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BRIEF COMMUNICATION

Influence of migration on the thought process of individuals at ultra-high risk for psychosis

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Objective: To assess the influence of migration on the psychopathological presentation of individuals at ultra-high risk for psychosis (UHR) in São Paulo, Brazil.
Methods: This study is part of the Subclinical Symptoms and Prodromal Psychosis (SSAPP) project, a cohort study in São Paulo, Brazil, designed to follow individuals at UHR. After screening with the Prodromal Questionnaire (PQ) and a clinical interview, the Global Assessment of Functioning (GAF) was administered, a neuropsychological assessment was performed, sociodemographic and migration data were obtained. We then analyzed UHR individuals who had migration data to see if migration had any effect on their cognition and psychopathology. Chi-square tests were used for categorical variables, and Student's *t* test or analysis of variance (ANOVA) were used for nonparametric and parametric distributions, respectively.
Results: The sample was composed of 42 at-risk subjects, of whom 5 had a migration history in the past two generations. Those with migration history showed significantly more formal thought disturbances ($p = 0.012$) and sleeping problems ($p = 0.033$) compared to those without.
Conclusions: Our data reinforce migration as a risk factor for psychosis in developing countries as well, and highlights the importance of studying the specific effect of this factor in UHR psychopathology.

Keywords: Schizophrenia; subclinical psychosis; at risk mental state; prodromal psychosis

Introduction

Currently, millions of people cross country borders throughout the year, and the migration process has become an integral part of global economic and social development. The literature reports a high incidence of psychosis in groups that have migrated to other countries.[1] This finding was explained by Cantor-Graae et al.,[1] who conducted a meta-analysis of incidence rates across 18 studies, finding a relative risk for schizophrenia of 2.9 (95% confidence interval [95%CI] 2.5-3.4) in the first and second generations of migrants compared to non-migrants. Another recent meta-analysis also addressed the relationship of psychosis and migration, showing a relative risk of 2.13 for the development of non-affective psychosis among migrants and their children.[2] In addition, further data suggest that first-generation migrants are slower to seek mental health services when they develop a first outbreak or prodromal symptoms than natives and second-generation immigrants.[3] They also have a high probability of entering the mental health system by emergency services when compared to native patients – this fact may be linked to a greater degree of shame and stigma.[4] Thus, besides being an important risk factor for psychosis, migration appears to also constitute a barrier to mental healthcare. As a consequence, several migrants may manifest subclinical psychotic experiences that go unnoticed. Moreover, social isolation caused by migration might specifically impact thought processes, a key feature in psychosis.[5]

The ultra-high risk for psychosis (UHR) criteria have been developed to detect prodromal states of the disease.[6] They include three syndromes: attenuated psychotic symptoms; brief, intermittent, and self-limiting psychotic symptoms; and presumed genetic vulnerability (schizotypal personality or first-degree relative with a psychosis

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diagnosis) associated with a drop in overall functioning. UHR criteria have been widely used for more than 10 years, but despite many studies investigating how migration affects psychosis risk in high-income countries,[7] there is a paucity of data regarding this issue in developing countries. This would be especially important in countries such as Brazil, where the frequent mixing of races would in theory attenuate the harmful effect of migration. Thus, the aim of the current study is to assess the presence of migration as a risk factor in a sample in São Paulo, Brazil, and how migration affects psychopathology and cognition in individuals at risk for psychosis.

Methods

This study is part of the Subclinical Symptoms and Prodromal Psychosis (SSAPP) project, a cohort study conducted in São Paulo, Brazil, which aimed to follow individuals at UHR.[8] Over 2,500 individuals between the ages of 18 and 30 participated in a household survey conducted by an international research company (IPSOS).[9] Individuals were selected according to their place of residence following the local census and the probability proportional to size method to constitute a probabilistic sample. Demographic factors were obtained, and the Prodromal Questionnaire (PQ) was used as the screening instrument.[10] The PQ is a self-report questionnaire with 92 true/false items designed to collect data on prodromal symptoms of psychosis. Most items are similar to the Structured Interview for Prodromal Syndromes (SIPS) and the Schizotypal Personality Questionnaire. Participants who scored higher than 18 on the positive subscale of the PQ were invited to participate in the second phase of the study, conducted at the Institute of Psychiatry, Universidade de São Paulo. A total of 226 individuals agreed to participate, and their UHR status was assessed by a group of experienced psychiatrists in the field of psychosis using the SIPS,[11] an instrument similar to the Positive and Negative Syndrome Scale (PANSS) measuring four dimensions of subclinical psychotic experiences. After the assessment, 98 were regarded as UHR, 124 as not UHR, and four as already psychotic. Besides this clinical interview, the Global Assessment of Functioning (GAF) was administered, sociodemographic data were obtained, a neuropsychological assessment was carried out, and whole blood was extracted. More details about the methods of the SSAPP have been published elsewhere.[8]

