

Social network analysis for health and social interventions among Kenyan scavenging street children

DAVID AYUKU,¹ WILSON ODERO,¹ CHARLES KAPLAN,^{2,3} RENE DE BRUYN² AND MARTEN DE VRIES²

¹*Faculty of Health Sciences, Moi University, Eldoret, Kenya,* ²*Faculty of Medicine, Maastricht University, Netherlands* and ³*Graduate School of Social Work, University of Houston, USA*

Street children are a high priority for health policy and service planning in Kenya. Poverty, wars, famine and disease have resulted in street children having a persistent presence in African cities and towns. The Maastricht Social Network Analysis (MSNA) was implemented as the core instrument in a battery to measure the health status of the street children. Owing to the absence of census data of street children in Kenya and the difficulty in tracking this mobile population, we implemented a mixed snowball and convenience sampling design to recruit research subjects. Three hundred street and orphanage children, and 100 primary school children as a control group, were included in the study. The MSNA provided a social diagnosis that complements the clinical diagnosis of the health status of the sample. Only one main methodological question is presented: is the MSNA applicable to describe the personal social networks of (1) children and of (2) people living in a Kenyan culture? Qualitative field observations, key informant interviews and focus groups inform the adaptation of the MSNA instrument, and improve its face validity. A case series analysis is presented. The main result is that the street children population consists of distinct subgroups defined by the UNICEF classification as 'on' and 'of' the street and by gender. Street children networks have some notable deficiencies depending on the subgroup. Constant across the groups is the deficiency of service providers in their networks. The conclusion is that the MSNA is a suitable instrument for obtaining a social diagnosis and gathering other useful information that helps in understanding the social and health backgrounds, status and daily experiences of Kenyan scavenging street children. Applying the MSNA protocol was successful in the diagnosis and interpretation of the findings.

Key words: Maastricht Social Network Analysis, street children, social networks, health status, Kenya

Introduction

More than a decade ago, UNICEF estimated that approximately 100 million children and adolescents were growing up on the streets of large cities (UNICEF 1989). Increasing poverty, war, famine and disease occurring singly or in combination has substantially increased this number. The phenomenon of street children is quite prevalent in Kenya, as throughout Africa. The adverse situation posed by economic deterioration over the last 10 years has resulted in increasing family disintegration, triggering off a much greater exodus of children from the rural areas to the streets of large towns. Other children are born on the streets; some come from poverty stricken families in the peri-urban slums. In Kenya alone, it has been estimated that there will be 1 million children orphaned by AIDS in the beginning of this century, and that most of them will end up on the streets (World Bank 1995). Following the national trend, the number of street children in Eldoret, a city with about 300 000 inhabitants in western Kenya and the subject of this report, is also increasing.

There is an urgent need for health policy and planning in Africa and globally to develop a methodology that can systematically measure the nature and extent of the street children population and its service needs. In this article, we

report upon how we implemented a personal social network methodology to this end. It is generally accepted that what a child does, with whom, and where, has far-reaching implications for that child's development. An analysis of the daily-life social environment and context can provide significant information about child developmental trajectories. Interpersonal relationships, which constitute the social environment, give children the opportunity to engage in joint activities, provide information about resources (a job, a good place to get free food, a place to sleep), and form affective ties. In most economically developed, Western societies, parents (or parent substitutes) protect and guide children until they reach late adolescence (Bronfenbrenner 1979). The lack of stable parental figures has been linked to a variety of negative outcomes (Damon 1983; Kranzler 1990). Additionally, social support from family and non-family members may alleviate the negative impact of stressful events in childhood (Roberts 1974). Children's ties to their families and their compensatory relationships with significant others are of developmental significance (Kimchi and Schaffner 1990). In order to ensure those children's social ties promote and support mental and physical healthy development, a practical way of obtaining an assessment of the available social network is required. This information is vital in order to detect individual vulnerabilities and to design suitable individual and collective treatment intervention

plans and policies. These data are also vital in order to better understand certain paradoxes in current research that inhibit policy and planning.

Given the importance of personal social networks to child development, it is surprising that few studies offer an in-depth analysis of the nature, extent and functions of street children ties (Campos et al. 1994). Part of the problem is methodological; a practical way of assessing street children's social networks for the purposes of diagnosis and intervention planning is lacking. Evidence pertaining to the vulnerability and coping of street children, for example, is contradictory; peer relationships are reported as erratic and unstable in some publications and mutually caring in others (Donald and Swart-Kruger 1994).

Objective

The goal of this article is to adapt/develop and test the Maastricht Social Network Analysis instrument for the purpose of measuring the social environment of street children. We designed a cross-sectional factorial study of 400 children in Eldoret town. The number of street children in the city is increasing and the problem has become a policy priority. Our study utilized a balanced design of 100 children in three groups reflecting the UNICEF (1986) definition, along with a matching school-child control group drawn from similarly disadvantaged urban areas. The UNICEF definition distinguishes between three main groups: (1) 'children on the streets' live for the most part with their parents; (2) 'children of the street' do not reside with their parents although they may retain some contact; and (3) abandoned or orphaned children have lost their parental contacts through death or by parental abandonment. A methodological limitation of most of the prior studies of street children in the developing world has been the lack of control groups. Therefore, the extra effort of implementing a controlled comparison research design should pay off in stronger scientific results for intervention planning and policy development.

