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SCHIZOPHRENIA AT ADOLESCENCE

The relationship between schizophrenia self-reported symptoms and substance abuse, schizoid personality disorder symptoms and migration history

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ABSTRACT

The Youth's Inventory-4 (YI-4) questionnaire's items related to schizoid personality disorder, schizophrenia and substance abuse, were administered to a sample of 1375 adolescents, aged between 11 and 17 years old (mean=13.9, statistical deviation=1.23). The objectives of this research are to analyze the prevalence of schizophrenia symptoms and the relationship between these symptoms with other disorder's symptoms: schizoid personality disorder and substance abuse. Also, the origin area of the participants was analyzed to see if there is any link between foreign birth and the onset of psychosis. These results suggest that schizophrenia symptoms are related to schizoid personality disorder symptoms and substance abuse symptoms, but there is not a clear relationship between migration history and the development of psychosis. This present study is aimed to corroborate previous researches and explore which differences could be found in a Spanish and Catalan sample.

Key words: *schizophrenia, adolescence, schizoid personality disorder, substance abuse, migration history, Youth's Inventory-4*

INTRODUCTION

Due to the importance of schizophrenia's early detection and intervention, this research tries to corroborate previous researches, comparing them to a Spanish and Catalan sample. Also, this study explores the link between schizophrenia and other related disorders: substance abuse and schizoid personality disorder. Furthermore, the relationship between migration history and schizophrenia is also analyzed.

The results obtained in previous researches shall be organized in sections: schizophrenia and adolescence; schizophrenia and pre-morbid schizoid personality disorder; psychosis and substance abuse; and schizophrenia and migration.

SCHIZOPHRENIA AND ADOLESCENCE

Psychotic disorders are a group of illnesses marked by the presence of unusual belief systems which do not conform to societal norms (delusions),

hallucinations (sensory perceptions in the absence of external stimuli, particularly auditory), and disorders of thought and cognition. Some clinical phenomena in schizophrenia can be understood in terms of a loss of normal contextualization and loss of co-ordination of cognitive and emotional processing.

In schizophrenia, symptoms can be seen as representing either an excess or distortion of normal function (positive symptoms) or a reduction or loss of normal function (negative symptoms) (Rutter et al, 2008).

DMS-IV describes various subtypes of schizophrenia: paranoid type, disorganized type, catatonic type and residual type (APA, 1994).

The lifetime prevalence of schizophrenia is estimated to be between 0.7% and 1,5% (mean = 1.1%). In Spain, the incidence per year is estimated to be 0.8 cases every 10,000 inhabitants; 3 per 1,000 inhabitants every year for men, and 2.86 for women (Ayuso-Mateos, et al., 2006).

Adult-based diagnostic criteria, incidence and prevalence (1.1%) have validity in adolescence and childhood, and the disorder has clinical and neurobiological continuity with schizophrenia in adults (Rutter et al, 2008).

Adolescence is a crucial life stage for the development of human-specific mental functioning, and schizophrenia develops most commonly during adolescence and early adulthood (Kasai, 2013).

Child and adolescent-onset schizophrenia is associated with poor premorbid functioning and early developmental delays (Alaghband-Rad, McKenna, Gordon et al, 1995; Hollis, 1995, 2003), such as subtle problems of language, attention and social relationships. These are typical dysfunctions in schizophrenia, although conduct problems are rare. Also, early-onset schizophrenia is characterized by greater disorganization and more negative symptoms (Hafner & Nowonty, 1995).

There is a strong link between self-reported psychotic symptoms in childhood and later schizophrenia (Poulton, Caspi, Moffitt et al, 2000), and this deterioration prior to the onset of psychosis is insidious (Werry, McClellan, Andrews & Ham, 1994). The prodromal symptoms can include odd ideas, eccentric interests, changes in

affect and emotions, unusual experiences and bizarre perceptual experiences.

