Mental disorders in adolescents, youth, and adults in the RPS Birth Cohort Consortium (Ribeirão Preto, Pelotas and São Luís), Brazil

Transtornos mentais em adolescentes, jovens e adultos do Consórcio de Coortes de Nascimento brasileiras RPS (Ribeirão Preto, Pelotas e São Luís)

Trastornos mentales en adolescentes, jóvenes y adultos del Conjunto de Cohortes de Nacimiento brasileñas RPS (Ribeirão Preto, Pelotas y São Luís)

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Abstract

Although depression and anxiety are known to result in disabilities and workplace and health system losses, population-based studies on this problem are rare in Brazil. The current study assessed the prevalence of mental disorders in adolescents, youth, and adults and the relationship to sociodemographic characteristics in five birth cohorts (RPS) in Ribeirão Preto (São Paulo State), Pelotas (Rio Grande do Sul State), and São Luís (Maranhão State), Brazil. Major depressive episode, suicide risk, social phobia, and generalized anxiety disorder were assessed with the Mini International Neuropsychiatric Interview. *Bootstrap confidence intervals were estimated and prevalence rates were stratified by sex and socioeconomic status in the R program. The study included 12,350 participants from the cohorts. Current major depressive episode was more prevalent in adolescents in São Luís (15.8%; 95%CI: 14.8-16.8) and adults in Ribeirão Preto (12.9%; 95%CI: 12.0-13.9). The highest prevalence rates for suicide risk were in adults in Ribeirão Preto (13.7%; 95%CI: 12.7-14.7), and the highest rates for social phobia and generalized anxiety were in youth in Pelotas, with 7% (95%CI: 6.3-7.7) and 16.5% (95%CI: 15.4-17.5), respectively. The lowest prevalence rates of suicide risk were in youth in Pelotas (8.8%; 95%CI: 8.0-9.6), social phobia in youth in Ribeirão Preto (1.8%; 95%CI: 1.5-2.2), and generalized anxiety in adolescents in São Luís (3.5%; 95%CI: 3.0-4.0). Mental disorders in general were more prevalent in women and in individuals with lower socioeconomic status, independently of the city and age, emphasizing the need for more investment in mental health in Brazil, including gender and socioeconomic determinants.*

Mental Disorders; Cohort Studies; Socioeconomic Factors; Gender and Health; Life Cycle Stages

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Introduction

Mental health promotion is considered a global priority as a key part of the agenda for the *Sustainable Development Goals* [1]. Estimates indicate that one out of ten persons may have a current mental disorder and that one out of four will develop a mental disorder some time in life [2,3]. In 2016, mental disorders and behavioral substance use disorders affected more than a billion persons in the world, accounting for 7% of the global burden of disease and 19% of years lived with disability [4,5]. In Latin America and the Caribbean, mental and behavioral disorders, including those involving substance use, account for 10.5% of the global burden of disease, while in South America the prevalence of mental disorders in the previous 12 months was 17% [6].

In Brazil, regionally and nationally representative studies on mental health are scarce [7], but estimates from the late 1990s indicated that neuropsychiatric disorders accounted for 34% of all the morbidity, and that among the noncommunicable diseases, they were the leading cause of years of life lost to premature death or disability (*disability-adjusted life year* – DALY) [8]. According to recent estimates, mental disorders such as depression and anxiety are among the 10 leading causes of years of life with disability in Brazil [9]. In various regions of the world, the exacerbation of social inequities has increased the prevalence of mental disorders [10,11]. In low and middle-income countries, environmental factors such as urban violence [12,13] appear to aggravate inequities in mental health, especially in groups with the greatest risk of these traumatic events, like women and individuals with lower socioeconomic status.

Studies using standardized instruments to assess the prevalence of mental disorders at the population level are useful for elucidating their extent, assess trends, compare patterns, and quantify factors associated with their occurrence [14,15,16]. This study aimed to describe the prevalence rates of depression, suicide risk, social phobia, and generalized anxiety disorder in adolescents, youth, and adults according to sociodemographic variables (sex, family income, and maternal schooling at birth) in five Brazilian birth cohorts that have been followed in different regions of Brazil.

Material and methods

Study design and sample characteristics

This study is based on data collected at birth in the Consortium of Birth Cohorts in Ribeirão Preto, Pelotas, and São Luís (the RPS Consortium), three geographically and socioeconomically distinct Brazilian cities. According to the Gini index, which reflects the degree of income concentration, in 2010, Ribeirão Preto (located in the state of São Paulo in Southeast Brazil) had the lowest social inequality score of the three cities, with 0.546, while Pelotas, located in the state of Rio Grande do Sul in the South, showed a Gini of 0.560, and São Luís, located in Maranhão in the Northeast, had the highest social inequality score, with 0.627 (Departamento de Informática do SUS. Índice Gini da renda domiciliar *per capita* segundo Município. http://tabnet.datasus.gov.br/cgi/ibge/censo/cnv/ginibr.def, accessed on 03/Jul/2019).