In the situation of street-children interviewing, a methodology inspired by the practicality of psychosocial medical science seems most useful (Guenther 1992). Such a methodology should be 'diagnostic', relying on not only in-depth cross-sectional data on cases, but also assembling collateral and context information. Such a multiple assessment approach has been shown to be especially appropriate for the investigation of street children as well as other 'hidden populations' (Campos et al. 1994; van de Goor et al. 1994). We measured the total sample with the Maastricht Social Network Analysis (MSNA) instrument in order to obtain a social diagnosis of the street child's environment (Baars and Kaplan 1996). A sub-sample ($n = 204$, with 51 in each group) was also measured with a general health and nutrition questionnaire, and the Revised Dimensions of Temperament Survey (DOTS-R), a standardized psychometric instrument for cross-cultural assessment of children's temperament validated for Kenyan samples, was also used (deVries 1984; Windle and Lerner 1986). The sub-sample was also given a thorough medical physical examination. Collateral data sources came from spot observations, key informant

interviews and focus groups. These data provided rich information on the context, community and service provider attitudes and the street children's own self-perception.

What is Maastricht Social Network Analysis?

A personal social network can be defined as 'all persons and groups, expressed in terms of actual persons, with whom one maintains direct and more or less lasting ties that satisfy the daily requirements of life' of a given 'key person' (Hammer 1978). The structure of this collective consists of the other persons ('network members') and ties that give shape and substance to the fulfilment of the key person's ('focal person') basic psychosocial needs. This structure can be divided into various 'plexus groups' (Pattison 1981). The MSNA model subdivides the network into family, friendly relations and service provider groupings referred to as 'sectors'. These sectors can be subdivided further into smaller units called 'clusters', varying depending on the goal and population of the study. Additional structural elements of the network are included. 'Variety' is measured by selected socio-demographic characteristics of network members and 'accessibility' by their geographical distance from the focal person. The characteristics of the ties between the focal person and the network members provide additional information and include: contact frequency, contact initiative, contact length and contact weight. Contact weight is especially important because it measures the degree to which a tie satisfies the focal person's basic psychosocial needs, i.e. 'social support' (Kaplan 1977; Coyne et al. 1988; Roberts 1988). Four basic needs are distinguished: affective needs, to be loved, appreciated, trusted and emotionally supported; connection needs, to belong, to be safe, to be supported by others based on common interests, values and backgrounds; stability needs, to have enduring, evenly distributed preferential and habitual ties; and material and instrumental needs, for housing, food, information and practical assistance. These MSNA categories fit well with the personal and physical support dimensions of the Environmental Context scale developed for psychosocial studies of Latin American street children (Tyler et al. 1991).

The MSNA instrument is a semi-structured interview lasting for about 1 hour in which subjects are systematically guided in describing their available personal networks. The MSNA is designed primarily as a diagnostic tool for the purpose of creating an effective intervention plan to establish a social equilibrium. The methodology proceeds in distinct steps: (1) diagnosis of the composition of a person's social network; (2) interpretation of the diagnosis in order to provide an understanding of both the deficiencies and resources in the social network; (3) creation of an intervention plan; and (4) implementation of intervention, monitoring and evaluation phases. The instrument was developed in Dutch social psychiatry in the 1970s for planning the social integration of chronically ill patients (Bolwijn et al. 1996; Baars et al. 1997; Baars and Verschuren-Schoutissen 1998). It followed an international trend of expanding the scope of family therapy to kinship structures and beyond (Pattison et al. 1979). In recent years, the MSNA has been applied and validated outside the Netherlands in European forensic and

drug-dependent populations (Baars et al. 1997; Kaplan et al. 2001). The Kenyan study posed new challenges of testing the applicability of the MSNA to African children populations.

Implementing the MSNA

In implementing the MSNA, a large amount of preparatory fieldwork was required that would not have been necessary in studying a well-defined European population. Our research began by observing and recording activities of Eldoret street children as they interacted among themselves and with the wider community. We employed an anthropological fieldwork methodology relying specifically on participant observation techniques (Bernard 1994). The principle investigator talked to the street children in their congregation areas around the university hospital, getting them to know him as a person and the aims of the university study. We learned that street children were organized in loose groups or more organized gangs that were rooted in one particular area. These social organizations had some form of leadership. Leaders were identified and selected as key informants and, later, focus group participants. In some cases, we were unable to pick a single leader because leadership was shared depending upon different circumstances. We also observed that leadership was quite fluid in the sense that each child aspired to the role. Similar findings are reported in earlier cross-cultural research (Whiting and Whiting 1975).

We then began systematic social mapping of the areas where the street children could usually be found in Eldoret town. Two main 'congregation sites' are publicly known (Shick and Wiebel 1981): one next to the post office and the other near the Faculty of Health Sciences. Compared with Nairobi, for example, these sites are not particularly characterized by aggressive and criminal behaviour. A total of six catchment areas were identified which included new congregation sites (e.g. bars and the open-air market) unknown to the public. Observations of the street children continued, but we expanded our methodology to focus groups. We needed to know more about the context before implementing the MSNA, specifically the community attitudes and perception toward street children and the children's perception of their situation. The identified street-children key informants were recruited for two focus groups to explore perceptions of their social environment, their health and social problems, what they ate and the attitudes they felt the wider community had about them. Each group consisted of 8–10 participants. Parallel to these focus groups, we organized five separate focus groups with school children, shelter children and shelter service providers to provide us with collateral data on the same issues.

Before administering the study instruments, an SPSS Data Entry file was made so that the raw data from the interviews could be processed efficiently. An English-language version of a standard MSNA interview form of three pages, one for each sector, was brought from the Netherlands. An instrument with the least amount of paper was highly desirable given high reproduction costs. With some adjustments, the form became an essential tool in the MSNA protocol package. But even with such streamlining we faced

considerable logistical problems in the course of data collection in producing enough forms to keep up with the tempo of recruitment. Sometimes there was no paper or electricity, and beyond this, the photocopying and printing required extensive bureaucratic approval. Nevertheless, we were able to supply the interviewers with instruments generally within the schedule.