Concerning the course, child and adolescent-onset schizophrenia characteristically runs a chronic course and social functioning (the ability to form friendships and love relationships) appears to be significantly impaired. (Gordon, Frazier, McKenna et al, 1994; Hollis, 2000; Werry, McClellan, Andrews et al, 1994).

For this reason, the poor outcome of children and adolescents with schizophrenia has high-lined the need to target early effective treatments and develop specialist services for this high-risk group.

In terms of etiology and risk factors, there are a lot of variables that may affect the developing of schizophrenia, such as pregnancy and birth complications (Geddes & Lawrie, 1995); maternal intrauterine nutritional deficiency (Susser & Lin, 1992); the use of cannabis and other recreational drugs (Arsenault, 2004; Fergusson et al, 2006); psychosocial risks, such as high levels of expressed emotion (EE) among relatives (Leff & Vaughn, 1985) or migration and social class (Cantor-Graee & Selten, 2005).

Also, structural brain abnormalities are found in both adult schizophrenia and childhood onset schizophrenia: brain volume reductions specific to gray matter, and bilateral reduction of the hippocampus and amygdala (Gur, Turetsky, Cowell et al, 2000).

Concerning genetics, it is suggested by twin studies that the heritability of schizophrenia is as high as 83% (Cannon, Kaprio, Lonnqvist, Huttunen & Koskenvuo, 1998).

Finally, cyto-genetic abnormalities are being studied presently, being the association between schizophrenia and chromosomal deletions another possible route to locate candidate genes (Hennah, Thompson, Peltronen & Porteous, 2006).

SCHIZOPHRENIA AND PRE-MORBID SCHIZOID PERSO-NALITY DISORDER

The frequency of the presence of schizoid personality disorder is highly common among schizophrenic patients, and represents a higher proportion of developing schizophrenia than the

controls (Wolff & Chick, 1980; Pfhol & Winokur, 1983).

It is demonstrated that patients with schizophrenia have a higher risk (nine times more) than general population of having a premorbid schizoid personality disorder (Zubin et al, 1983).

PSYCHOSIS AND SUBSTANCE ABUSE

The use of cannabis and alcohol frequently begins in the late years of adolescence, and so do the first signs of psychosis. Their use has almost become a rite of passage for teenagers and an accepted part of adolescent and student culture (Watson et al, 2000).

The risk of substance use in patients with schizophrenia was reported to be 4.6 times more than the general population of the United States (Regier et al, 1990). Stimulants, such as amphetamine, cannabis and nicotine, appear to be used by patients with psychotic disorders (Addington & Addington, 2001; Kavanagh et al, 2004; Lambert et al, 2005). These drugs have pharmacological characteristics that may explain its association with psychosis. For example, cannabis can lead to psychotic-like experiences in the experimental situation, and lead to changes in neurotransmitter levels.

Almost all studies suggest that there are higher rates of smoking in schizophrenia patients compared to the general population (Ripoll et al, 2004; Roick et al, 2007). It is suggested that nicotine may be used in these groups because of its cognitive enhancing qualities (Levin et al, 2006). However, nicotine does not induce psychotic symptoms.

There are still questions about the direction of the relationship between substance use and psychosis. Can substance use cause psychosis? Or does the development of psychosis make the development of substance use more likely?

Alcohol and cannabis

Among all the substances that can be found and used by teenagers, it is clear that the most consumed are alcohol and cannabis.

In a recent research from The United Nations Children's Fund, it appears that more of the 20% of Spanish population between 11 and 15 has consumed cannabis in the past 12

months, and almost the 15% of the same population declared having got drunk at least two times (UNICEF, 2013). Due to the increase of substance abuse, an increased onset of later schizophrenia may be found in some years.

As alcohol and cannabis are the most extensive between teenagers worldwide, they are also the ones with more literature contributions.

