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Hearing spirits? Religiosity in individuals at risk for psychosis—Results from the Brazilian SSAPP cohort

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ABSTRACT

In the last decades, biological and environmental factors related to psychosis were investigated in individuals at ultra-risk for psychosis (UHR) to predict conversion. Although religion relates to psychosis in a variety of ways, it is understudied in subclinical samples. Therefore, we assessed the interplay between religion and prodromal symptoms in 79 UHR and 110 control individuals. They were interviewed with the Duke University Religion Index and the Structured Interview for Prodromal Syndromes (SIPS). Organizational religious activity, a measure of how often someone attends churches/temples, was positively related to perceptual abnormalities/hallucinations (Spearman's rho = 0.262, p = 0.02). This relationship was replicated in a path analysis model (β = 0.342, SE = 0.108, p = 0.002), as well as a link between organizational religious activity and lower ideational richness (β = 0.401, SE = 0.105, p = 0.000) with no influence of sex, age, religious denomination, or socioeconomic class. Intrinsic religious activity was negatively correlated with suspiciousness (SIPS P2) (β = −0.028, SE = 0.009, p = 0.002), and non-organizational religious activity was correlated with higher ideational richness (N5) (β = −0.220, SE = 0.097, p = 0.023). We hypothesize that subjects with subclinical psychosis may possibly use churches and other religious organizations to cope with hallucinations. Indeed, Brazil is characterized by a religious syncretism and a strong influence of Spiritism in the popular culture. The mediumistic idea that some might be able to hear and/or see spirits is probably employed to explain subclinical hallucinations in the lay knowledge. Our results emphasize the importance of assessing religion and other region-specific aspects of various cultures when studying UHR individuals. This sort of assessment would enhance understanding of differences in conversion rates, and would help to transpose prevention programs from high-income countries to other settings.

1. Introduction

In the last decades, the concept of psychosis as a dimensional manifestation instead of an all-or-nothing event was consolidated (Verdoux and van Os, 2002). Today's view is that psychotic phenomena happen in a continuum, ranging from normality to severe symptomatic states. Also, prodromal stages of the disorder were better identified (Yung and McGorry, 1996), and ultra-high risk for psychosis (UHR) criteria were established to prevent people with subclinical conditions from progressing along the continuum to a psychotic disorder (Yung et al., 2008). Therefore, it is generally accepted that biological traits such as genes interact with environmental factors during one's life until a certain threshold is achieved, leading to the first episode of psychosis after a years-long prodromal phase (van Os et al., 2009). To further investigate the risk of conversion, several environmental factors related to psychotic disorders have been studied in UHR populations, such as migration (O'Donoghue et al., 2015), urbanicity (Dragt et al., 2011), and socioeconomic class (Loch et al., 2017), for instance. On the other hand, religion, a factor also related to psychosis in a variety of ways, appears underobserved in UHR studies.

The interplay between religiousness and psychosis has long been studied. In early psychiatry, Phillipe Pinel stated that religious fanaticism might be a causative factor of madness (Huneman, 2017; Pinel, 1806). Emil Kraepelin described a high frequency of mystical and religious content in his psychotic patients, and Kurt Schneider reported a heightened religiousness in schizophrenia patients (Menezes and

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Moreira-Almeida, 2010). This relationship has also been subject of current investigations, which have produced heterogeneous findings. Religiousness can take the more obvious form of religious delusions. About 25% to 39% of patients with schizophrenia and 15% to 22% of those with bipolar disorder experience this kind of psychopathology (Koenig, 2009). But the impact of these symptoms on the course of psychotic disorder is controversial. A British study with 193 subjects found that those with religious delusions (24%) had more severe symptoms, especially hallucinations and bizarre delusions, poorer functioning, and longer duration of illness, and they were on higher doses of medication (Siddle et al., 2002). However, other works have failed to find different prognoses of those who had religious beliefs compared to those who had not (McCabe et al., 1972). Regarding the relationship between denomination and frequency of delusions, some authors state that religious delusions are most frequent in Catholic societies, followed by Protestant and Islamic ones (Stompe et al., 1999; Stompe, 2001).

Further highlighting the heterogeneity of findings, a recent systematic review of studies from 1990 to 2010 showed that for schizophrenia, religion's effect displayed mixed results (Bonelli and Koenig, 2013). In this review, a study conducted by Linden et al. (2010) showed that intensive religious experiences increased the likelihood of transient psychosis. On the other hand, four other studies showed that religious involvement was related to greater compliance or higher well-being in subjects with schizophrenia (Borras et al., 2007; Mohr et al., 2006; Moss et al., 2006; Nimgaonkar et al., 2000). A study conducted in Geneva showed that 60% of a sample of schizophrenia subjects used religion extensively to cope with their illness (Huguelet et al., 2011). Also, a New York project enrolling 198 community-dwelling persons aged 55 and older who developed schizophrenia before the age of 45 observed a significant additive effect of religiosity on their quality of life (Cohen et al., 2010).