A special manual was then written for the MSNA Kenyan project and the interview form was translated and back translated in English and Kiswahili by a bilingual native speaker behavioural scientist. No substantive changes were needed in the instrument as a result of the back translation procedure. Two students of the Moi University Faculty of Health Sciences were trained in the administration of the MSNA and other instruments by the researcher. The training consisted of two sessions. In the first session the background of the MSNA methodology was explained and then the students were instructed on how to do the interviewing. In the second session they were asked to conduct an MSNA interview with a fellow student. After the interview, the two students discussed their experience and results with the trainer.

Pilot interviews with four primary school students on the outskirts of Eldoret were then conducted. We found two heads of primary schools who gave us permission. In one of the schools we conducted the pilot interviews. We were taken to selected classrooms where we talked to the teachers and were introduced to the school children. The children were very enthusiastic and, although rather shy, they cooperated. Two of the students did the MSNA interviews. Each pilot interview lasted about 45 minutes. After these first interviews we were convinced of the face validity of the MSNA for the general Kenyan culture and the general population of school children. Our main concern was that, in the case of the special population of street-children, things would be much more difficult given their reputation as being both restless and reluctant respondents.

Modifying the MSNA protocol

The pilot phase generally demonstrated that Kenyan school children could, in general, understand quite easily the MSNA questions. There were, however, exceptions and some questions were eliminated. For instance, children's understanding of initiative was very similar to their understanding of accessibility. In the MSNA methodology, 'initiative' has a subjective meaning. It implies a springing to action to make the contact. In contrast, 'accessibility' in the MSNA has an objective meaning having to do with geographical and social distance. Both items could be reduced in meaning to 'the place where the contact takes place'. The question about the mode of communication ('Is it mainly by telephone, by mail or face-to-face?') showed no variation because among the Kenyan lower social classes, there is hardly any contact by telephone or mail for children. Finally, variety in the Kenyan social environment was modified to measure primarily ethnic variation. This had not been the case in the original Maastricht studies conducted in a relatively ethnically homogeneous, small Dutch city.

Other modifications were necessary because the translated version was too abstract for the children to understand. After extensive discussion, we decided to transform these questions into more concrete formulations. Thus, the 'affection need' was changed to 'to what extent can you talk to your network member about things you love or hate and to what extent can you cry and laugh together'. The 'connection need' became 'to what extent do you like to play games or talk about the same interests'. The 'stability need' translated as 'to what extent will you miss your network member when he or she moves to a place far away'. Finally, the 'material and instrumental need' was described as 'to what extent can you go to your network member and get help if you are hungry, hurt, seek a place to sleep, need protection or need money'.

Table 1 presents our final model of a personal social network adapted to Kenyan street children. As indicated, some clusters of the European adult MSNA had to be eliminated and new clusters had to be added. For example, the European friendly relations cluster 'neighbour' did not apply. In Kenya, a neighbour can be a person who lives in the same village or area, and most of the time there is nothing like a 'neighbour-contact' in Europe, somebody one can 'borrow sugar from, drink a cup of coffee together with or look after the house'. The MSNA friendly sector also needed to be modified. The cluster 'gang mates' was added. Street children who were gang members told us that all their gang mates were also their friends. This strong correspondence between gang membership and friendship has been extensively described in the literature (Decker and Van Winkle 1996; Baron and Tindall 1998), therefore, in this subgroup, no distinction was made between the gang mates and friends clusters. Another age-specific modification was related to the contact duration. Street children normally have friends they know only for a short time, a pattern of fluidity reported also among Western school children (Cairns et al. 1995). It became quite evident that length of relationship is not always a good proxy for closeness of friendship when investigating street children.

The family cluster of parents in the European MSNA also needed modifying. Street children could barely make a distinction between 'brothers- or sisters-in-law' and 'other family members' clusters. They only mentioned them if personally important and often did not know their names. We

also found large differences in street children's contact with fathers and mothers. Although we did not split the family members into father and mother clusters, we came to appreciate that when one of these parents was completely absent from the network, the family members related to that parent were also completely absent. In the Kenyan context, a profound modification of the MSNA for 'lost and forgotten' family members was a necessity.

We also found that the social welfare institution cluster also needed extensive modification. Social welfare in Kenya is not organized, as in northern Europe, through strong welfare state policies. Institutions (and individuals) other than the government are extensively involved in providing health and welfare services. We found, for instance, that most of the services for children in Eldoret are provided by religious institutions or self-identified members of religious communities, and needed to be reflected as a distinct cluster. Also, a distinct cluster for individuals that regularly gave street children food or money ('private helper') had to be added.

Recruiting

After these final modifications in the instrument were made, MSNA training was expanded to more health science students ($n = 14$). Most of the students responded very well to the training and the few difficulties in comprehension were resolved by more intensive individualized attention by the researcher. When the training was completed, recruitment began in two kinds of sites: shelters that serviced street children and orphans, and street congregation areas. Three shelters were selected from which to draw the 'abandoned' children sub-sample. During the visits to the shelters, the principal investigator accompanied the students and supervised the interviews. Each interview was reviewed with the principal investigator and problems addressed.

At the first shelter, 300 children were provided with food, a place to sleep and had the opportunity to attend classes. The German director was a very religious man and he very much supported our study. Things went well because of the high discipline of the children and we obtained our MSNA and other data from a randomly selected sub-sample. The other two shelters had strong Christian beliefs too: a 'children's

Table 1. Modified MSNA sectors subdivided into clusters for Eldoret street children

Family	MSNA sectors	
	Friendly relations	Service providers
Partner	Friends	Colleagues
Children	Gang mates	Schoolmates
Father	Acquaintances	Health professionals
Mother	Club members	Church members
Brothers/sisters		Private helpers
Brothers/sisters in-law		Private institutions
Parents-in-law		Government institutions
Grandparents		Religious institutions
Relatives/in-laws		Lawyer/police
		Teachers

home' directed by a Kenyan couple and a section of a Roman Catholic Church in a slum area. At first, the priest was reluctant to enrol 'his' children in the study, but convinced of our good moral intentions, he eventually cooperated.

