., 2013	No	No	No	No	Yes	Cannot tell	NA
Ayaya and Esamai, 2001	No	No	Yes	No	NA	Yes	NA
Bal et al., 2010	Yes	Yes	No	No	Yes	Yes	NA
Busza et al., 2010	No	Yes	No	No	NA	Cannot tell	NA
Celik, 2009*	No	Yes	No	No	NA	Cannot tell	NA
Contreras-Bulnes et al., 2008	No	Yes	No	Yes	NA	Cannot tell	NA
de Carvalho et al., 2006	No	Yes	No	No	Yes	Yes	NA
Doğan et al., 2006	No	Yes	Yes	No	No	Yes	NA
Elkoussi & Bakheet, 2011	Yes	Yes	No	No	NA	Cannot tell	NA
Embleton et al., 2013*	No	Yes	No	No	NA	Yes	NA
Fallah et al., 2008	No	Yes	No	No	NA	Cannot tell	NA
Forster et al., 1996	No	Yes	Yes	Yes	Yes	Yes	NA
Greksa et al., 2007	No	Yes	Yes	No	Yes	Cannot tell	NA
Gross et al., 1996	No	No	No	No	NA	Cannot tell	NA
Hillis et al., 2012	Yes	Yes	No	No	Yes	Yes	NA
Hixon, 1993	No	Yes	No	No	No	Cannot tell	NA
Hosny et al., 2007	No	Yes	No	No	No	Yes	Yes
Huang et al., 2004	No	Yes	Yes	No	Yes	Yes	NA
Kerfoot et al., 2007	No	Yes	No	No	NA	Yes	NA
Khurana et al., 2004	No	Yes	No	No	NA	Cannot tell	NA
Lambert et al., 2005	No	Yes	No	No	NA	Cannot tell	NA
Mathur et al., 2009	No	Yes	No	No	Yes	Cannot tell	NA
Morakinyo & Odejide, 2003	No	Yes	No	No	Yes	Yes	NA
Nada and El Daw, 2010	Yes	Yes	No	No	NA	Cannot tell	NA
Njord et al., 2008	No	Yes	No	No	Yes	Cannot tell	NA

Njord et al., 2010	No	Yes	Yes	No	Yes	Yes	NA
Olley, 2006*	No	Yes	No	Yes	NA	Yes	NA
Pagare et al., 2004	No	Yes	No	No	Yes	Yes	NA
Panter-Brick et al., 1996	No	Yes	Yes	No	Yes	Cannot tell	NA
Patel and Bansal, 2010	No	Yes	No	No	NA	Cannot tell	NA
Pinto et al., 1994	Yes	Yes	Yes	No	No	Yes	NA
Pinzon-Rondon et al., 2009	No	Yes	No	No	Yes	Yes	NA
Porto et al., 1994	No	Yes	No	No	Yes	Cannot tell	NA
Salem and Abdel Latif, 2002	No	No	No	No	NA	No	NA
Scivoletto et al., 2011	No	No	No	No	NA	Cannot tell	No
Senanayake et al., 1998	No	Yes	No	No	NA	Cannot tell	NA
Sherman et al., 2005	No	No	No	No	Yes	Yes	NA
Sorsa et al., 2002	No	Yes	No	No	Yes	Cannot tell	NA
Souza et al., 2010	No	Yes	No	Yes	Yes	Cannot tell	No
Thapa et al., 2009	No	No	No	No	NA	Cannot tell	NA
Whitworth Wittig et al., 1997	No	Yes	Yes	No	Yes	Cannot tell	NA
Wright et al.,1993	No	No	No	No	NA	Cannot tell	NA
Total Yes	10%	80%	18%	10%	84%	35%	33%

Qualitative Studies	**Appropriate methodology**	**Appropriate purposive sampling strategy**	**Comprehensive and appropriate data collection**	**Rigorous and appropriate analysis**
Ali and De Muynck, 2005*	No	Yes	Yes	No
Ali et al., 2004*	No	Yes	Yes	No
Anjali, 2012*	No	No	Yes	No
Aptekar and Ciano-Federoff, 1999*	Yes	Yes	Yes	No
Celik, 2009*	No	No	Yes	Yes
Embleton et al., 2013*	Yes	Yes	Yes	Yes
Kombarakaran, 2004	Yes	Yes	Yes	Yes
Moolla et al., 2008	Yes	Yes	Yes	Yes
Morais et al., 2010	Yes	Yes	Yes	Yes
Olley, 2006*	No	Yes	Yes	No
Seth et al., 2005	No	Yes	Yes	No
Total Yes	45%	82%	100%	45%

**Study used both quantitative and qualitative methods.*

NA = Not applicable.

Chapter 3: The Impact of Drop-in Centres on the Health of Street Children in New Delhi: An Interpretive Descriptive Study

In this chapter, an author generated version of an article prepared for submission to *Children Youth and Services Review* on April 14, 2016 is presented (Nath, Sword, Georgiades, Raina, & Shannon, 2016). The submission number for this manuscript is CYSR-D-16-00190. As an author generated version of a submitted manuscript, no copyright license documentation is required.

For this manuscript, I developed the child and teacher interview guides with significant guidance from Wendy Sword. I recruited all the participants and conducted all of the data collection with the assistance of the GRP and Kishalaya drop-in centre staff members. I analyzed the qualitative findings and wrote the paper. Wendy Sword aided with the interpretation of the findings and revised the manuscript. Harry Shannon, Parminder Raina and Kathy Georgiades provided feedback to revise the manuscript.

Context and Background

Based on findings from the literature review, I discovered that street children in LMICs are susceptible to poor physical and mental health outcomes, and high rates of substance use, especially in comparison to non-street children. However, there is a lack of well-designed research examining the effectiveness of interventions that aim to improve the health and substance use status of this group. Drop-in centres are one of the most common interventions for street children, but it is unknown if these interventions impact the health and substance use status of street children in LMICs. In fact, very little is known about drop-in centres and their relationship to the health and substance use behaviour of street children in LMICs.

Considering that drop-in centres are one of the most common interventions for street children in LMICs, and that very little is known about these centres, it is important to explore how programs at drop-in centres influence or do not influence the health and substance use status of street children. This thought provided the impetus for conducting the qualitative study. In this qualitative study, I aimed to explore how drop-in centres influence or do not influence the physical health, mental health and substance use status of street children. I chose these three indicators because these three health indicators emerged in the systematic literature review (Chapter 2) as being the broad health indicators of concern among street children.

Paper: The Impact of Drop-in Centres on the Health of Street Children in New Delhi: An Interpretive Descriptive Study

Title: The impact of drop-in centres on the health of street children in New Delhi: An interpretive descriptive study

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Abstract

Our objective was to understand how drop-in centres influence the physical health, substance use status, and mental health of street children in New Delhi, India using interpretive description methodology. We conducted face-to-face semi-structured interviews with 23 street children and two staff members from two drop-in centres in New Delhi. We asked participants to describe how they believed drop-in centres worked or did not work to influence street children's physical and mental health and substance use status. We analyzed the interviews using constant comparative method. Participants believed that because street children regularly visited drop-in centres, their health outcomes improved. Street children participated in drop-in services rather than services provided by other facilities because at the centres, the staff members were nonjudgmental, they were free to be a child, their daily struggles were lessened and they received protection. Staff at drop-in centres also provided children with moral direction and an opportunity for a better life. However, children continued to live on the streets despite what centres offered because street life had become normal to them. According to street children and staff members, drop-in centres positively influence the physical health, mental health and substance use status of street children by providing services in an environment tailored for street children.

Keywords: drop-in centres, street child, New Delhi, India

Introduction

It is estimated that globally there are up to 100 million street children, that is, children living or working on the streets (United Nations Children's Fund [UNICEF], 2003). With approximately 18 million street children, India has the largest population of street children in the world (Sen, 2009). Many street children experience ill health (Ali & Muynck, 2005; Ayaya & Esamai, 2001; Kudrati, Plummer, & Yousif, 2008), yet there is little research on street child interventions that aim to improve their health outcomes.

Drop-in centres are one of most common programs for street children globally (Coren et al., 2013). They may provide street children with non-formal education, free lunches, recreational activities, preventative health services and basic medical care at strategic locations near railway stations and busy market areas for a few hours every day (Salaam Balaak Trust, 2015; War Child, 2014). They may also transition street children to shelter homes or restore them to their families. Staff members working at a drop-in centre in Brazil reported that these centres were necessary to the survival of street children because they ensured access to food, hygiene, health care and a space for the children to feel they belonged (Morais, Morais, Reis, & Koller, 2010).

Drop-in centre services including psychological care, case management and the provision of basic necessities have led to improvements in mental health, substance abuse and social stability among street youth in the United States (Slesnick, Kang, Bonomi, & Prestopnik, 2008). Unfortunately, few studies have described the outcomes of street children attending drop-in centres in low-income countries (Souza, Porten, Nicholas, & Grais, 2011). In a Cochrane review that summarized the effectiveness of interventions for street children that promoted inclusion and reintegration and reduced harms, the authors remarked, "We did not find any sufficiently robust

evaluations conducted in LMICs despite the existence of many relevant programmes" (Coren et al., 2013, p. 2).

Review of the Literature

Street children commonly experience adverse physical health outcomes, substance abuse and poor mental health. Qualitative and quantitative studies have found that skin infections, respiratory diseases, injuries, tuberculosis, and sexually transmitted infections are some of the most common physical health problems among street children (Ayaya & Esamai, 2001; Kudrati et al., 2008; Morais et al., 2010). A few qualitative studies have examined the experiences of street children with respect to their physical and mental health. For instance, interviews with ten homeless young adult males in Johannesburg revealed that participants experienced poor health, addiction, physical violence, psychological trauma, and public hostility (Mathebula & Ross, 2013). Another qualitative study in Johannesburg (n = 16) found that in street children's interactions with the police, they commonly experienced physical, verbal and sexual abuse (Moolla, Myburgh, & Poggenpoel, 2008). These interactions impacted their mental well-being such that the street children associated the experiences with fear, a sense of hopelessness and uncertainty, rejection, sadness, loss of trust, disillusionment, and intense resentment (Moolla et al., 2008). Anjali (2012) conducted an exploratory descriptive study (n = 100) to understand the state and nature of the quality of life of street children in Delhi. The study found that quality of life was low due to a lack of access or substandard educational and medical facilities, or absence of emotional support from their poverty stricken families.

Street children are at risk for using substances (Auerswald et al., 2013; Gupta, Khandekar, & Gupta, 2013; Souza et al., 2011). In a cross-sectional study in Kenya (n = 300), 78% of the street children reported using substances such as glue, alcohol and marijuana in the

previous three months (Auerswald et al., 2013). In addition to using inhalants, street children engage in other risky health behaviours that contribute to their ill health outcomes. Studies in Ethiopia and Nepal found street children's personal hygiene to be very poor; most of their health problems were due to poor health habits related to the nature of their work and lifestyles (Sorsa, Kidanemariam, & Erosie, 2002; Thapa, Ghatane, & Rimal, 2009). Other high-risk behaviours in which street children engage that are potentially detrimental to their health include frequent sexual activity with different partners, begging, stealing, and gang involvement (Ataei et al., 2010; Kudrati et al., 2008; Ruiz, 1994).

Street children encounter barriers to accessing health care (Ali & Muynch, 2005; Kombarakaran, 2004). In a qualitative study involving 73 children in Bombay, the participants discussed several challenges in their search for food, safety, employment, shelter and medical care (Kombarakaran, 2004). They commonly depended for survival on their peers, their own resourcefulness, and services offered by NGOs rather than on health care or other services provided by the government.

We were interested in evaluating how drop-in centres impacted the health of street children. Specifically, our study aimed to understand how drop-in centres operated by non-governmental organizations (NGOs) influenced or did not influence the physical health, substance use status, and mental health of children accessing these services in New Delhi, India.

Methods

Study Design

We used interpretive description methodology in this study. Interpretive description, developed by Thorne, Kirkham, and MacDonald-Emes (1997), is a qualitative methodology that goes further than simple description. The researcher is challenged to look beyond the obvious,

and document patterns and themes among cases to understand the complex nature of a phenomenon (Thorne, 2008). One of the aims of interpretive description is to generate knowledge that is of clinical relevance (Thorne, 2008).

Sampling and Recruitment

The overall sampling strategy was purposive, i.e., the sample selected consisted of data sources considered by the researchers most appropriate for answering the research question (Sandelowski, 1995). Maximum variation sampling, a purposive sampling technique, was used to recruit a diverse range of street children to obtain a broad understanding of the issues. Maximum variation was sought in educational level, socio-economic background, age, and length of time at the drop-in centres. We also implemented criterion sampling to sample street children and staff members.

Eligibility criteria for the child participants were:

1. Between seven and 18 years of age when interviewed;
2. Visited the General Reserve Police (GRP) or Kishalaya drop-in centre regularly (defined by at least five visits of a minimum of an hour each in the prior month);
3. Met the United Nations definition of a street child, which is "any boy or girl…for whom the street in the widest sense of the word… has become his or her habitual abode and/or source of livelihood, and who is inadequately protected, supervised, or directed by responsible adults" (Panter-Brick, 2002, p. 149); and
4. Had lived or worked on the streets for at least one week.

Children were excluded if they had any serious mental health conditions, such as a severe anxiety disorder or intellectual disability, which prevented them from providing informed consent.

The eligibility criteria for staff participants were:

1. Is an employee at either the GRP or the Kishalaya drop-in centre; and
2. Is involved in the organization and implementation of day-to-day activities at the drop-in centre.

Thorne (2008) states that although the sample size could be any number for an interpretive description study, a sample size between five and 30 is common.

The study involved street children and staff members from two drop-in centres in New Delhi. One centre, called the General Reserve Police or GRP Contact Point, was located at the New Delhi Railway Station. The other, known as the Kishalaya Contact Point, was located in Connaught Place, which is the city's centre or downtown. Both centres were open from 10:00 am to 1:00 pm, Monday through Saturday. Both centres provided free lunches, basic medical services, non-formal education, recreational activities, counselling, and referral to drug detoxification centres and shelter homes. The Kishalaya centre also provided a morning nutritional snack to the children.

Data Collection Procedures

Data were collected in one-on-one semi-structured interviews that lasted between 25 and 45 minutes. The three health indicators of interest – physical health, substance use status, and mental health – informed the development of the questions for the interview guides. We consulted the qualitative research literature on conducting interviews to develop the interview guides for the child and staff interviews (Bernard, 2005; Jacob & Paige Furgerson, 2012; Patton, 2002; Turner, 2010). Use of interview guides ensured the same general types of data were collected from each participant. Prompts were added to the open-ended questions and questions that participants may have felt more comfortable answering were presented in the beginning

(Jacob & Paige Furgerson, 2012). The interview guides were pretested with a group of street children who shared similar characteristics to the target group but who slept in a drop-in shelter at night, thus rendering them ineligible for the study.

One of the authors (RN) conducted all of the interviews. Data collection occurred entirely in Hindi. During the interviews, new leads were pursued as they arose. Following Partington's (2001) recommendations, the interviewer sought reinstatement and clarification from the participants, and she persisted in obtaining the core idea of what the participant was trying to say. Data collection occurred until data saturation was reached. The interviews were audiotaped and transcribed verbatim.

Data were organized and stored using the software program N-Vivo 10.0. Research Ethics Board (REB) approval was obtained from the Hamilton Integrated Research Ethics Board. All participation was voluntary. Staff members signed written consent forms. The interviewer sought verbal informed consent from the child participants. A drop-in centre staff member served as a witness to the informed verbal consent process, and helped to ensure the child participant understood his involvement in the study.

Analysis and Interpretation

Data collection and analysis took place iteratively over five months between September 2014 and January 2015. The analysis, like data collection, was done in Hindi. A decision trail documented all of the analytic choices made to enhance the transparency of the research and increase its rigor (Polit & Beck, 2013).

Constant comparative method, an analytical methodology suitable for interpretive description (Thorne, Kirkham, & O'Flynn-Magee, 2004), was used to analyze the data. The inductive analytical process involved reading and re-reading the data, as encouraged by Lincoln

and Guba (1985). The data were then broken down into 'units' and coded into categories (Lincoln & Guba, 1985). Categories constantly changed as units were compared and a greater understanding was reached about the properties of the categories and relationships between them. Categories were groups into themes.

RN analyzed all the transcripts and a second coder (PS) independently coded a sample of the interview transcripts. RN and the second coder came together to refine the list of themes. They also translated the main themes and quotes into English using the method of forward and back-translation (Brislin, 1970).

The themes that emerged from the analysis were compared and their relationships were explored. A final account of the findings was developed, reflecting the interpretations and shared understandings.

Rigor

Lincoln and Guba's (1985) evaluative criteria were used to maintain high standards of rigor. Lincoln and Guba state that the trustworthiness of a study's findings is reliant upon the findings' credibility, transferability, dependability and confirmability. A qualitative study is credible when faithful descriptions are obtained about the human experience (Sandelowski, 1995). To ensure the findings of this study were credible, the emergent themes were grounded in the data. We substantiated the interpretations with quotes. Furthermore, a second coder (PS) independently coded a sample of the transcripts to determine the themes of those samples. RN and the second coder discussed any differences in their respective analyses until consensus was reached.

Transferability is necessary to show that the findings are applicable in other contexts (Lincoln & Guba, 1985). This was achieved by providing thick descriptions of the sample and

context. Dependability is important for demonstrating that the findings are consistent and can be replicated (Lincoln & Guba, 1985). Therefore, a detailed decision trail was kept of the entire research process.

The interviewer maintained confirmability, or neutrality of the findings (Lincoln & Guba, 1985), by undertaking reflexive journaling. Reflexive journaling occurs when the interviewer regularly documents how she is impacting her research. This helps her to be grounded in the research. The interviewer documented her thoughts and feelings on the research process, particularly how she believed her background and experiences were influencing the research process and in turn, how aspects of the research environment were influencing her data collection and analysis. Negative case analysis, or searching for elements in the data that did not support the findings from the data analysis (Lincoln & Guba, 1985), was also done as part of the confirmability process.

Additionally, we followed Thorne's advice for establishing rigor. We conducted second interviews with some of the participants to obtain a thicker description of the data (Thorne et al., 1997). We also took the beginning conceptualizations of the analysis representing the entire sample to the participants for consideration (Thorne et al., 1997). The participants supported the interpretations of the data.

Findings

Demographic Characteristics of Sample

We interviewed 25 participants, 23 children and two staff members. One staff member was male and one was female, and each of them was from a different drop-in centre. The child participant demographics are provided in Table 1. All of the child participants were male and their average age was 13.5 years.

Table 1 Demographics of the Child Participants (*n* = 23)

Factor	Category	Number (Percent)
Gender	Male	23 (100%)
Drop-in centre	GRP	13 (57%)
	Kishalaya	10 (43%)
Lived with family	GRP	0 (0%)
	Kishalaya	10 (43%)
Age (years)	10 – 13	11 (48%)
	14 - 17	12 (52%)
Highest Educational Level (grade level)	0 – 1	2 (9%)
	2 – 4	15 (65%)
	5 - 7	6 (26%)
Time on the Streets (years)	0 – 2	7 (30%)
	3 – 7	5 (22%)
	8 – 12	8 (35%)
	13 – 17	4 (17%)
Time at the Drop-in centre (years)	0 – 2	10 (43%)
	3 – 6	10 (43%)
	7 – 10	3 (12%)
Substance Use	Current User	12 (52%)
	Former User	8 (35%)
	Never User	3 (13%)

Themes

We extracted thematic patterns from the interviews to portray how drop-in centres influenced the physical and mental health and substance use of street children. The participants believed that through the support services, drop-in centres improved the physical and mental health of street children, and helped reduce their substance use. Children were attracted to these support services, rather than services provided elsewhere, as per the following key themes drawn from recurrent points within the interviews: 1. Nonjudgmental staff; 2. Freedom to behave like children; 3. Life is less of a struggle; 4. Staff members are protectors and advocates; 5. Staff members provide moral direction; 6. Opportunity for a better life.

Street children wanted the opportunity for a better life, and they realized that the drop-in centre could provide this opportunity. On the other hand, the children also acknowledged that

changing their behaviour was difficult because street life and the associated behaviours had become a normal way of life for them. This idea resulted in the last theme: 7. Sense of normalcy. Health did not have its own theme; rather, aspects of health were reflected in all the themes. In the findings, quotes by street children are denoted with the letter "C" and quotes by staff members are denoted with the letter "S", followed by their identification number.

Nonjudgmental staff

Children's experiences with drop-in centre staff differed from their experiences with other people with whom they interacted. The children described the judgment and harassment they received from the police, hospital staff, and passersby. One child (C7) stated:

> The [railway] station is the worst. Whenever I am there, the police will come to me and tell me that I am a thief and I pick pockets – that I stole this or that. When they repeatedly say stuff like this, I go crazy. I wish I could just run away from there.

Remarking on how he felt judged by hospital staff, one child (C9) said:

> Doctors don't listen to you at the hospital. Maybe because we are street kids. They say it's not your time yet. …They ask for bribes from anyone. They ask it from me, they ask it from my friends. …If we dressed better or wore shoes, then they would help us.

On the other hand, children felt that drop-in centre staff did not judge them. They trusted the staff, and some even felt the staff members were their only allies. One child commented (C21):

> I have a great relationship with the staff. They are everything to me – sister, sir, brother, mother and father. I trust everyone here. I don't trust anyone at the [railway] station, except two friends. …At the station, my friends don't help me as much. Here I have the entire staff to help me. Here they have the power to help me and save me. My friends don't.

Because they trusted the staff members, the children often confided their feelings to them. One child said, (C17):

> If I have any problems, then I tell Sir. Sir then goes and talks to the other person and makes him understand that what he did was wrong and that he shouldn't do it again. I really like it that Sir and Didi [*sister*] help us out.

The staff's nonjudgmental nature facilitated a trusting relationship and information sharing between the children and staff, which in turn led to improvements in the children's mental health. A staff member (S2) talked about how the children's mental health changed the longer they attended the centre:

> We are trained to counsel the children. …Once children begin coming regularly to the centre, they start sharing their feelings with the staff. They start building a trusting relationship with the staff and opening up. Over time, because they share so much with the staff, their depression lessens, and then they share more. In this way, their mental minds start to change.

Freedom to be a child

Some of the children shared the sentiment that the centres allowed them the freedom to be a child. While at the centre, children felt that they could play and behave like children. When asked why he came to a centre, a child (C2) responded very simply with, "Here I can behave like a child, and that feels really good." Participants stated that they were able to engage in childlike activities at the centres, such as learning and recreation. For instance, one participant (C19) said:

> They feed you here, they give you drinks, and they take you on tours. We learn here and we play here. It feels good.

The children mentioned that they did not have the opportunity to play and learn at the railway station as they were able to do at the centre. One of them said (C17):

> I can't play at the station. There I do drugs and if I'm not doing drugs, then I'm working. Someone says, go get these supplies from here. Someone else says go do work for me. Get some chai. Someone else says go wash my clothes. That's why. Here, no one asks you to do those things, so I like that.

Another child (C18) similarly said, "I don't like it at the station. …At the station I just do drugs and work. Here I learn like a child should."

Children reported that they could not play and behave like children when on the streets where their days were filled with work and drugs. In fact, children pointed out that if the drop-in centres were not available, they would spend more time working or doing drugs, leading to worse physical and mental health outcomes, as well as increased substance use.