Even though results vary greatly, data is available regarding religion's effect on individuals with an established psychosis diagnosis. This effect has not yet been studied in subclinical UHR subjects, for whom there is an absolute paucity of data. Religion needs to be addressed in this population, for it is an important environmental factor that may influence coping with subclinical positive symptoms (Huguelet et al., 2016; Powers et al., 2017), as well as future conversion to disorder statuses. Besides addressing this literature gap, it is also important to assess factors related to other cultures to plan the expansion of currently available prevention strategies and programs from developed countries to low and middle-income countries (LaMIC).

Accordingly, our study aims to assess religiosity in a populational sample of UHR individuals in the city of São Paulo, Brazil. We hypothesize that positive symptoms in UHR individuals, especially perceptual abnormalities, might correlate with religion in our particular sociocultural context.

2. Materials and methods

2.1. Sample and procedures

This study is part of Subclinical Symptoms and Prodromal Psychosis (SSAPP) project, a cohort study in Sao Paulo, Brazil, aimed to follow-up individuals at ultra-high risk for psychosis (UHR). Over 2500 individuals between the ages of 18 and 30 participated in a household survey conducted by a renowned international research company (IPSOS). 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. Sociodemographics were obtained, and the Prodromal Questionnaire (PQ) was used as the screening instrument (Gonçalves et al., 2012; Yung et al., 2008). The PQ is a self-report questionnaire with 92 true/false items on prodromal psychosis symptoms. Most items are similar to the Structured Interview for Prodromal Syndromes (SIPS) and the Schizotypal Personality Questionnaire (Miller et al., 2003). Participants with score higher than 18 in the PQ's positive subscale were invited to participate in the study's second phase, conducted at the Institute of Psychiatry, University of Sao Paulo. Two-hundred-twenty-six individuals agreed to participate, and their UHR status was assessed by a group of experienced psychiatrists in the field of psychosis using the SIPS. After the assessment, 98 were regarded as UHR individuals, 124 as controls, and 4 as already psychotic. Besides this clinical interview, global assessment of functioning (GAF) was evaluated, and data on religiosity, childhood trauma, stress, urbanity, and substance use were obtained. Also, neuropsychological assessment was carried out, and whole blood was extracted. More details about methods of the SSAPP can be found elsewhere (Loch et al., 2017).

For the analysis, individuals declaring they did not believe in religion and with no religious practice ("atheist", "I don't believe in religion", and scoring the lowest in all religious activity items) (n = 3, 1%) were excluded, once it made sense to only include individuals with some sort of religious belief in the present study. Of the remaining 219 individuals, 189 had data on religiosity and were included in the final sample.

2.2. Religiosity evaluation

Religiosity was assessed with the DUREL, the Duke University Religion Index, Portuguese validated version (Lucchetti et al., 2012). The instrument consists of 5 questions addressing 3 issues. One question addresses organizational religious activity by asking how often the subject attends church or other religious meetings. The answer is given on a 6-point scale (1 = more than once/week, 6 = never). One question addresses non-organizational religious activity by asking how often the subject spends time in religious activities. This answer is also given on a 6-point scale (1 = more than once/day, 6 = rarely or never). And three questions address intrinsic religious activity. These answers are given on a 5-point Likert-scale (1 = definitely true of me, 5 = definitely not true). These questions assess religious beliefs or experiences (i.e., how much one employs religious concepts in his/her daily life). We also asked for the participant's religious denomination (coded as into 1 = Catholic, 2 = evangelical, 3 = others, encompassing "no defined religion", "Spiritists", "Buddhists", "Candomblé", etc.).

2.3. Statistical analysis

Scores on the DUREL were inverted per the instrument's recommendation so that a higher score reflected higher religiosity. The mean score was calculated for the three questions about intrinsic religious activity so that we had a single measure for this concept. Positive items on the SIPS (P1, P2, P3, P4, P5), Global Assessment of Functioning (GAF), organizational, non-organizational, and intrinsic religious activity were tested for normality with the Shapiro-Wilk and Kolmogorov-Smirnov tests, resulting in p values all below 0.001. So the non-parametric correlation test, Spearman's rho, was used to assess the relationship between P items, GAF, and religiosity.

Afterward, path analysis was performed. Because social class might be related to psychotic experiences in the general population and religiosity might be influenced by this factor, social class along with sex were included in the path analysis model. Also, to determine whether they might have differential effects across different symptom dimensions and whether they have a direct effect on UHR status or if they have an indirect effect through a specific symptom dimension, scores on all SIPS items were also included in the model. Path coefficients were indicated with standardized regression coefficients (β) and standard errors (SE). For a good model fit, the following parameters were used: a non-statistically significant χ^2 test of model fit ($p > 0.05$), a CFI value >0.95, and a standardized root mean square residual value (SRMR) <0.08. SPSS 23.0 and Mplus 1.5 for Mac were used.

3. Results

Of the total sample, 110 (58%) participants were controls, and 79 were UHR individuals. Seventy-three (38.6%) were male, and the mean age was 24.9 years. Seventy individuals (37%) were Catholics, 53 (28%) were evangelicals, and 66 (34.9%) had other religious denominations. These data did not differ between the UHR and controls (Table 1).

