Measuring the Mortality Consequences of Armed Conflict in Amritsar, India: A New Approach to the Indirect Sampling of Conflict-Related Mortality

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Introduction

There are a number of major epistemological challenges to clarifying basic questions about the magnitude and pattern of conflict-related mortality during armed conflict situations.

Such challenges stem from issues associated with the measurement of *elusive* phenomena, the unsettled nature of the population, the difficulties in gaining access to the affected population, and potential security and safety concerns for both enumerators and respondents.

Background

Human rights groups and media reports have documented that, in the process of carrying out its counterinsurgency between 1984 and 1996 against suspected Sikh insurgents, security forces engaged in torture, extrajudicial executions, and enforced disappearances in Punjab, India.

Indian authorities have downplayed reports of abuses in Punjab as "aberrations" that have been addressed according to appropriate procedures.

These documentation reports, however, are yet to conclusively clarify whether the government's counterinsurgency reports were, in fact, a model security operation or an example of the state suspending the rule of law and carrying out mass human rights violations against insurgents and suspected opponents.

We drawn on an adaptive sampling design, given that we are trying to indirectly measure an elusive population hidden within a large settled population (of approx. 5 million).

Aim

We seek to contribute new empirical evidence and defensible statistical findings to this important human rights debate, by moving beyond some of the limitations of existing data and placing this debate on stronger empirical and methodological footing.

Our aim is to clarify whether the alleged enforced disappearances and extrajudicial executions committed by police and security authorities were "widespread" and/or "systematic." Widespread in that such lethal violence was committed on a large-scale at the population-level, and systematic in the sense that the pattern of these events is consistent with the hypothesis that they are the result of a specific plan or set of social practices.

We develop a quasi-adaptive sampling strategy, which combines both probability-based random sampling (at the first sampling stage) and adaptive sampling (at the second stage), to measure the random data omissions of lethal violence in Amritsar.

Method

We conducted our survey in July and August 2009. We designed the survey to study the following reference population: victims of lethal counterinsurgency violence who were killed or disappeared any time between 1984 and 1995 and who were residents of rural Amritsar at the time of their death or disappearance.

Given the effects of migration between 1996 and the time of the survey, this sampling plan is expected to result in a downward bias when estimating the magnitude of lethal counterinsurgency violence in rural Amritsar between 1984 and 1996.

We used a referral-based sampling plan. We first randomly selected 190 village clusters proportional to population size. In each sampled village, we then interviewed at least two primary referral points which included local village officials or elders.

Primary referral points included:

- Sarpanches: the elected chief administrator of the village
- Bazurgs: groups of village elders who are highly visible in the village
- Chowkidars: village-level government officials who record vital events within the village

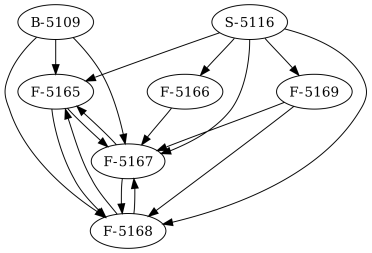

Fig 1: The referral network for the village of Johal Raju Singh, in Tarn-Taran, Punjab. The S- and B- nodes at the top represent the sarpanch and bazurg primary referral points, and the F- nodes represent interviewed families. An arrow from one node to another represents a referral.

These primary referral points were asked for referrals to families "who experienced an enforced disappearance and/or extrajudicial execution between 1984 and 1995, and were resident in the sampled village during that time."

The survey team then attempted to interview all such families still resident in the village. The survey field team then documented the details of any lethal violence incidents which this family experienced and also asked them for further referrals to other families resident in the sampled village who had experienced acts of lethal violence. All referrals from both primary referral points and families were followed exhaustively

Results

By applying the Horwitz-Thompson estimator (Horvitz & Thompson, 1952), we estimated that a lower bound of approximately 1865 (95% C.I. (1588, 2142)) on the number of people killed or disappeared in rural parts of Amritsar between 1984 and 1996 by the Indian and Punjab state authorities as part of the State's counter-insurgency campaign against Sikh non-state armed actors.