Life is less of a struggle

Life reportedly was less of a struggle for street children after they began to visit the drop-in centres. On the streets, the children faced many difficulties including police harassment, fighting, and theft. One participant (C11) said, "I don't like it at the [railway] station. I really don't like it there. The police beat us up badly. They threaten us and tell us to leave." As a result of such treatment, children experienced many negative emotions when on the streets, including fear and worry. One child (C13) said:

> You get hurt a lot by living at the [railway] station. Here I'm happy, but there I always feel a bit scared. A lot of effort just goes into trying to survive. There, some kids will beat me up. The kids who do drugs are the ones that beat me up.

In contrast, children expressed feeling better at the centres because the centres offered a safer environment than the streets and they felt happier there.

At the centres, street children did not worry as much about their adult responsibilities. The participants talked about the free meals they received at the centre, in addition to free medical care and clothing, which lessened some of their day-to-day worries. One child (C20) commented:

> I really like the centre. You get everything here. If the centre wasn't here, then I would always be selling balloons on the street. Because of the centre, I just sell balloons in the evening. In one day, I get 500 rupees. I give mom the money and she gives me 50 rupees.

This participant suggested that he was pressured to work on the streets by his family, but these pressures were lessened because of the centre. One participant (C16) stated that he valued the drop-in centre's food because it was free:

> I like the food here because you don't have to give money. Otherwise, I have to pay for the food I eat on the streets. Bread omelette is 30 rupees per plate. We earn money by selling bottles. I also work at a store that sells puris [*deep fried bread*].

Children went to sleep hungry at times because they were unable to obtain food on the streets. The children pointed out other features of the drop-in centre lunch that they felt made their lives better. For instance, the children commented that they did not get sick as often from eating the centre's food because it was hygienic and fresh, unlike street food.

The free and comprehensive health care provided by the drop-in centres also helped to make life less of a struggle for the street children because it allowed them to seek care whenever they needed it. The children stated that they rarely or never visited doctors before coming to the centre because of the cost and discomfort they felt at other health care facilities. Children

reported not getting sick as often since being able to access health care at a drop-in centre. For example, one participant (C2) said:

> Yes, my health has changed since coming here because you get medicine here. My health is good now. Before, I would get sick often. Now I just get sick once or twice a month. When that happens, I come here for medicine.

The street children accessed the drop-in centre health care primarily because it was free. To this effect, one child (C23) said:

> I like the health care a lot. Last week I saw the doctor here. I got a monkey bite. …I showed the doctor at the centre and he sent me with someone else to the hospital for an injection that I had to take for five days. So the doctor here is good and so is the medicine. The care at the centre is free. Otherwise, if I go with friends to the doctor, then I have to pay, which is a big problem for me.

The children identified that drop-in centres lessened their daily struggles by creating a safe and positive environment for them and providing them with essential resources in an accessible manner. The provision of these essential services directly improved their health.

Staff members are protectors and advocates

The participants spoke very positively of the staff at the centres. Most of them had known the staff members for a number of years. The children expressed that the staff helped with many of their personal problems. A child (C19) discussed how he relied on the staff to advocate on his behalf:

> If I ever have any problems, then I will tell the staff here. Like if someone steals something from me or hits me, then I go to Sir and say, "Sir, someone stole something and I am being suspected." It has happened before where others have blamed me for

> things I did not do. Then Sir tries to find that guy and he makes him understand or he takes him to the police. So then whatever worries I had, it goes away.

Some of the children felt that they did not have anyone to support them on the streets, except for the staff members. What was interesting to note was that even among children who had family and trustworthy friends, some of them emphasized that only the staff could provide them with the support they needed because their families and friends did not have the necessary resources or connections. For instance, one participant (C16) said:

> People on the streets don't help you very much or trust you. You just get swear words from them. My mom just sits there, she doesn't help. She tells me that you're old enough now. You should earn and feed yourself. We only get help from the centre. Like if I'm sick or anything, then Sir takes us to the hospital.

As a result of the unconditional support offered to them by the staff, the children viewed the staff as their family. One child (C1) said, "I have come to know the staff very well. They are like my own, like my family. I think of them as family because everything here is like home. They treat you like their own here." This close relationship with the staff members lessened the children's anxieties and worries. This, in turn, improved their mental health because they knew the staff would always be there to take care of them.

It addition to the positive impact on the children's mental health, their physical health also improved according to participants because the staff members took on the role of protector and advocate. This is because the children were more likely to seek care from the staff when they were sick or injured, knowing that their health problem would be solved. One participant (C1) spoke of this and contrasted it to the lack of care he received on the streets: "On the streets when you get sick, there is no one to take care of you. The other kids at the station are just lying

around there. The people here take care of you." The staff also protected the children's physical health by ensuring their safety. For instance, one participant (C5) said:

> Whenever someone threatens me, I come here to tell the staff. Like people fight on the streets and the older children threaten us, then I come here and tell the staff. I tell Sir and then he solves it and takes care of us.

Staff provides moral direction

A common theme was that the staff provided the children with moral direction, such that they explained the difference between "right" and "wrong" behaviours. A number of the children had grown up with little or no parental guidance because their parents had passed away or were drug addicts, they had run away from home at an early age, or they had been institutionalized. Therefore, many of the children did not have parents to explain to them what constituted "right" and "wrong" behaviours. They felt that the staff filled this role in their lives. One child (C4) spoke about this as follows: "The drop-in centre is important for becoming a good person. We won't learn how to become good living on the streets. Only at the centre." When asked why he comes to the drop-in centre, another child (C11) quite simply said, "They help you understand the right things here."

Some children explicitly stated that they came to the drop-in centre to interact with the staff and as a result, they learned good things from them. For instance, one child (C13) said, "I meet with Didi [*sister*] after classes. Didi says if you stay on the streets, you will become bad. And if you are going to stay on the streets, then you should come here, to the centre."

The participants mentioned that the staff spent considerable time with them addressing the harms of drug use and the benefits of hygienic behaviours. According to the children, these conversations had significant impact on reducing "bad" behaviours like substance use and

increasing their uptake of "good" healthy behaviours. Regarding drug use, one participant (C4) said:

> By coming here, I have reduced my drug habits. I only do it sometimes now. I don't like it as much anymore. Sir would talk to me about it. He said doing drugs isn't good and that we can get really sick from doing it. Before I would do a lot of drugs – beer, hard liquor, everything. Sir would lecture us. I didn't like that. He would lecture us and I slowly started to quit.

At the drop-in centre, the children were forbidden from using substances, and they were referred to rehabilitation if they began using drugs regularly. This rule, in conjunction with the conversations, provided a moral direction for the children, which helped to reduce their substance use.

The staff members also encouraged hygienic practices. They taught the children that these practices comprised good behaviour. The children mentioned that the staff encouraged them to wash their hands and face before eating, shower regularly, wash and change their clothes, visit the doctor if they were sick, brush their teeth, and keep clean to prevent getting ill. For instance, one child (C15) said, "Didi [*sister*] says if we don't wash our hands, we will get sick. She said we should wash our hands before and after eating." Children admitted to having healthier behaviours after accessing the drop-in centres because the staff encouraged these behaviours. The children were more also aware of the behaviours because they were exposed to them. One staff member said (S2) said:

> Education helps improve the health of street children. If we say something to the children everyday, and tell them that this is a good thing to do, then it will become automatic. I

> have seen it. It takes time, but it happens. The street kids who come here are healthier than the street kids who do not come here.

Opportunity for a better life

The children expressed wanting a better life and future, and they believed that the drop-in centres provided this opportunity. They reported disliking the streets because they were dangerous and dirty, drugs were prolific, they lacked support there, and they required engagement in negative activities. One child (C4) said, "I don't feel good inside when I'm at the [railway] station. I pick pockets. I feel bad about this, but I have to." Another child (C21) spoke about his transformation since he arrived at the station:

> Everyone is bad over there. Everyone does drugs. When I come here [GRP], I'm happy. When I first left home and came to the station, I didn't do drugs. The boys who lived at the station taught me to do it. How did I know? I used to live with these boys.

The children voiced wanting to obtain an education and skills so that they could get a "real job" when they were older, which would give them the opportunity to leave street life. Many came to the centres because they believed it could help them achieve these goals. For some of the children, coming to a centre made them realize that they wanted more for themselves. As one child (C8) said:

> Before, I just wanted to play and I didn't care about my future. And now I come here regularly and say to myself that I need to learn so that someday I can become something. Coming here made me understand that.

If the drop-in centres were not available, the children acknowledged that their lives would be "bad", with little hope for improvement. A participant (C12) said the following:

> I like it here because Sir gives us clothes and food. I also like to learn here. If the centre wasn't here, then we would all just wander around. We would become really skinny because we would do drugs.

Other children said they would have continued to work in their jobs on the streets if the centres did not exist.

The children reported living in bleak settings where drugs and danger are a normal part of life. A centre provided their only hope for a better tomorrow. The children recognized this and were optimistic about their futures.

Sense of normalcy

One theme emerged that differed from the rest in that it spoke positively of street life. The children had developed a sense of normalcy about living on the streets. They acknowledged that life there had become normal for them, and even enjoyable in some aspects. One child (C12) said:

> It's not good there. This is because we live on the streets. We sleep there and that's where the dirt collects. It's dirty there. Very dirty. But all my family and friends live there so it's become home. Now I'm starting to like it.

The children valued the streets for various reasons. For example, some of the children valued their freedom on the streets. One child (C19) said:

> I don't want to leave the streets. I know life isn't good at the [railway] station, but I want to live there. There I can live the way I want to live. Like if I want to do drugs, I can do it there.

Other children valued hanging out with their friends whenever they wanted. One participant (C18) said, "I don't like the [railway] station, but when my friends are there, then I like it. Otherwise, I don't."

The children recognized that life on the streets was not conducive to their health and life, yet they were still drawn to the streets. These views can explain why some of the children chose to live on the streets, even when the staff tried hard to place them in a shelter home. One of the staff members spoke to this (S1):

> We do whatever we can to place the children in a shelter home, and we even try to send them back home if their family situation is safe. It is very difficult, though. Their friends are here with them on the streets. They have the freedom to do what they want, like drugs. And some of them have stayed in shelter homes before. They say it's like jail to them. They hated the rules.

Viewing street life as normal, and even enjoyable, may be a barrier to the children's positive development, self-improvement and good health.

Discussion

This study examined how drop-in centres impact the physical health, substance use status and mental health of street children in New Delhi. According to street children and drop-in centre staff members, drop-in centres positively impact the health and substance use status of street children by providing health care in a child-friendly environment, teaching healthy behaviours, and having supportive staff members. The themes that emerged from analyzing the interviews illustrated how these elements could improve the children's health and why the children felt comfortable accessing the services. It is important to note that while a couple of the participants felt the centres' impact was neutral on their health, no participant stated that the

centres were detrimental to their health. This was not surprising considering the children we interviewed regularly visited the centres and therefore would have positive feelings towards the centres. Street children who did not visit the drop-in centre may have provided a different account.

The emergent themes are consistent with findings from the literature. For instance, the participants spoke about being judged by service providers, particularly hospital staff, which prevented them from soliciting health care from qualified professionals. Other studies have found that street children regard service providers as one of the barriers to accessing care (Ali & De Muynck, 2005; Anjali, 2012). In a qualitative study conducted in Delhi (n = 100), interview data revealed that service providers viewed street children as deviants, delinquents and a public nuisance (Anjali, 2012). These views impacted the children's decisions related to seeking care. These findings matched our findings that children did not want to seek care at hospitals because they felt judged there. In contrast, the drop-in centres provided health care in a street-child supportive setting. Drop-in centre staff members were trained to work with street children in a sensitive manner. Therefore, children were more likely to solicit care from the drop-in centres than from other facilities.

The children were drawn to the drop-in centres because they allowed them the freedom to be a child. The children stated that when on the streets, they spent most of their day either hanging out with friends and doing drugs, or working. Many street children were engaged in jobs with poor working conditions. They did not have the chance to engage in child-appropriate activities. Play contributes to the physical, social and mental well-being of children (Ginsburg, 2007). Because play has numerous beneficial effects on the well-being of children, it has been recognized as a child right according to the United Nations High Commission for Human Rights

(Office of the United Nations High Commissioner for Human Rights [OHCHR], 1989). On the other hand, child labour is detrimental to the physical and mental health of children. Children face numerous health risks from being exposed to hazardous working conditions (O'Donnell, Van Doorslaer, & Rosati, 2002). Their mental health may also be compromised due to abuse in the workplace (O'Donnell et al., 2002).

The children said that the staff members were their primary protectors and advocates. The children frequently encountered harassment from the police and other children. They reported that the staff members were instrumental in protecting their well-being and ensuring their safety. Other studies have explored the ongoing conflicts street children have with the police and other individuals (Anjali, 2012; Nada & El Daw, 2010). Among their sample of 857 street children, Nada and El Daw (2010) found that the most typical forms of abuse experienced by the group were harassment by the police (63%) and by older street children (51%). Children require protection from such abuse. The children in our study acknowledged that drop-in centres were able to provide this protection and that it was important for both their physical and mental health.

An interesting theme that emerged from the study was the sense of normalcy experienced by the children related to living on the streets. This sense of normalcy can be a barrier for many interventions targeted towards street children because it prevents the children from disengaging from street life. More research is needed to understand how this issue can be addressed.

There were many strengths to our study. Firstly, we followed Throne's interpretive description methodology closely. We interviewed a diverse range of participants to ensure the findings were transferable to different kinds of street children. Second interviews were conducted with eight participants to elaborate on issues that were insufficiently discussed in the first round of interviews. Also, we conducted member-checking with all the participants whereby

the participants confirmed the original findings and did not provide any new or contradictory information. There were some limitations to this study. For instance, we did not triangulate our data with observation or document review. Also, a few of the participants were very young and impatient, and therefore did not elaborate much on any topic. These interviews required significant probing from the interviewer. As a result, we may not have obtained rich descriptive data in these instances, which is a goal of any qualitative study.

There are practice and policy implications of the findings. For instance, the participants clearly identified major problems with the police and hospital staff. It is important that government organizations and NGOs in communities with large numbers of street children sensitize these groups on how to work with street children. Future research should engage these groups to understand their perspectives about street children so that the appropriate steps can be taken to provide more accessible and equitable care. The overall findings from this study support the notion that street children require tailored interventions to address their numerous physical and mental health concerns, as well as their substance abuse. The findings from this study are critical to understanding how street interventions work to positively impact the health of street children. To determine whether the findings are consistent across multiple drop-in centres, cultures and settings, it is important to conduct research with other street children partaking in similar inventions in low and middle-income countries.

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Chapter 4: The Impact of Drop-in Centres on the Health of Street Children in New Delhi, India: A Cross-Sectional Study

In this chapter, an author generated version of an article prepared for submission to *Child Abuse & Neglect* on June 12, 2016 is presented (Nath, Shannon, Georgiades, Sword, & Raina, 2016). The submission number for this manuscript is CHIABUNEG-D-16-00308. As an author generated version of a submitted manuscript, no copyright license documentation is required.

For this manuscript, I designed the study with advice and guidance from Parminder Raina and Harry Shannon. I developed the physical health, substance use and mental health questionnaires with significant guidance from Kathy Georgiades. I recruited all the participants and conducted all of the data collection with the assistance of the GRP and Kishalaya drop-in centre staff members. I conducted all of the statistical analyses, with intellectual direction from Parminder Raina and Harry Shannon. I wrote the paper and received critical review and suggestions from the other authors. Please note that *American* spellings are used throughout the article, as required by the journal.

Context and Background

Findings from the qualitative study (Chapter 3) demonstrated that participants deeply valued drop-in centres. According to street children and drop-in centre staff members, drop-in centres positively influence the health and substance use status of street children through a variety of mechanisms including: non-judgmental staff members; provision of education and recreational activities, which allowed street children the freedom to be children at the centres; provision of free food, medical care and clothing, which made life less of a struggle for street children; protection and provision of a moral direction; and the opportunity for a better life.

Chapter 3 provided the possible mechanisms through which drop-in centres may positively impact the health and substance use status of street children in New Delhi. The paper in this chapter follows directly from the observations in the previous chapter. It is now important to quantitatively examine if there is an association and the extent of the association between drop-in centres and the health and the substance use status of street children. In this paper, I aimed to determine the extent to which drop-in centres in New Delhi, India, were associated with the physical health, mental health and substance use status of street children who regularly visited these centres compared to street children who did not visit these centres. I also aimed to determine whether longer duration of attendance was associated with improved health and substance use outcomes. I chose physical health, substance use and mental health as the outcomes because these three health indicators emerged in the systematic literature review (Chapter 2) and in the qualitative study (Chapter 3) as being the broad health indicators of concern among street children.

Paper: The Impact of Drop-in Centers on the Health of Street Children in New Delhi, India: A Cross-Sectional Study

Title: The impact of drop-in centers on the health of street children in New Delhi: A cross-sectional study

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Abstract

Objectives: (1) To determine whether street children who visit drop-in centers experience better physical and mental health, and engage in less substance use than street children who do not visit centers. (2) To determine whether the duration of attendance at a center has an impact on the above outcomes.

Methods: We conducted a cross-sectional study with 69 street children from two drop-in centers in New Delhi, India (attenders) and a comparison group of 65 street children who did not visit drop-in centers (non-attenders). We used pretested questionnaires to assess their physical health, substance use status and mental health.

Results: Attenders experienced fewer ill health outcomes, engaged in less substance use, and had better mental health outcomes than non-attenders ($p<0.01$). For every month of attendance at a drop-in center, street children experienced 2.1% (95% CI=0% to 4.1%, $p=0.05$) fewer ill health outcomes per month and used 4.6% (95% CI 1.3% to 8%, $p=0.01$) fewer substances. Street children were also less likely to have been a current substance user than a never substance user for every additional month of attendance at a center (OR: 0.79, 95% CI=0.66—0.96, $p=0.02$). Duration of drop-in center attendance was not a significant factor in predicting mental health problems.

Conclusion: Drop-in centers may improve the physical health of street children and reduce their substance abuse. Rigorous longitudinal studies are needed to better determine if drop-in centers impact the health and substance use status of street children in LMICs.

Keywords: street children; health status; drop-in centers; India; substance abuse

Introduction

This paper describes a cross-sectional study that examined the association between attendance at drop-in centers and the physical health, mental health, and substance use status of street children in New Delhi, India.

There are approximately 100 million street children globally (United Nations Children's Emergency Fund [UNICEF], 2003). India is estimated to have 18 million street children, the largest population of street children in the world (Sen, 2009). The United Nations defines a street child as "any boy or girl…for whom the street in the widest sense of the word… has become his or her habitual abode and/or source of livelihood, and who is inadequately protected, supervised, or directed by responsible adults" (Panter-Brick, 2002, p. 149). We have used this definition in this study. Street children are further divided into four classifications, according to UNICEF: *Children at risk*: those who live with their families but supplement their income by working on the streets; c*hildren on the streets*: those who spend a portion of their time on the streets but still have a place of residence with some family support; c*hildren of the street*: those who maintain minimal relations with their families and spend the majority of their lives on the streets; and *abandoned children*: those who live completely on their own on the streets without any adult supervision (UN Dept. of Economics, 1986).

We conducted a systematic literature search for peer-reviewed quantitative and qualitative publications that looked at the physical health, mental health and substance use status of street children in low- and middle-income countries (LMICs) (Nath et al., submitted June 12 2016 to *Children and Youth Services Review*). Studies that assessed the impact of street child interventions on health were also examined with respect to the intervention. Fifty-three

publications met the eligibility criteria. Findings showed that street children commonly experience ill health and high rates of substance use.

With respect to physical health, publications in the review reported that skin infections, respiratory diseases, injuries, tuberculosis, and sexually transmitted infections were common physical health problems among street children (Ali & Muynck, 2005; Ayaya & Esamai, 2001; Kudrati, Plummer, & Yousif, 2008; Morais, Morais, Reis & Koller, 2010). Street children experienced worse physical health than non-street children (Ayaya & Esamai, 2001; Huang, Barreda, Mendoza, Guzman, & Gilbert, 2004). The use of inhalants and alcohol were also common among street children, especially compared to non-street children (Ayaya & Esamai, 2001; Njord, Merrill, Njord, Lindsay, & Pachano, 2010; Pinto et al.,1994). Commonly used substances included alcohol, glue, tobacco and marijuana. Injection drug use varied among street children between the studies. Street children also experienced mental health issues, although the mental health results varied considerably among street children in the review, and none of the studies in this section used adequate comparison groups.

Overall, street children fared worse than non-street children on most of the assessed outcomes, except in cases of nutrition, where street children fared better than poor and rural non-street children. Studies that have focused on the health of street children in LMICs have been largely descriptive in nature. The majority of the studies in the review were cross-sectional in design (n=46). Of these 46 cross-sectional studies, 9 had at least one comparison group; the other 37 did not. Only three studies were longitudinal in design; none employed a comparison group. Risk-of-bias was moderate to high among the studies in the review because the majority used non-probability sampling techniques, did not report reliability estimates, and did not use

comparison groups. More rigorous designs are needed to assess the health of street children in LMICs to determine if the results to date are valid and reliable.

Despite the fact that street children in LMICs experience very poor health, there is little research on street child interventions in these countries that aim to improve health outcomes. Only four of the studies reviewed evaluated the impact of health-related interventions for street children. Although the intervention studies showed positive results, it was difficult to determine the impact of these interventions because none of the studies used randomization into intervention and control, and many did not even include comparison groups. While randomizing street children into intervention and control groups may not be ethical or feasible because of adherence issues, it would have been feasible to recruit a comparison group of street children. There is a need to evaluate the impact of drop-in centers on the health of street children. In a Cochrane review, Coren et al. (2013) stated that there is a "need for research which considers the benefit of usual drop-in and shelter services, most particularly in low and middle income countries" (p. 2).

Drop-in centers are one of the most common interventions for street children (Coren et al., 2013). These centers may provide non-formal education, free lunches, recreational activities, preventative health services and basic medical care at strategic locations near railway stations and busy market areas for a few hours every day to street children (Salaam Balaak Trust, 2015; War Child, 2014). They may also restore children to their homes or enroll them in shelter homes. For example, Rohde et al. (1998) described a government drop-in center in Brazil, called *Projeto Girassol*. The program provided street children with recreation, food, medical care, odontological care, and group therapy. Children used the program from 9 a.m. to 5 p.m., and were free to come and go as they wished. A similar center in Honduras served about 30 to 40

children daily, from 10:00 am to 2:00 pm; the beneficiaries were provided access to a shower, laundry, recreational activities and a place to rest (Souza, Porten, Nicholas, & Grais, 2011). Health professionals and teachers (n=9) working at a drop-in center in Brazil were asked about health care for street youth. They reported that these centers were necessary for the survival of street children because they ensured access to food, hygiene, health care and a space for the children to feel they belonged (Morais et al., 2010).

Two studies have examined the outcomes of street children attending drop-in centers in the United States (Slesnik, Kang, Bonomi, & Prestopnik, 2008; Slesnick, Prestopnik, Meyers, & Glassman, 2007). One study found that services providing psychological care, case management and the provision of basic necessities at a drop-in center led to statistically significant improvements in street youth's mental health, substance use and percent days housed up to 12 months post baseline (Slesnick et al., 2008). Unfortunately, studies describing the outcomes of street children attending drop-in programs in low-income countries are scarce (Souza et al., 2011). In a Cochrane review of the effectiveness of interventions for street children that promoted inclusion and reintegration, and reduced harms, the authors remarked, "We did not find any sufficiently robust evaluations conducted in LMICs despite the existence of many relevant programmes" (Coren et al., 2013, p. 2). It is important to measure the extent to which drop-in centers in LMICs impact street children because compared to hospitals and clinics, they provide the most substantial, and often the only, support to street children.