An adaptive, snowball sampling strategy was then applied to recruit 'on' and 'of' the street children samples in the street congregation sites (Kaplan et al. 1987; Spreen 1992; Thompson 1997). This sampling strategy was employed because of the non-existence of a sampling frame for the street-based children samples. Since these street children constituted the 'experimental' groups in our research design, we wanted to go beyond a convenience sample we had used for our key informant and focus group interviews, to draw the most representative sample that was possible. We allowed the street children to 'drive' the sampling process, offering material incentives for their participation (Heckathorn 1997). They preferred money, Ksh.20 (US\$0.25), instead of milk and bread because those who go home could take something to their families and others felt that *githeri* (a cooked mixture of maize and beans) was a better deal for them at the cost of Ksh.5.

As is the standard practice, initial focal persons we knew from our focus groups were invited to nominate other street children they knew and to provide the names (mostly nicknames which were kept secure and confidential in the office file boxes), ages and self-defining characteristics of these children. These children knew a lot about others like themselves in different areas of town – whether they went home or stayed on streets at night and where we could find them. While the focus groups with the street children leaders were critical in building trust in the population, getting the sampling moving required the engagement of an older, respected former street child leader, as has been documented by other street studies (Whyte 1949; Wiebel 1990; Wiebel 1993). One of the student interviewers knew Manny, a man of about 30 years old, who was still acting as a trusted leader of a large group of street children who congregated near a bar and restaurant in the city centre. Manny was asked to help us. This was not an easy thing to ask because police were then routinely beating and detaining street children. However, after much anxiety, the ice was finally broken. The first day we succeeded in recruiting and interviewing five street children with Manny's help. Because of the concentration and time required to complete the data collection, our office in the academic hospital was transformed into a 'field station' (Goldstein et al. 1990). After the initial chill, the street children became increasingly eager to bring in new nominees. Street children from the other areas started appearing.

Analysis and interpretation

In a surprisingly short time, we had collected our data and were ready to clean and begin analysis. Our analytical approach was comparative and comprehensive, going beyond exclusive qualitative and quantitative strategies (Ragin 1987). For the purposes of this article, we will present only a brief overview of some descriptive statistical results of key variables across the four study groups. This analysis is intended as illustrative requiring further testing and elaboration.

Gains

The social diagnosis of the following series of three cases is illustrative of the scientific gains in understanding street children. With this description and interpretation accomplished (along with our other statistical analyses), we will be able to create an intervention plan targeting specific subgroups of the Eldoret street children population. Table 2 presents a summary overview of some of the structural and functional elements of the MSNA model for three Eldoret street children. The case series represents many of the distinguishing characteristics found among the total population, including age, ethnicity, gender, type of work, contact with parents and place of residence.

Case 1: Jimmy

The MSNA indicates that the total size of Jimmy's personal social network is 14 members. Jimmy's friendly sector at seven members is equal to seven members in his family sector. This indicated that Jimmy has a healthy balance of these sectors. However, what is clearly out of balance is an absolute deficiency ($n = 0$) in service providers in the network. The question that obviously rises is that if, as Jimmy says, his mother, brother and two sisters are dependent on him for material support, then who is supporting Jimmy's needs? Obviously, it is not the service provider sector.

In Jimmy's friendly sector, a good variety of ethnic groups are represented. It is clear that Jimmy does not stick only to his ethnic group for friendly support, but counts among his friends those belonging to the various ethnic groups that he interacts with, mainly Kikuyus, Luhyas and Luos. This implies that the needs of an urban street-life outweigh any ethnic rivalry that may exist in rural areas. Jimmy has good access to his family and friends. All his friends live in Eldoret and five of his seven family members are also living in the same town. This is also a healthy condition and indicates a good balance in access between these two sectors.

Jimmy has no problems in his social network in satisfying his

Table 2. Profiling personal social network characteristics for 'on' the street male, 'of' the street male and 'of' the street female cases

Network element	Cases		
	Jimmy	Mara	Turu
Structure (counts)			
Size	14	15	7
Family	7	8	3
Friendly relation	7	7	4
Service providers	0	0	0
Variety	3	3	2
Access family	5	1	1
Access friends	7	7	4
Function (means)			
Affection	4.4	3	4.5
Connection	5	2.5	3.5
Stability	1	2.5	3.2
Material resources	2.7	3.8	4.2

needs for connection and affection with mean values of 5 and 4.4, respectively. The problems in social support lie in the fulfilment of material resource needs (2.7) and most glaringly in stability (1). On the face of it, Jimmy has a well-balanced social network with the exception of the deficiency of service providers. However, the extremely low level of stability indicates a serious deficiency in his social support. This perception of Jimmy's of an almost total lack of stability seems to be derived from two factors. On the one hand, although Jimmy is not alone on the street, his friends are also his street business competitors. This fact of life does not make for a sense of enduring friendship in a relationship. Because competition is intense, it is not unlikely that today's close friend can be tomorrow's worst rival. On the other hand, Jimmy, as chief breadwinner of his family at 12 years old, has been allotted a strong responsibility and a commitment to his family that is out of balance with the commitment he should have to his friends. With all of this pressure to support a family instead of the family supporting him, as is the case, for instance, for the school children, it is not surprising that he feels his personal social network is extremely unstable.

Case 2: Mara

Mara, a 12-year old Luhya boy, left home in Mbale district when his parents separated after his father lost a job as a cleaner. At the time of our interview he had been on the streets for 3 years. He noted: "I run away from home because my father could not afford to feed and educate the five of us". Abuse from his father and brother was another factor. On his arrival on the streets of Eldoret from his rural home, 99 km away, life became hard. The older boys, who claimed to be initiating him into street life, abused him. He was sidelined, and begging could not earn him a living because the older street boys snatched all that he had earned. Most of the time he could only scavenge for food from garbage bins.

