Schizophrenia Research 171 (2016) 79–85

Contents lists available at ScienceDirect

Schizophrenia Research

journal homepage: www.elsevier.com/locate/schres

# Exposure to conflict and disaster: A national survey on the prevalence of psychotic experiences in Sri Lanka

Arune Keraite [a,*], Athula Sumathipala [b,c], Chesmal Siriwardhana [c,d], Craig Morgan [a], Ulrich Reininghaus [a,e]

[a] Centre for Epidemiology and Public Health, Health Service and Population Research Department, Institute of Psychiatry, Psychology & Neuroscience, King's College, London, UK
[b] Research Institute for Primary Care and Health Sciences, Keele University, Staffordshire, UK
[c] Institute for Research and Development, Colombo, Sri Lanka
[d] Faculty of Medical Science, Anglia Ruskin University, UK
[e] Department of Psychiatry and Psychology, School for Mental Health and Neuroscience, Maastricht University, The Netherlands

ARTICLE INFO

*Article history:*
Received 3 October 2015
Received in revised form 22 December 2015
Accepted 14 January 2016
Available online 24 January 2016

*Keywords:*
Psychotic experiences
Trauma
Sri Lanka
National survey

ABSTRACT

Recent research conducted in high-income countries suggests psychotic experiences are common in the general population, but evidence from low- and middle-income countries (LMIC) remains limited. Sri Lanka is a LMIC affected by three decades of civil conflict and, in 2004, a devastating tsunami. This study aimed to investigate the prevalence of psychotic experiences in a general population sample in Sri Lanka and associations with conflict- and tsunami-related trauma. This is a first National Mental Health Survey conducted in Sri Lanka. A cross-sectional, multi-stage, cluster sampling design was used to estimate the prevalence of psychotic symptoms. Data on socio-demographic characteristics, conflict- and tsunami-related trauma, and psychotic experiences were collected using culturally validated measures in a sample of 5927 participants. The weighted prevalence of psychotic symptoms was 9.7%. Exposure to one or more conflict-related events (adj. OR 1.79, 95% CI 1.40–2.31, $p < 0.001$) and loss or injury of a family member or friend through conflict (adj. OR, 1.83, 95% CI 1.42–2.37, $p < 0.001$) were associated with increased odds of reporting psychotic experiences. Psychotic experiences were more common in individuals directly exposed to tsunami disaster (adj. OR, 1.68, 95% CI 1.04–2.73, $P = 0.035$) and in those who had a family member who died or was injured as result of tsunami (adj. OR, 1.42, 95% CI 1.04–1.94, $p = 0.029$). Our findings suggest that psychotic experiences are common in the Sri Lankan population. Exposure to traumatic events in armed conflicts and natural disasters may be important socio-environmental factors in the development of psychotic experiences.



## 1. Introduction

Substantial evidence has accumulated that low-level psychotic experiences, such as fleeting and non-distressing hallucinations, strange experiences and delusions, are common in the general population (Johns and van Os, 2001). Findings from large population surveys suggest that the prevalence of psychotic experiences (PE) ranges from 5%–20% (Verdoux and van Os, 2002; Johns et al., 2004; King et al., 2005; Scott et al., 2006; Morgan et al., 2009). Further, in a considerable proportion of individuals, subclinical PE persist over time, which, in turn, is associated with an increased risk of psychotic disorder (Linscott and van Os, 2013). There is also evidence that socio-environmental risk factors are shared across PE and psychotic disorder (Morgan et al., 2009).

To date, most research on PE has come from high-income countries, with only a small number of studies conducted in low- and middle-income countries (LMICs) (Soosay et al., 2012). The reported prevalence in LMICs ranges from 4% in Tanzania (Jenkins et al., 2010) to 12% in Timor Leste (Soosay et al., 2012). An even greater variation in prevalence (0.8%–31.4%) was found in the WHO cross-national World Health Survey conducted in 52 countries (Nuevo et al., 2012), which reported a prevalence of PE of only 2.4% in Sri Lanka. Studies investigating this issue in LMICs are frequently beset by methodological shortcomings, such as having a representative sample and small sample size, which may account for variation in the prevalence of PE reported to date.

Several factors have been shown to be associated with PE (Spauwen et al., 2006; Campbell and Morrison, 2007; Hides et al., 2009). However, only a small number of studies have examined the role of exposure to trauma of armed conflict in relation to PE (Soosay et al., 2012; Amone-P'olak et al., 2013; Lindley et al., 2014). Exposure to natural disasters may increase risk of developing a mental disorder (Meewisse et al., 2011; Ekanayake et al., 2013; Dorrington et al., 2014), but no study that we are aware of has investigated the association between natural disasters and PE.