We wanted to quantify the extent to which drop-in centers are associated with the health of street children. Firstly, we aimed to determine whether street children who visited drop-in centers experienced better physical and mental health, and engaged in less substance use than street children who did not visit drop-in centers in New Delhi, India. Secondly, we wanted to

examine the association of duration of attendance on the physical health, mental health and substance use status of street children. To our knowledge, this is the first study to examine whether street children attending drop-in centers have better physical and mental health outcomes, as well as lower substance use, in comparison to street children who do not attend drop-in centers.

Methods

We used a cross-sectional design to: 1. Compare street children who visited drop-in centers versus those who did not visit drop-in centers on the following outcomes: physical health, mental health, and substance use; 2. Determine if duration of time at a drop-in center was associated with improved physical health, mental health and substance use outcomes.

Street children who regularly attended a drop-in center in any one calendar month from February 2015 to July 2015 (the qualifying month) were eligible to be included in the exposure group. We will refer to them as the "attenders". We defined regular attendance in one month as at least five visits to a drop-in center for at least an hour each. The attenders were assessed for the outcomes after five visits in the qualifying month. The attenders' outcomes were compared to the outcomes of a comparison group of street children who had not attended any drop-in centers in the past year. We will refer to participants in the comparison group as "non-attenders". To answer our second research question, we collected information on the number of months attenders regularly visited a drop-in center in the previous 12 months, including the qualifying month. We obtained this information from drop-in center records. Participants were marked as having regularly attended in any previous month if they had attended at least five times in that month. Non-attenders were assigned a value of zero months.

Research Ethics Board (REB) approval was obtained from the Hamilton Integrated Research Ethics Board prior to conducting the study. Research approval was also obtained from the Board of Trustees of the NGO managing the two drop-in centers, as well as from two members of two separate research ethics committees in New Delhi. All participation was voluntary. The interviewer sought verbal informed consent from the child participants. A drop-in center staff member served as a witness to the informed verbal consent process, and helped to ensure the child participant understood his involvement in the study.

Participants

Participants consisted of street children in New Delhi who visited drop-in centers (attenders) and those who did not visit drop-in centers (non-attenders). Two drop-in centers were selected for the study. One center, called the General Reserve Police (GRP) Contact Point, was located at the New Delhi Railway Station. The other, known as the Kishalaya Contact Point, was located in Connaught Place in New Delhi's city center. Both centers provided services to different types of street children. The Kishalaya drop-in center typically provided services to *Children on the Street* and *Children of the Street*, while the GRP center provided services to *Children of the Street* and *Abandoned Children*.

Eligibility criteria for attenders were:

1. Between seven and 18 years of age when interviewed;
2. Visited the GRP or Kishalaya drop-in center regularly (defined by at least five visits of a minimum of an hour each in the prior month);
3. Met the United Nations definition of a street child, which is "any boy or girl…for whom the street in the widest sense of the word… has become his or her habitual

abode and/or source of livelihood, and who is inadequately protected, supervised, or directed by responsible adults" (Panter-Brick, 2002, p. 149); and

4. Had lived or worked on the streets for at least one week.

The same eligibility criteria were applied to non-attenders, except for criterion number two regarding drop-in center attendance. We used center records to verify the first two criteria. The last two criteria were verified by directly asking potential participants and drop-in center staff members. If answers differed between the two groups, we deferred to the staff members' responses.

Drop-in center staff members identified non-attenders. There are many street children in New Delhi who do not use any support services, such as services from drop-in centers. They can be easily found in New Delhi, hanging around busy intersections, working at railway stations, or begging in markets. Drop-in center staff approached these children and recruited them into the study to serve in the comparison group. Drop-in center staff did not have any prior relationship with the non-attenders. Children were excluded if they had any serious mental health conditions, such as a severe anxiety disorder or intellectual disability that prevented them from providing informed consent. Drop-in center staff determined this.

We calculated a sample size of 65 in each group required to detect a difference in proportions of 0.25, with $\beta = 0.2$ (power of 80%) and two-sided α of 0.05.

Data Collection

The data collection was done entirely in Hindi in face-to-face interviews with the participants.

Exposure and Potential Confounders

The exposure variable for the study's first objective was regular attendance at a drop-in center in the past month, henceforth, simply "attendance". For the second objective, the exposure variable was the number of months a street child regularly visited a drop-in center from 12 months before the qualifying month, including the qualifying month. Drop-in center attendance for more than 12 months was not collected because the records were not reliable prior to this time. One of the researchers (RN) had helped implement a standardized attendance record sheet at both drop-in centers a year before data collection.

Information on potential confounders was collected from the drop-in center records (for attenders) and via a pretested structured questionnaire for attenders and non-attenders. Potential confounders included the child's age in years, the highest formal education the child completed, and the total number of months the child lived on the streets in their lifetime.

Outcomes

All the children were assessed for their physical health outcomes, substance use and mental health.

Physical health:

A pretested structured questionnaire was used to document the physical ill health outcomes the children experienced in the past month, including gastrointestinal problems, skin problems, respiratory illnesses, fever, and sexually transmitted infections. They were asked about the duration of the health problems and the type of health care they received, if any. This instrument was informed by similar structured questionnaires employed by Ayaya and Esamai (2001), Sorsa, Kidanemariam, and Erosie (2002), and Thapa, Ghatane, and Rimal (2009). The instrument was pretested with individuals who shared comparable characteristics to the target

group. The information the children provided was corroborated with drop-in center medical records for the attenders only.

Height and weight were measured and compared to explore wasting and stunting. Height-for-age z-scores that are below two standard deviations below the mean value of the World Health Organization (WHO)/National Center for Health Statistics (NCHS) international reference indicate stunting among adolescents (WHO, 2007). BMI-for-age z-scores were calculated to determine wasting. Although there are no agreed cut-offs for assessing wasting among adolescents, we defined wasting as a BMI-for-age z-score below two standard deviations below the mean value of the WHO/NCHS reference standard. Children's weights were taken using a digital bathroom scale and recorded to the nearest 0.1 kg. The bathroom scale was calibrated with 18 kg weights on a weekly basis. Height was taken using a standard measuring tape and recorded to the nearest 0.5 cm. This was done with the child standing erect without shoes, with the eyes looking horizontally forward and the feet together on the same horizontal level, against the same wall, each time. The interviewer (RN) conducted these measurements. It was not possible for her to be blinded to the exposure and comparison group status of the participants.

Substance use:

According to Abou-Hatab and Okasha (2010), a 'substance' is any psychoactive material which when consumed affects the way people feel, think, see, taste, smell, hear or behave. We assessed substance use using a pretested structured questionnaire. The questions were adapted from the 2014 Ontario Child Health Study (OCHS) (OCHS, 2015). Children were asked the following:

- If they have tried using substances in the past month.

- Which substance(s) they used in the past month: whiteout, glue, chewing tobacco, gutka (a combination of carcinogenic compounds including tobacco), cigarettes, beedi (unprocessed tobacco wrapped in leaves), marijuana, alcohol, or other.
- How often they used the substance(s) in the past month: once or twice a month, a few times, 1 to 2 days a week, 3 to 5 days a week, or 6 to 7 days a week.

Mental health:

Mental health was assessed using an adaptation of the 2014 Ontario Child Health Study mental health questionnaire (OCHS, 2015), self-report version for children and the teacher-report version for the teachers. We adapted the questionnaires for the street child population by omitting any questions related to a school setting. The teachers at the centers completed the teacher-reports independently.

The self-report version of the mental health questionnaire included 50 items that described mental health symptoms consistent with the following disorders: conduct disorder, social phobia, attention deficit hyperactivity disorder, depression, oppositional defiant disorder, and generalized anxiety disorder. Conduct disorder and oppositional defiant disorder together are behavioral mental health symptoms, while social phobia, depression and generalized anxiety disorder are emotional mental health symptoms. The teacher-report was reduced from 50 items in the OCHS version and included 25 symptoms. The attenders and non-attenders completed the self-report version of the mental health questionnaire. The teacher-report version could be used only for the attenders.

Normative scores have not been developed for these questionnaires. Participant scores were assessed relative to other participants. It is important to note that we were not trying to diagnose “disorders” by employing this test; it may be the case that the psychiatric states of

street children are contextually normal for people living on the streets. Rather, we were trying to determine the differences in the attributes assessed by the OCHS mental health questionnaire between children who attended drop-in centers and those who did not, and those who attended for longer periods of time compared to those who attended for shorter periods of time.

The questionnaires adapted from the OCHS were not available in Hindi; therefore, the English versions were translated into Hindi using the method of forward and back-translation (Brislin, 1970). The physical health outcomes and substance use questionnaires were also translated from English to Hindi using the same methods. To ensure the questionnaires were culturally appropriate, we reviewed the questions with staff members of the drop-in centers.

Reliability of instruments:

Duncan et al. (Submitted March 2016 to *Journal of Abnormal Child Psychology*) provided the psychometric properties of the OCHS mental health questionnaires, evaluated from a measurement study of 283 parent-youth dyads, the youths aged nine to 18 years, primarily from the Canadian general population. With the exception of conduct disorder, internal consistency (Cronbach's alpha) was at least 0.73, and test-retest reliabilities (Pearson's r) were at least 0.71. Duncan et al. concluded that the scales provided reliable and valid dimensional measurement of six mental health disorders in the general population and in children's mental health settings.

Many of the same questions from the OCHS mental health scales have been used in the School Mental Health Survey (School Mental Health Survey, 2016) and the Hamilton Youth Study (Hamilton Youth Study, 2016), both of which had larger and more diverse samples than the measurement study by Duncan et al. In the School Mental Health Survey, there were 3,410 Canadian-born South Asian youth and 1,290 foreign-born South Asian youth. The internal

consistency for self-reported behavioral and emotional symptoms was 0.87 or above in both groups of participants. The scales have also been used in the Hamilton Youth Study (n=1,456), of which 219 youth identified as South Asian origin. This study had teacher reported data on behavioral symptoms. For the subsample of South Asian youth in the study, the teacher reported internal consistency reliability estimate was 0.84 on 10 items. Therefore, among South Asian youth in Canada, the OCHS mental health scales have high reliability. Because the questionnaires we used have been validated among South Asian youth in Canada, and similar scales have been validated within the Indian population (e.g. Child Behaviour Checklist and Strengths and Difficulties Questionnaire), our questionnaires were reliable and relevant to the cultural context of India.

We also measured the reliability of the physical health, mental health and substance use questionnaires. To obtain test-retest reliability estimates, we asked twelve respondents to complete the interview twice, one to two weeks apart. Test-retest reliabilities (intraclass correlation coefficient) were above 0.97 for the physical heath, substance use and mental health questionnaires. Internal consistency (Cronbach's alpha) of the self-reported items in the mental health questionnaire was 0.86. The internal consistency of the subset of items related to self-reported behavioral symptoms was 0.85 and it was 0.74 for items related to self-reported emotional symptoms. Based on these results, we had high reliability on all of the measures.

Analyses

The statistical software package SPSS Version 20 was used to perform the statistical analyses. We calculated the following descriptive statistics: average number of ill health outcomes per month per participant, stunting, malnutrition, average number of substances used per participant, and average child and teacher report mental health scores. Proportions were

reported for types of health problems, types of treatment received, and types of substances used. The significance of any observed differences between the attenders and non-attenders was determined using the independent *t*-test and test for difference in proportions.

We used various regression analyses to examine differences in outcomes between the attenders and non-attenders, and also to examine differences in the outcomes as a function of duration of attendance at drop-in centers in the past 12 months. We used Poisson regression generalized linear model with the log link function to model the log of the expected count of ill health outcomes in the prior month as a function of the independent variable. We also used Poisson regression to predict the number of substances used in the past month as a function of drop-in center attendance. A multinomial logistic regression was used to examine the relationship between substance use status (0 = never user, 1 = former user, 2 = current user) and number of months of the drop-in center attendance in the previous 12 months. We did not use a multinomial logistic regression to evaluate the same outcomes in our comparison between the attenders and non-attenders because none of the non-attenders had never used substances. Instead, we ran a binary logistic regression where we compared current substance users to both never and former users together. Finally, we ran a multiple linear regression to predict the mental health scores from drop-in center attendance. We controlled for age, education and total number of years on the streets for all regression models.

Results

Descriptive Statistics

All of the children who met the eligibility criteria participated in the study. We assessed 69 attenders and 65 non-attenders. The characteristics of the participants are provided in tables 1 and 2. The age range was 7 to 17 years (Mean [M]=12.8, Standard Deviation [SD]=2.9 years) for

attenders, and 8 to 17 years (M=14.9, SD=2.2 years) for non-attenders. Among the attenders, there were 32 street children from the GRP drop-in center and 37 from the Kishalaya center. Only ten of the participants were females; all were attenders and all were from the Kishalaya center. The most common health problems experienced by both attenders and non-attenders were ear problems, lice, gastrointestinal problems and respiratory problems (Figure 1). Among the attenders who had health problems (n=68), half sought treatment from a drop-in center for at least one of their health concerns (Table 3). Of the attenders with health problems, 0.85 did not seek any treatment for at least one of their health problems compared to 0.94 of the non-attenders (difference= -0.09, 95% Confidence Interval [CI]= -0.17 to 0.03) (Table 3).

Substance use was common among the participants (Table 4). Chewing tobacco was the most commonly used substance for both non-attenders (0.86) and attenders (0.65) (difference = -0.22, 95% CI= -0.35 to -0.06), followed by glue/whiteout (0.66 for non-attenders and 0.28 for attenders, difference= -0.39, 95% CI= -0.54 to -0.21). In an additional analysis that examined categories of substance use frequency (not shown), *t*-tests found significantly lower use in attenders versus non-attenders.

The difference in the mental health scores between the teacher reports and child reports was small, but statistically significant ($t(68)= -3.7$, $p<0.01$) (Table 2). On average, teachers reported better mental health scores for attenders than attenders did for themselves. Non-attenders reported worse mental health, on average, than attenders ($t(132)=5.1$, $p<0.01$). Table 5 breaks down the mental health results for behavioral symptoms and emotional symptoms for the attenders and non-attenders, as well as for the teacher and child reports.

Table 1

Independent Variables	Group	n	Min.	Max.	Med.	M	SD
Age (Years)	Attenders	69	7	17	13.0	12.8	2.9
	Non-Attenders	65	8	17	16.0	14.9	2.2
Highest Formal Education (Class)	Attenders	69	0	9	3.0	2.6	2.4
	Non-Attenders	65	0	10	2.0	2.6	3.0
Total Time on the Streets (Years)	Attenders	69	0.1	14.5	5.5	5.8	4.4
	Non-Attenders	65	0.1	16.5	5.0	5.4	4.2
Total Months at center in Past Year	Attenders	69	1	12	3.0	5.0	4.2
Sex (Female)	Attenders	10					
	Non-Attenders	0					

Demographics of the Participants
M = Mean, SD = standard deviation.

Table 2
Descriptive Statistics for Outcomes in the Past Month

Outcome	Statistics	Attenders (M ± SD)	Non-Attenders (M ± SD)	*t*-test[2]	*p*-value
Physical Health	# Health concerns per participant	4.7 ± 2.4	6.7 ± 2.4	4.9	<0.01
	Height-for-age z-score	-1.6 ± 0.9	-2.1 ± 0.9	-2.7	<0.01
	BMI-for-age z-score	-1.0 ± 0.8	-1.6 ± 1.0	-3.7	<0.01
Substances	# Substances used per participant	1.7 ± 1.4	3.4 ± 1.7	6.0	<0.01
Mental Health[1]	Child report (range: 50 to 150)	79.6 ± 11.6	89.4 ± 10.9	5.1	<0.01
	Teacher-report 25 items (range: 25 to 75)	36.8 ± 7.7		-3.7	<0.01
	Child report 25 items (range: 25 to 75)	39.9 ± 6.5			

1. Lower scores indicate better mental health.
2. Degrees of freedom (df) = 132.

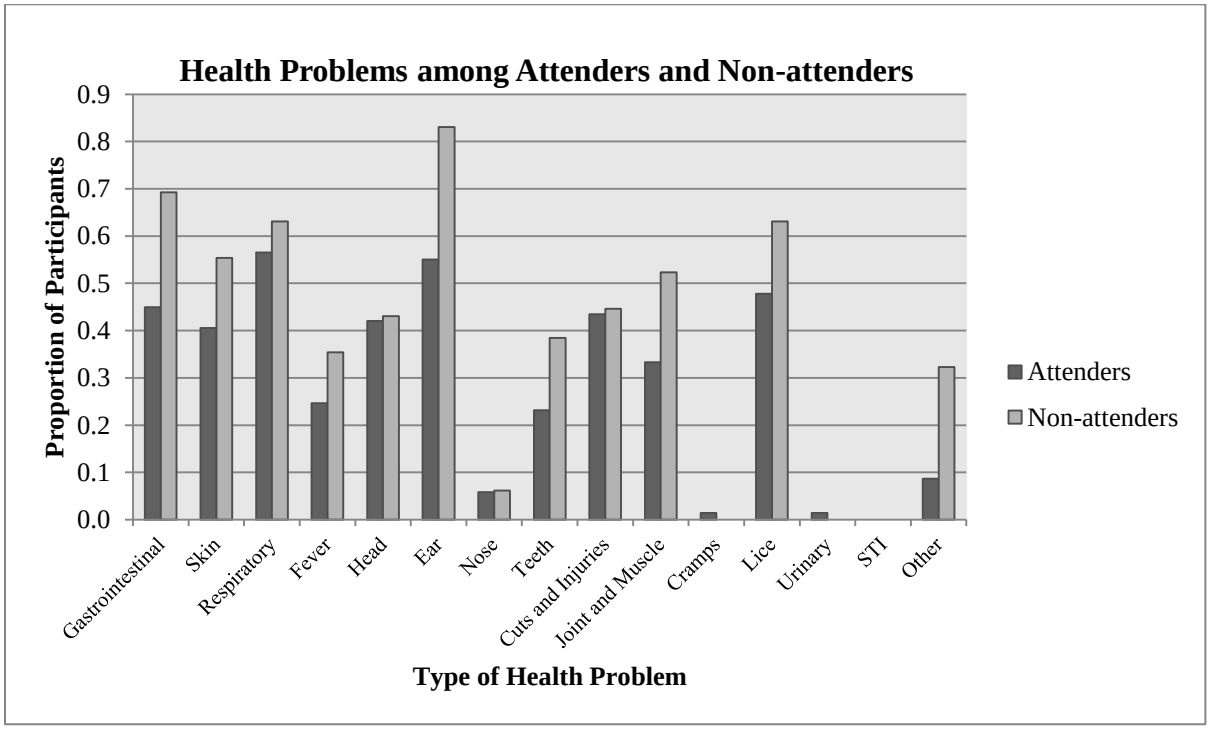

Figure 1. Proportions of attenders and non-attenders affected by type of health problem.

Table 3
Type of Health Care Received Among Attenders and Non-Attenders

Health Care	Proportion of Attenders (n=68)	Proportion of Non-Attenders (n=65)	Difference	95% CI
Drop-in Center	0.50	0		
Other Doctor	0.25	0.46	-0.21	-0.37 to -0.03
Pharmacist	0.35	0.37	-0.02	-0.19 to 0.16
Self-medicate	0.63	0.78	-0.15	-0.30 to 0.02
No Treatment	0.85	0.94	-0.09	-0.17 to 0.03

CI = Confidence Interval

Table 4
Substances Used Among Attenders and Non-Attenders (Per Month)

	Glue/ Whiteout	**Chewing Tobacco**	**Cigarettes/ Beedis**	**Marijuana**	**Alcohol**	**Other**
Proportion of Attenders	0.28	0.65	0.32	0.13	0.29	0.01
Proportion of Non-attenders	0.66	0.86	0.63	0.45	0.60	0.11
Difference in proportions	-0.39	-0.22	-0.31	-0.32	-0.31	-0.09
95% CI	-0.54 to -0.21	-0.35 to -0.06	-0.48 to -0.13	-0.44 to -0.15	-0.47 to -0.13	-0.12 to -0.00

Table 5
Average Child and Teacher-Report Mental Health Scores for Behavioral and Emotional Symptoms

Attribute	**Child Self-Report Mental Health Score**			**Child Self-Report and Teacher-Report Mental Health Score on 25 items**		
	Possible Range	Attenders (M ± SD)	Non-Attenders (M± SD)	Possible Range	Child Report (M ± SD)	Teacher Report (M ± SD)
Behavioral Symptoms	22 to 66	31.9 ± 6.2	36.6 ± 6.3	16 to 48	23.1 ± 4.6	22.7 ± 5.2
Emotional Symptoms	22 to 66	36.9 ± 6.1	41.2 ± 5.9	6 to 18	11.2 ± 2.4	9.1 ± 2.3

Note: Lower scores indicate better mental health.

Attenders vs. Non-Attenders

A summary of the analytical results is provided in Table 6. For the physical health outcomes, non-attenders experienced 1.4 times (95% CI= 1.2 to 1.7) more ill health outcomes per month than attenders, given the variables age, education and time on the streets were in the model.

Attendance statistically significantly predicted substance use status and number of substances used in the previous month. Attenders were 0.1 times (95% CI= 0.03 to 0.65) as likely to use substances as non-attenders. A Poisson regression found that non-attenders used 1.6 times (95% CI= 1.1 to 2.1) as much substances in the past month compared to attenders, adjusted for the other variables.

Attendance significantly predicted total mental health score. The predicted total mental health score for attenders was 8.7 points lower (95% CI=-13 to -4.5) than for non-attenders, after adjusting for age, education and time on the streets.

Number of Months of Drop-in Center Attendance

We saw slightly different results when we examined the outcomes as a function of attendance at a drop-in center in the previous 12 months. A Poisson regression found that street children experienced 2.1% (95% CI=0% to 4.1%) fewer ill health outcomes per month for every additional month at a drop-in center, allowing for the other variables. This was a marginally statistically significant result (p=0.05).

In our multinomial logistic regression, the relationship between substance use status and drop-in center attendance for former substance users versus never substance users was not significant (p=0.78). Comparing current substance users to never substance users, for every one month of drop-in center attendance, the risk of being a current substance user to a never

substance user decreased significantly by a factor of 0.79 (95% CI=0.66 to 0.96), after adjusting for the other variables in the model. More generally, the more often a street child came to a center, the more likely they were to have never used substances than to have been a current substance user. The Poisson regression showed that for every month of drop-in center attendance, street children used significantly fewer substances – 4.6% (95% CI=1.3% to 8%) – in the past month, adjusting for the other variables. In this model, education and total time on the streets were not significant predictors of substance use, while older children were significantly more likely to use more substances than younger children (Odds Ratio [OR]=1.11, 95% CI=1.06 to 1.17).

A multiple regression found that only age contributed significantly to the prediction of total mental health score, $F(4, 129) = 3.41$, $p < 0.05$, $R^2 = 0.096$; on average, older children had worse mental health than younger children. Drop-in center attendance, education, and time on the streets were not significant in the model.