Mara has been admitted twice at the Moi University Teaching and Referral Hospital because of a leg injury. On the first admission in mid-June 1997, he said that he fell down while playing with his friends and sustained an injury to his right limb. Thereafter, he was not able to walk or bear weight on the injured limb. His medical history recorded that he had a recurrence of cough and fever. Mara admitted to a history of sniffing glue and smoking cigarettes. On further medical examination, there was a swelling on his right hip with destructed range of movement. After a blood test and X-rays, a diagnosis of tuberculosis of the hip was made, and subsequently he was put on treatment and skin traction. He defaulted after 1 month of treatment and returned to the streets.

Mara's personal social network is similar in size (15) to Jimmy's and is quite representative of male street children. Similar to Jimmy, the network displays the same compositional pattern of a healthy balance of the number of friendly relations and family. Like Jimmy, however, there is a complete deficiency in service providers. Mara's network, like Jimmy's, also has a good variety of ethnic group members consisting of friendly relations. However, there is one glaring deficiency in the access to family members. A

brother living in Langas, a slum area on the outskirts of Eldoret, is the only family member accessible to Mara. In terms of social support, Mara has a fairly evenly distributed and moderate level of satisfaction of his basic needs. His network does not provide him with any great satisfaction in any of his needs, but a diagnosis of a functional deficiency, as was seen with Jimmy, has to be ruled out.

The case of Mara clearly represents the poor health and social backgrounds, states and conditions of many scavenging street children. The case also provides a rather typical dilemma faced by medical care providers. Although treatment plans are developed and good medical diagnoses obtained, the scavenging street child is often not in the social or mental condition to comply with standard clinical treatment practices. The case of Mara indicates that compliance with a treatment plan, especially for a child, seems to have the structural requirement of accessible family members to act as primary care providers. Mara has only one brother living in a slum area who obviously is not in a position to help him with his medical problems. A second factor may be the lack of a primary care physician in Mara's network. While treatment of a high quality is available at the academic hospital, this seems to be delivered in Mara's case in an impersonal way, as indicated by the absence of any mention of a physician in the service provider sector.

Case 3: Turu

In contrast to Jimmy and Mara, Turu represents the case of a girl, from which gender differences among street children can be detected. An 11-year-old, she comes from Turkana district, a remote district in Northwest Kenya characterized by a mixture of natural beauty and violent social conflict. Her parents were killed in banditry raids, which are frequent in the area. She seems content with the street life, as for her, she said, "life in the streets is better than home".

Compared with Jimmy and Mara, Turu's network is small, about half the size of the two boys. Like the boys, there are no service providers in her network. She also presents a network with some degree of variety in ethnicity. While access to friends is good, access to family is not. This, of course, is not surprising given that she is an orphan and has migrated from a remote and unsafe area. Her main structural deficiencies clearly lie in the absence of service providers and little access to her existing family relations.

In terms of social support, she seems to be doing somewhat better than the boys. In terms of material and emotional needs, she is receiving in her view a very high level of social support. This seems related to her closeness to her friends on the streets. Turu's relatively small friendly relations sector is all girls. They have highly supportive emotional and material ties. This contrasts greatly with the male competitiveness of the boys. The bonding between these girls is especially strong in the absence of living parents and accessible family relations. Where protection is necessary, alliances with older street boys are possible. Her perception that life is better for her now than as an orphan in strife-torn Turkana is not unrealistic.

Summary

These cases are illustrative of the substantive gains in applying the street-based MSNA methodology. Linking the MSNA to a snowball sampling as a recruitment strategy proved to be an efficient and effective way of obtaining a relatively large sample of street children that was representative of the variation in areas in the town. In a relatively short period of time (approximately 3 months) 250 street children were enrolled in the study and interviewed. In addition, a control group of primary school students was also recruited and interviewed, as well as focus groups organized to clarify the context of the MSNA social diagnosis and to provide validating collateral data. This allowed us to start planning a case registry and database for street children in Eldoret as we move to the intervention stage.

Discussion

This article has attempted to describe how we were able to transfer a social network-based assessment methodology developed in a European social psychiatric context to the situation of street children in Africa. This process involved a true collaborative learning and relearning of the foundations of social network analysis (Tenkasi and Mohrman 1995). While the case-specific interpretations offered in this article are limited by their small numbers, it should be clear that how we implemented the MSNA methodology allowed us to gain insight into both the deficiencies and strengths in scavenging street children's social networks that otherwise would never have been possible.

Our findings support the current opinion that street children do not present a highly homogeneous population. It is necessary to make structural distinctions within the population and work with the planning and policy most suitable for specific subgroups. Primarily, the currently accepted classification of 'on' the street, 'of' the street and 'abandoned' street children authorized by UNICEF finds some preliminary support in our findings, as has been done in more extensive previous studies (UNICEF 1986; Rosa et al. 1992; Taylor and Veale 1996). Holding gender constant, we have been able to see clearly the similarities and differences in social network patterns between Jimmy who represents an 'on' the street child (living with a parent at night and working the streets in the day) and Mara who represents an 'of' the street child. In the African context, because of strong and large kinship relations, true 'abandoned' children might be a rare phenomenon. More case studies need to be analyzed, however, to increase the confidence that the UNICEF classification is valid in contemporary Eldoret in particular and in Africa in general.