Disaggregation Variable		Point	Lower	Upper
Characteristic	Value	Estimate	95% CI	95% CI
Border Status	Border Village	738	533	943
	(per 10,000 persons)	9.7	7	12.4
	Non-Border Village	1,127	886	1,369
	(per 10,000 persons)	10.1	7.96	12.3
Amritdhari Status	Amritdhari	1,098	932	1,264
	Non-Amritdhari	757	596	917
Militancy Status	Militant	660	520	799
	Non-Militant	1,198	990	1,406
Age-Group	13–19	299	220	379
	20–29	1,109	911	1,308
	30–39	266	198	335
	40–49	98	63	134
	50+	55	30	80

Fig 2: Disaggregated Estimates of Killings and Enforced Disappearances that were attributed to the State and occurred in rural Amritsar between 1984-1996.

Our one-stage cluster design assumes that social networks are completely observable and that the survey referral process is exhaustive and error-free. This is an unrealistic assumption, given that social knowledge is likely to be incomplete (due to such factors as recall errors, migration effects in between the end of the counterinsurgency and the survey, etc.) and given that Punjabi society is highly stratified

Upon examining the sensitivity of our estimates to choice of primary referral point, we find a surprising amount of stability. The largest changes in the resulting point estimate arises when the Sarpanche referral point is excluded.

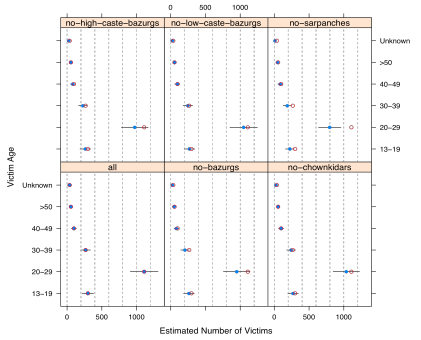

Fig 3: Sensitivity of Estimated Age Pattern of Victims of Killings and Enforced Disappearances to Choice of Primary Referral Points. Red circles show the point estimates resulting from all collected data. Blue circles and black bars show the point estimates and 95% confidence intervals for estimates using data that would have resulted if the given primary referral type had not been used.

One way to visualize the referral process is as a directed graph or network. When examining such networks, social scientists use measures of centrality to characterize the connectedness of the network being studied. In our referral-based sampling situation, we can use measures such as *closeness* and *outdegree* to examine the relative centrality of the different primary referral points.

Closeness is the degree an individual is near all other individuals in a sampled village (directly or indirectly). It reflects the ability of the sampling process to access information about lethal violence deaths which occurred in the sampled village through the social network of the referral points. The *degree* is the count of the number of links to other referral points in the social network and is a simple metric of the connectedness of a referral point to families of lethal violence resident in the sampled village.

Node Type	Betweenness	Closeness	In degree	Out degree
Bazurg	0.00	0.17	0.00	2.38
Family	1.04	0.01	1.94	0.77
Sarpanch	0.00	0.20	0.00	2.22

Fig 4: Mean Network Descriptive Statistics by Referral Network Node Type

We also observe strong bias amongst secondary (family-to-family) referrals along caste lines, as shown in Fig 5. The sampling process is overwhelmingly driven, at the secondary stage, by referrals to high caste families from both low and high-caste referrers. This points to a challenge in modeling and controlling for social network dynamics when deriving population estimates from a referral-based sample.

	Jat	Khatri	Ramgarhia	Mazbi	Dalit	Other	Unknown
Jat	265	0	5	14	0	16	2
Khatri	0	0	0	0	0	0	0
Ramgarhia	4	0	1	1	0	0	0
Mazbi	10	0	1	6	0	3	0
Dalit	0	0	0	0	0	0	0
Other	14	0	1	9	0	2	0
Unknown	0	0	0	0	0	0	0

Fig 5: Castes of Secondary Referral Sources and Referents

Conclusion

We find that the use of referral-based sampling to measure elusive phenomenon, such as direct lethal violence during the counterinsurgency in Amritsar, India, leads to efficient sample sizes which can be used for calculation of conservative, lower-bound mortality estimates.

In contrast to Roberts et al. (2010), we find our estimates to be reasonably stable for the choice of different primary referral points. However, we find the secondary referral process to be characterized by notable bias, thus making unbiased network-based estimation challenging.

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