Table 6
Association Between Outcomes and Drop-in Center Attendance Adjusted for Age, Education and Total Time on the Streets

Outcome	OR (95% CI) Attendance	*p*-value	OR (95% CI) Months at Drop-in Center	*p*-value
# Physical Ill Health Outcomes in Past Month	1.4 (1.2 to 1.7)[1]	<0.01	0.98 (0.96 to 1.0)[3]	0.05
# Substances Used in Past Month	1.64 (1.09 to 2.09) [1]	<0.01	0.95 (0.92 to 0.99)[3]	0.01
Never Used Substances	1.0 (Ref)		1.0 (Ref)	
Former Substance User			0.96 (0.72 to 1.3)[3]	0.78
Current Substance User	0.13 (0.03 to 0.65)[2]	0.01	0.79 (0.66 to 0.96)[3]	0.02
	β (95% CI) Attendance	***p*-value**	**β (95% CI) Months at Drop-in Center**	***p*-value**
Total Mental Health Score	-8.7 (-13 to -4.5)[2]	<0.01	-0.44 (-1.0 to 0.14)[3]	0.14
Behavioural Symptoms	-4.0 (-6.3 to -1.7)[2]	0.001	-0.18 (-0.50 to 0.13)[3]	0.26
Emotional Symptoms	-3.9 (-6.1 to -1.7)[2]	0.001	-0.25 (-0.55 to 0.05)[3]	0.10

1. Attenders are the reference group.
2. Non-attenders are the reference group.
3. This shows the per month effect of exposure to the drop-in center.
OR = odds ratio; β = unstandardized beta coefficient

Discussion

The aim of this paper was to examine the association between attendance at drop-in centers and the physical health outcomes, substance use status and mental health outcomes of street children in New Delhi, India. We focused on these outcomes because drop-in centers provide free health care, education on healthy behaviors, drug detoxification services and social support to street children, all of which would be expected to positively impact the outcomes.

Attenders and non-attenders exhibited numerous health problems, substance abuse and serious mental health concerns. Attenders experienced better physical and mental health than non-attenders. They also used fewer substances than non-attenders and were more likely to be

former or never substance users than current substance users compared to non-attenders. These results were statistically significant.

We saw a somewhat different picture when we treated the exposure variable as continuous (number of months of drop-in center attendance in the past 12 months). In these analyses, drop-in center attendance was a significant predictor only for number of substances used and substance use status. It was associated with a marginally significant reduction in the number of ill health outcomes per month and it was not associated with a reduction in mental health scores. It was surprising that there was not a reduction in mental health scores in this analysis, given that attenders had a significantly lower mental health score than non-attenders. A possible explanation may be that only a small number of visits to a drop-in center was required for mental health to improve, after which it stayed at that improved level if children kept attending. We cannot check this because mental health was only assessed after five visits to a center, not after each visit. Selection bias may be another explanation, where street children who have better mental health are more likely to regularly seek services from a drop-in center.

There were several strengths to our study. Unlike many studies that examined the health of street children, we recruited a comparison group to better understand how the intervention worked. Our study included a diverse range of street children, from abandoned street children to children on the streets, and we examined a range of health outcomes, all of which contribute to greater applicability of the findings. Most importantly, this is the first study to look at the association between drop-in centers and the health of street children in a LMIC. This is a common intervention for street children and through further research, we expect we can understand how drop-in centers can better impact the health of street children.

A significant limitation of the study is that causation is difficult to determine when assessing the relationship between predictors and outcomes in a cross-sectional manner, even with good historical data in records. A better design would be to follow attenders and non-attenders longitudinally and assess the predictors and outcomes monthly for several months. We attempted to follow the attenders over time. We assessed the same set of outcomes for every month a child regularly attended a drop-in center over the course of the study. However, we obtained very low numbers. Out of the 69 street children who regularly attended a center for at least one month between February 2015 and July 2015, only half (34/69) regularly attended for two or more months during that period. Twenty regularly attended a center for three or more months. Eight participants attended for four or more months regularly, only three attended for five months, and none attended for the entire six months.

It is nearly impossible to follow a large group of street children over time because they tend to be a migrant population and they travel in search of economic opportunities. One possibility would have been to increase the duration of the study period from six months to at least one or two years; this would have allowed participants to have more follow-ups. To track them, a presence at numerous drop-in centers would be needed to achieve an appropriate sample size, and even then it would still be difficult to track a comparison group.

Another limitation may include self-selection bias because participants were not randomized into attenders and non-attenders. Rather, street children selected themselves into those groups. Those who chose to visit drop-in centers may have been inherently different from street children who did not visit centers, biasing the comparison. Also, recall bias may have been a problem with this study because participants were asked about their health and activities in the past month. However, we do not believe recall bias was a significant issue in this study because

we did not find any discrepancies between medical records and the results of our pretests. Furthermore, we had high test-retest reliability for all our instruments.

Despite the study's limitations, the association between drop-in center attendance and reduced drug use should be considered seriously. The staff members devote much of their time and energy to encourage and counsel the children to quit drugs. We would thus expect reduced drug use over time. Perhaps if the centers devoted more resources to preventative health services and mental health counseling, we would similarly see improvements in the physical and mental health of street children. For instance, we noticed that only half of the street children who visited drop-in centers and had health problems sought treatment from a drop-in center for at least one of their health concerns. Furthermore, of the street children who visited drop-in centers and had health problems, 0.85 did not seek any treatment for at least one of their problems. This finding was surprising considering that health care was free and readily available to children who visited the centers. Perhaps they thought their health problems were not serious and did not warrant medical attention, or they may have felt uncomfortable talking to a health professional about their problems. The drop-in centers should encourage street children to seek care for all of their health problems, regardless of how minor.

Despite the caveats, the results from this study suggest there are benefits of drop-in centers. Further research is important to help determine how best to design and tailor interventions to have a greater impact on the health of street children.

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Chapter 5: Special Methodological Challenges of a Longitudinal Study with Street Children

This chapter has not been submitted for publication at this point. However, we intend to submit this paper for publication at a later date.

For this manuscript, I identified the challenges of a longitudinal study I conducted with participants from the cross-sectional study described in Chapter 4. Parminder Raina and Harry Shannon provided intellectual direction and significant guidance in writing this manuscript. Kathy Georgiades and Wendy Sword provided feedback in revising the manuscript.

Context and Background

Participants in the cross-sectional study described in Chapter 4 were followed in a longitudinal study. Although the cross-sectional study was very important for determining if associations exist between drop-in centres and the health and substance use status of street children in New Delhi, we cannot make any causal claims from the results of this study because causation is difficult to determine when assessing the relationship between predictors and outcomes in a cross-sectional manner. Therefore, I conducted a longitudinal pilot study with the same participants from the cross-sectional study in Chapter 4. I anticipated that there would be challenges with doing a longitudinal study with this population in India; therefore, I conducted a pilot study to assess the feasibility of conducting a longitudinal evaluation of the drop-in centre intervention with New Delhi's street child population. I encountered several methodological challenges in doing this study, which prevented me from conducting a proper longitudinal study and precluding analysis of the longitudinal data.

This paper describes the challenges encountered with designing and implementing the longitudinal study with street children in New Delhi, India. Considering the dearth of longitudinal studies with street children in LMICs, I expected that there would be challenges with designing and implementing such a study. That is why I conducted a cross-sectional detailed in Chapter 4 – in the event that the longitudinal study did not provide sufficient data. However, I did not know the nature of the other problems I would encounter with the longitudinal study because these problems have not been described previously in the literature. I describe those challenges in this chapter and I also provide possible strategies to circumvent these challenges in future studies with street children from LMICs.

Paper: Special Methodological Challenges of a Longitudinal Study with Street Children

Title: Special methodological challenges of a longitudinal study with street children in LMICs

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Abstract

Street children in low- and middle-income countries face significant health issues. We conducted a pilot study to assess the feasibility of using a longitudinal design to evaluate an intervention for street children in New Delhi, India. Specifically, we aimed to determine whether street children in New Delhi who regularly visited drop-in centres experienced better physical and mental health, and engaged in less substance use when they spent more time at these centres. We followed street children at two drop-in centres by monitoring whether they regularly attended the centres each month. For every month of regular attendance, we used pretested structured questionnaires to assess the physical health, substance use status and mental health of the participants.

Several methodological challenges were encountered in designing and implementing a longitudinal study with street children, precluding analysis of the longitudinal data. These challenges were: 1. Defining drop-in centre exposure for children with unpredictable and highly variable attendance in drop-in centres; 2. Finding and following street children who did not visit drop-in centres to form a comparison group; 3. High loss to follow-up; 4. Minimizing the burden of repeated questioning; and 5. Randomly sampling street children. Out of 69 street children who regularly attended a drop-in centre for at least one month during the six-month study period, 34 provided longitudinal data and did at least one follow-up assessment. Only three children attended the centres regularly enough during the six-month study period and completed four follow-ups.

Although we intended for this pilot study to develop into a full-scale rigorous longitudinal study of the drop-in centre intervention, the challenges encountered prevented such a rigorous longitudinal study. This study is instead a pilot study to assess the feasibility of doing

intervention evaluations using longitudinal study designs with street child populations in low- and middle-income countries. In this paper, we discuss the acute challenges that arise when conducting longitudinal studies with street children in New Delhi, India.

Background

Street children in low- and middle-income countries (LMICs) face significant health concerns (Ali & Muynck, 2005; Ayaya & Esamai, 2001; Kudrati, Plummer, & Yousif, 2008; Morais, Morais, Reis, & Koller, 2010). According to the United Nations Children's Fund (UNICEF), there are tens of millions of street children in the world (2006). This number is rising due to population growth, increased urbanization, and decline of economic opportunities in rural areas (UNICEF, 2006). India has the largest population of street children in the world (Sen, 2009). Some put the number of Indian street children as high as 47 million (Khurana, Sharma, Jena, Saha, & Ingle, 2004). Although the term "street child" is widely disputed among different groups (Thapa, Ghatane, & Rimal, 2009), the United Nations has stated that a street child is "any boy or girl…for whom the street in the widest sense of the word… has become his or her habitual abode and/or source of livelihood, and who is inadequately protected, supervised, or directed by responsible adults" (Panter-Brick, 2002, p. 149). We used this definition in this study.

Despite the fact that many street children experience ill health, there is little research on street child interventions that aim to improve health outcomes, especially in LMICs. Drop-in centres are one of the most common interventions for street children (Coren et al., 2013). These centres may provide street children with non-formal education, free lunches, recreational activities, preventative health services and basic medical care at strategic locations such as in railway stations and busy market areas for a few hours on most days (Salaam Balaak Trust,

2015; War Child, 2014). Morais et al. (2010) and Souza, Porten, Nicholas and Grais (2011) described drop-in centres in Brazil and Honduras, respectively, which were open only during the day and ensured access to food, hygiene, health care and a safe space for street children.

Review of Longitudinal Studies with Street Children in LMICs

While there is little research into drop-in centre interventions for street children in LMICs, there have been rigorous studies that have examined the outcomes of street children attending drop-in centres in the United States (Slesnik, Kang, Bonomi, & Prestopnik, 2008; Slesnick, Prestopnik, Meyers, & Glassman, 2007). For instance, Slesnick et al. (2007) evaluated two interventions for street youth at a drop-in centre in the U.S. Ninety-six street youth were randomized into the first intervention, called the Community Reinforcement Approach (CRA). This included sessions to build rapport with street youth; help youth identify areas of their life they wanted to examine more closely such as housing, medical care and job finding; apply treatment strategies implemented by therapists and matched to participants' needs; do role plays and homework assignments to practice newly learned skills; and learn about Acquired Immune Deficiency Syndrome (AIDS). Another 84 street youth received the second intervention, treatment as usual (TAU), at a drop-in centre. The drop-in centre offered a place to rest during the day, food, showers, clothing, and case management that linked youth with community resources. Outcomes were assessed after six months. Eighty-one (84%) participants assigned to CRA completed the baseline and six month follow-up assessments, and 74 (88%) TAU participants completed the baseline and six month follow-up assessments. Youth assigned to CRA, compared to TAU, reported significantly reduced substance use (37% versus 17% reduction), depression (40% versus 23%) and increased social stability (58% versus 13%) after six months.

Unfortunately, studies describing the outcomes of street children attending drop-in programs in low-income countries are scarce (Souza et al., 2011). It is important to measure the extent to which drop-in centres in LMICs impact street children because compared to hospitals and clinics, they provide the more substantial, and often the only, support to street children.

In addition to the lack of drop-in centre evaluations in LMICs, there have been very few well-designed studies examining the impact of any intervention on the health of street children in LMICs. In a Cochrane review that summarized the effectiveness of interventions for street children that promoted inclusion and reintegration, and reduced harms in all countries, the authors remarked, "We did not find any sufficiently robust evaluations conducted in LMICs despite the existence of many relevant programmes" (Coren et al., 2013, p. 2). Experimental or quasi-experimental designs would be the best designs to evaluate interventions; however, there are ethical concerns with controlling the assignment of the intervention in vulnerable populations like the street child population. In these populations, an observational, longitudinal study would be the most appropriate design to evaluate an intervention. Longitudinal studies are less susceptible to bias than cross-sectional studies when one wants to draw causal inferences. Therefore, if we are to understand the impact of an intervention on the health of street children, it is important to assess the health of street children over time while they are using the intervention.

In a systematic literature review we conducted for peer-reviewed quantitative and qualitative publications that looked at the health status of street children in LMICs, we found only three longitudinal studies of street child interventions in these countries (Nath et al., Submitted June 12 2016 to *Children and Youth Services Review*). One of these studies evaluated the effect of an environmental behavioural modification program for street children in Egypt (Hosny, Moloukhia, Abdel Salam, & Abdel Latif, 2007). Another study examined the effect of a

multidisciplinary case management program delivered to 400 street children at a drop-in centre in Honduras (Souza et al., 2011). The third study looked at preliminary findings from The Equilibrium Project – a project that provided health services through a community sports centre with the aim of facilitating social reintegration of street children in Brazil into mainstream society (Scivoletto, da Silva, & Rosenheck, 2011).

The longitudinal study by Hosny et al. (2007) evaluated an environmental behavioural modification program for 35 street children in Alexandria, Egypt. The children were selected through an institute in Alexandria that provided only night shelter. To be included in the study, the children had to remain in the institute for the duration of the program. The objective of the program was to change the behaviour of street children, discover their abilities, and help them develop and acquire new skills and knowledge. The program ran from October 2001 to April 2003 and included 7 main units: outdoors and recreational education, urban and health education, heritage and museum education, moral and religious education, human rights and peace education, economic and civic education, and future and sustainable education. Data were collected from observational sheets and conversation sessions before and after the intervention.

A second longitudinal study examined a multidisciplinary case management program delivered to 400 street children at a drop-in centre in Honduras over a period of four years, from March 2005 to January 2009 (Souza et al., 2011). The multidisciplinary case management therapeutic package consisted of mental health interventions, medical interventions, education on social services, health education and recreational activities. The three outcomes assessed were psychological distress, substance use and social situation. The median follow-up time for the cohort was 18 months. Researchers followed participants by monitoring who came back to the centre. Souza et al. (2011) identified loss to follow-up as a limitation in their study. Of 400 street

children, 281 (71%) came to two or more sessions. They had outreach workers attempt to find defaulters, but not all defaulters were traced.

Another longitudinal study evaluated the effect of The Equilibrium Project in Brazil among 351 street children (Scivoletto et al., 2011). The Equilibrium Project offered professional health services to street children in a protected community setting. This study examined the impact of the intervention after two years of operation. A total of 351 patients had been served. Scivoletto et al. (2011) provided mostly descriptive data of the intervention's impact: they found that 64% (n=223) of the children had successfully completed or continued treatment and 35% (n=122) were reunited with their families.

The duration of these longitudinal studies varied from two years to four years. None of the longitudinal studies employed a comparison group. Large sample sizes are typically required for a longitudinal study. The sample sizes of the studies presented ranged from a small sample size of 35 street children to a moderate sample size of 400 children. The studies also varied in the rigor of their designs. For instance, the study by Scivoletto et al. (2011) was entirely descriptive in nature; they did not compare results between follow-up and baseline. Hosny et al. (2007) evaluated outcomes at baseline and then once again in a follow-up after the intervention. Only Souza et al. (2011) had multiple follow-ups, which allowed trends in the data to be discerned and adjusted for.

Overall, there have been very few published longitudinal studies that have examined the impact of interventions on the health of street children in LMICs. The studies that have been published have varied in their sample size, design, time of follow-up, exposure variable and outcome variables. Given these differences, it is important that these studies are replicated so that we can establish if their findings are reliable. In particular, it is important to conduct longitudinal

studies on established interventions, such as the drop-in centre, to determine if such interventions are beneficial for the health of street children.

We conducted a longitudinal pilot study to evaluate the drop-in centre intervention in New Delhi, India. The purpose of the pilot study was to assess the feasibility of doing a longitudinal evaluation of the drop-in centre with the street child population in a LMIC. We intended for the pilot study to develop into a full-scale rigorous longitudinal study to answer the research question of whether street children who regularly visit drop-in centres in New Delhi experience better physical and mental health, and engage in less substance use with more time spent at these centres. However, we encountered several methodological challenges in designing and conducting this study, which prevented the development of the pilot study into a rigorous longitudinal study. We met a number of challenges common to any longitudinal study, such as deciding on appropriate scales and determining the total time needed for data collection. However, some challenges are particularly acute with street children in LMICs, and we focus on those in this paper.

Study Design

Detailed information about the participants, drop-in centres, data collection methods and research instruments will be published in a separate article that describes a cross-sectional study we conducted (Nath et al., Submitted June 12 2016 to *Child Abuse & Neglect*). Participants in the cross-sectional study were followed in the longitudinal study. The cross-sectional study examined the extent to which drop-in centres were associated with better physical health, mental health and substance use status of street children who visited the centres, compared to street children who did not visit centres. Participants consisted of street children in New Delhi who visited two drop-in centres. One centre, known as the General Reserve Police (GRP) Contact

Point, was located at the New Delhi Railway Station. The other, known as the Kishalaya Contact Point, was located in Connaught Place in New Delhi's city centre.

Street children who "regularly" attended a drop-in centre for at least one month (the qualifying month) from February 2015 to July 2015 were eligible to be included in the study and were assessed for physical health, mental health and substance use outcomes. Regular attendance was defined as at least five visits to a centre in a month, for at least an hour each. The first calendar month a street child regularly visited a drop-in centre during the study period, February 2015 to July 2015, was labeled as the qualifying month T_0 (Figure 1). T_0 differed between participants. For instance, if a street child first attended a centre five times in March, their T_0 would be March. If another participant first attended a centre four times in February, but did not complete five visits in any single month until June, then their T_0 would be June. Participants were assessed after five visits. Similarly, children who regularly attended in the next month, T_1, were assessed again after five visits in T_1, and so on. This meant that participants were each assessed once for each month they regularly attended a centre. We intended to examine their data longitudinally to look at the change of health outcomes with time at a drop-in centre.

The exposure variable was the number of months a street child had regularly visited a drop-in centre in the 12 months leading up to and including the month of assessment. In other words, this time period included the month the assessment was done and the 11 months prior to the month of assessment. This time period was used because the records were not reliable for periods further into the past. One of the researchers (RN) had assisted in the design and implementation of a standardized attendance record keeping system at both drop-in centres a year before beginning data collection.

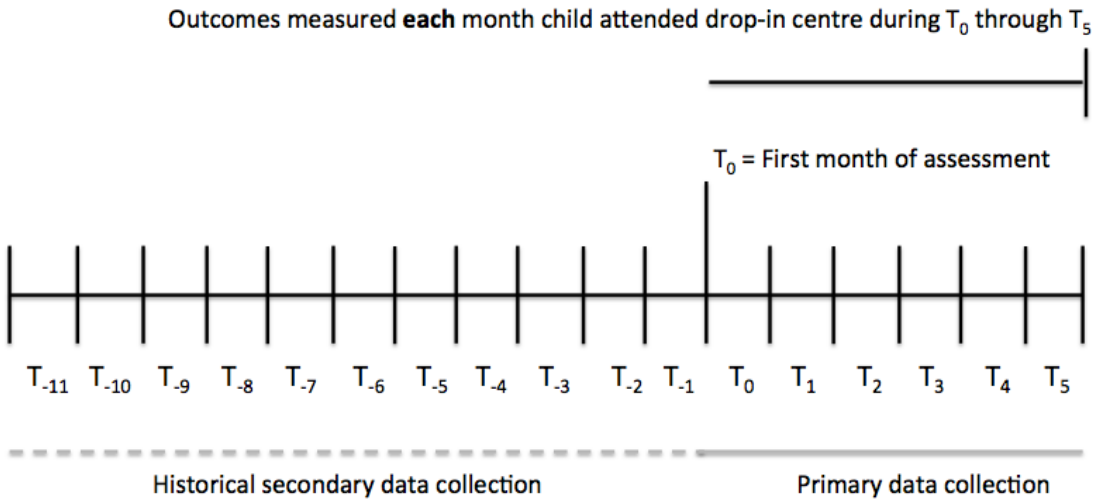

Figure 1. Longitudinal study design.

All the children were assessed for their physical health outcomes, substance use and mental health with pretested structured questionnaires. The physical health outcomes questionnaire tracked the number of physical ill health outcomes the children experienced in the past month. The questionnaire on number of substances used and frequency of use was adapted from the Ontario Child Health Study (OCHS) (OCHS, 2015). The mental health questionnaire was adapted from the Ontario Child Health Study mental health questionnaire (OCHS, 2015), self-report version for children and the teacher-report version for the staff at the drop-in centres. Information on potential confounders was collected from drop-in centre records and via a pretested structured questionnaire.

Research Ethics Board (REB) approval was obtained from the Hamilton Integrated Research Ethics Board prior to conducting the study. Research approval was also obtained from the Board of Trustees of the NGO managing the two drop-in centres, and two individuals who were each members of different research ethics committees in New Delhi.

Methodological Challenges

1. Defining Drop-in Centre Exposure

There were many methodological challenges we encountered when designing the longitudinal study. One such challenge was defining the exposure variable – drop-in centre attendance. The definition needed to appropriately reflect both the number of visits at a centre and the distribution of these visits.

Number of visits

With respect to number of drop-in centre visits, street children typically attended one drop-in centre; however, they did not attend consistently. This inconsistent attendance created a problem in defining the exposure variable. The exposure varied dramatically between participants.

We consulted the staff members and the centres' attendance records to understand how regularly street children attended the centres. Staff members at both centres felt that attendance below five times a month should not be considered "regular". We therefore defined regular attendance as at least five complete visits to a centre in a calendar month, where one complete visit was defined as participating in the centre's services for at least one hour. We collected information on our outcomes – ill health outcomes, substance use status and mental health – for every month of regular attendance, based on the child's experiences in the month leading up to the assessment. We felt monthly assessments would not be burdensome for the participants. We

also felt that recalling information about the past month was a reasonable time frame for participants to accurately recall information. We validated this belief by pretesting the instruments and did not find any discrepancies between the self-reported ill health outcomes and the drop-in centre medical records.

The definition we used for regular monthly attendance was still problematic because it did not weight high levels of attendance. For example, a street child who attended frequently, twenty times per month, would be treated the same as a child who attended only five times per month, even though we would expect that a street child who came to the centre twenty times per month would have better outcomes than a child who came five times. If we conducted assessments every time a child visited the centre, it would be burdensome on the participant. We also could not conduct the assessment on the last day the participant visited the centre in that month because we did not know which visit would be the last. One possible solution would be to document the total number of visits for each child who met the eligibility criteria, which could then be controlled for in the analysis. In such an analysis, the relationship between outcome and exposure might not necessarily be linear; the exact relationship may be difficult to determine. Nonetheless, we recommend controlling for total number of drop-in centre visits in future studies.

Distribution of visits

In defining the exposure variable, we also had to consider whether a child would have better outcomes if they visited a drop-in centre in concentrated bursts, with large gaps between the bursts, versus if a child came to a drop-in centre consistently but less frequently. For instance, suppose there is Child A, who comes five days to a drop-in centre consecutively during one month. He does not show up again to the centre until the next month when he repeats his five

consecutive days of attendance, and does not show up again until the next month when he again repeats his five consecutive days of attendance. He is always assessed for his outcomes on the fifth visit. Another child, Child B, comes to a centre once every six days. He will also have five visits per month, and he will be assessed near the end of the month. The issue is whether Child A has better or worse outcomes than Child B based on the distribution of their visits, after controlling for the confounding variables.