Data for Ribeirão Preto were taken from the waves at 37/39 years and 21/23 years of age, from the 1978/1979 and 1994 cohorts, respectively. In Pelotas, we included data from the visits at 30 years (1982 cohort) and at 18 and 22 years in the 1993 cohort. In São Luís, we analyzed data from the visit at 18/19 years of age in the 1997-1998 cohort. The terms adolescents, youth, and adults are used here to describe results for individuals under 19 years, from 21 to 23 years, and over 29 years of age, respectively.

In Pelotas, in 1982 and 1993, all the city's maternity hospitals were visited daily and the newborns whose families lived in the urban area were examined and their mothers were interviewed [17,18]. In Ribeirão Preto, participants from the 1978-1979 cohort were also recruited at birth in the city's eight maternity hospitals and their mothers were interviewed from June 1, 1978, to May 31, 1979.

From May to August 1994, births were recruited from the maternity hospitals in Ribeirão Preto [19,20,21]. In São Luís, participants in the 1997-1998 cohort were recruited in 10 maternity hospitals from March 1, 1997, to February 28, 1998, using systematic sampling with probability of selection

proportional to the number of births at each hospital, such that one out of seven live births in São Luís was selected for the study [20,22,23].

In all the birth cohorts, follow-up waves were conducted at different moments in the life cycle. Complete details on the studies' methodology have been published previously [17,18,19,20,22].

As for the study population in Pelotas, in the follow-up waves, we attempted to assess all participants from the 1982 and 1993 cohorts [17,18]. In Ribeirão Preto, we also attempted to assess all participants from the 1978-1979 and 1994 cohorts [24]. In São Luís, participants from the 1997-1998 cohort were seen at 18/19 years, where part of the (613) came from the original cohort and the rest of the sample (1,886) consisted of an open cohort with individuals also born in that city in 1997 [25].

Assessment of mental disorders

Mental disorders were assessed by previously trained professionals in all three sites of the RPS Consortium, using diagnostic modules from the *Mini International Neuropsychiatric Interview* (MINI), based on criteria from the fourth version of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) and of the International Classification of Diseases, 10th revision (ICD-10). In São Luís and Pelotas, only some modules of MINI were applied, while all the modules were used in Ribeirão Preto. This study assessed current and past major depressive episode (MDE), suicide risk, social phobia, and generalized anxiety disorder (GAD), since these disorders had data available from all the follow-up waves, and their presence was determined by preestablished algorithms in MINI [26].

Data analysis

Due to the low prevalence of some outcomes, the confidence intervals were estimated with bootstrap percentages with five thousand replications [27]. This avoided negative values and loss of precision in the interval estimates. Thus, the different prevalence rates between the cities were assessed by inspecting the lower and upper limits of the estimated confidence intervals. Chi-square test was also used to assess the equality of proportions within each of the participating cities. Prevalence rates were stratified by family income (income tertiles), maternal schooling at birth (0-4 years; 5-8 years; 9-11 years; 12 and older) and sex (male and female). The R program, version 3.6.0 (http://www.r-project.org), was used for the statistical analyses, with significance set at 5%.

All participants signed a free and informed consent form. For those under 18 years of age, parents or guardians signed the form. Data collection was preceded by approval by the respective institutional review boards.

Results

Five birth cohorts were assessed at different life stages, two in Ribeirão Preto, two in Pelotas, and one in São Luís. In all, 12,350 individuals were included in the analyses: 4,055 from the 1993 cohort in Pelotas, 3,576 from the 1982 cohort in Pelotas, 2,499 from the 1997/1998 cohort in São Luís, 1,624 from the 1978/1979 cohort in Ribeirão Preto, and 596 individuals from the 1994 cohort in Ribeirão Preto.

Table 1 shows that prevalence rates for MDE were lower in the Pelotas cohorts, independently of age. Prevalence of current MDE was higher in adults in the 1982 cohort than in youth and adolescents from the 1993 cohort. In Ribeirão Preto, prevalence in adults was also higher than in youth. Regardless of the city and age, prevalence of current MDE was higher in women and in individuals with lower socioeconomic status.