For controls, intrinsic religious activity negatively correlated with P1–unusual thought content (Spearman's rho = −0.345, $p < 0.001$). In UHR individuals, organizational religious activity correlated with perceptual abnormalities (P4) (Spearman's rho = 0.262, $p = 0.02$) (Fig. 1). GAF did not correlate to any measure of religiosity or positive symptoms (P). No other significant correlation was observed.

The path model is depicted in Fig. 2. GAF was not significantly correlated with any variable and considerably worsened path analysis fit indices, so it was not included in the model. The model for UHR individuals reached good fit parameters with χ^2 $p = 0.167$, CFI = 0.984, and SRMR = 0.026. The controls failed to achieve a model with good fit indices.

Intrinsic religious activity was negatively correlated with suspiciousness (SIPS P2) ($\beta = -0.028$, SE = 0.009, $p = 0.002$). Organizational religious activity correlated significantly with perceptual abnormalities/hallucinations (P4) ($\beta = 0.392$, SE = 0.137, $p = 0.004$) and with lower ideational richness (N5) ($\beta = 0.401$, SE = 0.105, $p = 0.000$). On the other hand, non-organizational religious activity correlated with higher ideational richness (N5) ($\beta = -0.220$, SE = 0.097, $p = 0.023$). Higher age correlated with lower scores on P1, P5, N5, and D2 ($p = 0.004$, $p = 0.027$, $p = 0.001$, $p = 0.001$, respectively). Higher social class correlated with intrinsic religious activity ($\beta = 4.352$, SE = 1.925, $p = 0.024$), and female sex correlated with dysphoric mood ($\beta = 0.932$, SE = 0.405, $p = 0.022$) (Fig. 3).

4. Discussion

Several studies have addressed the issue of religion in individuals with an established psychotic disorder. However, this is the first study to assess religiosity in a subclinical populational sample of UHR individuals for psychosis. Results showed that organizational religious activity significantly correlated with perceptual abnormalities and lower ideational richness in UHR individuals. Higher intrinsic religious activity and non-organizational religious activity were related with lower suspiciousness and higher ideational richness, respectively.

Table 1
Sample characteristics.

	UHR (n = 79)	Controls (n = 110)	p[a]
Sex – male; % (n)	32.9 (26)	44.5 (49)	0.11
Social class – A&B[b]; % (n)	33.8 (26)	40.8 (44)	0.48
Age – years; mean (SD)	24.6 (3.9)	25.1 (4.4)	0.43
Religious denomination – Catholics; % (n)	17.7 (11)	35.1 (34)	0.08
Organizational RA – score; mean (SD)	3.55 (1.62)	3.91 (1.59)	0.12
Non-organizational RA – score; mean (SD)	3.35 (1.72)	3.39 (1.78)	0.88
Intrinsic RA – score; mean (SD)	3.70 (0.94)	3.86 (1.06)	0.32
Global assessment of Functioning – score; mean (SD)	75.35 (10.93)	75.22 (13.20)	0.96
SIPS positive symptoms – score; mean (SD)	1.72 (0.79)	0.53 (0.54)	**0.00**
SIPS negative symptoms – score; mean (SD)	0.98 (0.79)	0.27 (0.46)	**0.00**
SIPS disorganization symptoms – score; mean (SD)	0.59 (0.52)	0.21 (0.35)	**0.00**
SIPS general symptoms – score; mean (SD)	1.26 (0.92)	0.56 (0.70)	**0.00**

SD = standard deviation; RA = religious activity; **bold** = significant differences.
[a] For "% (n)" results Chi-square tests were used; for "mean (SD)" results p refers to ANOVA analysis.
[b] Social class categorization is described in methods; A&B class reflects the highest income class.

As our sample was drawn from the general population, regarding the psychosis continuum embedded in it (van Os et al., 2009), epidemiological studies show that psychotic experiences in the community (e.g., perceptual abnormalities) are not necessarily linked to psychotic disorders. A populational study conducted in the same city as the SSAPP revealed that although 2.1% of the individuals had the diagnosis of non-affective psychosis, 30.8% presented non-clinically relevant psychotic symptoms (Loch et al., 2011). Moreover, 3.8% had clinically relevant symptoms, but they neither sought help nor showed any sign of disability. Romme and Escher reason, for instance, that people who hallucinate may gradually develop a natural attitude toward their perceptual experiences (Romme and Escher, 1989), developing strategies to cope with the voices.

In this sense, religion may be a tool with which one copes with psychotic experiences, and its effect varies in accordance with the culture in which the subject lives (Menezes and Moreira-Almeida, 2010). Studies in developing countries add some supporting evidence for that possibility. Erinosho found in the late 70s that the great majority of 208 patients with schizophrenia in Nigeria sought help from local healers before seeking a mental health professional (Erinosho, 1977). In India, good outcomes among 323 schizophrenia patients were related to an increase in patients' religious activities (Verghese et al., 1989). Similar reports have also been published in Brazil (Redko, 2003). Religion may importantly provide a meaning for abnormal perceptual experiences, promoting conformity and security in spiritualized individuals (Huguelet et al., 2016).

