



http:// www.elsevier.com/locate/jegh

## Measuring a hidden population: A novel technique to estimate the population size of women with sexual violence-related pregnancies in South Kivu Province, Democratic Republic of Congo



Lisa G. Johnston<sup>a</sup>, Katherine R. McLaughlin<sup>b</sup>, Shada A. Rouhani<sup>c,d,e</sup>, Susan A. Bartels<sup>c,d,f,g,\*</sup>

<sup>a</sup> Tulane University School of International Public Health and Tropical Medicine, New Orleans, LA, USA

<sup>b</sup> Department of Statistics, University of California, Los Angeles, Los Angeles, CA, USA

<sup>c</sup> Harvard Humanitarian Initiative, Cambridge, MA, USA

<sup>d</sup> Harvard Medical School, Boston, MA, USA

<sup>e</sup> Department of Emergency Medicine, Brigham and Women's Hospital, Boston, MA, USA

<sup>f</sup> Department of Emergency Medicine, Beth Israel Deaconess Medical Center, Boston, MA, USA

<sup>g</sup> Department of Emergency Medicine, Queen's University, Kingston, ON, Canada

Received 2 May 2016; received in revised form 13 July 2016; accepted 25 August 2016 Available online 20 September 2016

KEYWORDS Democratic Republic of Congo; Hidden populations, pregnancy; Respondent-driven sampling; Sexual violence; Successive samplingpopulation size estimation

Abstract Successive sampling (SS)—population size estimation (PSE) is a technique used to estimate the sizes of hidden populations using data collected in respondentdriven sampling (RDS) surveys. We assess past estimations and use new data from an RDS survey to calculate a new PSE. In 2012, 852 adult women in South Kivu Province, Democratic Republic of Congo, who self-identified as survivors of sexual violence, resulting in a pregnancy, since the start of the war (in 1996) were sampled using RDS. We used imputed visibility, enrollment order, and prior estimates for PSE using SS-PSE in RDS Analyst. Prior estimates varied between Congolese local experts and researchers. We calculated the PSE of women with a sexual violence-related pregnancy in South Kivu using researchers' priors to be approximately 17,400. SS—PSE

\* Corresponding author at: Queen's University, 76 Stuart Street, Empire 3, Kingston General Hospital, Kingston, ON K7L 4V7, Canada.

E-mail address: susanabartels@gmail.com (S.A. Bartels).

Peer review under responsibility of Ministry of Health, Saudi Arabia.

http://dx.doi.org/10.1016/j.jegh.2016.08.003

2210-6006/© 2016 Ministry of Health, Saudi Arabia. Published by Elsevier Ltd.

This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

is an effective method for estimating the population sizes of hidden populations, useful for providing evidence for services and resource allocation. SS—PSE is beneficial because population sizes can be calculated after conducting the survey and do not rely on separate studies or additional data (as in network scale-up, multiplier, and capture-recapture methods).

© 2016 Ministry of Health, Saudi Arabia. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

## 1. Introduction

Sexual violence is a predominant feature of the armed conflict and post conflict insecurity in eastern Democratic Republic of Congo (DRC) [1,2]. It is estimated that 40% of the female Congolese population (approximately 38,700,000) has experienced sexual violence and up to 17% of survivors become pregnant as a result of sexual assault, although this varies by region [1]. There are limited data about children born from sexual violence-related pregnancies (SVRPs) in DRC or elsewhere [3], although available evidence suggests that both children born from SVRPs, as well as their mothers, face high levels of stigma and experience considerable life adversities [4,5].

Estimating the size of hidden populations, including women with SVRPs, helps to inform the magnitude of the issue, guide resource allocation, and advocate for public health programs to reach affected populations. However, measuring the size of hidden populations is extremely challenging. Most hidden populations, which often practice or are victims of illegal behaviors and/or face discrimination and stigma, prefer to avoid being identified or counted. Measuring women with SVRP through household surveys would likely result in gross underreporting since affected women may be unwilling to report accurately and may not reside in typical household settings that are amenable to counting. Furthermore, it is impossible to count women with SVRPs through mapping or observation estimation, since the population is not visibly distinguishable. Finally, certain segments of the population may be more hidden or diffuse than others, resulting in their exclusion from population size estimations.

Attempting to estimate the number of women with SVRPs using published data also has limitations. Congolese census data are outdated (1984) [2]. The two most commonly used sources for population data in DRC are: (1) population projections for 2006 calculated by the National Institute of Statistical Sciences (NISS) [6]; and, (2) projected population data from the 2007 Expanded Program on Immunization (EPI) [7]. NISS and EPI estimate the population of South Kivu Province to be 4,281,000 and 4,379,129, respectively, the number of reproductive-aged women in South Kivu to be 943,228 and 964,848, respectively, and the number of women with lifetime experiences of sexual violence to be 120,709 and 123,476, respectively.

Globally, it is estimated that 5–18% of sexual violence survivors aged 12-45 years have an SVRP [8]. However, these estimates are from a variety of contexts in developed and developing countries. Within the African context, 17% of sexual violence survivors in Ethiopia reported a resultant pregnancy [8], consistent with the 17% estimated in DRC [1]. Using 17% as an estimate for the number of women who become pregnant from sexual violence, as well as the NISS and EPI data for the number of women in South Kivu province who have experienced sexual violence, we would estimate that approximately 20,000 women in South Kivu Province had SVRPs. However, this estimate may be inaccurate. First, estimates for the number of women who had experienced sexual violence are outdated. Furthermore, Peterman et al. [2] estimate that in DRC, 1150 women between the ages of 15 years and 29 years, experience sexual violence every day. Even if the daily incidence of sexual violence were much lower than Peterman's estimate, one could still conclude that the NISS and EPI estimates from 2006 and 2007, respectively, could be low. Additionally, the estimate that 17% of sexual violence survivors in DRC have an SVRP [1] may be inaccurate.

To provide an additional population size estimate than can be extrapolated from the available literature, we estimate the population size using data from a respondent driven sampling (RDS) survey of women with SVRPs in South Kivu Province, DRC. Briefly, RDS is a sampling method used worldwide [9–11] to sample hidden populations whose members are connected through a network of social ties, and for which no sampling frame exists [12–14]. RDS uses participants' recruitment data Download English Version:

## https://daneshyari.com/en/article/5662946

Download Persian Version:

https://daneshyari.com/article/5662946

Daneshyari.com