Table 2 shows that past MDE was less prevalent in youth in Pelotas (2.4%; 95%CI: 1.9-2.8) and more prevalent in adults in Ribeirão Preto (7.7%; 95%CI: 7.0-8.4). Prevalence rates were higher in women, independently of age and city. For maternal schooling and income tertiles at birth, differences in prevalence rates for past MDE between the different categories were not clear.

Table 3 shows that suicide risk was similar between adolescents in São Luís (13.5%; 95%CI: 12.5-14.5) and Pelotas (12.9%; 95%CI: 12.0-13.9) and was also more prevalent in youth (13.4%; 95%CI:

12.5-14.4) and adults (13.7%; 95%CI: 12.7-14.7) from Ribeirão Preto, compared to youth (8.8%; 95%CI: 8.0-9.6) and adults (11%; 95%CI: 10.1-11.9) from Pelotas. Prevalence of suicide risk was higher in females and generally in those with lower socioeconomic status, independently of age and city. Exceptionally, among adolescents in São Luís, prevalence of suicide risk was higher when the mothers had 12 or more years of schooling.

As shown in Table 4, social phobia was less prevalent in youth (1.8%; 95%CI: 1.5-2.2) and adults (2.3%; 95%CI: 1.9-2.7) in Ribeirão Preto, while the highest rates were seen in youth (7%; 95%CI: 6.3-7.7) and adolescents (6.9%; 95%CI: 6.2-7.6) from the 1993 cohort in Pelotas. Social phobia was more prevalent in adolescents than in adults, while the prevalence rates did not differ between adolescents from São Luís and Pelotas. Except for youth in Ribeirão Preto, prevalence of social phobia was higher in women. It was even higher in individuals whose mothers had low schooling at birth, except among youth from Ribeirão Preto and Pelotas. As for family income, prevalence of social phobia was higher among individuals with lower socioeconomic status, except for adults in Ribeirão Preto.

Table 5 shows that prevalence of GAD was higher in youth in Pelotas (16.5%; 95%CI: 15.4-17.5) and lower in adolescents in São Luís (3.5%; 95%CI: 3.0-4.0). Prevalence rates were similar between adults in Ribeirão Preto (9.3%; 95%CI: 8.5-10.1) and Pelotas (10.4%; 95%CI: 9.5-11.2). Prevalence of this disorder was at least twice as high in women and was generally similar across socioeconomic strata. Unlike Pelotas and Ribeirão Preto, prevalence of GAD was higher in adolescents in São Luís whose mothers had 12 years or more of schooling.

Discussion

This was the first study on mental disorders combining data from different Brazilian birth cohorts, conducted with a similar methodology in different regions and at different ages. Our data not only reinforce the high rates of major depression, suicide risk, social phobia, and generalized anxiety as a public health problem, but also corroborate that these disorders vary according to the individual's sex, place of occurrence, and socioeconomic status.

Table 1

Prevalence of current major depressive episode (current MDE) according to sociodemographic characteristics of birth cohorts in Ribeirão Preto (São Paulo State), Pelotas (Rio Grande do Sul State), and São Luís (Maranhão), Brazil, RPS Cohorts.

Current MDE	1978-1979 cohort (Ribeirão Preto, 37/39 years)		1982 cohort (Pelotas, 30 years)		1994 cohort (Ribeirão Preto, 21/23 years)		1993 cohort (Pelotas, 22 years)		1993 cohort (Pelotas, 18 years)		1997-98 cohort (São Luís, 18/19 years)	
	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI
Sex	**p < 0.05**		**p < 0.05**		**p < 0.05**		**p < 0.05**		**p < 0.05**		**p < 0.05**	
Female	17.3	16.2-18.4	12.8	11.8-13.7	12.6	11.6-13.5	10.7	9.8-11.5	10.0	9.2-10.9	22.1	20.9-23.3
Male	8.2	7.4-9.0	4.5	3.9-5.1	6.9	6.2-7.6	4.4	3.8-5.0	3.5	3.0-4.0	8.8	8.1-9.6
Mother's schooling at birth (years)	**p < 0.05**		**p < 0.05**		**p > 0.05**		**p < 0.05**		**p < 0.05**		**p > 0.05**	
0-4	15.3	14.3-16.4	11.3	10.4-12.2	13.6	12.7-14.6	10.3	9.5-11.2	8.9	8.1-9.7	18.6	17.5-19.7
5-8	13.2	12.2-14.2	8.7	7.9-9.5	12.0	11.1-12.9	8.0	7.2-8.8	7.4	6.7-8.1	15.3	14.3-16.3
9-11	7.8	7.0-8.6	7.8	7.1-8.6	7.2	6.5-7.9	4.6	4.0-5.2	4.3	3.7-4.9	15.0	14.0-16.0
≥ 12	6.1	5.4-6.8	4.1	3.5-4.6	5.0	4.4-5.6	5.2	4.6-5.8	1.6	1.3-2.0	13.2	12.2-14.1
Income tertiles at birth	**p < 0.05**		**p < 0.05**		**p < 0.05**		**p < 0.05**		**p < 0.05**			
First	17.7	16.7-18.8	11.0	10.1-11.9	15.5	14.5-16.4	10.7	9.8-11.6	8.9	8.1-9.7	-	-
Second	12.9	12.0-13.9	9.1	8.3-9.9	8.0	7.2-8.7	7.0	6.3-7.8	6.9	6.2-7.6	-	-
Third	7.8	7.1-8.6	6.4	5.7-7.1	2.0	1.6-2.4	5.5	4.9-6.2	4.3	3.8-4.9	-	-
Total	12.9	12.0-13.9	8.8	8.0-9.6	10.2	9.4-11.	7.7	7.0-8.5	6.8	6.1-7.5	15.8	14.8-16.8