Even though alcohol use is extensive among adolescents, there is not a clear relationship between its abuse and the onset of schizophrenia. The only data found indicates that patients may use alcohol to alleviate negative symptoms and encourage social interactions (Hambrecht & Häfner, 1996; Salyers & Mueser, 2001), but its use is more frequent after the onset of schizophrenia, and not before.

Again, it is difficult to know the direction of the relationship between cannabis abuse and psychosis, although it is commonly accepted, and there is general consensus, that cannabis use increases the risk of developing psychotic disorders among vulnerable or predisposed individuals, and can negatively affect the course of preexisting chronic psychosis (Ben Amar & Potvin, 2007). It is known that patients with established psychosis who continue to use cannabis have a worse prognosis than those who stop its use (Kovasznay et al, 1997; Grech et al, 2005; Linszen & van Amelsvoort, 2007).

There are also suggestions that cannabis use in early adolescence, before the age of 15, may have the most significant impact on the risk of developing of a future psychotic disorder (Arseneault et al, 2002).

Cannabis use interacts with other risks factors for psychosis, such as genetic vulnerability and environmental factors to contribute toward psychosis onset (Fergusson et al, 2006; Semple et al, 2005).

Barnes et al. (2006) suggest that the first use of cannabis is significantly associated with age of onset of first psychotic symptoms. However, not all studies report this association (Cantor-Graae et al, 2001; Sevy et al, 2001).

Effects of substance use

Substance use not only can increase the risk of developing psychosis in later life, but it also impacts on some of psychosis related deficits. For example, spatial working

memory, delayed memory, and working memory have supporting evidence to be considered endophenotypes for psychosis. Patients with schizophrenia have impaired performance in these domains (Driesen et al, 2008; Van Snellenberg, 2009), as do their relatives (Conklin et al, 2000; Park et al, 1995), and those from the general population who express schizotypy (Saperstein et al, 2006), and studies show that certain substances have an impact on performance in spatial and standard working memory.

Furthermore, prepulse inhibition (PPI) deficits are reported in patients with schizophrenia (Braff et al, 2001; Kumari et al, 2000; Weike et al, 2000), and most drugs of abuse lead to deficits in PPI (an eye blink is usually measured as a startle response in humans, and it is considered a physiologically basic reflex).

Substance use by psychotic patients leads to increased hospitalization and remission, and these patients have a poorer response to treatment and a worse outcome.

SCHIZOPHRENIA AND MIGRATION

Finally, as in the sample of the region of *Baix Empordà* there is information about the country of birth of the participants (first generation) and the country of birth of at least one parent (second generation), I would like to see if there's any relationship between the migration history of these participants and the risk of developing schizophrenia.

Studies from the UK and The Netherlands have demonstrated an excess of schizophrenia in immigrants, with particularly high rates in people of African-Caribbean and Surinamese origin (Harrison et al, 1997; Selten et al, 1997, 2001), although the explanation for these findings remains unknown. These results confirm the need for a broader focus on migration in general.

In a Danish population-based cohort study (Cantor-Graae et al, 2003) foreign birth was associated with an increased risk of developing schizophrenia and, interestingly, there was no indication that foreign-born adoptees were at increased risk compared with foreign-born individuals from the same country.

The results concerning region of birth show subtle but significant variation in risk magnitude across regions. Also, adverse social circumstances and ethnic minority disadvantage may have an etiological role in the migrant effect in schizophrenia. (Sharpley et al, 2001). It has been found that the effect of migration may depend on socio-environmental variables (Mallett et al, 2002).

In this same line, Patino et al (2005), investigated whether the relationship between migration history and psychosis is modified by family dysfunction. The results showed that the interaction between migration and family dysfunction accounted for the majority of participants with psychotic symptoms. Thus, family dysfunction may have acted as a psychological stressor upon susceptible individuals (with history of migration), precipitating psychotic symptoms.