Creating an intervention plan in the next step of the MSNA application will take such differences into consideration. 'On' the street children seem to especially need social support that targets their needs for stability. The highly competitive male world in combination with the growing unemployment and market driven economy is not easy for Kenyan fathers, and it seems virtually impossible for a child to bear. It is hard to see what kind of social programmes could address this

deficiency given the basic condition of poverty. However, something could be done to target the increasingly difficult circumstances of female single parents such as Jimmy's mother. These mothers are forced to rely on their sons to overcome the lack of a supportive husband and/or other types of support. The survival strategy of relying on one son to act as the surrogate adult male breadwinner is counter-productive in the long run. The instability that this son experiences is likely to have mental and physical health consequences and undermine even further the scant family resources. The MSNA provided a social diagnosis of 'on' the street children specifying a social network mechanism that mediates the disruptive effect of poverty on the family. Kenyan female single parents, as in most parts of the world, have comparatively less access to economic resources, education and formal employment. The case of Jimmy illustrates that the meagre earnings his mother can make in the informal economic sector are not sufficient to relieve him of the stress of an adult family breadwinner role. Instead of having the opportunity for education that would in the long term benefit his family, Jimmy must opt for short-term economic survival strategies.

The case of Mara is a good example of the typical 'of' the street child who is quite likely to not have any daily contact with his parents and low access to family relations. In general, factors such as alcoholism, drug abuse, violence and physical or sexual abuse in the home, acting singly or in different combinations, have contributed to pushing otherwise intelligent and functioning children into the streets. At the individual level, the reasons offered by the children in our study for leaving home were family conflict, being unloved, physical or sexual abuse from a parent or relative, a desire for independence and the need to earn money. In the case of Mara the physical abuse within the family and the need to earn money seem paramount, and once into the streets the situation only marginally improved if we are to accept his existing moderate levels of social support. But without more access to his family, we clearly see how vulnerable Mara is to illness and injury and how reduced his prospects for recovery.

From the focus group discussions, the public is looking to the government and non-governmental organizations to provide solutions to the street children problems and to the deficiency in access to their families. As Jill Swart found in her study of street children in South Africa, that street children network provided a high enough degree of social support to be characterized as 'pseudo-families' (Swart 1990). As the case of Mara illustrates, however, this support can never be the same as a family, especially when illness strikes. Creating an intervention plan for 'of' the street children would have to go beyond simple family therapy, as was discovered in the origins of the network paradigm in social psychiatry mentioned in the beginning of this article. The deeper consideration of network therapy as it has been applied to substance abusers in the USA deserves further consideration (Galanter 1990).

Our findings also illustrate the need to take a gender perspective when especially looking at 'of' the street children. The case of Turu shows how different the social support functions

and the size of the network are for girls. There are far fewer girls pushed into the streets than boys for a number of reasons and this makes for smaller network sizes since children are socialized at an early age into gender-specific groupings. What advantages these girls may have in social support, as described in the case of Turu, can be offset by the small network size. Compared with American street population norms, Turu's personal social network is about the same size as the extremely low crisis cases presenting in American drug programmes (mean 6.7) (Westermeyer and Neider 1988). The American heroin addicts in treatment had social networks that were about the same as our male cases (mean 14.5) who were significantly less in number than the normal American adult subjects (mean 22.4). Despite the high social support, the small network of the street girls makes them vulnerable. One or two friends lost could have disastrous effects on the social support of these girls. Interventions need to be developed that are gender specific and aim at increasing the size of these street girls' networks.

Despite these subgroup differences, one finding is consistent across all cases and related to the deficiency in the size and overall balance of street children's personal social networks – the total lack of service providers. While there is shelter help available in Eldoret, those street children who are neither ready nor suitable for the religiously inspired and disciplined help available are left completely without services. Obviously more outreach work and 'drop in' centre programmes are warranted to try to insert at least one service provider into these street children's personal social networks. It needs to be emphasized that the service needs to be personalized so that the child has a feeling of a real tie with the service provider. In the case of Mara, we saw that a health crisis could provide the opportunity for the introduction of such a relationship. From our findings, it is clear that street children must start fendng for themselves at a very young age. Besides, their lifestyle exposes them to a greater than average risk of health problems. There is high risk of infections, skin disorders, injuries caused by violence and traffic accidents, substance abuse, sexually transmitted diseases, nutritional deficiencies and gastro-intestinal disorders. Obtaining treatment is difficult because of the cost-sharing user-fees introduced in government hospitals. However, given the chance of being provided with a personalized case-worker (for instance, a psychiatric social worker), most would choose to live like any other children and take dignified family life as a matter of routine.

The MSNA diagnosis provides a strongly contrasting evidence-based view opposed to the public stereotypes of the morally defective character of street children. Their personal social networks have many indications of a healthy balance in structure between the friendly relations and family sectors. If there is one possible deficiency other than in the service provider sector, it lies in size, especially for the girls. On the positive side, the street children networks seem to show a healthy structural variety of ethnicity in their friendly sector. Street children of different ethnic backgrounds socialize together and do not show the same degree of ethnic exclusiveness and animosity found among adults in many segments of Kenyan society. We observed that even when playing,

joking and fighting there were no expressions of ethnic animosity that would be common with adults in similar situations. Street children networks should not be primarily viewed as supporting gang and organized criminal behaviour, as is often implied in the public discourse. Rather, street children networks could be seen as a resource for developing a modern, democratic and ethnically diverse society in Kenya.

The MSNA provided us with a core social diagnostic instrument upon which we could integrate psychiatric and general health instruments as well as supplementary qualitative information. The qualitative research approaches applied in this study were also especially appropriate in highlighting the various causes of the increasing phenomenon of street children in Kenya. Perceptions of the public, government officials and NGO representatives towards street children, though divergent, provided valuable insights that can help in developing solutions to the growing problem. The MSNA protocol is currently being developed as the framework for establishing a registry of Eldoret's street children for future health policy development, planning and monitoring. With the registry in place, we will be in a position to form alliances with church and private institutions in Eldoret to take the next step of intervention planning.