95%CI: 95% confidence interval.

Table 2

Prevalence of past major depressive episode (past MDE) according to sociodemographic characteristics of birth cohorts in Ribeirão Preto
(São Paulo State), Pelotas (Rio Grande do Sul State), and São Luís (Maranhão), Brazil, RPS Cohorts.

Past MDE	1978-1979 cohort (Ribeirão Preto, 37/39 years)		1982 cohort (Pelotas, 30 years)		1994 cohort (Ribeirão Preto, 21/23 years)		1993 cohort (Pelotas, 22 years)		1993 cohort (Pelotas, 18 years)		1997-98 cohort (São Luís, 18/19 years)	
	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI
Sex		p < 0.05		p < 0.05		p > 0.05		p < 0.05		p < 0.05		p < 0.05
Female	10.2	9.3-11.0	5.2	4.6-5.8	7.7	7.0-8.5	3.2	2.7-3.7	4.1	3.5-4.7	11.4	10.4-12.3
Male	5.0	4.4-5.6	2.0	1.6-2.4	4.5	3.9-5.1	1.4	1.1-1.8	1.7	1.3-2.0	3.5	2.9-4.0
Mother's schooling at birth (years)		p < 0.05		p > 0.05		p > 0.05		p >0.05		p < 0.05		p > 0.05
0-4	9.7	8.9-10.5	4.6	4.0-5.2	9.1	8.3-9.9	3.2	2.7-3.7	3.6	3.1-4.1	7.0	6.2-7.7
5-8	7.3	6.6-8.0	3.5	3.0-4.0	7.8	7.1-8.6	2.1	1.7-2.5	3.3	2.8-3.8	7.3	6.5-8.0
9-11	4.1	3.5-4.7	3.3	2.8-3.8	5.2	4.6-5.9	1.9	1.5-2.2	1.7	1.3-2.0	7.6	6.8-8.4
≥ 12	4.1	3.5-4.6	2.4	2.0-2.9	2.5	2.1-2.9	2.3	1.8-2.7	1.0	0.7-1.3	7.9	7.1-8.7
Income tertiles at birth		p < 0.05		p > 0.05		-		p > 0.05		p > 0.05		-
First	11.0	10.2-11.9	4.5	3.9-5.1	4.8	4.2-5.4	3.2	2.7-3.6	3.0	2.5-3.4	-	-
Second	7.4	6.7-8.1	3.8	3.3-4.3	-	-	1.8	1.5-2.2	3.1	2.6-3.6	-	-
Third	4.7	4.1-5.3	2.8	2.4-3.3	-	-	2.0	1.6-2.4	2.5	2.0-2.9	-	-
Total	7.7	7.0-8.4	3.7	3.2-4.2	6.4	5.7-7.1	2.4	1.9-2.8	2.9	2.4-3.4	7.6	6.9-8.4

95%CI: 95% confidence interval.

Table 3

Prevalence of suicide risk according to sociodemographic characteristics of birth cohorts in Ribeirão Preto (São Paulo State), Pelotas
(Rio Grande do Sul State), and São Luís (Maranhão), Brazil, RPS Cohorts.