Accordingly, in our sample, perceptual abnormalities/hallucinations and lower ideational richness strongly correlated with frequent church and temple attendance among UHR individuals. Indeed, Powers et al. (2017), in their interesting study comparing psychics to individuals with an established psychosis diagnosis, argue that a source of support for voice-hearers might be the church, a physical location and social group one can depend on for a set of practices that provides meaning (Huguelet et al., 2016). On the other hand, at-risk individuals with higher ideational richness would be less dependent on communal organization to provide signification, for they can rely on other forms of religious activity, such as non-organizational religiosity. Last, intrinsic religiosity is often related with internal loci of control (Bergin, 1983; Jackson and Coursey, 1988), which is why less persecutedness was related with intrinsic religious activity in our study. It appears also that intrinsic religiosity mediated the relationship between higher social class and less persecutedness. Higher social class might be a proxy for higher education, which is sometimes linked to intrinsic religiosity/more spiritualized individuals (Lawler-Row and Elliott, 2009).

With respect to the relationship between hallucinations and religiosity, Brazil is characterized by several anthropologists due to its origins as a culture with a religious syncretism (Macedo, 2008). That is, several religious beliefs are blended into the popular culture, and aspects of various religious beliefs are incorporated into the popular wisdom (Pereira, 2013). Therefore, although most Brazilians declare themselves Catholic (Estatística, 2000), Spiritism strongly influences the culture (Stoll, 2002). Among other doctrines, Spiritism entails belief in life after death and the spirits of the dead wandering among the living. Hearing the voices of spirits and seeing them would be signs of mediumistic activity according to the popular knowledge. As such, hallucinations in UHR individuals may be interpreted in the common folk knowledge as spiritual manifestations. A study also conducted in Sao Paulo enrolling 21 poor families revealed that youth suffering a first episode of psychosis often resorted to religion, not for health services but for help, mimicking the results of the Nigerian study previously mentioned (Redko, 2003). Finally, recalling the Powers et al. (2017) study, voices heard by psychics had almost similar characteristics to those heard by psychotic individuals. In locations with pervasive Spiritist beliefs, such as Brazil, perceptual abnormalities might be more easily embraced by religion.

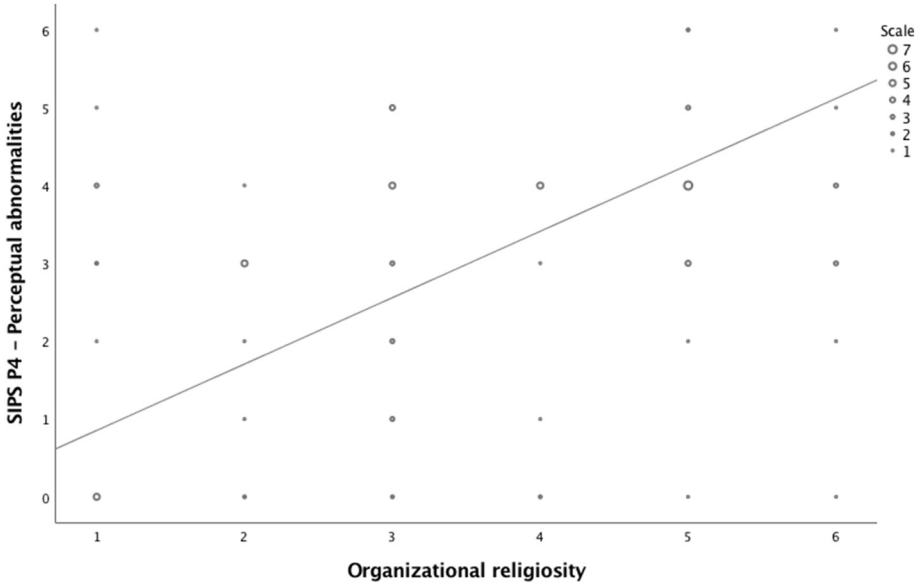

Fig. 1. Correlation between organizational religious activity and perceptual abnormalities (SIPS P4) in UHR individuals. Spearman's rho = 0.262, p = 0.02.

Our results also show that several sociodemographic variables were related to multiple SIPS items. Higher age was protective against many SIPS items, likely reflecting our age recruitment range of up to 30 years of age. It is possible that older individuals show lower scores because they have already passed the conversion to psychosis age window. And the relationship between female sex and mood symptoms replicates a previous retrospective study conducted in Korea about prodromal symptoms in first-episode schizophrenia (Choi et al., 2009), but this finding is not unequivocal among UHR studies (Willhite et al., 2008).

Last, it might be argued that because this is a cross-sectional study, one might not know if religion's strong effect *induced* the appearance of transient perceptual abnormalities, resembling Linden's previously mentioned results (Linden et al., 2010). The fact that all other SIPS dimensions were statistically different between UHR individuals and controls speaks against it. Anyway, a longitudinal follow-up will provide us more data on this issue.