Sri Lanka is one of the few countries that simultaneously faced war and natural disaster, in which the relative impact of each can be

* Corresponding author.
*E-mail address:* arune.keraite@kcl.ac.uk (A. Keraite).

http://dx.doi.org/10.1016/j.schres.2016.01.026
0920-9964/

**Table 1**
Prevalence of positive responses on Psychosis Screening Questionnaire (PSQ).

| PSQ Items | | |
|---|---|---|
| *Initial probe*<br>Secondary questions | 'Yes" responses | 'Yes' responses (weighted[a]) |
| | n | % |
| Hypomania | | |
| *Over the past year, have there been time when you felt very happy indeed without a break for days on end?* | 1886 | 29.56 |
| Was there an obvious reason for this? | 175 | 2.61 |
| Did your relatives or friends think it was strange or complain about it? | 4 | 0.00 |
| Thought insertion | | |
| *Over the past year, have you ever felt that your thoughts were directly interfered with or controlled by some outside force or person?* | 166 | 2.75 |
| Did this come about in a way that many people would find hard to believe, for instance through telepathy? | 45 | 0.85 |
| Paranoia | | |
| *Over the past year, have there been times when you felt that people were against you?* | 729 | 11.87 |
| Have there been times when you felt that people were deliberately acting to harm you or your interests? | 497 | 8.18 |
| Have there been times when you felt that a group of people was plotting to cause you serious harm or injury? | 163 | 2.74 |
| Strange experiences | | |
| *Over the past year, have there been times when you felt that something strange was going on?* | 136 | 2.23 |
| Did you feel it was so strange that people would find it very hard to believe? | 79 | 1.37 |
| Hallucinations | | |
| *Over the past year, have there been times when you heard or saw things that other people could not?* | 151 | 2.55 |
| Did you at any time hear voices saying quite a few words or sentences when there was no-one around that might account for it? | 76 | 1.23 |
| Any psychotic-like experiences excluding hypomania | | |
| Yes to one or more initial probe questions | 889 | 14.58 |
| Yes to the secondary questions | 571 | 9.54 |
| Any psychotic-like experience | | |
| Yes to one or more of the initial probe question(s) | 2408 | 38.71 |
| Yes to one or more of the secondary question(s) | 572 | 9.68 |

[a] Weighted for household size and sex.

compared and studied in relation to psychosis. The country has experienced three armed conflicts that have arisen out of ethnic tensions (Siriwardhana and Wickramage, 2014). It is estimated that up to 70,000 people died as a consequence of the most recent conflict between the majority Sinhalese and minority Tamil population and many thousands more were displaced (Siriwardhana et al., 2013a, Siriwardhana and Wickramage, 2014). In addition, Sri Lanka was hit by a tsunami on 26th December 2004, devastating almost two thirds of the island's coastline and resulting in an estimated death toll of 40,000 (Siriwardhana et al., 2012). Against this background, we sought to investigate the association between PE and exposure to traumatic events of prolonged conflict and a devastating natural disaster in a large community-based sample. Specifically, our aims were to: 1) estimate the prevalence of PE in the Sri Lankan population; and 2) assess whether a) exposure to conflict-related traumatic events and/or b) exposure to tsunami-related traumatic events were associated with a higher prevalence of PE.

## 2. Method

The National Mental Health Survey was a community based cross-sectional survey in Sri Lanka. Full details of the methods used are provided in previous reports (Institute for Research and Development, 2007).

### 2.1. Sample

The inclusion criteria used in the study were as follows: 18–65 years of age; living in an included district for at least six months prior to inclusion; and sufficient knowledge of Sinhala, Tamil, or English. The ratio of women to men was higher in the current sample than in a recent national census. Therefore, analyses were weighted for sex to account for the oversampling of women.

A multi-stage cluster sampling method used the Grama Niladari divisions (GND), i.e. the lowest-level administrative unit in Sri Lanka, for cluster selection. GND clusters were chosen to be the primary sampling unit, identifying 36 clusters from 17 districts and 10 respondents from each cluster. Ethical approval was obtained from the Ethics Review Committee, University of Sri Jayewardenepura, Sri Lanka.

### 2.2. Data collection

Structured questionnaires were used for collecting data on socio-demographic characteristics.

To assess PE in the past year, the Psychosis Screening Questionnaire (PSQ) (Bebbington and Nayani, 1995) was administered. The PSQ is divided into 5 sections with questions on hypomania, thought insertion, paranoia, strange experiences, and hallucinations. Each section has secondary questions to establish the presence (i.e., endorsement of one or more secondary question(s)) of PE.

Exposure to the conflict and tsunami was measured using the Brief Questionnaire on War and Tsunami (Siriwardhana et al., 2013b; Dorrington et al., 2014), which consists of 16 items and allows for computing separate indices for conflict- and tsunami-related traumatic events. One or more positive responses to items on this questionnaire indicated the degree to which participants were affected by conflict- and/or tsunami-related traumatic events (including injury, death, and displacement). Items were grouped by type of event to create indices of a) direct exposure to combat or tsunami (i.e. participation or injury through conflict/in area or injured during tsunami), b) loss/injury of family/friends, and c) displacement/loss of property. Instruments were translated into Sinhala and Tamil, both of which are official languages spoken in Sri Lanka. Items were further summarized into a binary (no event, 1 or more events) index to assess the impact of linked and cumulative exposure to conflict- or tsunami-related trauma.

### 2.3. Statistical analysis

Statistical analyses were conducted using STATA 12 (StataCorp., 2011). All analyses were weighted for household size and sex to account for oversampling of women and participants from larger households. The weighted prevalence of PE was calculated in the whole sample. Logistic regression was used to examine associations between socio-demographic characteristics, conflict- and tsunami-related exposures and the binary outcome of presence or absence of PE, while controlling for potential confounders. Finally, we examined whether there was evidence that exposure to conflict-related traumatic events combined synergistically with exposure to tsunami-related events by testing for interaction on an additive scale (i.e., for departure from additivity) using interaction contrast ratios (ICR), with departure from additivity (i.e., interaction) being indexed by an ICR greater than 0. The nlcom procedure was used to generate confidence intervals and p-values for ICRs (Morgan et al., 2014).