These results agree with the findings from the Finnish Adoptive Family Study of Schizophrenia (Wahlberg et al, 1997; Tienari et al, 2004), which demonstrates that susceptible individuals (adopted children born to a biological mother with schizophrenia) are more sensitive to the effects on an adverse family environment.

Thus, further investigation concerning the nature of the relationship between migration and schizophrenia is indeed needed, as the psychosocial environment plays an important role in the increased incidence of psychotic disorders in subjects with migration history (Mallett et al, 2002).

OBJECTIVES

The main objective of this research is to determine the prevalence of schizophrenia symptoms among adolescent population in *Girona* and the region of *Baix Empordà*.

A secondary objective would be to examine the relationship between schizophrenia symptoms and other disorder's symptoms, specifically schizoid personality disorder and substance abuse.

Finally, a third objective is to explore whether migration history is linked to developing schizophrenia.

HYPOTHESES

As a result of all the information gathered about schizophrenia and adolescence and all those factors that may influence in this mental disorder, the hypotheses are the following:

- There is at least a 1.1% prevalence of schizophrenia symptoms in adolescence.
- There is a direct relationship between schizophrenia risk and substance abuse in adolescents.
- There is a direct relationship between schizophrenia symptoms and schizoid premorbid personality disorder symptoms in adolescents.
- There is a higher prevalence of schizophrenia symptoms in adolescent participants with migration history.

METHODS

PARTICIPANTS

The participants were, at first, 1662 teenagers that were studying ESO (*Educació Secundària Obligatòria*) in the town of *Girona* or the region of *Baix Empordà*. Those cases which the observers had invalidated (because the questionnaire's reliability and validity was doubtful) were excluded. Also, those cases in which the participants had not responded those items related to schizophrenia, schizoid personality disorder or substance abuse from the YI-4 (Youth's Inventory) were erased.

Also, those participants who showed poor reading comprehension or difficulties with the language were excluded.

The sampling of the participants of the region of *Baix Empordà* (742 participants) was random. A sampling with conglomerates (the classrooms of all the schools in the region were randomly selected) was made. The sample from *Girona* (633 participants) was not random, because not all the schools of the town were disposed to participate.

Items about origin area and migration history (origin country) were only explored in the Baix Empordà sample (739 out of 1375).

The final sample consisted in 1375 participants, aged from 11 to 17 years old, (mean=13.9, statistical deviation=1.23). 669 were boys and 706 were girls.

INSTRUMENTS

The instrument used was the Youth's Inventory 4 (only the self-report part), (Gadow & Sprafkin, 1999). It is a self-report rating scale that helps to evaluate DSM-IV emotional and behavioral disorders in youths between 12 and 18 years old. Responses to the YI-4 can provide valuable insight into the youth's perceptions of his or her problems. The YI-4 contains 120 items that correspond to those in the Adolescent Symptom Inventory-4 and includes the symptoms of 18 disorders. The YI-4 can be scored to derive Symptom Count scores (diagnostic model) or Symptom Severity scores (normative data model). Scoring is quick and easy with user-friendly score sheets. For this study, only the items 73-74 (schizoid personality), 76-81 (schizophrenia) and 115-120 (substance abuse) were considered.

PROCEDURE

The data was obtained by "*Infància, adolescència, els drets dels infants i la seva qualitat de vida*" research group, from the University of Girona, during March of 2008. After requesting and obtaining permission from the Catalan Government of Education for the research, the directives of the schools and the participants were informed about the investigation. Also, the confidentiality and anonymity of the data was reassured. After this, the questionnaire was applied jointly in the classroom during the class period.

Concrete instructions about how to respond the items in the questionnaire were given, and the participants were accompanied by instructors in case they needed any help or clarification.

The present research is a transversal study, as data is tied to a concrete time period.

To statistically analyze the data, the PASW Statistics 18 program (formerly SPSS Statistics) was used.

Pearson's correlation was used to analyze the linear relationship between the categorical dimensions of schizophrenia and schizoid personality disorder and substance abuse.