4.1. Implications

These data have several implications. First, mental healthcare resources aimed at primary prevention should draw some attention to religious cults, as they might include individuals at risk for psychosis. Religion may be a form of help-seeking behavior in settings with low mental healthcare resources, such as Brazil (Loch et al., 2016), challenging the concept of linking UHR criteria to traditional help-seeking through medical services and referral (Yung and Nelson, 2013). Second, and consequently, religion and other more cultural-specific factors should be investigated in other countries' UHR studies. Broader socioenvironmental factors such as urbanicity, for

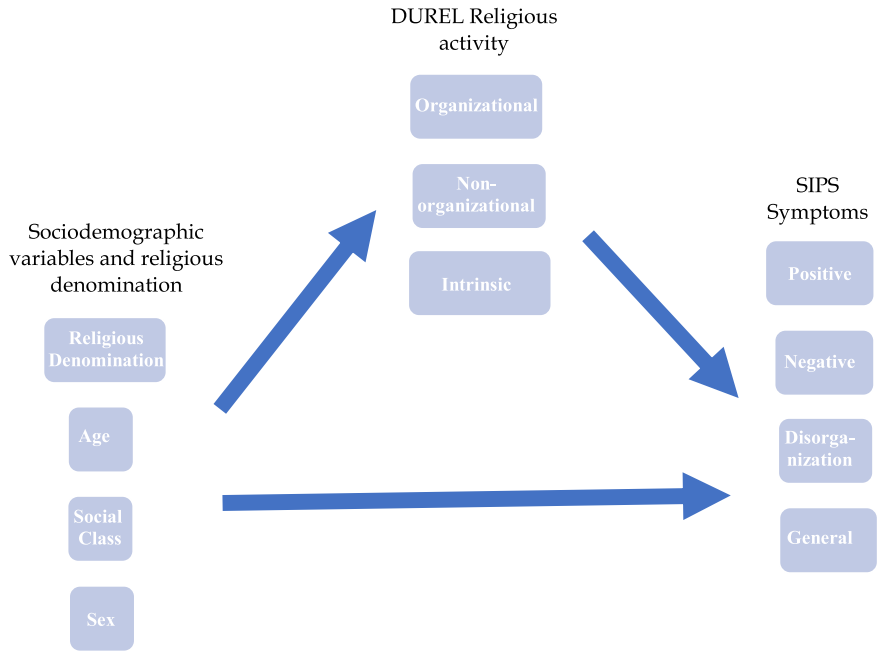

Fig. 2. Path analysis model.

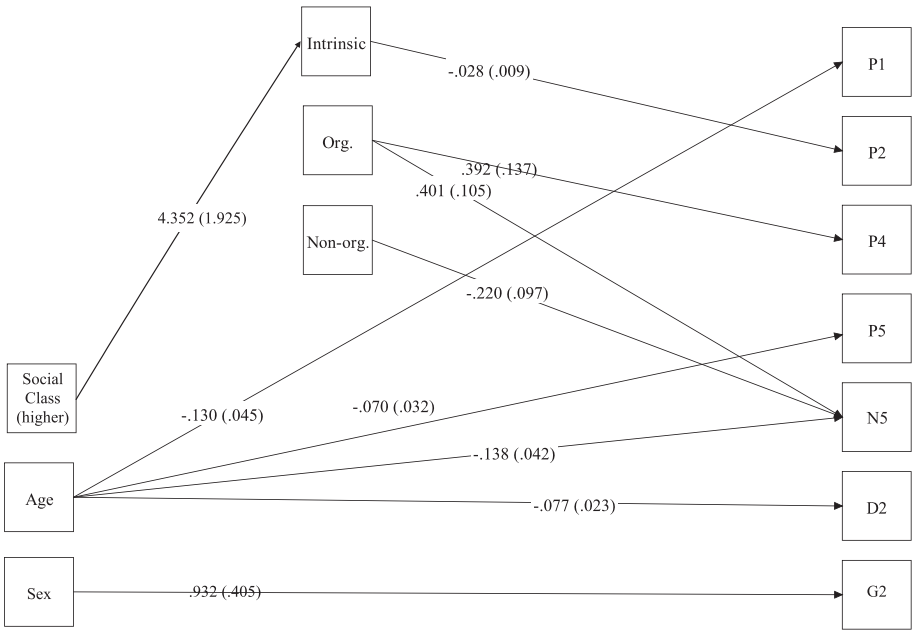

Fig. 3. Path analysis model results for UHR individuals (only significant correlations shown). Intrinsic: intrinsic religious activity; Org.: organizational religious activity; Non-org.: non-organizational religious activity; Soc.Class: social class. P1, P2, P4, P5 = SIPS positive symptoms (unusual thought content/delusional ideas, suspiciousness/persecutory ideas, perceptual abnormalities/hallucinations, disorganized communication, respectively). N5 = SIPS negative symptoms (ideational richness). D2 = SIPS disorganization symptoms (bizarre thinking). G2 = SIPS general symptoms (dysphoric mood).

instance, shift the expression of psychotic symptoms in the general population (Spauwen et al., 2004). However, much less is known about other more specific culture-related factors; for instance, there is an absolute paucity of data regarding the interplay between UHR and religion and culture. It is possible that, recalling previous studies about outcomes of schizophrenia in developed versus developing countries (Jablensky et al., 1992; Strauss and Carpenter, 1974), religion might play a greater role in low- and middle-income countries than in high-income countries. Last, the question remains whether religious practice would be effective in preventing the progression from UHR status to threshold psychosis. Religion can be important by providing social contextualization for subclinical experiences. On the other hand, religion can involve feelings of guilt and punishment, which can progress to the unpleasant form of religious delusions, for instance. It will be possible to address this question after following up with these individuals.