Cognition was assessed with the University of Pennsylvania Computerized Neuropsychological Testing (Penn CNP Battery), which comprises 11 tests that elicit 409 variables.[12] The scores of the main outcome variables of the 11 tests were used as variables in this study.

Migration data were obtained afterwards by telephone interview using the Bologna inventory, a brief questionnaire that evaluates the respondent's migration status (across country borders or within the country) and the country of their parents' and grandparents' birth.

We then analyzed UHR individuals for whom migration data were available (n=42) to see if migration had any effect on their cognition and psychopathology. The Bologna questionnaire item scores were correlated with demographic variables to ascertain whether migrants differed from non-migrants. Migration scores were also correlated with the SIPS items scores and with the neurocognitive variables. Chi-square tests were used for categorical variables, while Student's *t* test or analysis of variance (ANOVA) were used for nonparametric and parametric distributions, respectively. Results were confirmed by Mann-Whitney *U* tests for small samples. All analyses were carried out in SPSS version 25 for Mac.

Results

Sample characteristics are depicted in Table 1. Five individuals in the sample had a history of migration in the past two generations, while the remaining 37 did not. Those with migration history had a significantly higher level of education (mean of 12.80 vs. 10.75 years of schooling, p = 0.035). Regarding clinical data, unusual thought content – SIPS P1 – scores were significantly higher in UHR participants with a migrant background compared to those with no migration among parents or grandparents (mean score on P1 = 3.60 vs. 1.95, respectively, p = 0.012) (Table 2). Sleep disturbances were also statistically higher among those with a familial history of migration (mean score on SIPS G1 = 1.06 vs. 2.60, respectively, p = 0.033). Cognitive data were not significantly different between individuals with vs. those without a recent familial history of migration (Table S1, available as online-only supplementary material).

Discussion

The main results of the study suggest that migration might be a modulating factor in our UHR sample, influencing

Table 1 Sociodemographic characteristics of individuals at ultra-high risk for psychosis according to familial migration history

	Migrant parent or grandparent		
	No (n=37)	Yes (n=5)	p-value
Gender (female), n (%)	27 (73.0%)	3 (60.0%)	0.547
Age (years), mean (SD)	24.7 (4.5)	25.8 (4.4)	0.604
Years of education, mean (SD)	10.75 (1.94)	12.80 (1.79)	**0.035**

SD = standard deviation.
Bold type denotes significant correlations.

Table 2 Clinical data (SIPS items and GAF) of individuals at ultra-high risk for psychosis according to familial migration history

	Migrant parent or grandparent		
	No (n=37)	Yes (n=5)	p-value
SIPS items			
Positive symptoms			
P1	**1.95 (1.29)/2**	**3.60 (1.52)/3**	**0.012**
P2	2.14 (1.36)/2	1.60 (1.82)/1	0.430
P3	0.49 (0.87)/0	0.40 (0.55)/0	0.831
P4	3.08 (1.69)/3	3.60 (1.14)/4	0.511
P5	0.81 (1.31)/0	0.00 (0.00)/0	0.178
Negative symptoms			
N1	1.23 (1.68)/0	0.20 (0.45)/0	0.186
N2	1.00 (1.59)/0	0.80 (1.30)/0	0.790
N3	0.40 (0.77)/0	0.20 (0.45)/0	0.579
N4	0.74 (0.98)/0	0.40 (0.89)/0	0.465
N5	1.51 (1.62)/1	0.60 (0.55)/1	0.221
N6	0.66 (1.16)/0	0.20 (0.45)/0	0.394
Disorganization symptoms			
D1	0.26 (0.65)/0	0.20 (0.45)/0	0.139
D2	0.23 (0.60)/0	0.60 (1.34)/0	0.283
D3	1.37 (1.44)/1	1.40 (1.14)/1	0.966
D4	0.26 (0.78)/0	0.20 (0.45)/0	0.875
General symptoms			
G1	**1.06 (1.41)/0**	**2.60 (1.81)/3**	**0.033**
G2	1.60 (1.40)/2	2.00 (0.71)/2	0.537
G3	0.35 (0.73)/0	0.00 (0.00)/0	0.294
G4	1.46 (1.40)/1	1.20 (0.84)/1	0.693
GAF	70.58 (11.67)/72	67.20 (9.88)/61	0.545