We discussed this issue with the drop-in centre staff members. Based on these discussions, we hypothesize that street children who come less frequently but regularly experience better health and substance use outcomes than street children who come for concentrated bursts and then are not seen again until a month or so later.

We believe this hypothesis is supported by education performance measures. When we looked at education assessments at the same centres, children who came less frequently but regularly had better English and Mathematics scores than street children who came for a few weeks consistently and then were not seen again until much later. When assessed at a follow-up visit, the latter group of street children was not able to remember much of the information they learned during their previous regular span of attendance, whereas the former group of street children was progressing slowly but steadily in their education.

It may be that without consistent, albeit infrequent, attendance at drop-in centres, street children are not able to retain enough of the education they receive regarding good health behaviours from the centres to have an impact on their outcomes. It is important to note that there are many street children whose attendance patterns are more complicated than those described. Our definition of the exposure did not take into account different distribution patterns of drop-in centre visits because it would have greatly complicated our design. We intended to

explore these patterns further in our longitudinal analysis; however, we were not able to analyze our longitudinal data. We recommend that future studies examine street children's health and substance use outcomes as a function of the distribution of visits to a drop-in centre, either by incorporating distribution into the exposure variable or by examining distribution during the analysis.

2. Comparison Group

Ideally, we would have preferred to follow a comparison group of street children who did not visit drop-in centres so that we could compare their outcomes to our "exposed" group, those who did visit the centres. This would have allowed us to determine more rigorously if any changes over time were due to the drop-in centre or a result of other extraneous factors. Street children in New Delhi who did not use drop-in centres would have been an appropriate comparison because in the cross-sectional study, we found that street children who did not visit drop-in centres closely resembled the exposure group in many demographic variables, such as age, education, and time on the streets.

We did not have a comparison group in this longitudinal study because of the difficulties in following street children who did not attend centres. Whereas the drop-in centre staff knew the whereabouts of street children who came regularly to the centres, street children who did not participate in these services did not have any contact information and they could rarely provide secondary contacts who knew of their whereabouts. These street children also did not have a fixed place of residence.

In the cross-sectional study, we were able to do baseline assessments of a comparison group of street children who did not attend centres. There are many street children in New Delhi who do not use any support services, such as services from drop-in centres. They can be easily

found in New Delhi, standing around busy intersections, working at railway stations, or begging for money in markets. For the cross-sectional study, drop-in centre staff approached these children and recruited them into the study to serve in the comparison group. Many of these children were very mobile, moving within the city and to other cities to earn a living. It was rare to see them frequent the same location for an extended period of time, which made them difficult to track in a city as large as New Delhi. Therefore, although it would have been possible to conduct a baseline assessment with street children who did not visit the centres, it was not feasible to conduct follow-up assessments with the majority of them.

Other comparison groups should be considered because of the difficulties in following street children over time. Cross-sectional studies that have examined the health outcomes of street children in LMICs have used comparison groups that were not street children. Madu, Meyer and Mako (2005) recruited 54 children who lived in a shelter home and 54 non-street children to serve as controls for 108 street children. Rohde, Ferreira, Zomer, Forster, and Zimmermann (1998) recruited 51 boys from low-income families living with their biological parents to be controls for 31 street boys attending drop-in centres. Children in shelter homes or poor non-street children living with families may not be the most appropriate comparison groups to study the impact of the drop-in centre intervention on the health of street children because these children have the benefit of shelter and education, both of which are known to positively impact health. However, children in shelter homes or poor non-street children living with their families may overlap in some areas with street children, such as in income bracket and geography, making them suitable comparison groups for street children in a longitudinal study. More importantly, they are a stable group that can be followed over time, because children living in shelter homes and poor non-street children tend to live in a fixed location with secondary

contacts. We would therefore be able to compare if street children attending drop-in centres over time approach the health status of these comparison groups.

3. Loss to Follow-up

For each subsequent follow-up period, we lost more children to follow-up (Table 1). For instance, out of the 69 street children who regularly attended a centre for at least one month between February 2015 and July 2015, only half (34/69) regularly attended for two or more months during that period. Twenty regularly attended a centre for three or more months. Eight participants attended for four or more months regularly, only three attended for five months, and none attended for the entire six months. These were very low numbers, and they precluded analysis of the longitudinal data.

Table 1. Follow-up information by number of children for each month of study

	Number of children with number of months of follow-up				
Qualifying month (T_0)	**T_1**	**T_2**	**T_3**	**T_4**	**T_5**
February (n=20)	15	13	5	2	-
March (n=14)	12	6	3	1	-
April (n=13)	3	1	-	-	-
May (n=6)	3	-	-	-	-
June (n=7)	1	-	-	-	-
July (n=9)	-	-	-	-	-
Total	**34**	**20**	**8**	**3**	**0**

- = *NA*

We found that there was a small core group of street children who attended a drop-in centre regularly during most of the data collection period. Another small group of street children attended less regularly during the same period. They would visit a centre consistently for a

couple of months, and then they would not be seen for two or three months. They would come back after that and pick up from where they left off. The other children in our sample only came for a month or two during the entire data collection period. Attendance records showed that such children either visited the centre sporadically throughout the year or they visited the centre for a short period of time before they were rehabilitated (i.e. the child was restored to their family or enrolled in a shelter home) or they moved to another city for economic opportunities.

In total, we were unable to complete follow-up with 28 street children (41% of our sample) because of the positive efforts undertaken by the drop-in centre. Five children were counselled and placed in a shelter home. One child was taken back to his family after his family situation was assessed to be safe. Twenty-two of the regular street children at the Kishalaya drop-in centre enrolled in a formal school during the fourth month of data collection. The Kishalaya centre provided services mostly to children who lived on the streets with their families or who maintained some contact with their families. The formal school enrolment occurred due to a large initiative undertaken by the centre in collaboration with a local school and the support of the street children's families, many of whom lived on the streets and sold drugs to earn a living. We were unable to follow these children after their school enrolment.

If we had analyzed the longitudinal data, it would have been important to capture these as positive outcomes because the ultimate purpose of these centres is to rehabilitate street children. It is important to note, however, that according to drop-in centre records (not shown), it is common for street children to relapse from schools, shelter homes, or from their family homes to come back to live on the streets. We suggest that another study be designed to examine these relapse rates.

To better understand how to obtain higher follow-up rates, we can look to the literature on longitudinal studies with street children in high-income countries that have had high follow-up rates, such as in studies done in Canada. For instance, the At Risk Youth Study (ARYS) was a prospective cohort study of street youth in Vancouver, British Columbia that recruited 1,002 participants between September 2005 and November 2013 (Hadland et al., 2015). As part of the study, researchers examined the risk of attempted suicide in relation to childhood maltreatment. Assessments were conducted semi-annually. Out of 1,002 participants, 660 (66.0%) returned for at least one follow-up visit by November 2013. To ensure high follow-up rates, the researchers obtained the street youth's contact information, and street youth were offered a five-dollar incentive to check in at the three-month mark to update their contact information (Wood, Stolz, Montaner, & Kerr, 2006). They found that the majority checked in. The vast majority of youth also provided their e-mail addresses.

In another Canadian prospective cohort study, Roy et al. (2003) sought to estimate the incidence rate of injection drug use and predictors of injection drug use among street youth in Montreal over five years. Of their sample, 89% had completed at least one follow-up questionnaire. Cohort participants were followed on a semi-annual basis. The study mentioned that they employed rigorous follow-up procedures. For instance, interviewers contacted participants around the due date by telephone, page, or leaving messages with parents or friends or at agencies known to be visited by the youth. The project also had a toll-free number to facilitate contact by the participants. A list of unreachable participants was sent monthly to various organizations. Interviewers also traveled up to 200 km from Montreal to meet participants who were unable to come to the study office for their follow-up interview. Finally,

for participants who could not be met by an interviewer, the questionnaire was completed by phone.

Both of the above studies by Hadland et al. (2015) and Roy et al. (2003) used comprehensive and well thought out follow-up procedures. However, it is important to make a distinction between using these techniques in high-income countries compared to in low-income countries. Unfortunately, Hadland et al.'s (2015) and Roy et al.'s (2003) techniques would most likely not be successful for following street children in many low-income countries, including India. It is likely that it is easier to follow street children in high-income countries because there are better tracking systems in place for people in these countries. Furthermore, there are younger and a greater number of street children in low-income countries than in high-income countries due to a myriad of factors including greater overall poverty in these countries, the prevalence of child labour in these areas, weaker governmental infrastructures to enforce child protection laws, and limited resources to place all of these children in facilities that provide care and protection. As a result, it would be difficult to obtain secondary contacts from Indian street children because some are too young to provide this information, while others have been abandoned and may not know their families' contact information. In other instances, street children may only visit their families occasionally. Such families may not be useful secondary contacts because they may not know the whereabouts of their child.

Some of street children's closest contacts are other street children. Furthermore, although some street children may have cell phones, these are frequently stolen by people on the streets. Instead of following street children in a large metropolitan city such as New Delhi, it may be more practical to follow street children in a smaller town where there is less migration in and out of the town.

One feasible way to ensure higher follow-up rates would be to follow street children over years rather than months due to their sporadic attendance at drop-in centres. This would require significant resources. Rather than outside researchers collecting the data, it would be more efficient and practical to train staff at drop-in centres to collect health and substance use data on street children over time.

An additional way to increase follow-up rates would be to sample a larger group of street children from a drop-in centre that provides services to a large number of street children, or to sample street children from multiple centres in New Delhi. However, because different centres offer different services, this may lead to heterogeneity; thus, such results may not be meaningful.

To minimize heterogeneity, street children could be recruited from centres that provide similar services. We collected data at two drop-in centres because there was only one data collector and it was not feasible for one person to collect data at more than two centres. With more data collectors, it would have been possible to collect the data from street children at more drop-in centres.

Finally, follow-up rates could be increased by shortening the number of visits required for regular attendance per month. For instance, instead of evaluating outcomes after five visits in a month, assessments could be done after every three or four visits per month because some street children may not visit as frequently as five times a month. However, this may lead to an inaccurate representation of the exposure, which is regular drop-in centre attendance.

4. Repeated Questioning

We noticed that the participants had short attention spans and that they were easily distracted. As a result, they were resistant to being interviewed for a long period of time. Although we anticipated this and designed the questionnaires to be short, they were still not short

enough for the children who participated in the follow-up assessments. The interviews became more tedious for the children with each subsequent follow-up assessment because they knew what the questionnaires would entail and they were not able to maintain their concentration. They preferred playing. We found that the children maintained their interest in the interviews if we encouraged them to take breaks to run and play between the questionnaires. These interviews took twice as long, but this method worked well for everyone involved. We did not encounter any problems with the baseline assessment because the participants were excited about being interviewed for the first time.

5. Randomly Sampling Street Children

Sampling street children was problematic because a sampling frame for street children in New Delhi does not exist. Therefore, we could not use probability-based sampling techniques. This means that our study was not generalizable to the larger street child population in New Delhi. In our systematic literature search (Nath et al., Submitted June 12 2016 to *Children and Youth Services Review*), we also found that 90% of the studies also did not use probability-based sampling techniques, thereby their findings were not generalizable.

It is important to note that 10% of the studies in the literature review did use probability-based sampling techniques. For instance, in Belo Horizonte, Brazil, Pinto et al. (1994) constructed a daily list of children and adolescents 10 to 18 years of age according to the order of admission at a state shelter that received 3,000 to 5,000 youths per year. After randomly selecting a starting child, every fifth child was systematically selected for the study. Participants were selected only once and excluded if selected on subsequent admissions. Elkoussi and Bakheet (2011) used a multistage random area sampling technique where they divided Assiut, Egypt into primary, secondary, and tertiary units. A total of 3,336 children were identified in the

primary unit, and random selections were made within successively smaller units until the study population of 120 children was identified.

Nada and El Daw (2010) used time-location sampling to recruit street children in Greater Cairo and Alexandria, Egypt. This is a popular sampling strategy to study hard-to-reach populations. First, a comprehensive list of locations where street children could possibly be located was identified. Researchers counted the number of street children present at each location in three shifts throughout the day, and then selected a random sample of time-location units. At these selected locations, the researchers consecutively approached street children and invited them to participate. Time-location sampling used by Nada and El Daw (2010) would be the most suitable strategy to randomly sample street children in New Delhi because this strategy would allow us to approximately determine the total number of street children in the city. However, this sampling technique would require significant resources.

Discussion

This pilot study assesses the feasibility of conducting a longitudinal evaluation of the drop-in centre intervention in the street child population in a LMIC. In this paper, we have explored the unique methodological difficulties encountered in designing and implementing a longitudinal evaluation of an intervention with street children in New Delhi, India. We sought to understand how drop-in centres impact the physical health, substance use status and mental health of street children over time. Unfortunately, the data did not provide us with any information on this because of the limited follow-up – many children did not have repeat measures.

This paper highlights the methodological challenges we faced in the longitudinal study, including: 1. Defining drop-in centre exposure for street children with unpredictable and highly

variable attendance in drop-in centres; 2. Finding and following street children who did not visit drop-in centres to form a comparison group; 3. High loss to follow-up; 4. Minimizing the burden of repeated questioning; and 5. Randomly sampling a hard-to-reach population. These challenges made it difficult to conduct a rigorous study of the drop-in centre intervention. We have provided strategies to address these challenges. For instance, we suggested the following: collecting and controlling for total number of visits to drop-in centres per month, analyzing distribution of visits, using comparison groups other than street children, conducting data collection at several drop-in centres in one city, collecting data over years rather than months, training drop-in centre staff members to collect data, conducting interviews in short segments to alleviate the burden of repeated questioning on the participants, and using a time-location sampling strategy to randomly sample participants. Implementing these suggestions may be costly in the short-term, but only by doing so can we know the true extent to which drop-in centres impact the health of street children in LMICs. An investment into this research in the short term has the potential to acquire substantial benefits for street children's health over a longer term.

The challenges described in this paper have been identified in other studies with street children. For instance, Kerfoot et al. (2007) found that none of the street children in their study had a "regular" pattern of attendance at the agency the researchers were working with. Some children visited every day, while for others, several months passed between visits. Kerfoot et al. (2007) felt that this was because their attendance was driven by life circumstances, the season of the year, and by crisis. Souza et al. (2011) identified loss to follow-up as a limitation in their study. They said that loss to follow-up is usual and expected for services providing care for such populations. They advocate for more studies to understand the determinants of loss to follow-up and the development of strategies to increase adherence to therapeutic strategies.

The lack of rigorous longitudinal intervention studies with street children is problematic. It prevents us from understanding the impact of programs over the long term and therefore, we lack information on how to tailor programs to better impact the health of street children. Aptekar and Stoecklin (2014) said, "The absence of longitudinal data reveals the largest gap in the research agenda on children in street situations. …[A]ll we have is a few small semi-longitudinal studies." We find this to be particularly true for LMICs.

After careful considering the challenges faced in this study, we propose the following longitudinal design, which addresses the limitations in our study. In order to conduct a rigorous evaluation of the drop-in centre on the health of street children in New Delhi, three cohorts would be required. The first would be the exposure group of street children who regularly visit drop-in centres. To obtain a large sample size, data should be collected from all drop-in centres in New Delhi, as opposed to only the two centres we collected data from. The organization we affiliated with operates 19 drop-in centres in New Delhi. There are many more drop-in centres in the city run by other NGOs.

The second cohort should be a stable comparison group that can be assessed over time. We recommend low-income, non-street children living with their families in New Delhi or children who live in shelter homes.

The last cohort should be street children who do not use any support services. To ensure a large sample size and high follow-up rates, street children from this group should be followed according to the rotating sample design used in national statistical surveys such as the Canadian Labour Force Survey (Stasny, 1986). A rotating sample design combines the advantages of a regular cross-sectional survey with the panel study. In this instance, at the outset, a group of street children who do not visit drop-in centres would be recruited. At the time of the first

follow-up, a portion of the initial sample would have dropped out and this portion would be replaced with a fresh sample of equal size. This would repeat for each subsequent follow-up until the study is complete. Unlike the Canadian Labour Force Survey, which was able to guarantee a portion of the cohort would be available at each subsequent follow-up, we cannot guarantee a portion of street children will be available at each subsequent follow-up. Therefore, the rotating sample design would need to be adapted accordingly for the street child population.

In addition to having these three cohorts, all the children should be followed over years, as done by Hadland et al. (2015) and Roy et al. (2003). The longer study period may increase follow-up rates and provide a greater understanding of the impact of the intervention over time.

This paper has provided some relevant concerns that need to be addressed if we are to conduct rigorous longitudinal studies with street children in LMICs. Longitudinal studies are very valuable, but only if they are designed and conducted well. Such studies will allow us to more rigorously determine if drop-in centres improve the health of street children. We did not discuss any longitudinal analytical issues in this paper because we did not analyze our data. However, we anticipate that analyses of longitudinal data for this population would present further challenges. For example, complications may arise from children entering and dropping out at different points of the study. Furthermore, there may be problems with missing data if there are significant gaps in attendance.

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Chapter 6: Discussion

The purpose of this dissertation was to examine the manner and the extent to which drop-in centres impact the health and substance use status of street children in New Delhi, India. The high rate of ill health experienced by street children is a pressing global health problem (Nada & El Daw, 2010). I felt it imperative to evaluate such centres because they are often the only support for street children living in LMICs and therefore, they have the potential to positively impact the health of this vulnerable group. The research showed that drop-in centres are associated with better health outcomes for street children in New Delhi, but more can be done within these programs to help street children attain better physical and mental health.

In this thesis, I present findings from a qualitative interpretive description study and a cross-sectional study where I examined the relationship between drop-in centres and the health and substance use status of street children. Prior to conducting these studies, I did a systematic literature review to understand the health status of street children in LMICs according to the current literature. In the review, I also looked at health-related interventions that have been evaluated within this population. In September 2014, I began primary data collection in New Delhi, India. I started with a qualitative study to understand how drop-in centres influence the health and substance use status of street children. The qualitative study, including pretesting the instruments and member-checking, lasted until January 2015. From February 2015 to July 2015, I undertook a quantitative study to understand the impact of attendance at drop-in centres on the health and substance use status of street children. There were two components to my quantitative study – a cross-sectional component and a longitudinal component that attempted to follow street children over time. However, I was only able to follow a small number of street children in the longitudinal study.

Literature Review

The purpose of the literature review was firstly, to understand the health status of street children in LMICs, and secondly, to understand the impact of health-related interventions on street children's health. It showed that there is a great need for evaluating existing programs for street children. Coren et al. (2013) arrived at the same conclusion in their systematic literature review that looked at interventions promoting reintegration into mainstream society and reducing harmful behaviour and lifestyles for street children. They failed to find any rigorous evaluations of interventions for street children in LMICs. This is unfortunate considering that there are many NGO programs providing services to street children. The lack of published literature on street child interventions in LMICs, together with the fact that street children experience very poor health outcomes, provided impetus to conduct both the qualitative and quantitative studies.

Qualitative Study

I conducted the qualitative study first, aiming to understand how drop-in centres influence or do not influence the physical health, mental health and substance use status of street children. In my interviews with street children and staff members, they spoke very positively about the centres. They mentioned several aspects of the drop-in centres that drew street children to come repeatedly, which resulted in improved health in their opinions. For instance, the participants said that street children participated in drop-in services because the staff members were nonjudgmental, unlike the police and doctors at hospitals. They were also free to be a child at the centre, participating in childlike activities and not having to engage in any work. Their daily struggles were lessened at the centres due to the provision of free food, clothes, and medical care. The staff also protected them from other children and the police, and they gave them moral guidance on how to conduct their lives, which the children found helpful. The

children believed that drop-in centres give them the opportunity for a better life that would not be possible otherwise.

I did not receive any negative input about the drop-in centres. There were neutral comments where two street children said that coming to a drop-in centre had not changed their health, substance use status, or health care seeking behaviour. However, no participant reported that the drop-in centres were harmful for their physical health, mental health, or substance use behaviour. If their physical health, mental health or substance use habits had gotten worse over time since coming to a centre, the participants stated that it was due to the powerful influence of street life and nothing to do with the centre. One reason why there may have been such positive feedback about the drop-in centres was because only street children who regularly attended drop-in centres were recruited. Presumably, street children who regularly attend drop-in centres enjoy going there. I did not speak to street children who chose not to visit centres or who discontinued coming to the centres. They may have made criticisms of the drop-in centres.

It was evident in the conversations with the children that they were grateful to the staff and drop-in centres for their unending support; however, the children expressed feeling conflicted about living on the streets. They recognized that the streets were not conducive to their health and well-being; at the same time, they enjoyed their freedom on the streets and felt it was their home. This positive sentiment they had about street life was what prevented them from accepting better opportunities provided by the drop-in centre, such as enrolment in shelter homes or formal schools. It is critical to understand how we can address this barrier. One possibility would be to provide regular, ongoing counselling for all street children. I observed that due to a lack of resources, street children were provided counselling either on a sporadic basis or on an ongoing basis if they had severe behavioural problems. Another possibility may be to implement

a trial period where children can live in shelter homes for a short period of time so that they can become gradually used to living in these homes. Presently, any street child wishing to live in a shelter home must have their case heard by the Child Welfare Committee (CWC), the authority handling matters of child care and protection in India, to explain the level of care and protection they are receiving from their current guardian(s). The CWC hears each child's case, usually in the presence of an NGO employee, police officer, or public servant. After assessing the child's situation, the CWC deems if the child's circumstances warrants him or her to live in a shelter home. The child's case must be heard by the CWC because guardianship would legally change to the State if the CWC ordered a child to live in a shelter home. More street children may decide to live in shelter homes if they are allowed to experiment with living in them first. NGOs should work with the CWC to devise a plan to help street children become gradually used to living in shelter homes.

The qualitative findings showed that drugs play a large part in street life. The staff at the centres noted that it would be much easier to rehabilitate children if they were not addicted to drugs, because the addiction made it hard for the children to leave street life. For this reason, the drop-in centres invested many resources into drug de-addiction programs. One staff member mentioned that these programs should be followed with direct placement in a shelter home, which was usually not the case. After the street children's drug detoxification programs were over, they were typically sent back to live on the streets. Within days they were addicted again. Greater coordination between programs for street children is necessary for programs to be more effective.

Another purpose of the qualitative study was to characterize the main aspects of the exposure variable – drop-in centre attendance – for the quantitative study. Specifically, I

reviewed findings from the qualitative study to develop ideas about any intermediary exposure variables related to the drop-in centre that impacted the three outcomes: physical health, substance use, and mental health. I then investigated these intermediary exposure variables in the quantitative study. For instance, the children provided information about the types of health problems they commonly experienced and the kinds of drugs they used. They also described the places where they sought health care, like the pharmacist and local clinics. I then incorporated questions about these particular items in the quantitative questionnaires. If these questions had not been included in the questionnaires, it would not have been possible to obtain an accurate picture of the health and substance use behaviour of street children.

Challenges with the Qualitative Study

There were multiple challenges in conducting the qualitative portion of the research. Younger children were difficult to interview because they were easily distracted and did not have the attention span to sit down for a lengthy interview. In these cases, I conducted the interview over two sessions. Some of the children who had a history of being exploited were hesitant to provide me with much information at first. These interviews had to be discontinued because the participants were providing only the bare minimal responses, even though they had agreed to participate in the study. I spent weeks building a rapport with these particular children, and I interviewed them again near the end of the study. The children were more talkative during the second round of interviews.

There were also problems with maintaining privacy throughout the interviews at first. The centres had limited space, so the interviews had to be held in the afternoons when the drop-in centre services were closed for the day. Still, people came in and out of the centres to visit the staff members who were still working. Many of these people were curious about the interviews.