4.2. Strengths and limitations

As a strength, we point out that this is the first study to assess religiosity in a large sample of UHR individuals and the first carried out in Brazil with such an at-risk population. Thus, it provides important information to be used in local and global prevention programs.

A discussion has emerged around the use of help-seeking behavior as a criterion of UHR status (Yung and Nelson, 2013). On one hand, its use would not pathologize normal psychotic experiences in the community; on the other hand, at-risk individuals would not reflect the true behavior of subclinical psychosis in the population (van Os and Guloksuz, 2017). Drawing from a populational sample could be seen as a handicap in our study, but by doing so, we minimized the risk of selection bias due to help-seeking behavior. Also, this recruitment method might have enabled us to enroll individuals with subclinical hallucinations who might have adapted to their psychotic experiences due to religion (see above discussion about similarity between psychic's voice-hearing and voice-hearing in psychotic individuals). Furthermore, religious activity might be an alternative help-seeking behavior in low-resource settings, as stated previously. On the other hand, our sample consisted mainly of females, which is atypical for a UHR cohort. This fact probably reflects a bias because many males would be their family's breadwinners and were therefore not able to attend the study.

A noticeable limitation is the fact that the study is cross-sectional in its present state, which hinders the establishment of causational relationships. For example, did individuals use collective religious practices to cope with psychosis (remediation), or did they first go to the temple and then start experiencing subclinical psychosis (causation)? Future follow-ups with these individuals might shed some light on this issue.

The question also exists regarding whether these phenomena are in fact culture-bound syndromes. To reduce the inadequate inclusion of religious experiences in a psychotic framework, we created our research team solely with experienced psychiatrists in the field of psychosis (all of them had at least 5 years of training in the field). Furthermore, even though this distinction is routine in local mental health practice, interviewers took extra care in differentiating "normal" religious experiences from psychosis by employing previously published standards, such as evaluating whether phenomena happened outside the boundaries of a religious temple, level of suffering, annoyance generated by them, etc. (Menezes and Moreira-Almeida, 2010).

Exemplifying, our cohort included a 26-year-old woman who started hearing voices at the age of 22. Voices would call her name in despair from outside her house so that she had to go outside and check who was calling her. When she saw nobody, she would run back into her home, scared. She heard this voice daily for 3 months before she decided to share her suffering with her mother. Her mother would tell her that these phenomena were due to a mediumistic gift she had. She started frequenting the church and since then she has become accustomed to the voices, which decreased in frequency but never disappeared.

This concisely described pictorial case illustrates what was often observed in our sample. Finally, as mentioned before, significant SIPS differences across all symptom dimensions between UHR and control individuals contradict the culture-bound hypothesis. However, it is still possible that some individuals with normal religious experiences might have been classified as UHR.

4.3. Conclusion

In conclusion, our results show that subclinical psychotic symptoms such as perceptual abnormalities probably are being dealt with collective religious practice in temples and churches, which would be facilitated in the local culture, where Spiritism has a strong influence and may bias the interpretation of subclinical hallucinations as mediumistic manifestations, for instance.

This fact emphasizes the importance of studying more culture-related factors in the assessment of subclinical psychosis. A myriad of environmental variables, many of them culture-specific, that are currently underobserved in UHR studies (Myers, 2011), partly because the majority of data come from developed countries, with information from other places being very scarce. Our study provides us a brief insight into the effect of a specific cultural factor (i.e., religion) in a LaMIC on subclinical psychosis. This factor might influence transition rates and adaptation/disability. The longitudinal analysis of religion's effect on subclinical psychosis should provide us more understanding of this important cultural element's effect on UHR individuals.

Conflict of interest

All authors declare they have no conflict of interest.

Contributors

All authors designed the study and wrote the protocol. Author AAL managed the literature searches and analyses, undertook the statistical analysis, and wrote the first draft of the manuscript. All authors contributed to and have approved the final manuscript.