Data presented as mean (standard deviation)/median.
GAF = Global Assessment of Functioning; SIPS = Structured Interview for Prodromal Syndromes.
Bold type denotes significant correlations.

thought process. Migrants face the difficulty of being located in a new country, dealing with many obstacles such as bias in interpersonal relationships due to communication, differences in cultural background, and, in many cases, uncomfortable conditions such as illegality and other issues with the law.[13] Our study resonates with the literature in that the risk for mental disorders in this population is increased, such as that of developing mood disorders.[14]

Authors have reported that the mental disorder that most affects migrant populations is psychosis.[15] Cantor-Grae et al.[16] found an unusual frequency of psychotic disorders in first-generation migrants. Cultural distress and language problems would play a key role in amplifying personal and social preoccupations.[17] Our results reinforce this hypothesis, further suggesting the important role of migration on specific aspects of risk for psychosis, namely thought process.[5] Since language and thought process are tightly linked,[18] difficulties with language and culture found in migrant families would act as a mediator of unusual thought content, as detected in our sample.

We also found that sleep disturbances were increased in UHR individuals with migration history, denoting another specific aspect of this factor on the mental state of UHR individuals. On the other hand, these individuals had more years of education. This could be possibly explained by the fact that migrants leave their country of origin to improve productive skills and consequently gain education. Furthermore, becoming a student in the host country might be the preliminary step to gaining admission abroad as a migrant later on.[19]

Some studies have shown that people at significant risk for schizophrenia spectrum disorders can present with cognitive deficits that impact on memory, attention, and reasoning, and compromise functional and social abilities.[20] Though we did not compare UHR individuals with healthy controls, no modulating effect of migration on cognition within UHR individuals was found.

A limitation of the present study was the small sample size, which prevented us from investigating an important aspect of migration, namely the generation of immigration.[13] While, intuitively, first-generation migrants would be expected to carry migration as a greater risk factor, research shows that even second-generation migrants have a higher incidence of mental disorders compared to the native population. Some evidence shows that the risk of psychosis in the first generation of immigrants is almost three times than that of native populations, and four to five times higher in populations of second-generation migrants.[21] Nevertheless, a larger sample size would be required to test this hypothesis in our case. Our analysis might also be underpowered due to our small sample. However, we observed that UHR which could not be contacted had a baseline higher suspiciousness ($p = 0.006$), i.e., the association found in this study could be stronger, given that those with higher suspiciousness might accumulate more risk factors – such as migration. Data missing not at random also hindered us from using multiple imputation techniques. Furthermore, the possibility of collider bias cannot be ruled out. The second limitation concerns the cross-sectional design. Accordingly, there is the classical issue of drifting vs. migration

harm. In the first case, already-impaired individuals would drift from their homeland; in the second, migration would harm otherwise healthy individuals. Research has proven the second hypothesis to be much more likely,[22] but still, our cross-sectional design prevents us from drawing more precise conclusions about causality.

In conclusion, our study shows the effect of migration on a specific psychopathological aspect of individuals at risk for psychosis, namely thought disturbances, as shown by unusual thought content. This is especially important considering the lack of data in Latin American settings, as well as the existence of this effect despite mixing of races in the Brazilian population. Future research should seek to replicate this finding in larger samples, highlighting migration as a specific psychopathology modulator in at-risk states.

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Disclosure

The authors report no conflicts of interest.