A chi-squared test was used to explore the relation between the qualitative dimensions of schizophrenia and schizoid personality disorder, substance abuse and migration history.

Finally, to explore differences between Spanish/Catalan population and other countries population, an ANOVA was conducted for two factors: YI-4 schizophrenia's score criterion and origin region.

The statistical significance level requested in all the testing has been p<0,05.

RESULTS

According to the YI-4 criterion score, among the 1375 participants in total, the 3.8% showed schizophrenia symptoms (52), 2.3% of boys and 1.5% of girls, but the difference is not significantly relevant. There is a significant difference between age groups $\chi^2(2, N=1375)=7.94$, $p=.019$, and it is more frequent between ages 11 and 13 in this sample, as shown in the following table:

Prevalence of schizophrenia symptoms

Age groups			Gender	
11-13 n=544	**14 n=341**	**15+ n=490**	**male n=669**	**fem. n=706**
1.9%*	1.2%	0.7%	2.3%*	1.5%
Total n=1375			**3.8%**	

Regarding schizoid personality disorder symptoms, a 4.1% of the students (56), showed significant symptoms. There is a significant difference between sexes, $t(1373)=3.218$, $p=.001$, and it is more frequent in boys (2.8%) than in girls (1.2%). There is not a significant difference between group ages.

Prevalence of schizoid personality symptoms

Age groups			Gender	
11-13 n=544	**14 n=341**	**15+ n=490**	**male n=669**	**fem. n=706**
1.7%	1.2%	1.2%	2.8%*	1.3%
Total n=1375			**4.1%**	

In the case of substance abuse, we can also see this difference between sexes. Among the 15.7% total of students showing substance abuse symptoms (216), 9.3% were boys and 6.4% were girls, and the difference is significant $t(1373)=3.408$, $p=.001$. Furthermore, there is a difference statistically significant between age groups, being the older ones (15 years or older) more likely to show substance abuse symptoms, $\chi^2(2, N=1375)=19.072$, $p<.05$.

Prevalence of substance abuse symptoms

Age groups			Gender	
11-13 n=544	14 n=341	15+ n=490	male n=669	fem. n=706
4.2%	4.2%	7.3%*	9.3%*	6.4%
Total n=1375			15.7%	

Frequency of substance abuse YI-4 items

To analyze which substances are more used and abused among adolescents, here are the results of every YI-4 item related to substance abuse:

- ***I smoke cigarettes***

	Frequency	Percentage
Never	1051	76.4%
Sometimes	158	11.5%
Often	60	4.4%
Very often	80	5.8%
Lost	26	1.9%
Total	1375	100%

A 23.6% of the participants smoke cigarettes, and it is more likely to consume very often than often. It means that among those participants who smoke, most generally smoke a lot.

- ***I drink alcoholic drinks (beer, wine, other liquors)***

	Frequency	Percentage
Never	880	64%
Sometimes	343	24.9%
Often	89	6.5%
Very often	43	3.1%
Lost	20	1.5%
Total	1375	100%

In the case of alcohol, compared to tobacco, it is more consumed (36% consume it), but less frequently. Most of the participants are occasional drinkers.

- ***I get in trouble for drinking alcohol***

	Frequency	Percentage
Never	1258	91.5%
Sometimes	53	3.9%
Often	23	1.7%
Very often	20	1.5%
Lost	21	1.5%
Total	1375	100%

As it is for alcohol use, most of the participants never get in trouble for drinking. And if they do, it is occasionally.

- ***I smoke marihuana***

	Frequency	Percentage
Never	1104	80.3%
Sometimes	127	9.2%
Often	43	3.1%
Very often	41	3%
Lost	60	4.4%
Total	1375	100%

Again, marihuana's use is occasional, for most of the participants who consume it do it sometimes, rather than being its use a habit.