As a result, the interviews had to be stopped repeatedly so that I could explain that the interviews were confidential and required privacy. This worked and eventually we received the privacy needed.

My Roles

My role was not only that of a researcher in New Delhi; I embraced multiple roles at the drop-in centres. For instance, in addition to collecting data at the centres, I volunteered there. It is not uncommon for researchers to volunteer with organizations to build a rapport with participants. Gross, Landfried, and Herman (1996) reported that the researcher in their study worked as an independent volunteer at the street child NGO with which they were affiliated to study the health of street children. The organization I worked with strongly preferred that researchers volunteered at the centres because they were short-staffed and needed any help they could get. More importantly, volunteering helped the children to become comfortable with the researchers. In the mornings, I taught the children English and Mathematics. I served them lunch alongside the other staff. I helped to enrol them in formal schools and drug detoxification facilities.

Naturally, I developed attachments to many of the street children and vice versa. The children called me “Didi”, which in Hindi means “sister”. They shared many of their problems with me. The children realized that I was there to do research, but many of the children had known me from when I worked there previously as a fieldworker and teacher. My previous involvement with the organization, as well as my role as a volunteer during the data collection, helped me to develop a trusting relationship with the children and staff. These relationships were important to ensure the children did not feel exploited in any way during the research process.

It was important that trusting relationships were developed between the street children and me; however, it also created challenges for maintaining an objective lens during the analysis of the qualitative data, which took place concurrently with the data collection. To ensure that qualitative analysis was conducted as objectively as possible, I tried to maintain reflexivity throughout the data collection and analysis by writing in a journal and taking field notes. According to Barry, Britten, Barber, Bradley, and Stevenson (1999), reflexivity is an awareness of the influence of the researcher's own presence and involvement in the research. Reflexivity is the process of having researchers acknowledge that they are part of the phenomenon they are studying. By being mindful about how their involvement influences the direction of research, they can improve the quality and trustworthiness of the research (Barry et al., 1999). One way to retain a reflexive stance is by keeping a reflexive journal. Lincoln and Guba (1985) described a reflexive journal as a diary where the researcher regularly documents her thoughts on what is happening with the research in terms of the researcher's own values and interests. In addition, the researcher records any methodological decisions in this journal, and her reasons for them (Lincoln & Guba, 1985).

I did reflexive journaling on a daily basis. I recorded my understandings of the data, and any of my beliefs that I felt would skew the findings. When analyzing the data, I referred to the journal to ensure that I was not imposing my preconceptions on the analysis. In this way, the journal helped to sensitize me to my prejudices and sensitivities, while informing me of the impact of these influences on the credibility of the research outcomes. As another way to ensure credibility of the data, I took the preliminary analyses to the participants for their comments. In all the cases, the participants confirmed the findings. By having multiple safeguards for credibility, I can be confident that the findings are trustworthy.

Cross-sectional Study

Following the qualitative study, I conducted a cross-sectional study to understand whether street children who regularly attended drop-in centres (attenders) experienced better physical and mental health, and engaged in less substance use than street children who did not visit centres (non-attenders). Also, I wanted to know whether regular attendance at a drop-in centre in the previous 12 months was associated with improved physical health, mental health and substance use outcomes.

In the cross-sectional data, I found that attenders had better physical and mental health outcomes than non-attenders ($p<0.01$). Attenders also used fewer substances than non-attenders ($p<0.01$) and they were more likely to be never or former substance users than current substance users ($p<0.01$). However, when I assessed the association between the same outcomes and regular monthly attendance in the previous 12 months, I found that although street children used 4.6% fewer substances for every month of attendance (95% CI=1.3% to 8.0%, p=0.01), monthly attendance was only marginally significant in predicting physical health outcomes at a power of 80% (OR=0.98, 95% CI=0.96 to 1.00, p=0.05), and it was not a significant predictor of mental health problems (β=-0.44, 95% CI=-1.0 to 0.14, p=0.14).

When the outcomes were analyzed as a function of the binary exposure variable (attenders versus non-attenders) as opposed to the continuous exposure variable (number of months of regular attendance in the past 12 months), the analyses showed more positive results. This may be due to selection bias – street children who regularly visit drop-in centres may be healthier and engage in less substance use than street children who do not visit centres. Alternatively, it may be that only a small number of visits to a drop-in centre was required for the outcomes to improve, after which it stayed at that improved level if children kept attending. I

could not check this because the outcomes were only assessed after five visits to a centre, not after each visit.

It is important to keep in mind that our cross-sectional study had low power because of our small sample size. In conclusion, drop-in centres may need to do more to meet the physical and mental health concerns of street children.

Longitudinal Study

The results obtained above are from a cross-sectional study. It is difficult to determine causation through cross-sectional designs. Causation is more likely when there is a temporal relationship between the predictor and outcomes. Therefore, I attempted to follow the exposure group from the cross-sectional study over time to examine how the physical health, mental health and substance use status of street children changed with longer duration of attendance at the centres. Unfortunately, it was very challenging following participants over time. I had a response rate greater than 80%; however, 51% of the participants were lost in follow-up. Therefore, I did not have sufficient numbers to analyze the longitudinal data. More research is needed to understand how to best conduct longitudinal studies with populations that are difficult to follow.

Synthesis of the Qualitative and Quantitative Results

It is important to look at the findings from the qualitative and quantitative studies in their entirety to understand how and to what extent drop-in centres may work to impact street children's health. The findings from the qualitative study revealed a very positive picture of drop-in centres, showing that street children deeply valued drop-in centres, while the results from the quantitative study portrayed only a somewhat positive picture. The former makes sense because the street children felt that a drop-in centre was their only source of support and therefore played a significant part in improving their physical health, mental health and

substance use status through a variety of ways. On the other hand, I found a significant positive correlation only between drop-in centre attendance in the past 12 months and reduced substance use, while the correlation between attendance in the past 12 months and mental health was not significant and only marginally significant between attendance in the past 12 months and number of ill health outcomes per month.

There are many reasons that could explain the difference between the positive qualitative findings and the mixed quantitative results. For instance, in the quantitative study, I did not discriminate in the severity of health outcomes. I asked about all the health problems the children experienced in the past month, whether the health conditions were as serious as malaria or as slight as minor dermatitis. I also asked about the health care the children received for each of those problems. I found that 0.85 of the children in the exposure group with health problems (n=68) did not seek any health care for at least one of their health problems. It could be that due to limited health personnel or time, or because the participants believed that some of their minor health problems did not require treatment, the children visited the drop-in centre doctors only for more severe outcomes. It is understandable then that drop-in centre attendance in the past 12 months was not significantly correlated with reduced ill health outcomes because a centre physician was not assessing a large portion of the health outcomes. In the qualitative study, the children reported that the centre had a positive impact on their health possibly because the few times they saw the centre's physician, it was for a severe health problem that the physician was able to treat. More research is needed to understand if this indeed was the case. If it was, then drop-in centres require more health professionals to meet the health needs of street children, and drop-in centre staff members need to encourage the children to seek health care for all their health problems. It would also be beneficial to conduct more general health check-ups to detect

and treat some of the health problems at an earlier stage before they progress. This would require more staff, as well.

The lack of staff members and time at the centres may also be one reason why a significant correlation was not observed between regular monthly attendance at centres and mental health outcomes. Most street children in the sample had mental health concerns, so it may be that only children with more severe mental health concerns were counselled by drop-in centre staff due to an insufficient number of staff to attend to all the children.

Overall, the findings from the studies show that drop-in centres are beneficial for street children. Drop-in centres fill an important gap for health care and protection that other entities – such as hospitals, the police, and government services – do not. Not only are such organizations failing to meet the needs of street children, but they also discriminate against them, creating more problems for this vulnerable group. Drop-in centres still need to do much more to address the physical health problems and mental health of street children. For instance, more general health check-ups are needed to address health problems early on, staff should advocate for the children to check with the centre's doctor for any health problems they have, and mental health counselling should be a priority for all the children.

These findings are relevant to drop-in centres and the funders of these centres. Previously, we had no idea of the association between drop-in centres and the health and substance use status of street children. Now we have an idea because of the studies in this dissertation. Considering that strong positive associations were not seen between monthly drop-in centre attendance and health outcomes, drop-in centres and funders can refer to the quantitative findings in this dissertation to drive projects that focus on improving preventative health services and mental health counselling for street children. On the other hand, it may be

unrealistic to expect that drop-in centres will change the physical and mental health of street children. For instance, as per the findings from the qualitative study, I found that street children received substantial value from the drop-in centres. However, this value could not been seen in the street children's health outcomes. The value of the centres resided in the fact that the centres stabilized the lives the street children and protected them from high-risk situations, but they did not necessarily improve street children's physical or mental health outcomes. It may be that this value cannot be measured through any type of quantitative study. Or perhaps future quantitative studies should be done differently by assessing different indicators that can measure this value.

Ethics

There were ethical challenges in conducting this study because street children are a vulnerable group, meaning that their circumstances are such that it does not allow them to protect their own interests. These particular circumstances are firstly, because street children are very young, they typically do not have the same decision-making capacity as adults. Secondly, the children I was working with were homeless and either completely lacked care and protection from a guardian or received very minimal care and protection.

I took numerous steps to ensure the children were able to give full, free and voluntary informed consent. For instance, I asked drop-in centre staff members to recruit street children into the study rather than recruiting the participants myself because the street children trusted the staff members and knew them better than they knew me. Secondly, I sought verbal informed consent from the participants, which was witnessed by a staff member. Other studies that have done research with street children have engaged in similar practices because many street children are not literate (Kudrati et al., 2008; Olley, 2002; Sherman et al., 2005). To further ensure the children did not feel exploited, I tried to build a rapport with them by volunteering at the centres

in the mornings and doing the data collection in the afternoons. As a result, the children felt comfortable with me during the data collection. Finally, I received ethics approval to conduct the study from the Hamilton Integrated Research Ethics Board (HiREB) in Hamilton, Ontario. I contacted several research ethics committees in New Delhi, India, to apply for local ethics approval. Unfortunately, I was informed that research ethics committees in New Delhi do not review ethics applications for out-of-county applicants. I subsequently reached out to several members of research ethics committees in New Delhi and requested them to review my study's protocol. Two members of two different research ethics committees in New Delhi reviewed the protocol and deemed the study to be ethical. The HiREB felt this level of ethical approval was sufficient to proceed with the study.

Methodological Advances

Major methodological advances were made in this research. This is the first research to utilize both qualitative and quantitative methods to comprehensively understand how drop-in centres work and what their effect is on the health and substance use status of street children. Rigorous criteria were applied to define the exposure and comparison groups in the quantitative study. This may have resulted in small numbers, and therefore low power, but it allowed us to have strong internal validity. In addition to the qualitative and cross-sectional studies, I designed and implemented a longitudinal study following street children at two centres. This was particularly difficult because street children are a mobile group who travel frequently to wherever the economic opportunities are. Street children had to be closely monitored for when they came to a drop-in centre and when they met the eligibility criteria to participate in the follow-up questionnaires. I had to be careful to conduct the follow-up questionnaire on the day

that the participants met the eligibility criteria because I faced the possibility of not being able to reach them afterwards.

Other Issues

The female street child population was not well represented in my studies. For instance, many of the articles in the literature review had either very few female participants or none at all. Female street children were not interviewed in the qualitative study, and there were only ten females in the cross-sectional study, all in the exposure group. Female street children are a challenging group to study partly because there are fewer girls than boys on the streets, and also because female street children are more vulnerable to threats on the streets, such as sexual trafficking and slavery (Consortium for Street Children, 2009). Other studies also have had difficulties making contact with female street children. For instance, Aptekar and Ciano-Feddro (1999) found it impossible to obtain an equal number of randomly selected street girls as street boys in Nairobi because there were very few street girls. Therefore, they had to choose street girls non-randomly as they were made known to the agencies and researchers. Seth, Kotwal, and Ganguly (2005) also remarked that they found no female volatile solvent users throughout their study period in Delhi. The lack of data from female street children in this thesis implies that these findings may not be applicable to the larger female street child population in New Delhi.

Issues related to sexual health and intravenous drug use did not surface in the qualitative findings and cross-sectional study, even though the literature showed that both issues were of concern in the street child population. For instance, in Patel and Bansal's (2010) study in India (n=326), 51% of the children with a history of having had sex had symptoms suggestive of STI infection in the past six months. Busza et al. (2010) found that 16% of their sample (n = 805), aged 10 to 19 years in Ukraine, engaged in injection drug use. My lack of findings in these areas

could be because street children felt uncomfortable disclosing these issues to me, or because they had not been diagnosed with sexual health issues. Drop-in centre staff members should make greater efforts to ascertain the sexual health status and intravenous drug use behaviours of street children so that appropriate interventions can be designed to address the issues.

Future Directions for Research

Several studies in the literature review advocated for comprehensive and appropriate programs for street children that aim to improve their health. For instance, Salem and Abdel Latif (2002) said that there was a need to evaluate and upgrade street child programs to include both physical and mental health guidance. Kudrati, Plummer and Yousif (2008) called for street-based services to improve street children's health and safety. Busza et al. (2010) advocated for future research to explore facilities perceived as user-friendly among street children. In Embleton, Atwoli, Ayuku and Braitstein's (2013) study, the majority of street children (91%, n=133) said that they wanted to see more services available to help them stop using drugs. The authors recommended innovative and multifaceted programs to prevent, reduce and stop drug use among the population. Souza et al. (2011) believed that drop-in centres, based on outreach work and the case management approach, could be a promising strategy to address the complex health and social needs of street children.

My research has shown that drop-in centres meet the criteria outlined in previous studies. Drop-in centres provide comprehensive and multi-faceted services that target not only the physical health of street children, but also their mental health and substance use status. More importantly, though, they are user-friendly for street children so that street children feel comfortable accessing the services. I believe that the drop-in centre model is the most suitable mechanism by which to improve the health and substance use status of street children. Therefore,

it is imperative that we research how to improve the model to have greater impact on the health and substance use status of street children.

There are several possibilities for future directions of research in this area to improve our understanding of how drop-in centres work and their impact on the health of street children in LMICs. First, it is important to conduct qualitative studies with street children who do not go to drop-in centres to understand why they do not attend the centres. This may provide us with insight into the limitations of drop-in centres and their ability to reach out to street children. Second, we need better longitudinal studies to assess the impact of drop-in centres over time. This may require a multi-year study conducted over multiple drop-in centres in one city to obtain an adequate sample size, in addition to following a stable comparison group. Although a study over multiple centres would lead to more heterogeneity, and would be complex and costly, a sufficiently large study would allow for greater applicability of the findings.

Future longitudinal studies should also seek to understand how to follow a comparison group of street children who do not attend centres. Following street children who do not attend centres is very challenging because the children do not have a fixed residence or secondary contacts. Any follow-up study with this group will first require a better understanding of how to maintain contact with them. Finally, for results to be generalizable, we must conduct studies with drop-in centres in other low- and middle-income countries. Drop-in centres are not all the same. While the two centres I worked at were very similar in the services they provided because they were run by the same organization, other centres around the world vary in the services they provide. The services provided largely depend on the financial resources available and the need for the particular services. Some centres only offer a free breakfast or lunch while others provide education, lunches and medical care. Therefore, different centres may show different types of

results. Future studies can evaluate the impact of different types of centres of the health of street children.

Through the studies presented in this dissertation, significant strides have been made towards understanding the manner and the extent to which drop-in centres influence the health and substance use status of street children in New Delhi, India. However, there is a great deal of research that needs to be done to understand the impact of such centres on the health of street children in other LMICs.

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Appendix 1: Consent Forms

This section provides the child participant and staff participant consent information sheets and consent forms.

CHILD PARTICIPANT INFORMATION SHEET FOR QUALITATIVE STUDY

Title of Study: Investigating the Impact of Contact Points on the Health of Street Children in New Delhi, India

Locally Responsible Investigators: Dr. Harry Shannon, PhD, Department of Clinical Epidemiology and Biostatistics, McMaster University

Co-Investigator: Dr. Parminder Raina, PhD, Department of Clinical Epidemiology and Biostatistics, McMaster University

Principal Investigator (Student): Ronita Nath, MPH (PhD Candidate), Department of Clinical Epidemiology and Biostatistics, McMaster University

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Instructions for obtaining verbal consent: *Read the following to the child in Hindi with a contact point staff member present as a witness. Ask the child if he understands what is being asked of him. Request verbal consent after the instructions have been read and the child understands what is being asked.*

You are being invited to participate in a research study conducted by the student, Ronita Nath. The study will help the student learn more about contact points and how they impact the health of street children.

In order to decide whether or not you want to be a part of this research study, you should understand what is involved and the potential risks and benefits. This form gives detailed information about the research study, and I will discuss this with you. Once you understand the study, you will be asked to verbally consent to the information on this form if you wish to participate. Please take your time to make your decision. Feel free to discuss it with your friends, family and the contact point staff.

WHY ARE WE DOING THIS STUDY?

Street children experience worse overall physical and mental health compared to children who do not live on the streets. This research is being done because it is important to understand the impact of interventions that aim to improve the overall physical and health of street children.

WHY AM I BEING ASKED TO BE IN THIS STUDY?

The purpose of this study is to understand if contact points improve the physical and mental health of street children and how this happens.

WHAT WILL I HAVE TO DO IF I AM IN THE STUDY?

If you volunteer to participate in this study, we will ask you to do the following things:

Take part in a 30 to 45 minute audiotaped interview at this time where you will be asked about your experiences at the contact point, your health, your access to health care, your experience with substance use, as well as some questions about your behaviour and feelings.

We will do this interview at your contact point.

WILL I BE HURT IF I AM IN THE STUDY?

This study will involve very little risk and discomfort. The risk and discomfort will not be greater than what you experience in your daily life. Risks may include emotional discomfort from answering questions. If you feel uncomfortable at any point, we can stop and continue later, or you can withdraw from the study.

HOW MANY PEOPLE WILL BE IN THIS STUDY?

About 10 to 12 children from the NDRS Contact Point, 10 to 12 children from the Kishalaya Contact Point, and two to three staff members from each contact point will be participating in this study for a total of about 25 to 30 people.

WILL THIS STUDY HELP ME?

This study will not directly help you if you participate. Your participation will help promote our understanding of what factors at the contact point influence the health of street children in New Delhi.

DO I HAVE TO BE IN THIS STUDY IF I DO NOT WANT TO BE?

You do not have to be in this study, if you do not want to be. You will not lose any service or assistance at the contact point if you choose to not participate in the study. If you decide that you don't want to be in the study after we begin, that's OK too. Nobody will be angry or upset. We are discussing the study with the contact point staff and you should talk to them about it too.

WHAT INFORMATION WILL BE KEPT PRIVATE?

Your data will not be shared with anyone except with your consent. All personal information such as your name, will be replaced with a number. A list linking the number with your name

will be kept in a secure place, separate from your file. The data, with identifying information removed, will be securely stored in an encrypted, password protected computer.

If the results of the study are published, your name will not be used and no information that discloses your identity will be released or published without your specific consent to the disclosure.

The audio-tapes will only be listened to by members of the research team for purposes of analyzing the data. The audiotapes will be destroyed after one year.

When you verbally provide consent to the information on this form, a copy of the form will be given to the contact point, signed and dated by the investigator. You will be able to request this form at any time. I will keep the other under lock and key, separate from your reported responses.

CAN I STOP EARLY?

If you volunteer to be in this study, you may withdraw at any time and this will in no way affect the services you receive at this contact point. You can withdraw by letting Ronita know you do not want to continue any longer, or you can tell any other contact point staff member. You have the option of removing your data from the study. You may also refuse to answer any questions you don't want to answer and still remain in the study.

WILL I BE PAID TO PARTICIPATE IN THIS STUDY?

You will not receive any money for participating in this study.

WILL THERE BE ANY COSTS?

Your participation in this research project will not involve any additional costs to you.

WHAT HAPPENS AFTER THE STUDY?

When we are finished this study, we will write a report about what was learned. This report will not include your name or that you were in the study.

DO YOU HAVE ANY QUESTIONS NOW?

Please feel free to ask any questions you have now to the student researcher, Ronita.

IF I HAVE ANY QUESTIONS OR PROBLEMS, WHOM CAN I CALL?

If you have any questions about the research later, please contact Ronita Nath at _____ (list number in India once available).

CONSENT STATEMENT FOR CHILD PARTICIPANT VERBAL CONSENT

Participant:

I have received the preceding information thoroughly. I have had an opportunity to ask questions and all of my questions have been answered to my satisfaction. I agree to participate in this study. I understand that the contact point will keep a copy of this form.

Verbal consent was received from the participant: ☐ **Yes** ☐ **No**

Name of child: _____

Contact Point: _____

Person obtaining consent:

I have discussed this study in detail with the participant. I believe the participant understands what is involved in this study.

Name, Role in Study	**Signature**	**Date**

Witness:

I was present when the information in this form was explained and discussed with the participant. I believe the participant understands what is involved in this study.

Name	**Signature**	**Date**

This study has been reviewed by the Hamilton Integrated Research Ethics Board (HIREB). The HIREB is responsible for ensuring that participants are informed of the risks associated with the research, and that participants are free to decide if participation is right for them. If you have any questions about your rights as a research participant, please call the Office of the Chair, Hamilton Integrated Research Ethics Board at 905.521.2100 x 42013.

June 2014

STAFF PARTICIPANT INFORMATION SHEET

Title of Study: Investigating the Impact of Contact Points on the Health of Street Children in New Delhi, India

Locally Responsible Investigators: Dr. Harry Shannon, PhD, Department of Clinical Epidemiology and Biostatistics, McMaster University

Co-Investigator: Dr. Parminder Raina, PhD, Department of Clinical Epidemiology and Biostatistics, McMaster University

Principal Investigator (Student): Ronita Nath, MPH (PhD Candidate), Department of Clinical Epidemiology and Biostatistics, McMaster University

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You are being invited to participate in a research study conducted by the student, Ronita Nath, because you are a staff member who regularly works at this contact point. This is a student research project conducted under the supervision of Dr. Harry Shannon and Dr. Parminder Raina at McMaster University in Canada. The study will help the student learn more about contact points and how this impacts the health of street children.

In order to decide whether or not you want to be a part of this research study, you should understand what is involved and the potential risks and benefits. This form gives detailed information about the research study, which will be discussed with you. Once you understand the study, you will be asked to sign this form if you wish to participate. Please take your time to make your decision. Feel free to discuss it with your friends, family and the contact point staff.

There are no conflicts of interest to any of the investigators in this study.

WHY IS THIS RESEARCH BEING DONE?

Street children experience worse overall physical and mental health compared to children who do not live on the streets. This research is being done because it is important to understand the impact of interventions that aim to improve the overall physical and mental health of street children.

WHAT IS THE PURPOSE OF THIS STUDY?

The purpose of this study is to understand if contact points improve the physical and mental health of street children and how this happens.

WHAT WILL MY RESPONSIBILITIES BE IF I TAKE PART IN THE STUDY?

If you volunteer to participate in this study, we will ask you to do the following things:

Take part in a 30 to 45 minute audiotaped interview at this time where you will be asked about the significance of contact point programs and the impact they have on the lives of street children. We will do this interview at the contact point.

WHAT ARE THE POSSIBLE RISKS AND DISCOMFORTS?

This study will involve very little risk and discomfort. The risk and discomfort will not be greater than what you experience in your daily life. Risks may include emotional discomfort from answering questions. If you feel uncomfortable at any point, we can stop and continue later, or you can withdraw from the study.

HOW MANY PEOPLE WILL BE IN THIS STUDY?