References

1 Cantor-Graae E, Zolkowska K, McNeil TF. Increased risk of psychotic disorder among immigrants in Malmo: a 3-year first-contact study. Psychol Med. 2005;35:1155-63.
2 Selten JP, van der Ven E, Termorshuizen F. Migration and psychosis: a meta-analysis of incidence studies. Psychol Med. 2020;50:303-13.
3 Boonstra N, Sterk B, Wunderink L, Sytema S, De Haan L, Wiersma D. Association of treatment delay, migration and urbanicity in psychosis. Eur Psychiatry. 2012;27:500-5.
4 Villatoro AP, Morales ES, Mays VM. Family culture in mental health help-seeking and utilization in a nationally representative sample of Latinos in the United States: the NLAAS. Am J Orthopsychiatry. 2014;84:353-63.
5 de Sousa P, Spray A, Sellwood W, Bentall RP. 'No man is an island'. Testing the specific role of social isolation in formal thought disorder. Psychiatry Res. 2015;230:304-13.
6 Yung AR, Nelson B, Stanford C, Simmons MB, Cosgrave EM, Killackey E, et al. Validation of "prodromal" criteria to detect individuals at ultra high risk of psychosis: 2 year follow-up. Schizophr Res. 2008;105:10-7.
7 O'Donoghue B, Nelson B, Yuen HP, Lane A, Wood S, Thompson A, et al. Social environmental risk factors for transition to psychosis in an Ultra-High Risk population. Schizophr Res. 2015;161:150-5.
8 Loch AA, Chianca C, Alves TM, Freitas EL, Hortêncio L, Andrade JC, et al. Poverty, low education, and the expression of psychotic-like experiences in the general population of São Paulo, Brazil. Psychiatry Res. 2017;253:182-8.
9 IPSOS Brasil Pesquisas de Mercado Ltda. [Internet]. [cited 2019 Aug 24]. https://www.ipsos.com/pt-br
10 Gonçalves PD, Martins PA, Gordon P, Louzã M. Prodromal Questionnaire: translation, adaptation to Portuguese and preliminary results in ultra-high risk individuals and first episode psychosis. J Bras Psiquiatr. 2012;61:96-101.
11 Miller TJ, McGlashan TH, Rosen JL, Cadenhead K, Cannon T, Ventura J, et al. Prodromal assessment with the structured interview for prodromal syndromes and the scale of prodromal symptoms: predictive validity, interrater reliability, and training to reliability. Schizophr Bull. 2003;29:703-15.
12 WebCNP. The University of Pennsylvania Computerized Neuropsychological Testing Main Menu [Internet]. [cited 2019 Aug 24]. https://penncnp.med.upenn.edu/
13 Mandaglio C, Maierà E. Psychosis and migration: does a correlation exist? Psychiatr Danub. 2014;26 Suppl 1: 119-22.
14 Mindlis I, Boffetta P. Mood disorders in first- and second generation immigrants: systematic review and meta-analysis. Br J Psychiatry. 2017;210:182-9.
15 Malzeberg B. Mental disease among the native and foreign-born white populations of New York State, 1939-1941. Ment Hyg. 1995;39:545-63.
16 Cantor-Graae E, Selten JP. Schizophrenia and migration: a meta-analysis and review. Am J Psychiatry. 2005;162:12-24.
17 Kirmayer LJ, Young A. Culture and somatization: clinical, epidemiological, and ethnographic perspectives. Psychosom Med. 1998;60:420-30.
18 Barch DM, Berenbaum H. Language production and thought disorder in schizophrenia. J Abnorm Psychol. 1996;105:81-8.
19 United Nations Educational, Scientific and Cultural Organization (UNESCO). Think piece prepared for the 2019 Global Education Monitoring Report Consultation, Migration and Education [Internet]. [cited 2019 Aug 24]. es.unesco.org/gem-report/sites/gem-report/files/Think%20piece%20%20International%20migration%20and%20education%20-%20Tani%20-%20FINAL.pdf
20 Friedman-Yakoobian M, Parrish EM, Thomas A, Lesser R, Gnong-Granato A, Eack S, et al. An integrated neurocognitive and social-cognitive treatment for youth at clinical high risk for psychosis: cognition for learning and for understanding everyday social situations (CLUES). Schizophr Res. 2019;208:55-9.
21 McGrath J, Saha S, Welham J, El Saadi O, MacCauley C, Chant D. A systematic review of the incidence of schizophrenia: the distribution of rates and the influence of sex, urbanicity, migrant status and methodology. BMC Med. 2004;2:13.
22 Ríos PD. Migration and psychopatology. An Psicol Clin Salud. 2008;4:15-25.