



Letter to the Editor

From where we came: Absence of internal migration effect on psychosis in two case-control Brazilian samples


To the Editors:

Among a multitude of risk factors, migration has been associated to psychosis (Morgan et al., 2010). It might act according to a stress-vulnerability model, which proposes that prolonged exposure to conditions of social defeat, as chronic discrimination and isolation, would be associated with the high rates of psychotic disorders in groups of migrants (Selten et al., 2013).

So far, the majority of the studies considered the effect of external migration (Leão et al., 2006; Nerhus et al., 2015), i.e., the mobility from a country to another, which may represent significant changes in language, culture and habits. Recent studies about migration within a country also suggested its association with higher rates of psychosis (Cardano et al., 2018; Tarricone et al., 2016).

In low- and middle-income countries (LMICs), internal migration is a common phenomenon, usually from a poorer to a richer region without planned occupation of urban area. Adding this to data that environmental conditions, as urbanicity, also risk factors in wealthy countries, may not have the same impact on psychosis in less developed countries (Del-Ben et al., 2019; DeVlyder et al., 2018), we investigated whether internal migration would be associated to psychosis in two Brazilian catchment areas in São Paulo, the richest state of the country.

The areas were the city of São Paulo (SP) and the Ribeirão Preto region (RP), where service-based epidemiologic studies were developed (Del-Ben et al., 2019; Menezes et al., 2007). SP is a densely populated megalopolis with diversified economy and 11,253,503 inhabitants; whereas RP, composed by 26 towns, is an agribusiness pole based on sugar-cane plantation, and with 1,327,989 inhabitants (2010 Brazilian Census, <https://cidades.ibge.gov.br/>).

Historically, the state of São Paulo has been one of the main poles of internal migration, attracting migrants mainly from poorer areas. More recently, however, there was a decrease in the rates of migration in the state as a whole (4.3, in 2000, to 1.21/1000 inhabitants-year, in 2010), but with heterogeneities across regions. In particular, there was a significant increase in the rates in Ribeirão Preto region (6.45, in 2000, to 7.58/1000 inhabitants-year, in 2010), and negative rates in São Paulo in (−5.07, in 2000, and −2.97/1000 inhabitants-year, in 2010) (<http://www.imp.seade.gov.br>).

Patients, aged from 16 (RP) or 18 (SP) to 64 years old, were recruited in their first ever contact with public mental health services motivated by psychotic symptoms; with inclusion periods from 2002 to 2005 (SP $n=200$) and from 2012 to 2015 (RP $n=213$). In SP, controls were paired by sex, age and housing neighborhood in 2:1 proportion; in RP, community-based controls

($n=318$) came from randomly drawn census tracts according to sex and age intervals proportions based on the 2010 census.

Internal migration was categorized according to place of birth and the time of continuous living in the city of first episode of psychosis. With this, we intended to control both the change of place of living and the time of exposition to the environment.

Using STATA 13.0, the final regression models (conditional logistic regression with SP data) were presented by the OR and 95%CI values of each category of internal migration adjusted by sex and age (only RP), years of education, marital status and skin color.

We observed a higher proportion of men and young people among patients from RP in comparison to SP (Supplementary Table 1). The distribution regarding patient's self-reported skin color was similar in both cities, but, between controls, there were a smaller percentage of non-whites in RP. For both patients and controls, there were more volunteers with more years of education in RP. There was a lower percentage of patients in marriage or in a stable affective relationship in SP.

The vast majority of the participants were born in Brazil (smallest portion was SP patients with 99.0%). More RP patients were still living in the same city where they were born in comparison to SP; but more RP patients had moved to onset city less than three years ago (Supplementary Table 2). As also displayed in Supplementary Table 2, our data did not support the hypothesis of an association between internal migration and increased incidence of psychosis, as observed in high-income countries (Cardano et al., 2018; Tarricone et al., 2016).

Our negative results can be related to changes, in the Brazilian Southern, of the pattern of internal migration from rural-urban to urban-urban areas, reduction of long-distance residence relocation and from a fixed to pendulum pattern of mobility, in which people have their activities in one city but live in another (IBGE, 2011).

It is possible that this more recent mobility pattern might no longer be associated to major discrepancies in lifestyle or definitive decrease of contact with original social group. Furthermore, despite the Brazilian continental dimension, we have a unity in the language spoken in the country, and we cannot rule out some population-shared cultural denominator, as mass media supplied by national coverage of open television networks.

Differences in the profile of the two Brazilian samples of cases with enrollment periods that were apart in ten years can be related to methodological differences between the studies such as the procedures for recruitment of the population-based controls. Regarding level of education differences, we have witnessed an increase in the school frequency in Brazilian population partially associated to governmental conditional cash transfer program (de Brauw et al., 2015).

Limitations should be considered in generalizing these data. Our categorization of internal migration based on accumulated years living in the region might not portray as a valid proxy of social defeat to which the migrants are subject, such as acculturative processes, language barrier, or social deprivation due to discrimination,

involuntary migration or legal residency status (Close et al., 2016; DeVlyder et al., 2013).

Summarizing, internal migration was not associated to psychosis in Brazilian patients. Future research of other factors related to social defeat, such as social adversities, prejudice experiences as racism (Selten et al., 2013), social capital as migration together with relatives (Dyckhoorn et al., 2019) should take place in our country.

Contributors

Authorship credit was based on the contribution of each researcher. Cristina Marta Del-Ben and Paulo Rossi Menezes designed the Ribeirão Preto thematic project and were responsible for obtaining grants. Geraldo Busatto Filho, Marcia Scazufca and Paulo Rossi Menezes designed the São Paulo thematic project and also obtained grants. Rosana Shuhama, Lorena de Souza Rodrigues do Carmo, Cristina Marta Del-Ben and Paulo Rossi Menezes contributed to the conception and design of this study. Rosana Shuhama and Lorena de Souza Rodrigues do Carmo drafted the first version of the manuscript. Rosana Shuhama, Lorena de Souza Rodrigues do Carmo, Cristina Marta Del-Ben, Paulo Rossi Menezes and Jair Lício Ferreira Santos performed the analysis. All the authors interpreted the data and revised the final version of the manuscript.

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Declaration of competing interest

The authors declare that there is no conflict of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.schres.2019.07.042>.

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