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References

Bergin, A.E., 1983. Religiosity and mental health: a critical reevaluation and meta-analysis. Prof. Psychol. Res. Pract. 14 (2), 170–184.
Bonelli, R.M., Koenig, H.G., 2013. Mental disorders, religion and spirituality 1990 to 2010: a systematic evidence-based review. J. Relig. Health 52 (2), 657–673.
Borras, L., Mohr, S., Brandt, P.Y., Gilliéron, C., Eytan, A., Huguelet, P., 2007. Religious beliefs in schizophrenia: their relevance for adherence to treatment. Schizophr. Bull. 33 (5), 1238–1246.
Choi, J.S., Chon, M.W., Kang, D.H., Jung, M.H., Kwon, J.S., 2009. Gender difference in the prodromal symptoms of first-episode schizophrenia. J. Korean Med. Sci. 24 (6), 1083–1088.
Cohen, C.I., Jimenez, C., Mittal, S., 2010. The role of religion in the well-being of older adults with schizophrenia. Psychiatr. Serv. 61 (9), 917–922.
Dragt, S., Nieman, D.H., Veltman, D., Becker, H.E., van de Fliert, R., de Haan, L., Linszen, D.H., 2011. Environmental factors and social adjustment as predictors of a first psychosis in subjects at ultra high risk. Schizophr. Res. 125 (1), 69–76.
Erinosho, O.A., 1977. Social background and pre-admission sources of care among youruba psychiatric patients. Soc. Psychiatry 12, 71–74.
Estatística, I.B.G., 2000. Censo Demográfico Brasileiro (15th July 2012). Available online:. http://www.ibge.gov.br/home/estatistica/populacao/censo2000/tabelabrasil111.shtm, Accessed date: 12 December 2017.
Gonçalves, P.D., Martins, P.A., Gordon, P., Louzã, M., 2012. Prodromal Questionnaire: translation, adaptation to Portuguese and preliminary results in ultra-high risk individuals and first episode psychosis. J. Bras. Psiquiatr. 61 (2).
Huguelet, P., Mohr, S., Betrisey, C., Borras, L., Gillieron, C., Marie, A.M., Rieben, I., Perroud, N., Brandt, P.Y., 2011. A randomized trial of spiritual assessment of outpatients with schizophrenia: patients' and clinicians' experience. Psychiatr. Serv. 62 (1), 79–86.
Huguelet, P., Mohr, S.M., Olié, E., Vidal, S., Hasler, R., Prada, P., Bancila, M., Courtet, P., Guillaume, S., Perroud, N., 2016. Spiritual meaning in life and values in patients with severe mental disorders. J. Nerv. Ment. Dis. 204 (6), 409–414.
Huneman, P., 2017. From a religious view of madness to religious mania: the Encyclopédie, Pinel, Esquirol. Hist. Psychiatry 28 (2), 147–165.
Jablensky, A., Sartorius, N., Ernberg, G., Anker, M., Korten, A., Cooper, J.E., Day, R., Bertelsen, A., 1992. Schizophrenia: manifestations, incidence and course in different cultures. A World Health Organization ten-country study. Psychol. Med. Monogr. Suppl. 20, 1–97.
Jackson, L.E., Coursey, R.D., 1988. The relationship of God control and internal locus of control to intrinsic religious motivation, coping and purpose in life. J. Sci. Study Relig. 27 (3), 399–410.
Koenig, H.G., 2009. Research on religion, spirituality, and mental health: a review. Can. J. Psychiatr. 54 (5), 283–291.
Lawler-Row, K.A., Elliott, J., 2009. The role of religious activity and spirituality in the health and well-being of older adults. J. Health Psychol. 14 (1), 43–52.
Linden, S.C., Harris, M., Whitaker, C., Healy, D., 2010. Religion and psychosis: the effects of the Welsh religious revival in 1904–1905. Psychol. Med. 40 (8), 1317–1323.
Loch, A.A., Wang, Y.P., Rossler, W., Tofoli, L.F., Silveira, C.M., Andrade, L.H., 2011. The psychosis continuum in the general population: findings from the Sao Paulo Epidemiologic Catchment Area Study. Eur. Arch. Psychiatry Clin. Neurosci. 261 (7), 519–527.
Loch, A.A., Gattaz, W.F., Roessler, W., 2016. Mental healthcare in South America with a focus on Brazil: past, present, and future. Curr. Opin. Psychiatry 29 (4), 264–269.
Loch, A.A., Chianca, C., Alves, T.M., Freitas, E.L., Hortencio, L., Andrade, J.C., Van de Bilt, M.T., Fontoni, M.R., Serpa, M.H., Gattaz, W.F., Roessler, W., 2017. Poverty, low education, and the expression of psychotic-like experiences in the general population of Sao Paulo, Brazil. Psychiatry Res. 253, 182–188.
Lucchetti, G., Granero Lucchetti, A.L., Peres, M.F., Leão, F.C., Moreira-Almeida, A., Koenig, H.G., 2012. Validation of the Duke Religion Index: DUREL (Portuguese version). J. Relig. Health 51 (2), 579–586.
Macedo, E., 2008. Religiosidade popular brasileira colonial: um retrato sincrético. Revista Ágora 7, 1–20.
McCabe, M.S., Fowler, R.C., Cadoret, R.J., Winokur, G., 1972. Symptom differences in schizophrenia with good and poor prognosis. Am. J. Psychiatry 128 (10), 1239–1243.