- ***I use other illegal drugs (cocaine, LSD…)***

	Frequency	Percentage
Never	1281	93.2%
Sometimes	40	2.9%
Often	23	1.7%
Very often	14	1%
Lost	17	1.2%
Total	1375	100%

Illegal drugs are the least consumed (6.8%), and they are used both occasionally and frequently.

- ***I get in trouble for using these illegal drugs***

	Frequency	Percentage
Never	1287	93.6%
Sometimes	35	2.5%
Often	16	1.2%
Very often	22	1.6%
Lost	15	1.1%
Total	1375	100%

Few participants report getting in trouble for using illegal drugs (6.4%), and if they do, it is something occasional.

It seems that alcohol is the most consumed substance among teenagers (36% have consumed it at least once). It is followed by cigarettes (23.6%) and marihuana (19.7%).

A 6.4% gets in trouble for consuming illegal drugs, and a 8.5% for drinking alcohol, which is a rather high percentage, considering they are aged between 11 and 16 years old, generally.

Examining the last variable, migration history, 148 students out of 742 (19.9%), among the sample from *Baix Empordà*, presented migration history. 9.7% were boys and 10.2% were girls. There is neither a statistically significant difference between sexes nor between age groups, although a lightly higher prevalence between 15-year-old students or older can be found.

Schizophrenia and schizoid personality disorder

There is a significant but low correlation (.292) between schizophrenia symptoms and schizoid personality disorder symptoms.

Furthermore, the expected frequency of comorbidity of these two disorders is 2.1 cases, being the real frequency 11 cases found, so it is signifycantly higher, $\chi^2(1, N=1375)= 40{,}36$, $p<.05$.

	Present	Correlation
Expected Frequency	2.1	.292
Real frecuency	11*	

	Present	Correlation
Expected Frequency	8.2	.29
Real frecuency	28*	

Still, the results should be taken carefully, because schizoid personality disorder's diagnostic criteria would not be observed if the symptoms appear as a consequence of schizophrenia, but the personality disorder would be observed if the symptoms were present before developing the schizophrenia symptoms, and we cannot know this information.

Schizophrenia and substance abuse

Again, there is a low but significant direct relationship (.29) between schizophrenia symptoms and substance abuse symptoms.

The real frequency of comorbidity between the two criterion scores, 28, is significantly higher than the expected frequency, 8.2, $\chi^2(1, N=1375)=59.362, p<.05$.

Schizophrenia and migration history

There is not a significant relationship between schizophrenia symptoms and migration history, $\chi^2(1, N=1375)=3.631, p=.057$, although it is nearly significant. In this case, the expected frequency is 5.2, being the real frequency 9. We can see there are more cases with both migration history and schizophrenia criterion scores, but it is no significantly relevant.

To see if there was any difference between the origin area of the people with migration history and schizophrenia symptoms, five groups were created: Spanish/Catalan, African, Hispanic American, European and Eastern European.

Descriptive statistics

	n=
Spanish/Catalan	573
African	54
H. American	52
European	19
Eastern European	15

The results of the ANOVA show that there are significant differences: the participants from Eastern Europe have significantly higher rates of schizophrenia symptoms than the Catalan and Spanish participants, F(5, 710)=4.951, *p=.041*. Even though, the results must be taken carefully because the groups' size is not equal.

Origin area		Sig.
Spanish/Catalan	**African**	.844
	H. American	.815
	European	1
	Eastern Eur.	.041*

Furthermore, it can be seen that the groups with bigger sample (African and Hispanic American), are also the ones with less signification.

DISCUSSION

Regarding the first objective and the first hypothesis of the present research, these results indicate that the prevalence of schizophrenia is of a 3.8% among 1375 participants. This prevalence, compared to the 1.1% Ayuso-Mateos (2006) proposes, seems to be much higher. These participants showed the schizophrenia criterion score in the YI-4 scale, so it has to be taken into account that they cannot be diagnosed with schizophrenia, as they just report experiencing its symptoms. Even though, it seems that a link between self-reported schizo-phrenia symptoms and later onset of schizophrenia is probable (Poulton, Caspi, Moffitt et al, 2000), which means that it is possible that those participants who report schizophrenia symptoms develop the disorder in the future.

