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Review article

Respondent-Driven Sampling for an Adolescent Health Study in Vulnerable Urban Settings: A Multi-Country Study

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A B S T R A C T

The global adolescent population is larger than ever before and is rapidly urbanizing. Global surveillance systems to monitor youth health typically use household- and school-based recruitment methods. These systems risk not reaching the most marginalized youth made vulnerable by conditions of migration, civil conflict, and other forms of individual and structural vulnerability. We describe the methodology of the Well-Being of Adolescents in Vulnerable Environments survey, which used respondent-driven sampling (RDS) to recruit male and female youth aged 15–19 years and living in economically distressed urban settings in Baltimore, MD; Johannesburg, South Africa; Ibadan, Nigeria; New Delhi, India; and Shanghai, China (migrant youth only) for a cross-sectional study. We describe a shared recruitment and survey administration protocol across the five sites, present recruitment parameters, and illustrate challenges and necessary adaptations for use of RDS with youth in disadvantaged urban settings. We describe the reach of RDS into populations of youth who may be missed by traditional household- and school-based sampling. Across all sites, an estimated 9.6% were unstably housed; among those enrolled in school, absenteeism was pervasive with 29% having missed over 6 days of school in the past month. Overall findings confirm the feasibility, efficiency, and utility of RDS in quickly reaching diverse samples of youth, including those both in and out of school and those unstably housed, and provide direction for optimizing RDS methods with this population. In our rapidly urbanizing global landscape with an unprecedented youth population, RDS may serve as a valuable tool in complementing existing household- and school-based methods for health-related surveillance that can guide policy.

IMPLICATIONS AND CONTRIBUTION

This multi-country study confirms the feasibility and efficiency of RDS in quickly reaching diverse samples of youth. Lessons learned from multisite implementation provide direction for optimizing RDS with youth, particularly those in disadvantaged setting.

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Globally, the current population of youth ages 10–24 years is larger than ever before in history, with an estimated one in four individuals worldwide within this age group; the vast majority lives in low- and middle-income nations [1]. Although adolescents are considered a healthy population, youth suffer morbidity and mortality stemming from intentional and unintentional injury, and sexual and reproductive health issues spanning sexually transmitted infections including HIV, and unintended pregnancy [1,2]. Health risk behavior in the forms of tobacco, alcohol, and other substance use and lack of physical activity can initiate and intensify during this life stage and impart risk for subsequent chronic health conditions [1,2].

The 2012 global synthesis of adolescent health [2] illustrates that much of our knowledge of population-level adolescent health is derived from household- and school-based surveillance systems, including the household-based Demographic and Health Survey (DHS) and Multiple Indicator Cluster Survey (MICS). Both systems include adolescents ages 15 years and older. The international Health Behaviour in School-Aged Children and the Global School Health Survey include younger adolescents up to age of 15 years. Despite the insights and international comparisons enabled by these systems [3–9], significant gaps remain in our understanding of global adolescent health. The school-based sampling strategies of the Health Behaviour in School-Aged Children and Global School Health Survey, although efficient, risk biased estimates in settings with chronic school absenteeism and high dropout rates. These biases are particularly salient for women and girls, who are less likely to be in school in some settings [2,10]. The household-based sampling of DHS and MICS risks overlooking the most vulnerable youth who risk housing instability for reasons of poverty, institutionalization, migration, civil conflict, and other forms of individual and structural instability. The health of youth who risk being missed by these surveillance systems is likely compromised. Experiences of housing instability, food insecurity, poverty, and gender inequity constitute powerful social determinants of health [11]. Adequate housing protects urban children from disease, injuries, and accidents; living environments are closely linked with psychological stress and overall health [12].

The confluence of heightened risk and limited access to health services for youth who are out of school and unstably housed, coupled with the lack of globally comparable data on health outcomes and determinants using samples that adequately include these populations, has prompted calls for the exploration of respondent-driven sampling (RDS) [2,13] to reach a broader spectrum of youth, much in the way that it has been applied to other marginalized populations often made invisible through more traditional sampling methods. RDS [14] is a chain-based recruitment method that has been widely adopted for HIV-related research [15] with marginalized hidden populations including injection drug users [16], men who have sex with men [17], and female sex workers [18]. More recently, the method has been adopted for other hidden populations, such as migrant workers [19], street children, and homeless youth [20,21].

We undertook a comparative investigation of adolescent health spanning domains of substance use, sexual and reproductive health, mental health, and gender-based violence, in distressed urban setting in five countries using RDS. Here, we describe recruitment in these five geocultural settings, including challenges and solutions, and illustrate the extent to which RDS reaches into populations of youth who risk exclusion from household- and school-based surveillance systems.

Methods

In 2013, the cross-sectional Well-Being of Adolescents in Vulnerable Environments study surveyed youth aged 15–19 years living in economically distressed urban settings in Baltimore, MD; Johannesburg, South Africa; Ibadan, Nigeria; New Delhi, India; and Shanghai, China (migrant youth only, as they constitute a particularly vulnerable population in this setting). RDS was selected for this study population given feasibility concerns for household- or school-based sampling, for example, inaccessible households (e.g., locked apartment buildings in Johannesburg) and many migrant youth not enrolled in school (Shanghai). A shared protocol enabled cross-site comparability. At each site, an extensive formative phase was conducted, including key–informant interviews, community mapping, focus groups, and in-depth interviews [22]. This phase informed RDS acceptability and logistics; we assessed evaluated youths network properties including subgroupings and the level of networking within and across subgroupings, identified necessary seed characteristics and potential seeds, and refined survey domains, consistent with formative RDS recommendations [23,24].

Eligible seeds and participants were adolescents aged 15–19 years and residing in the geographically designated target communities at each site. Adolescent seed participants were purposefully selected to serve as the initial contacts for recruiting from the target population through the formative phase, and through existing relationships with youth, community advisory boards, and other service providers at each site. Seeds represented diverse school enrollment, gender, employment, and residential statuses. Consistent with RDS methods [15], seeds and subsequent recruits were provided with up to three recruitment coupons each to recruit additional adolescents into the study until recruitment goals were reached. Each coupon had an expiration date, after which it could not be redeemed. Coupon expiration dates were used to control recruitment pace and to end recruitment when the sample size was achieved. Controlling chain referral recruitment through restricting the number of referrals per person encourages long recruitment chains and reaches into the target population. Coupons were identifiable by sequential numbers which linked recruits to their recruiters, enabling creation of recruitment chains. Several steps ensured the tracing of these links, including duplicative documentation of coupon links in both hard copy recruitment logs and electronically collected survey data. Procedures were piloted extensively in the Baltimore, MD site, with iterative discussion of pilot findings and challenges with partners at all sites. All other sites were able to transition directly into data collection from the pilot phase when logistics were finalized. Many made minor procedural adaptations through the pilot to maximize participant comfort, minimize coupon tampering, and ensure capacity to link participants with recruiters via coupon number documentation.

Consistent with RDS methods, participants self-reported the size of their social network to account for potential bias because of differences in selection probability for participants with larger versus smaller networks. To improve accuracy [23], network size questions were asked sequentially and structured to ensure reciprocity in social ties. The sequence was how many youth [age and location eligibility] … do you know, … do you know that know you, … do you know that know you and that you have seen in the past two weeks, … do you know that know you and that you have seen and talked to in the past two weeks, with the final question serving as the participant's network size.