Menezes, A., Moreira-Almeida, A., 2010. Religion, spirituality, and psychosis. Curr. Psychiatry Rep. 12 (3), 174–179.
Miller, T.J., McGlashan, T.H., Rosen, J.L., Cadenhead, K., Cannon, T., Ventura, J., McFarlane, W., Perkins, D.O., Pearlson, G.D., Woods, S.W., 2003. 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. 29 (4), 703–715.
Mohr, S., Brandt, P.Y., Borras, L., Gilliéron, C., Huguelet, P., 2006. Toward an integration of spirituality and religiousness into the psychosocial dimension of schizophrenia. Am. J. Psychiatry 163 (11), 1952–1959.
Moss, Q., Fleck, D.E., Strakowski, S.M., 2006. The influence of religious affiliation on time to first treatment and hospitalization. Schizophr. Res. 84 (2–3), 421–426.
Myers, N.L., 2011. Update: schizophrenia across cultures. Curr. Psychiatry Rep. 13 (4), 305–311.
Nimgaonkar, V.L., Fujiwara, T.M., Dutta, M., Wood, J., Gentry, K., Maendel, S., Morgan, K., Eaton, J., 2000. Low prevalence of psychoses among the Hutterites, an isolated religious community. Am. J. Psychiatry 157 (7), 1065–1070.
O'Donoghue, B., Nelson, B., Yuen, H.P., Lane, A., Wood, S., Thompson, A., Lin, A., McGorry, P., Yung, A.R., 2015. Social environmental risk factors for transition to psychosis in an ultra-high risk population. Schizophr. Res. 161 (2–3), 150–155.
Pereira, J., 2013. Religiosidade no Brasil. Edusp, São Paulo.
Pinel, P., 1806. Traité médico-philosophique de l'aliénation mentale (A Treatise on Insanity: In Which Are Contained the principles of a New and More Practical Nosology of Maniacal Disorders), I. Cavell and Davies, London.
Powers, A.R., Kelley, M.S., Corlett, P.R., 2017. Varieties of voice-hearing: psychics and the psychosis continuum. Schizophr. Bull. 43 (1), 84–98.
Redko, C., 2003. Religious construction of a first episode of psychosis in urban Brazil. Transcult. Psychiatry 40 (4), 507–530.
Romme, M.A., Escher, A.D., 1989. Hearing voices. Schizophr. Bull. 15 (2), 209–216.
Siddle, R., Haddock, G., Tarrier, N., Faragher, E.B., 2002. Religious delusions in patients admitted to hospital with schizophrenia. Soc. Psychiatry Psychiatr. Epidemiol. 37 (3), 130–138.
Spauwen, J., Krabbendam, L., Lieb, R., Wittchen, H.U., van Os, J., 2004. Does urbanicity shift the population expression of psychosis? J. Psychiatr. Res. 38 (6), 613–618.
Stoll, S., 2002. Religião, ciência ou auto-ajuda? Trajetos do Espiritismo no Brasil. Rev. Antropol. 45 (2), 361–402.
Stompe, T., 2001. Religious delusions among schizophrenia. Newsl. Transcult. Psychiatry Sect. World Psychiatr. Assoc. 19 (1), 16–19.
Stompe, T., Friedman, A., Ortwein, G., Strobl, R., Chaudhry, H.R., Najam, N., Chaudhry, M.R., 1999. Comparison of delusions among schizophrenics in Austria and in Pakistan. Psychopathology 32 (5), 225–234.
Strauss, J.S., Carpenter, W.T., 1974. The prediction of outcome in schizophrenia. II. Relationships between predictor and outcome variables: a report from the WHO international pilot study of schizophrenia. Arch. Gen. Psychiatry 31 (1), 37–42.
van Os, J., Guloksuz, S., 2017. A critique of the "ultra-high" and "transition" paradigm. World Psychiatry 16, 200–206.
van Os, J., Linscott, R.J., Myin-Germeys, I., Delespaul, P., Krabbendam, L., 2009. A systematic review and meta-analysis of the psychosis continuum: evidence for a psychosis proneness-persistence-impairment model of psychotic disorder. Psychol. Med. 39 (2), 179–195.
Verdoux, H., van Os, J., 2002. Psychotic symptoms in non-clinical populations and the continuum of psychosis. Schizophr. Res. 54 (1–2), 59–65.
Verghese, A., John, J.K., Rajkumar, S., Richard, J., Sethi, B.B., Trivedi, J.K., 1989. Factors associated with the course and outcome of schizophrenia in India. Results of a two-year multicentre follow-up study. Br. J. Psychiatry 154, 499–503.

Willhite, R.K., Niendam, T.A., Bearden, C.E., Zinberg, J., O'Brien, M.P., Cannon, T.D., 2008. Gender differences in symptoms, functioning and social support in patients at ultra-high risk for developing a psychotic disorder. Schizophr. Res. 104 (1–3), 237–245.

Yung, A.R., McGorry, P.D., 1996. The prodromal phase of first-episode psychosis: past and current conceptualizations. Schizophr. Bull. 22 (2), 353–370.

Yung, A.R., Nelson, B., 2013. The ultra-high risk concept-a review. Can. J. Psychiatr. 58 (1), 5–12.

Yung, A.R., Nelson, B., Stanford, C., Simmons, M.B., Cosgrave, E.M., Killackey, E., Phillips, L.J., Bechdolf, A., Buckby, J., McGorry, P.D., 2008. Validation of "prodromal" criteria to detect individuals at ultra high risk of psychosis: 2 year follow-up. Schizophr. Res. 105 (1–3), 10–17.