Regarding the second hypothesis, schizophrenia symptoms and schizoid personality disorder were analyzed to explore any existent link. As Zubin et al found in their 1983 research, there is also a significant relationship in the present research between schizophrenia symptoms and schizoid personality disorder. Even though, there are some limitations: it is impossible, in this study, to determine whether the schizoid symptoms were premorbid to the schizophrenia symptoms or appeared as a consequence of the illness. It means that although a high amount of participants who showed both schizoid personality and schizophrenia symptoms, some data is still needed (age of the beginning of the schizoid personality symptoms, and age of the beginning of the schizophrenia

symptoms) to determine the existence of a premorbid personality disorder.

Concerning the third hypothesis, the relationship between schizophrenia and substance abuse, there is a widespread acceptance that heavy use of cannabis increases the risk of psychosis (Ben Amar & Potvin, 2007). Substance abuse is also demonstrated to be a risk factor for the onset of schizophrenia in the present research.

However, further research is needed to fully understand why some people can use recreational drugs without significant adverse effects while others develop psychosis.

Even though most of the adolescents consuming substances such as cannabis might not develop schizophrenia, the high rates of substance use are worrying. In this research, 19.7% of the participants had consumed cannabis at least once. This result is concordant with the recent study from The United Nations Children's Fund, where more than the 20% of Spanish population aged 11-15 had consumed cannabis in the past 12 months (UNICEF, 2013).

Finally, the hypothesis about participants with migration history having a higher risk of developing schizophrenia symptoms cannot be accepted. Only one group of participants (East European) had significantly higher rates of symptoms, compared to the Spanish and Catalan sample.

For that reason, these results are contrary to other researches where foreign birth was associated with an increased risk of developing schizophrenia (Harrison et al, 1997; Selten et al, 1997, 2001; Cantor-Graae et al, 2003).

The reasons why only East European participants presented higher schizophrenia symptoms is unclear, and further investigation should be made. In later contributions, groups should be made more exhaustively, and should be divided in geographic zones or countries, not in continents. Also, migration history data should be compared to other variables, such as socioeconomic status and educational formation.

Some of the principal limitations found in this research are that the questionnaires were self-reported, and there was not any clinical interview performed. Also, the questionnaires were answered collectively, in the

presence of the participant's classmates. It might have caused that some of the answers were not fully reliable, although the observers already had that limitation in mind.

Also, the present research is a transversal study, so the results are limited to the studied sample in a concrete time period.

As mentioned before, the results concerning migration history must be taken carefully because the groups' size is not equal, as there are groups with few participants (only 15).

Having all the limitations and all the contributions in mind, there are still some clinical implications. Knowing the high prevalence of substance abuse and the consequences this consume can have on the onset of later schizophrenia, it would be important to design prevention programs in our institutions.

As primary prevention, there could be some general prevention at high schools, like speeches. For secondary prevention, teachers and directives could be trained to detect adolescents in risk or that show some symptoms either of substance abuse or psychotic disorders.

Also, it is essential that teenage population receive detailed information about schizophrenia and its implications on patients, such as the disease's risk to mental and physical health, and how it affects the patient's relatives and significant ones.

Conclusions

In conclusion, the present study results are similar to previous researches, although there are still some results that are inconsistent, such as the findings regarding migration history.

Thus, further research concerning the relationship between migration history and schizophrenia is needed, as mentioned before, to see if there are more variables that could be related to the onset of schizophrenia among population who migrated.

It has been largely demonstrated that schizophrenia is related to both schizoid personality symptoms and substance abuse symptoms. For this reason, the present research is aimed to corroborate that these results can also be found in a Catalan and Spanish sample.

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