About 10 to 12 children from the NDRS Contact Point, 10 to 12 children from the Kishalaya Contact Point, and two to three staff members from each contact point will be participating in this study for a total of about 25 to 30 people.

WHAT ARE THE POSSIBLE BENEFITS FOR ME AND/OR FOR SOCIETY?

You will not directly benefit from participating in this study. Your participation will help promote our understanding of what factors at the contact point influence the health of street children in New Delhi.

IF I DO NOT WANT TO TAKE PART IN THE STUDY, ARE THERE OTHER CHOICES?

There are no alternative procedures. Your position at the contact point will not be affected if you choose to not participate in the study.

WHAT INFORMATION WILL BE KEPT PRIVATE?

Your data will not be shared with anyone except with your consent. All personal information such as your name, will be replaced with a number. A list linking the number with your name will be kept in a secure place, separate from your file. The data, with identifying information removed, will be securely stored in an encrypted, password protected computer.

If the results of the study are published, your name will not be used and no information that discloses your identity will be released or published without your specific consent to the disclosure.

The audiotapes will only be listened to by members of the research team for purposes of analyzing the data. The audiotapes will be destroyed after one year.

At the time that you sign this consent form, you will receive a copy of it for your records, signed and dated by the investigator. I will keep the other under lock and key, separate from your reported responses.

CAN PARTICIPATION IN THE STUDY END EARLY?

If you volunteer to be in this study, you may withdraw at any time and this will in no way your position at this contact point. You can withdraw by letting Ronita know you do not want to continue any longer, or you can tell any other contact point staff member. You have the option of removing your data from the study. You may also refuse to answer any questions you don't want to answer and still remain in the study.

WILL I BE PAID TO PARTICIPATE IN THIS STUDY?

You will not receive any money for participating in this study.

WILL THERE BE ANY COSTS?

Your participation in this research project will not involve any additional costs to you.

DO YOU HAVE ANY QUESTIONS NOW?

Please feel free to ask any questions you have now to the student researcher, Ronita.

IF I HAVE ANY QUESTIONS OR PROBLEMS, WHOM CAN I CALL?

If you have any questions about the research later, please contact Ronita Nath at _____ (list number in India once available).

CONSENT STATEMENT FOR STAFF PARTICIPANT

Participant:

I have read the preceding information thoroughly. I have had an opportunity to ask questions and all of my questions have been answered to my satisfaction. I agree to participate in this study. I understand that I will receive a signed copy of this form.

Name	**Signature**	**Date**

Person obtaining consent:

I have discussed this study in detail with the participant. I believe the participant understands what is involved in this study.

Name, Role in Study	**Signature**	**Date**

This study has been reviewed by the Hamilton Integrated Research Ethics Board (HIREB). The HIREB is responsible for ensuring that participants are informed of the risks associated with the research, and that participants are free to decide if participation is right for them. If you have any questions about your rights as a research participant, please call the Office of the Chair, Hamilton Integrated Research Ethics Board at 905.521.2100 x 42013.

June 2014

CHILD PARTICIPANT INFORMATION SHEET FOR QUANTITATIVE STUDY

Title of Study: Investigating the Impact of Contact Points on the Health of Street Children in New Delhi, India

Locally Responsible Investigators: Dr. Harry Shannon, PhD, Department of Clinical Epidemiology and Biostatistics, McMaster University

Co-Investigator: Dr. Parminder Raina, PhD, Department of Clinical Epidemiology and Biostatistics, McMaster University

Principal Investigator (Student): Ronita Nath, MPH (PhD Candidate), Department of Clinical Epidemiology and Biostatistics, McMaster University

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Instructions for obtaining verbal consent: *Read the following to the child in Hindi with a contact point staff member present as a witness. Ask the child if he understands what is being asked of him. Request verbal consent after the instructions have been read and the child understands what is being asked.*

You are being invited to participate in a research study conducted by the student, Ronita Nath. The study will help the student learn more about contact points and how they impact the health of street children.

In order to decide whether or not you want to be a part of this research study, you should understand what is involved and the potential risks and benefits. This form gives detailed information about the research study, and I will discuss this with you. Once you understand the study, you will be asked to verbally consent to the information on this form if you wish to participate. Please take your time to make your decision. Feel free to discuss it with your friends, family and the contact point staff.

WHY ARE WE DOING THIS STUDY?

Street children experience worse overall physical and mental health compared to children who do not live on the streets. This research is being done because it is important to understand the impact of interventions that aim to improve the overall physical and mental health of street children.

WHY AM I BEING ASKED TO BE IN THIS STUDY?

You are being asked to be in this study because you visit the contact point regularly.

WHAT WILL I HAVE TO DO IF I AM IN THE STUDY?

If you volunteer to participate in this study, we will ask you to do the following things:

Take part in a 10 to 15 minute verbal questionnaire at this time where:

- You will asked about any ill health outcomes you experienced in the prior month.
- Your height and weight will be measured.
- You will be asked about your health habits.
- You will be asked about taking substances.
- You will be asked about your feelings and emotions.

We will do this questionnaire at your contact point. You do not have to answer any part of the questionnaire you do not feel comfortable answering. If you visit the contact point regularly each month until September 2015, we will ask for you to complete these verbal questionnaires once per month until September 2015.

We are asking also for your permission to collect your medical data from only the contact point medical records. By signing this consent form, you are allowing such access.

WILL I BE HURT IF I AM IN THE STUDY?

This study will involve very little risk and discomfort. The risk and discomfort will not be greater than what you experience in your daily life. Risks may include emotional discomfort from answering questions. If you feel uncomfortable at any point, we can stop and continue later, or you can withdraw from the study.

HOW MANY PEOPLE WILL BE IN THIS STUDY?

Thirty children will be participating from the NDRS Contact Point and another 30 children from the Kishalaya Contact Point, as well as about 10 street children who do not come to contact points. A total of 70 children will be taking part in this study.

WILL THIS STUDY HELP ME?

This study will not directly help you if you participate. Your participation will help promote our understanding of what factors at the contact point influence the physical and mental health of street children in New Delhi.

DO I HAVE TO BE IN THIS STUDY IF I DO NOT WANT TO BE?

You do not have to be in this study, if you do not want to be. You will not lose any service or assistance at the contact point if you choose to not participate in the study. If you decide that you don't want to be in the study after we begin, that's OK too. Nobody will be angry or upset. We are discussing the study with the contact point staff and you should talk to them about it too.

WHAT INFORMATION WILL BE KEPT PRIVATE?

Your data will not be shared with anyone except with your consent. All personal information such as your name, will be replaced with a number. A list linking the number with your name will be kept in a secure place, separate from your file. The data, with identifying information removed, will be securely stored in an encrypted, password protected computer.

If the results of the study are published, your name will not be used and no information that discloses your identity will be released or published without your specific consent to the disclosure.

When you verbally provide consent to the information on this form, a copy of the form will be given to the contact point, signed and dated by the investigator. You will be able to request this form at any time. I will keep the other under lock and key, separate from your reported responses.

CAN I STOP EARLY?

If you volunteer to be in this study, you may withdraw at any time and this will in no way affect the services you receive at this contact point. You can withdraw by letting Ronita know you do not want to continue any longer, or you can tell any other contact point staff member. You have the option of removing your data from the study. You may also refuse to answer any questions you don't want to answer and still remain in the study.

WILL I BE PAID TO PARTICIPATE IN THIS STUDY?

You will not receive any money for participating in this study.

WILL THERE BE ANY COSTS?

Your participation in this research project will not involve any additional costs to you.

WHAT HAPPENS AFTER THE STUDY?

When we are finished this study we will write a report about what was learned. This report will not include your name or that you were in the study.

DO YOU HAVE ANY QUESTIONS NOW?

Please feel free to ask any questions you have now to the student researcher, Ronita.

IF I HAVE ANY QUESTIONS OR PROBLEMS, WHOM CAN I CALL?

If you have any questions about the research later, please contact Ronita Nath at _____ (list number in India once available).

CONSENT STATEMENT FOR CHILD PARTICIPANT VERBAL CONSENT

Participant:

I have received the preceding information thoroughly. I have had an opportunity to ask questions and all of my questions have been answered to my satisfaction. I agree to participate in this study. I understand that the contact point will keep a copy of this form.

Verbal consent was received from the participant: ☐ **Yes** ☐ **No**

Name of child: _____

Contact point: _____

Person obtaining consent:

I have discussed this study in detail with the participant. I believe the participant understands what is involved in this study.

Name, Role in Study	**Signature**	**Date**

Witness:

I was present when the information in this form was explained and discussed with the participant. I believe the participant understands what is involved in this study.

Name	**Signature**	**Date**

This study has been reviewed by the Hamilton Integrated Research Ethics Board (HIREB). The HIREB is responsible for ensuring that participants are informed of the risks associated with the research, and that participants are free to decide if participation is right for them. If you have any questions about your rights as a research participant, please call the Office of the Chair, Hamilton Integrated Research Ethics Board at 905.521.2100 x 42013.

June 2014

Appendix 2: Research Instruments for Qualitative Study

This section provides the research instruments that were used in the qualitative and quantitative studies.

Interview guide for child participant interviews

Script (Read in Hindi)

Thank you for agreeing to do this interview with me. It will take about a half hour to 45 minutes. I will be asking you some questions about your experience at the contact point. I would like your permission to tape record this interview, so I may accurately document the information you provide. If at any time you wish to discontinue the interview, please feel free to let me know. All of your responses are confidential and will remain confidential. The purpose of this study is to increase our understanding of the contact point program.

Do you have any questions or concerns before we begin? Then with your permission we will begin the interview.

Questions	Probes
Contact point general thoughts	
1. Tell me about why you come to the contact point.	*- Do you come here for food, education, free health care, to meet with people, or for some other reason? Please describe.* *- Why is the contact point important to you?*
2. In what ways has your use of the contact point influenced your health (physical health, emotional health, and mental health)?	*- How has coming to the contact point made your health better or worse? Please explain.*
Physical health	
3. In what ways has coming to the contact point influenced your physical health?	*- How do you think the food you receive here has influenced your physical health, if at all?* *- How important are the free lunches to you? Please explain.* *- How has the health care provided here influenced your physical health?* *- In what ways has learning about being clean and healthy at the contact point influenced your physical health?*

Substance Use	
4. What are your thoughts on substance use?	- *Why do you feel this way?*
5. What have you learned here, if anything, about using substances?	- *Has the staff talked to you about using substances?* - *What have they said?* - *Have your peers talking to you about using substances?* - *What have they said?*
6. *(If participant uses substances, ask this question)* How has coming to the contact point had an impact on your use of substances?	- *(If there is an impact) Why do you think coming to the contact point has influenced your use of substances?* - *How have your interactions with the staff and other children at the contact point influenced your use of substances?*
Mental Health	
7. How has coming here influenced your state of mind or emotions?	- *How do you feel when you come here (happy, sad)? Please explain.* - *Tell me about what happens here at the contact point that makes you feel that way.* - *Tell me about how you feel when you leave the contact point and are in your usual environment. (Explore if there are any changes)*
8. Please explain what your relationships with the people at the contact point mean to you and how that influences your state of mind and emotions?	- *Please describe how important or not important they are to you?* - *Please describe the level of trust and support you receive at the contact point compared to the level of trust and support you receive on the streets.*
9. If the contact point were not available, where would you go for… *(here fill in whatever the interviewee has given as reasons for using the contact point)?*	- *What does that mean to you? Please explain.*

Demographic variables:
(Note: Name, age and contact point are collected on a separate form.)

1. Residence of: _____

2. Current residence: _____

3. Lives with family: ____ Yes ____ No

4. Currently in school: ____Yes ____ No

5. What is the highest educational level you have completed?

____ No education

_____1st Class _____2nd Class _____3rd Class _____4th Class _____5th Class

____ 6th Class _____7th Class _____8th Class _____9th Class _____10th Class

_____11th Class ____12th Class

6. How long have you been living or working on the streets (in months)?

_____

7. How many months have you regularly been coming to the contact point in the past 12 months (in months)? _____

8. Drugs use status:

____ Former____Current ____ Never

Script (Read in Hindi)

Thank you for your participation. Do you have any other comments you would like to add? *[Take final comments and thank the participant again]*.

Interview guide for staff participant interviews

Script (Read in Hindi)

Thank you for agreeing to do this interview with me. It will take about a half hour to 45 minutes. I will be asking you some questions about street children's experience at this contact point and about contact point programs. I would like your permission to tape record this interview, so I may accurately document the information you provide. If at any time wish to discontinue the interview, please feel free to let me know. All of your responses are confidential and will remain confidential. The purpose of this study is to increase our understanding of the contact point program.

Do you have any questions or concerns before we begin? Then with your permission we will begin the interview.

Questions	Probes
Contact point general thoughts	
1. Why do you think street children come to the contact point?	*- Do they come here for food, education, free health care, to meet with people, or for some other reason? Please describe.*
2. How do you think contact points impact the health or do not impact the health of street children?	*- How are they important for the health of street children? Please explain.* *- How do they help street children? Please explain.*
3. If this contact point were not here, how would the health of street children be different?	*- Would children's health be worse off or would it not make much of a difference? Please describe.* *- Where would they go to receive food, medical care, and shower?* *- Where would they receive the support that is provided here?*
Physical Health	
4. In what ways do coming to the contact point influence the physical health of street children?	*- How do you think the food they receive here influences their physical health?* *- Why is this an important service to provide to street children?* *- How does the health care provided here influence the physical health of street children?* *- In what ways do learning about being clean and healthy at the contact point influence the physical health of the children?*
Substance Use	
5. What does the contact point do in	*- How do you think these programs influence the*

terms of addressing substance use among street children?	*severity of drug use or the drugs use status of street children?*
Mental Health	
6. How does coming to the contact point influence the children's mental health?	*- Please describe if there any changes in the state of mind or emotions of the children after coming to the contact point?* *- (If there are changes) Why do you think there are these changes?*
7. What impact, if any, do you think your relationships with the children have on their mental health?	*- How do you think your relationships with the children influence their state of mind or emotions?*
8. What impact, if any, do you think the children's relationship with other children at the contact point have on their mental health?	*- How does your think their peer group here influences their mental health compared to their peer group on the streets?*

Script (Read in Hindi)

Thank you for your participation. Do you have any other comments you would like to add? *[Take final comments and thank the participant again]*.

Appendix 3: Research Instruments for Quantitative Study

Script

Thank you for agreeing to do this interview with me. It will take about 10 to 15 minutes. I will be asking you some questions about your health outcomes in the past month, your health habits, as well as some questions about substance use and your feelings and emotions. I would like your permission to tape record this interview, so I may accurately document the information you provide. If at any time during the interview you wish to discontinue the use of the recorder or the interview itself, please feel free to let me know. All of your responses are confidential and will remain confidential. The purpose of this study is to increase our understanding of the contact point program.

Do you have any questions or concerns before we begin? Then with your permission we will begin the interview.

Demographic variables

1. What is the highest educational level you have completed?

____ No education _____1st Class _____2nd Class _____3rd Class _____4th Class

_____5th Class _____6th Class _____7th Class _____8th Class _____9th Class

_____10th Class _____11th Class _____12th Class

2. How long have you been living or working on the streets (in months)? _____

3. How many months have you been regularly* coming to the contact point in the past 12 months (in months)? _____

   **Note: Regular attendance is defined as five or more visits to the contact point per month.*

Physical health outcomes questionnaire

Health outcomes in prior month

1. Did you experience any of the following type of health problems in the past month?

Health Outcomes in Prior Month			
Health Problem Description	**Duration**	**Experiencing health problem presently**	**Health Care Received *(may check more than one)***
Gastrointestinal problems (e.g. diarrhea, vomiting, nausea, heart burn, abdominal pain) ☐ **Yes** ☐ **No** **Description:**	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ > 2 weeks to 1 month ☐ > 1 month	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment
Skin problems ☐ **Yes** ☐ **No** **Description:**	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ > 2 weeks to 1 month ☐ > 1 month	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment
Respiratory problems (e.g. cough, chest pain) ☐ **Yes** ☐ **No** **Description:**	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ > 2 weeks to 1 month ☐ > 1 month	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment
Fever ☐ **Yes** ☐ **No** **Description:**	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ > 2 weeks to 1 month ☐ > 1 month	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment
Head related problems (e.g. headache, dizziness, injury) ☐ **Yes** ☐ **No** **Description:**	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ > 2 weeks to 1 month ☐ > 1 month	☐ Yes ☐ No	☐ Contact point health care ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment
Ear problems ☐ **Yes** ☐ **No**	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist

Description:	☐ > 2 weeks to 1 month ☐ > 1 month		☐ Hospitalization ☐ Self-medicate ☐ No treatment
Nose problems **☐ Yes** **☐ No** **Description:**	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ > 2 weeks to 1 month ☐ > 1 month	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment
Teeth problems **☐ Yes** **☐ No** **Description:**	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ > 2 weeks to 1 month ☐ > 1 month	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospital visit ☐ Self-medicate ☐ No treatment
Cut injury/wounds **☐ Yes** **☐ No** **Description:**	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ > 2 weeks to 1 month ☐ > 1 month	☐ Yes ☐ No	☐ Contact point health care ☐ Other doctor visit ☐ Hospitalization ☐ Self-medicate ☐ No treatment
Joint pain **☐ Yes** **☐ No** **Description:**	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ > 2 weeks to 1 month ☐ > 1 month	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment
Cramps **☐ Yes** **☐ No** **Description:**	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ > 2 weeks to 1 month ☐ > 1 month	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment
Lice **☐ Yes** **☐ No** **Description:**	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ > 2 weeks to 1 month ☐ > 1 month	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment
Urinary tract problems (micturition, burning urination) **☐ Yes** **☐ No** **Description:**	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ > 2 weeks to 1 month ☐ > 1 month	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment

Sexually transmitted conditions ☐ **Yes** ☐ **No** **Description:**	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ > 2 weeks to 1 month ☐ > 1 month	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment
Other (please specify) **Description:**	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ > 2 weeks to 1 month ☐ > 1 month	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment

Height and Weight: Researcher will record these values			
Height (nearest cm):		**Weight (nearest 0.1 kg):**	
Wasting:	☐ Yes ☐ No		Less than 2 SD below the median value of the WHO/ NCHS reference standard for weight-for-height.
Stunting:	☐ Yes ☐ No		Less than 2 SD below the median value of the WHO/NCHS reference standard for height-for-age.

Health outcomes in prior month for street children who were assessed in the last month

1. Instructions: For **each health problem** mentioned in last visit, ask the following questions.

   a. When we last saw you on *(date)*, you mentioned that you had the following health problem *(mention health problem from last visit)*.

   b. Do you still have the same episode of the same health problem _____ *(mention health problem from last visit, but ensure it is not a recurrence of that health problem)*?

      (If participant answers "yes", document that they are experiencing same health problem from last visit.)

      (If participant answers "no", ask the following question):
      How long did that health problem last after we saw you? *(Document answer in table below.)*

2. Did you experience any of the following health problems in the last month? *(Document in table below.)*

Health Outcomes in Prior Month					
Health problem	**Health problem from last visit**	**Experiencing SAME episode of SAME health problem from last visit**	**Duration**	**Experiencing health problem presently**	**Health care received in past month *(may check more than one)***
Gastrointestinal problems (e.g. diarrhea, vomiting, nausea, abdominal pain) **☐ Yes** **☐ No** **Description:**	☐ Yes ☐ No	☐ Yes ☐ No	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ 2 to 4 weeks ☐ 4 to 6 weeks ☐ 6 to 8 weeks ☐ > 8 weeks	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment
Skin problems **☐ Yes** **☐ No** **Description:**	☐ Yes ☐ No	☐ Yes ☐ No	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ 2 to 4 weeks ☐ 4 to 6 weeks ☐ 6 to 8 weeks ☐ > 8 weeks	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment
Respiratory problems (e.g. cough, chest pain)	☐ Yes ☐ No	☐ Yes ☐ No	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ 2 to 4 weeks	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospitalization

☐ **Yes** ☐ **No** **Description:**			☐ 4 to 6 weeks ☐ 6 to 8 weeks ☐ > 8 weeks		☐ Self-medicate ☐ No treatment
Fever ☐ **Yes** ☐ **No** **Description:**	☐ Yes ☐ No	☐ Yes ☐ No	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ 2 to 4 weeks ☐ 4 to 6 weeks ☐ 6 to 8 weeks ☐ > 8 weeks	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment
Head related problems (e.g. headache, dizziness, injury) ☐ **Yes** ☐ **No** **Description:**	☐ Yes ☐ No	☐ Yes ☐ No	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ 2 to 4 weeks ☐ 4 to 6 weeks ☐ 6 to 8 weeks ☐ > 8 weeks	☐ Yes ☐ No	☐ Contact point health care ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment
Ear problems ☐ **Yes** ☐ **No** **Description:**	☐ Yes ☐ No	☐ Yes ☐ No	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ 2 to 4 weeks ☐ 4 to 6 weeks ☐ 6 to 8 weeks ☐ > 8 weeks	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment
Nose problems ☐ **Yes** ☐ **No** **Description:**	☐ Yes ☐ No	☐ Yes ☐ No	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ 2 to 4 weeks ☐ 4 to 6 weeks ☐ 6 to 8 weeks ☐ > 8 weeks	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment
Teeth problems ☐ **Yes** ☐ **No** **Description:**	☐ Yes ☐ No	☐ Yes ☐ No	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ 2 to 4 weeks ☐ 4 to 6 weeks ☐ 6 to 8 weeks ☐ > 8 weeks	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospital visit ☐ Self-medicate ☐ No treatment
Cut injury/wounds ☐ **Yes** ☐ **No** **Description:**	☐ Yes ☐ No	☐ Yes ☐ No	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ 2 to 4 weeks ☐ 4 to 6 weeks ☐ 6 to 8 weeks ☐ > 8 weeks	☐ Yes ☐ No	☐ Contact point health care ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment

Joint/muscle pain ☐ **Yes** ☐ **No** **Description:**	☐ Yes ☐ No	☐ Yes ☐ No	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ 2 to 4 weeks ☐ 4 to 6 weeks ☐ 6 to 8 weeks ☐ > 8 weeks	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment
Cramps ☐ **Yes** ☐ **No** **Description:**	☐ Yes ☐ No	☐ Yes ☐ No	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ 2 to 4 weeks ☐ 4 to 6 weeks ☐ 6 to 8 weeks ☐ > 8 weeks	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment
Lice ☐ **Yes** ☐ **No** **Description:**	☐ Yes ☐ No	☐ Yes ☐ No	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ 2 to 4 weeks ☐ 4 to 6 weeks ☐ 6 to 8 weeks ☐ > 8 weeks	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment
Urinary tract problems (micturition, burning urination) ☐ **Yes** ☐ **No** **Description:**	☐ Yes ☐ No	☐ Yes ☐ No	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ 2 to 4 weeks ☐ 4 to 6 weeks ☐ 6 to 8 weeks ☐ > 8 weeks	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment
Sexually transmitted conditions ☐ **Yes** ☐ **No** **Description:**	☐ Yes ☐ No	☐ Yes ☐ No	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ 2 to 4 weeks ☐ 4 to 6 weeks ☐ 6 to 8 weeks ☐ > 8 weeks	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment
Other (please specify) ☐ **Yes** ☐ **No** **Description:**	☐ Yes ☐ No	☐ Yes ☐ No	☐ 1 to 2 days ☐ 3 to 6 days ☐ 1 to 2 weeks ☐ 2 to 4 weeks ☐ 4 to 6 weeks ☐ 6 to 8 weeks ☐ > 8 weeks	☐ Yes ☐ No	☐ Contact point ☐ Other doctor visit ☐ Chemist ☐ Hospitalization ☐ Self-medicate ☐ No treatment
Height and Weight: Researcher will record these values					
Height (nearest cm):		**Weight (nearest 0.1 kg):**			

Wasting:	☐ Yes ☐ No	Less than 2 SD below the median value of the WHO/ NCHS reference standard for weight-for-height.
Stunting:	☐ Yes ☐ No	Less than 2 SD below the median value of the WHO/NCHS reference standard for height-for-age.