Conclusions

Our research supports the theory that 'social network' is a universal concept and therefore is a good basis for developing a methodology to diagnose, interpret and intervene in health and social problems in hidden and special street-children populations. Everyone has family members and some kind of friends, and therefore it is possible to ask certain things about the social network members of a focal person that can be compared across groups and populations. We found that most of the questions in the MSNA interview were generally easy to understand and not difficult to answer for children, and provided a valid and reliable instrument in the Kenyan context. Only the questions about the functions of the network (i.e. 'weight') had to be modified. This may be more an issue of age than culture. However, in the Kenyan socio-cultural context, some concepts, like family, neighbours and acquaintances, will have a slightly different meaning. Caution should also be made in interpreting a few case studies that may not be representative of the heterogeneous street-children population that we found in Eldoret. Future work with the MSNA in other African cultures must first employ intensive and continuing anthropological fieldwork in order to determine what the local people mean with words like friends and neighbours. It can be expected that one category will be larger across cultures, but that is, instead of being a problem of validity, an interesting fact. Our results also suggest that in the African context, because of the issue of 'lost and forgotten' parents, future applications of the MSNA should be especially sensitive to whether family relations are linked to the father or mother.

Finally, the MSNA methodology demonstrated that health and social services research capacities could be developed that reach the most disadvantaged segments of Kenyan

society (Ayuku 2001). Policy-makers were provided with health and social data and policy-relevant evidence on a hidden and special population where not even census data had existed before. A continuing perspective that sustains this methodology is the plan of erecting a case register of street children in Eldoret that should provide an essential policy resource for the community.

References

- Ayuku D. 2001. A case study of street children in Kenya. In: Blumenthal DS, Boelen (eds). *Universities and the health of the disadvantaged*. Geneva: World Health Organization, pp. 81–2.
- Baars H, Verschuren-Schoutissen M. 1998. Sociale-netwerkanalyse: een diagnostiek van de maatschappelijke inpassing (social network analysis: a diagnostic of social integration). In: *Handboek dagbesteding (Handbook of daily life structuring)*. Vol. April. Houten/Antwerpen: Stafleu Van Loghum.
- Baars HMJ, de Bruyn RGM, van den Bergh WM. 1997. Die wiederengliederung von forensisch psychiatrische patienten. In: Duncker H, Dimmek B, Kobbe U (eds). *Forensische psychiatrie und psychotherapie, werkstattsschriften*. Vol. 4. Lengerich, pp. 33–52.
- Baars HMJ, Kaplan CD. 1996. Maastricht University Department of Social Psychiatry, Maastricht.
- Baron SW, Tindall DB. 1998. Network structure and delinquent attitudes within a juvenile gang. *Social Networks* **15**: 255–73.
- Bernard RH. 1994. *Research methods in anthropology: qualitative and quantitative approaches*. London: Sage Publications.
- Bolwijn PH, van Santen-Hoeufft HMS, Baars HMJ, Kaplan CD, van der Linden S. 1996. The social network characteristics of fibromyalgia patients: a controlled comparison. *Arthritis Care and Research* **9**: 18–26.
- Bronfenbrenner U. 1979. *The ecology of human development*. Cambridge, MA: Harvard University Press.
- Cairns RB, Leung M-C, Buchanan L, Cairns BD. 1995. Friendships and social networks in childhood and adolescence: fluidity, reliability and interrelations. *Child Development*, **66**: 1330–45.
- Campos R, Antunes CM, Raffaelli M et al. 1994. Social networks and daily activities of street youth in Belo Horizonte, Brazil. *Child Development* **65**: 319–30.
- Coyne JC, Wortman C, Lehman D. 1988. *Marshalling social support: formats, processes, and effects*. Beverly Hills, CA: Sage.
- Damon W. 1983. *Social and personality development*. New York: Norton.
- Decker SH, Van Winkle B. 1996. *Life in the gang: family, friends, and violence*. Cambridge: Cambridge University Press.
- de Vries MW. 1984. Temperament and infant mortality among the Masai of East Africa. *American Journal of Psychiatry* **141**: 1189–94.
- Donald D, Swart-Kruger J. 1994. The South African street child: developmental implications. *South African Journal of Psychology* **24**: 169–74.
- Galanter M. 1990. *Network therapy for alcohol and drug abuse*. London: The Guilford Press.
- Goldstein PJ, Spunt BJ, Miller T, Bellucci P. 1990. Ethnographic field stations. In: Lambert EY (ed.) *The collection and interpretation of data from hidden populations*. Vol. 98. Washington, DC: USGPO, pp. 80–95.
- Guenther H. 1992. Interviewing street children in a Brazilian city. *The Journal of Social Psychology* **132**: 359–67.
- Hammer M. 1978. Social networks and schizophrenia. *Schizophrenia Bulletin* **4**: 522–45.
- Heckathorn DD. 1997. Respondent-driven sampling: a new approach to the study of hidden populations. *Social Problems* **44**: 174–99.
- Kaplan BH, Cassel JC, Gore S. 1977. Social support and health. *Medical Care* **15**: 47–58.
- Kaplan CD, Broekaert E, Morival M. 2001. Improving social psychiatric treatment in residential programmes for emerging dependence groups in Europe: cross-border networking, methodological innovations and substantive discoveries. *International Journal of Social Welfare* **10**: 127–33.
- Kaplan CD, Korf D, Sterk C. 1987. Temporal and social contexts of heroin-using populations: an illustration of the snowball sampling technique. *Journal of Nervous and Mental Disorders* **175**: 566–74.
- Kimchi J, Schaffner B. 1990. Childhood protective factors and stress risk. In: Arnold LE (ed). *Childhood stress*. New York: Wiley, pp. 475–500.
- Kranzler EM. 1990. Parent death in childhood. In: Arnold LE (ed.). *Childhood stress*. New York: Wiley, pp. 405–21.
- Pattison EM. 1981. Introduction: The social network paradigm. *International Journal of Family Therapy* **3**: 241–5.
- Pattison EM, De Francisco D, Wood P, Frazier H, Crowder JA. 1979. A psychosocial kinship model for family therapy. *American Journal of Psychiatry* **132**: 1246–51.
- Ragin CC. 1987. *The comparative method: moving beyond qualitative and quantitative strategies*. Los Angeles, CA: University of California Press.
- Roberts AR (ed.). 1974. *Childhood deprivation*. Springfield, IL: Thomas.
- Roberts SJ. 1988. Social support and help-seeking: review of the literature. *Advances in Nursing Science* **10**: 1–11.
- Rosa CSA, de Sousa RE, Borba R, Ebrahim GJ. 1992. The street children of Recife: a study of their background. *Journal of Tropical Pediatrics* **38**: 34–40.
- Shick J, Wiebel W. 1981. Congregation sites for youthful multiple drug abusers: locations for epidemiological research and intervention. *Drug and Alcohol Dependence* **7**: 63–79.
- Spren M. 1992. Rare populations, hidden populations, and link-tracing designs; what and why? *Bulletin de Methodologie Sociologique* **36**: 59–70.
- Swart J. 1990. *Malunde: the street children of Hillbrow*. Johannesburg: Witwatersand University Press.
- Taylor M, Veale A. 1996. Rethinking the problem of street children: parallel causes and interventions. In: Carr SC, Schumaker JF (eds). *Psychology and the developing world*. London: Praeger, pp. 90–1.
- Tenkasi RV, Mohrman SA. 1995. Technology transfer as collaborative learning. In: Backer TE, David SL, Soucy G (eds). *Reviewing the behavioural science knowledge base on technology transfer*. National Institute on Drug Abuse Research. Monograph 155. Washington, DC: USGPO, pp. 147–68.
- Thompson SK. 1997. Adaptive sampling in behavioral surveys. In: Harrison L, Hughes A (eds). *The validity of self-reported drug use: improving the accuracy of survey estimates*. Vol. 167. Washington, DC: USGPO, pp. 296–319.
- Tyler FB, Tyler SL, Echeverry JJ, Zea MC. 1991. Making it on the streets in Bogota: a psychosocial study of street youth. *Genetic, Social and General Psychology Monographs* **117**: 397–417.
- UNICEF. 1986. *Children in especially difficult circumstances*. New York: UNICEF.
- UNICEF. 1989. *Annual report*. New York: UNICEF.
- van de Goor LAM, Garretsen HFL, Kaplan C, Korf D, Spruit IP, deZwart WM. 1994. Research methods for illegal drug use in hidden populations. *Journal of Psychoactive Drugs* **26**: 33–40.
- Westermeyer J, Neider J. 1988. Social networks and psychopathology among substance abusers. *American Journal of Psychiatry* **145**: 1265–9.
- Whiting J, Whiting B. 1975. *Children in six cultures*. Cambridge, MA: Harvard University Press.
- Whyte WF. 1949. *Street corner society: the social structure of an Italian slum*. Chicago: University of Chicago Press.
- Wiebel W. 1993. *The Indigenous Leader Outreach Model: Intervention manual*. Rockville, MD: National Institute on Drug Abuse.
- Wiebel WW. 1990. Identifying and gaining access to hidden populations. In: Lambert EY (ed.). *The collection and interpretation*

- of data from hidden populations*. Vol. 98. Washington, DC: USGPO, pp. 4–11.
- Windle M, Lerner RM. 1986. Reassessing the dimensions of temperamental individuality across the life span: the revised dimensions of temperament survey. *Journal of Adolescent Research* 1: 213–30.
- World Bank. 1995. *Kenya Poverty Assessment 1995*. Washington DC: World Bank.

Acknowledgements

The study was supported by an educational development grant from the Dutch International Education Organization (NUFFIC) and the Directorate General of the Dutch Ministry of International Cooperation (DGIS) to the Maastricht University Centre for International Cooperation in Academic Development (MUNDO) and the Moi University Faculty of Health Sciences. We would like to especially thank Dean BO Khwa-Otsyula of the Moi University Health Sciences and Margreet te Wierik and Geraldine van Kasteren, the MUNDO Long Term Experts, the Eldoret street children and Faculty of Health Sciences students.

Biographies

David O Ayuku, MA, is a Lecturer in the Department of Behavioural Sciences and Director of the WHO-UNESCO UNI-SOL Centre of Excellence for African Street Children Services Research located at the Faculty of Health Sciences at Moi University. He is a Ph.D. candidate in the Faculty of Medicine, Department of Psychiatry and Neuropsychology at Maastricht University, The

Netherlands and is engaged in developing a psychiatric social work curriculum for Moi University.

Wilson Odero, MD, Ph.D., is Professor and Dean of the Institute of Public Health in the Faculty of Health Sciences, Moi University, Kenya. His area of specialization in public health research is injury and accidents.

Charles Kaplan, Ph.D., is a Research Professor, Graduate School of Social Work, University of Houston, Texas, USA, and lectures and conducts social psychiatric research in the Department of Psychiatry and Neuropsychology, Faculty of Medicine, Maastricht University, The Netherlands. His research specializations are in the areas of drug misuse, prostitution and gang-related and intimate partner violence.

Rene De Bruyn, MD, is a tutor in the Medical Faculty of Maastricht University and a Resident Psychiatrist at Welland Psychiatric Hospital, Heerlen, The Netherlands. He has been engaged in research in psychopathology and social networks in forensic psychiatry and neighbourhood populations in Maastricht.

Marten deVries, MD, is Professor and Director of the Collaborating Centre for Public Mental Health, in the Faculty of Medicine of Maastricht University. He is a specialist in child psychiatry and his research focus is public mental health policy and planning and ecological psychiatry.

Correspondence: David O Ayuku, Faculty of Health Sciences, Moi University, PO Box 4606, Eldoret, Kenya