Substance Use

1. Have you used glue/whiteout/"floot"/"solution" in the past month?
☐ Yes, I used glue/whiteout/" floot"/"solution" in the past month → Question #3
☐ No, I did not use glue/whiteout/" floot"/"solution" in the past month → Question #2

2. Have you ever used glue/whiteout/"floot"/"solution"?
☐ Yes → Question #5
☐ No → Question #5

3. On average, how often did you use glue/whiteout/"floot"/"solution" in the past month?

☐ A few times → Question #5
☐ About once or twice a month → Question #5
☐ About 1-2 days a week → Question #5
☐ About 3-5 days a week → Question #5
☐ About 6-7 days a week → Question #4

4. On average, how often did you use glue/whiteout/"floot"/"solution" per day?

☐ 1 – 4 times a day
☐ 5 – 9 times a day
☐ 10 or more times a day

5. Have you used gutka/supari/paan/chewing tobacco in the past month?

☐ Yes, I used gutka/supari/paan/chewing tobacco in the past month → Question #7
☐ No, I did not use gutka/supari/paan/chewing tobacco in the past month → Question #6

6. Have you ever used gutka/supari/paan/chewing tobacco?

☐ Yes → Question #9
☐ No → Question #9

7. On average, how often did you use gutka/supari/paan/chewing tobacco in the past month?

☐ A few times → Question #9
☐ About once or twice a month → Question #9
☐ About 1-2 days a week → Question #9
☐ About 3-5 days a week → Question #9
☐ About 6-7 days a week → Question #8

8. On average, how often did you use gutka/supari/paan/chewing tobacco per day?

☐ 1 – 4 times a day

☐ 5 – 9 times a day
☐ 10 or more times a day

9. Have you smoked cigarettes or beedis in the past month?

☐ Yes, I smoked cigarettes or beedis in the past month → Question #11
☐ No, I did not smoke cigarettes or beedis in the past month → Question #10

10. Have you ever smoked cigarettes or beedis?

☐ Yes → Question #13
☐ No → Question #13

11. On average, how often did you smoke cigarettes or beedis in the past month?

☐ A few times → Question #13
☐ About once or twice a month → Question #13
☐ About 1-2 days a week → Question #13
☐ About 3-5 days a week → Question #13
☐ About 6-7 days a week → Question #12

12. On average, how often did you smoke cigarettes or beedis per day?

☐ 1 – 4 times a day
☐ 5 – 9 times a day
☐ 10 or more times a day

13. Have you used marijuana (ganja) in the past month?
☐ Yes, I used marijuana (ganja) in the past month → Question #15
☐ No, I did not use marijuana (ganja) in the past month → Question #14

14. Have you ever used marijuana (ganja)?
☐ Yes → Question #17
☐ No → Question #17

15. On average, how often did you use marijuana (ganja) in the past month?

☐ A few times → Question #17
☐ About once or twice a month → Question #17
☐ About 1-2 days a week → Question #17
☐ About 3-5 days a week → Question #17
☐ About 6-7 days a week → Question #16

16. On average, how often did you use marijuana (ganja) per day?

☐ 1 – 4 times a day

☐ 5 – 9 times a day
☐ 10 or more times a day

17. In the past month, how often did you drink alcohol?

☐ I had a sip of alcohol to see what it's like → Question #19
☐ Once a month → Question #19
☐ 2 or 3 times a month
☐ Once a week
☐ 2 or 3 times a week
☐ 4 or 5 times a week
☐ Almost every day – 6 or 7 times a week
☐ Drank, but not in the past month → Question #19
☐ Never drank alcohol in lifetime → Question #19

18. How many times in the past month have you had 5 or more drinks of alcohol on the same occasion?

☐ Never
☐ Once
☐ 2 times
☐ 3 times
☐ 4 times
☐ 5 or more times

What other substances did you use? *For each substance:*

19. Have you used *(specify substance)* in the past month?

☐ Yes, I used _____ the past month → Question #21
☐ No, I did not use _____ → Question #20

20. Have you ever used *(specify substance)*?

☐ Yes → No more questions
☐ No → No more questions

21. On average, how often did you use _____ in the past month?

☐ A few times → No more questions
☐ About once or twice a month → No more questions
☐ About 1-2 days a week → No more questions
☐ About 3-5 days a week → No more questions
☐ About 6-7 days a week → Question #22

22. On average, how often did you use _____ per day?

☐ 1 – 4 times a day
☐ 5 – 9 times a day
☐ 10 or more times a day

Mental Health Survey, Adolescent Self-Report Version (based on School Mental Health Surveys Student Questionnaire from the 2014 Ontario Child Health Study)

Below is a list of statements that describe some of the feelings and behaviours of young people. For each statement, please select the response that best describes you now or within the past month.

Participant ID ..... Date.....

	Never or Not true	Sometimes or Somewhat True	Often or Very True
1. I am mean to others			
2. I am mean to animals			
3. I destroy my own things			
4. I destroy things belonging to others			
5. I damage property			
6. I get in many fights			
7. I lie and cheat			
8. I physically attack people			
9. I set fires			
10. I steal things from places other than home			
11. I threaten to hurt people			
12. I have been physically cruel to others			
13. I use weapons when fighting			
14. I have mugged people			
15. I have broken into someone else's house, building or car			
16. I don't like to be with people I don't know well			
17. I feel nervous with people I don't know			
18. I avoid social situations			
19. I am shy			
20. I have trouble concentrating or paying attention			
21. I have trouble sitting still			
22. I act without stopping to think			
23. I am easily distracted, having difficulty sticking to any activity			
24. I fidget			
25. I fail to finish things I start			
26. I cry a lot			
27. I deliberately try to hurt or kill myself			
28. I think about killing myself			
29. I am unhappy, sad, or depressed			
30. I have trouble enjoying myself			

31. I feel worthless or inferior			
32. I get no pleasure from usual activities			
33. I have difficulties making decisions			
34. I have had a change in appetite			
35. I have trouble sleeping			
36. I feel overtired or lack energy			
37. I am angry and resentful			
38. I lose my temper			
39. I blame others for my own mistakes			
40. I am defiant and talk back to people			
41. I argue a lot with adults			
42. I am easily annoyed by others			
43. I get back at people			
44. I am nervous or tense			
45. I am too fearful or anxious			
46. I worry a lot			
47. I am anxious or on edge			
48. I am moody or irritable			
49. When anxious I have disturbed sleep			
50. I find it hard to stop worrying			

Mental Health Survey, Teacher-Report Version

Below is a list of statements that describe some of the feelings and behaviours of students. For each statement, please select the response that best describes this student now or within the past month. *Please mark only one of the three columns for each statement.*

Participant ID ..... Date.....

	Never or Not true	Sometimes or Somewhat True	Often or Very True	Don't Know
1. Is mean to others				
2. Damages property				
3. Gets in many fights				
4. Physically attacks people				
5. Steals things from places other than his/her home				
6. Threatens to hurt people				
7. Has been physically cruel to others				
8. Uses weapons when fighting				
9. Has mugged people				
10. Has broken into someone else's house, building or car				
11. Has trouble concentrating or paying attention				
12. Has trouble sitting still				
13. Acts without stopping to think				
14. Cries a lot				
15. Is unhappy, sad, or depressed				
16. Is angry and resentful				
17. Loses his/her temper				
18. Blames others for his/her own mistakes				
19. Is defiant and talks back to people				
20. Argues a lot with adults				
21. Easily annoyed by others				
22. Is nervous or tense				
23. Is fearful or anxious				
24. Worries a lot				
25. Is anxious or on edge				

Form for Collecting Personal Identifying Information

The following form will collect personal identifying information for each participant. Each participant will be identified with a numeric code. This key will be kept in a secure place, away from the data set. The student researcher will be responsible for controlling access to the data coding key.

For child participants

Participant ID (numeric code)	Participant Name	Date of Birth	Gender	Contact Point or Streets

For staff participants

Participant ID (numeric code)	Participant Name

Appendix 4: Additional Quotes from Qualitative Data Collection

Nonjudgmental staff

Judgemental hospital staff

(C21) My mom got really sick. She needed glucose. The doctor wouldn't give it to her unless we paid 2500 rupees. I didn't have that much. The doctor didn't care about us because of who we were. He would not do anything unless he got his money.

(C17) I don't like it at hospitals. You are all alone there. They don't treat you nicely or sit with you or explain things well. Here, everyone is with you.

(C22) When I go to the hospital, they say I look dirty and that they will not take a look at me.

(C23) If I go to the hospital, they will tell me to shower and come, and only come when I am clean. They will ask, why do I do drugs. That's why I just go to the chemist because they don't say anything; they just give me my medicine.

Judgemental police

(C17) Whenever I do drugs at the station, I get beat up. The police hit me. They think I am really bad. Life at the station is really bad. The kids who live at home live a good life. Looking at them makes me wish that I lived their life. I want their life.

(C20) I don't like it on the streets. The police chase us away and harass us. They don't like us. They think we are really bad, but we are not.

Staff are nonjudgmental and trustworthy

(C2) I trust the staff because they are not going anywhere. They will always be here for us. They care about us.

(C6) I trust Sir and Ma'am. If something ever happens to me then I tell them. Like if I need books or clothes, I tell them and they give it to me.

(C7) I trust the staff here because they help us. They teach us. They give us food, drinks, clothes, everything. This is why we have the trust that we have.

(C8) I trust the staff here. On the footpath I trust my grandmother. And I trust my friend's mom. She is also very helpful.

(C9) I trust the entire staff. They also trust me. They help me like when I'm sick, they say, let's go, let's go to a doctor. They also encourage me to come to the centre each day, and to leave drugs and do some learning at the centre.

(C10) I trust them. If we get hurt, then Sir looks after us, he takes care of us.

(C14) I trust the staff because they teach us. They help us. Like if we get a fever, then Sir ji gives us medicine. He has been helping me for many years.

(C15) If I am ever in some difficulty then I tell my friend or Sir. I trust my friend just as much as I trust the staff here. I trust the staff because they trust us so I should also trust them. I don't get any kind of help at the station because everyone is always high there so no one there ever helps you.

(C17) At the station, I don't trust anyone except my friend and I also trust the staff here. Whatever Didi and Sir say, I do because I come here daily to learn from them. If I get in some kind of problem, then I will only tell Sir. I really appreciate it that Sir and Didi help us.

(C18) I trust the staff a lot because they help me. Like when I'm sick, then they help me. When I break my hands or feet, then they help me and get me treated.

(C21) I trust all the staff here. I don't trust anyone at the station.

(C24) I trust the staff because they are there to help us. They do not judge us.

Freedom to behave like a child

(C1) I like talking to everyone. I like playing and having fun here. I don't have that much fun at the station.

(C2) Before, when I didn't come here, then I was scared. I was scared that someone would come and take me to their home. Now I have the centre and they treat children like they should be treated. … It is better here than at the station because there is a lot of garbage there. There we don't shower or anything like that. Here, they take care of us like children should be taken care of. … At the station I'm always worried. People constantly swear at me. That doesn't happen here. Like when the trains come and you have to do work, people swear at you to get the work done. It doesn't feel good. Here, you can just be like a child.

(C4) I come here to meet Sir and the other children. I like playing with the children.

(C7) My mental state has become better since coming here because I realized here is better for me than the station. When I'm here, then I start thinking that if I stayed at home, I would be getting a proper education. I feel good here. You get to be free here. For a little while, there are no worries. You are taken care of. You can just be a child.

(8) Before I used to feel lazy. I would sleep for very long. I would just wander around very sad. But since I have been coming here, they have been telling me that I shouldn't sleep much, that I should come here and play, learn, and eat because that is what children do. So I'm fine right now. All my friends come here and play with me. We eat food together and we learn together.

(C10) I come to learn at the school. I really like it there. I like acting like the child I am.

(C12) I come to the contact point to learn. I like learning. Children should learn and here you can behave like a child.

(C13) We play and jump. I like playing carom board. We don't play this on the streets.

(15) Everyone gets the food here. This food helps people. I like this food because I can get it whereas no one from outside will give you food. No one helps you. If you want food, you have to pay for it. If you don't have money, you don't get food. This has happened to me before. The food here is free, so I like it. Children should not have to worry about food. They should play and have fun. Here, they let you be like a child.

(C16) Lots of children come here. I like hanging out with the other children, that's why I come here. On the streets, I don't get that very much.

(C18) I come here to play with the other children. I like it. I don't get to play like this very much at the railway station.

(C19) I usually eat packed food at the station or I get it from a restaurant. It costs 40 rupees. By collecting bottles, I earn 40 rupees. Here you don't have to pay for food. That's why I like the food here and eat here, because they treat you like a child and don't make you work for food. …I come here because I want to, because I want to learn. My heart is here. I like it here. I like being with my friends here. I'm happy in my mind when I'm here because it's a better environment than the station. When I'm at the station, then I just pick garbage and sell bottles. I do drugs. It's all right there too. I sleep there. But here I am treated like a child, and I like that.

(C20) It feels good to play and go to different places. …I really like it here. Sometimes I get frustrated because I can't understand the material they teach here. But it's better than staying on the footpath. Here I can be a child. On the streets, people take smack (cocaine) and solution. None of that happens here. We only learn here, like children should. That doesn't happen on the footpath. People only do smack there.

(C23) Here you get food for free. So there is no tension that we have to earn money for food or that we have to sell bottles.

Life is less of a struggle

Difficulties on the streets

(C1) It's very difficult there. You don't get any support. Your health becomes bad there and there is no one to look after you. The other kids don't look after you. They're just lying around. Here they look after you.

(C2) At the station you have to go here and there…for work. Like if a train comes, then you have to go. But here you can sit and be like a child. …At the station I'm always worried. People constantly swear at me. That doesn't happen here. Like when the trains come and you have to do work, people swear at you to get the work done. It doesn't feel good.

(C8) I really dislike the station. Everyone does drugs there so I don't like it. I feel like going far away from there. Life is very difficult there, and it makes me sad. I keep thinking why is it like this. Everyone does drugs and then get sick and eventually die from the lifestyle.

(C10) Life is very difficult there. The police chase you so that you leave. But we endure that and live there. When we come to the centre than there are no difficulties. I really like it here. …Before I used to go to the hospital. Now I don't go there. I get medicine from the centre. There are a lot of difficulties in going to the hospital…a lot of waiting. You get hassled. I like it a lot that the doctor comes here. He comes with his medicine and gives all the kids his medicine and they become better. Mom and dad also see this doctor.

(C17) I can't play at the station. There I do drugs and if I'm not doing drugs, then I'm working. Someone says, go get these supplies from here. Someone else says go do work for me…get some chai. Someone says go wash my clothes. That's why. Here, no one asks you to do those things. …The food we get here is like homemade food and homemade food is good for the body.

Outside food isn't that good for you because they don't cook it well with healthy ingredients. They even use *rotten* ingredients.

(C18) There I do mostly drugs and work, and here I learn. …Here I get peace of mind. I don't get nervous or worried like I do at the station. The station is a bad place.

(C19) I get hurt lots on the streets.

(C20) I get hurt on the streets from riding my bicycle. I also get illnesses from drinking bad water.

(C21) I get sick living at the station. Like when I sleep in the dirty environment of the station. The doctor here then takes care of me. …At the station I collect bottles. I encounter a lot of difficulties there such as sometimes kids steal other kids' bottles and then fighting ensues. I sweep the floor of train cars. In one day, I get 300 rupees.

Get everything here

(7) This is better than the station. You get an education, food, play. I like it.

(9) You get everything here. Like food, drinks, clothes. Sometimes they lecture you but they don't hit you.

(17) You get education, food, and recreation here. You get everything here. That's why I like the centre very much.

(19) They feed you, give you drinks, and take you on tours. We learn here and play here. It feels good.

(20) I like it here. You get everything. If it weren't for the centre, I would be selling balloons on the streets. No one tells me to come here. I come out of my own volition.

Availability of food makes life easier

(C3) I eat a lot here, so I have become fatter and healthier. Life is better now…easier now.

(C4) I have gotten less illness by coming to centre because I don't do as much drugs anymore, and I keep eating. Smoking no…only eat!

(C10) My health is good now. I eat apples and bananas at the centre, so I have become fatter. Before I was thin.

(C13) By coming to the centre, I have become fatter. I am stronger now because of the food. I don't get sick as often anymore. Life is easier.

(C17) I have become much fatter by coming here. You get food really well here. By eating food from outside, you are never full. Here even if you eat only one roti, you feel full.

(C20) My health has become better because I get good food at the centre. I have become fatter. Before I would get lots of illnesses.

(C24) By coming to the centre, my health has become better. I have become fatter. If I didn't come to the centre, then I would be skinny because we don't eat that much food on the footpath because you don't get that much food there. If you come here, you also get tea and food. I like the food.

Better mental health

(C13) I feel so much better since coming here because I get everything.

(C7) I feel good here. You get to be free here. There are no worries.

(S23) Children who come here share things with the staff and feel lighter. Those who don't come are more depressed.

(S25) Children who come here open up more with others. When they first come here, they are quiet, then they slowly start sharing their feelings. Also, if they have mental health issues, then the staff helps them.

Staff as protectors and advocates

(C5) I like them a lot. I like the relationship I have with them. If I am in any difficulties, I will tell them and then they will go take care of it.

(C7) The staff here teach us. They help us. They help the children who are lost or who have run away from home. They help them do better in life. They help them quit drugs.

(C8) The staff are like our friends. They understand us and they are there to help us with all our problems.

(C9) The staff help me. Like if I get sick, they say, let's go to the doctor. They also bring us to the centre and tell us to quit drugs. They tell us to get an education at the centre.

(C11) Whatever we want, they give us. They help us, that's why we think so highly of them. They are good people. Till now, they have only tried to make us go on the right path. That's why we like them.

(C13) I have known the staff for two months. Yes, if any child hits me then I tell Didi or Sir and they help me. Like if there has been a fight, then they help me.

(C15) They help you here, which is why I like it a lot. Whatever problem it is, Sir solves it. For example, if you get sick and then Sir takes you to the hospital.

(C17) I come here to meet Sir. He makes me understand the right things and he also lectures me, but he doesn't think badly of me. So whenever I am in some difficulty, I come here. He will always try to help me.

(C18) I have my friend to help me at the station. But there is no elder that can help me there. Only here I have Sir and Didi. If anything bad happens to me, then I will tell Sir. He helps me and Didi helps me.

(C20) I like the staff. They teach us, they help us. If something bad happens, then I tell them. All they do here is help us. At home, no one really helps us.

(C21) I don't want any help. If anyone tries to do anything bad to me, I'll hit them twice. If I get sick or in some problem, then I will tell Sir. I'll tell the police. If the police doesn't do anything, then I will come here. At the railway station, my friends don't help me as much. I just have two. Here I have the entire staff to help me. Here they have the power to help me and save me. My friends don't.

(C22) I tell the staff here my problems. I just don't tell them my financial difficulties. Like I tell them if I get sick. Then they help me.

(S23) The children's safety is here. They get a lot of things here – education, nutrition, food. They also share their problems here and we solve it for them. …There was a child who lived at the station and picked bottles and did drugs. He started to come here and slowly started to open us to the staff. The staff motivated him to go live in a shelter home. He did the transfer and the staff also helped him to get a job. He also suffered from depression and they helped him daily to get through it.

Staff provide moral direction

Staff teach us the right path

(C6) The relationship I have with the staff is important because they teach me the right way.

(C7) The staff help us progress forward in life. They help us decrease our drug use.

(C11) They have only tried to make us better. That is why I think so highly of them. … Whatever we want, they give us. They help us. That is why we think so highly of them. They are good people. Till now, they have only tried to make us go on the right path. That's why we like them.

(C13) The staff here help us. They encourage us to learn here and they teach us good things.

(C14) I have a six-year long relationship with the staff. They give us good knowledge. They teach us.

(C16) I have a good relationship with the staff. Sir says for our good that we should learn a skill or a trade so that when tomorrow comes, we won't have to live on the streets. And Sir does a lot for us.

(C17) Sir comes to the railway to meet us. He comes and teaches us good things, which is why I like him. … I like him a lot. He teaches us good things and also yells at us, but I don't take it personally. If I have any problems, then I come here.

(C18) Yes, the relationship I have with the staff has meaning for me. It's a good relationship. Sir and Didi make us understand the right things. They tell us to come here and learn.

(C23) My job as a staff member is to give children the right knowledge, to make them understand. We can't think that this is not my child so why should I make him understand right from wrong. This never comes in my mind. All of these children are like my children.

Learn hygienic practices

(C1) I shower daily to keep my body clean. This has become a habit by coming to the centre.

(C6) My health got a lot better from coming here. I used to gamble before. Now I don't. At that time, I didn't come here. I would just wander and would have nothing to do. Now I come here and take part in the activities. My body was bad before. I wouldn't shower or wash my clothes. Now we have access to water here. Sir tells them to provide water to us and then he tells us that we should keep clean. I used to get sick a lot before. Now I don't get sick at all. Maybe once a year.

(S23) Children who come here regularly bathe. Their habits start changing by coming here. They also wash their hands and face. They give more attention to their bodies. They eat regularly. They don't do drugs as much. If they get sick, they come here for medicine.

(S25) The children who come here follow the rules we teach a bit. And if they follow it even a bit, they come out ahead in terms of their health. Like they learn to bathe daily. Keep clean. When they do these things, they get respect and they start changing their habits.

Motivated to decrease drug use

(C6) Before I would get sick a lot because I used to do drugs. Since coming here, I have quit drugs. I don't feel like doing it since coming here. I like it here. They teach you the good things here.

(C21) By coming to the centre, I don't get sick often. They teach you to quit drugs here. They teach you good things like this.

(S23) The more time the children spend here, the less time they will spend doing drugs. Those who don't come will continuously do drugs.

Opportunity for a better life

(C10) The centre is good for us because it helps us grow up properly, and to become something in life. The centre is there to make us better people.

(C11) The centre will make me a better person. The centre is important to me because it will help me become something in life because I want to leave the streets. I have to walk on my own to feet. That's why I come to the centre.

(C14) The centre is important for me for learning, and after learning, to become older and get a job. The centre is important for learning, and after learning to get a job so that my life is good.

(C18) I come to learn because I want to become an important person when I am older. After learning, I want to become a good person. I feel good coming here.

(C22) Can't spend our entire lives like this. If we learn something, then we'll get a job.

(C24) The centre is important for becoming a good person. We will not learn how to become good living on the streets…only at the centre.

(S25) Children come here to become better people.

Sense of normalcy

(C4) The environment is not good on the streets. The police come and harass you, your things get stolen, people are picking up garbage, people are doing drugs. That's why. Life is frightening there. Sometimes, people get cut, their hands get cut off, or people die. But it's become a habit to live there. I am used to living there now.

(C7) I hate that the police always bother us on the streets. I wish I could just run away from there. But after they go away, I can do whatever I want. In that way, I like it better there than having to live in a shelter home. There are too many rules in a shelter home. In one way, I do like it at the railway station because at a shelter home you can't freely roam around outside. Here you at least have that freedom. At the centre, you have to sit around the whole day.

(C11) I am sad on the streets. But sometimes I like it there and it feels good there because my friends stay with me. We play. But the place isn't good. We sleep on the sidewalks. The public also sees that we sleep on the footpath, and that's what I don't like.