Suicide risk	1978-1979 cohort (Ribeirão Preto, 37/39 years)		1982 cohort (Pelotas, 30 years)		1994 cohort (Ribeirão Preto, 21/23 years)		1993 cohort (Pelotas, 22 years)		1993 cohort (Pelotas, 18 years)		1997-98 cohort (São Luís, 18/19 years)	
	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI
Sex		p < 0.05		p < 0.05		p < 0.05		p < 0.05		p < 0.05		p < 0.05
Female	17.7	16.6-18.7	14.3	13.3-15.3	16.0	14.9-17.1	10.8	9.9-11.6	17.6	16.5-18.7	18.3	15.0-17.0
Male	9.4	8.5-10.2	7.6	6.8-8.3	9.8	8.9-10.6	5.8	5.2-6.5	8.1	7.3-8.9	8.2	8.9-10.6
Mother's schooling at birth (years)		p < 0.05		p < 0.05		p < 0.05		p < 0.05		p < 0.05		p > 0.05
0-4	17.0	16.0-18.1	14.7	13.7-15.7	17.3	16.2-18.4	11.4	10.5-12.3	16.6	15.5-17.6	15.9	14.9-16.9
5-8	12.1	11.1-13.0	10.3	9.4-11.2	17.5	16.4-18.6	8.7	7.9-9.5	12.8	11.8-13.7	13.1	12.1-14.0
9-11	8.3	7.5-9.0	10.4	9.5-11.2	7.2	6.5-7.9	6.0	5.4-6.7	10.7	9.8-11.5	11.8	10.9-12.7
≥ 12	6.8	6.1-7.5	5.3	4.7-5.9	7.5	6.8-8.2	3.2	2.7-3.7	6.5	5.8-7.2	17.5	16.5-18.6
Income tertiles at birth		p < 0.05		p < 0.05		p < 0.05		p < 0.05		p < 0.05		
First	17.7	16.7-18.8	15.3	14.3-16.3	24.5	23.3-25.7	11.8	14.2-16.3	15.2	14.2-16.3	-	-
Second	13.7	12.7-14.7	10.1	9.3-11.0	9.0	8.2-9.8	7.8	7.0-8.5	12.8	11.9-13.8	-	-
Third	9.7	8.8-10.5	8.0	7.3-8.8	7.0	6.3-7.7	5.9	5.2-6.5	9.9	9.1-10.8	-	-
Total	13.7	12.7-14.7	11.0	10.1-11.9	13.4	12.5-14.4	8.8	8.0-9.6	12.9	12.0-13.9	13.5	12.5-14.5

95%CI: 95% confidence interval.

Table 4

Prevalence of social phobia according to sociodemographic characteristics of birth cohorts in Ribeirão Preto (São Paulo State), Pelotas (Rio Grande do Sul State), and São Luís (Maranhão), Brazil, RPS Cohorts.

Social phobia	1978-1979 cohort (Ribeirão Preto, 37/39 years)		1982 cohort (Pelotas, 30 years)		1994 cohort (Ribeirão Preto, 21/23 years)		1993 cohort (Pelotas, 22 years)		1993 cohort (Pelotas, 18 years)		1997-98 cohort (São Luís, 18/19 years)	
	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI
Sex		p > 0.05		**p < 0.05**		p > 0.05		**p < 0.05**		**p < 0.05**		**p < 0.05**
Female	2.7	2.3-3.2	5.1	4.4-5.7	1.7	1.3-2.1	8.3	7.5-9.0	10.0	9.1-10.8	7.2	6.5-8.0
Male	1.8	1.4-2.2	2.0	1.6-2.4	2.0	1.6-2.4	5.4	4.8-6.1	3.7	3.2-4.2	5.0	4.4-5.6
Mother's schooling at birth (years)		p > 0.05		**p < 0.05**		p > 0.05		p > 0.05		**p < 0.05**		**p < 0.05**
0-4	2.5	2.0-2.9	5.1	4.5-5.8	2.7	2.3-3.2	7.9	6.1-7.5	9.5	8.7-10.3	8.1	7.4-8.9
5-8	2.7	2.3-3.2	3.1	2.6-3.5	1.8	1.5-2.2	6.8	6.1-7.5	6.6	5.9-7.3	7.0	6.3-7.7
9-11	1.8	1.5-2.2	3.3	2.8-3.8	2.0	1.6-2.4	5.7	5.1-6.4	4.7	4.1-5.3	4.8	4.2-5.4
≥ 12	1.4	1.0-1.7	2.0	1.6-2.4	-	-	7.5	6.7-8.2	4.9	4.3-5.5	3.5	3.0-4.0
Income tertiles at birth		p > 0.05		**p < 0.05**		p > 0.05		p > 0.05		p > 0.05		
First	2.6	2.2-3.1	4.9	4.3-5.5	4.5	4.0-5.1	8.2	7.4-9.0	7.9	7.2-8.7	-	-
Second	1.8	1.5-2.2	3.8	3.2-4.3	1.5	1.1-1.8	6.6	5.9-7.3	7.1	6.3-7.8	-	-
Third	2.8	2.3-3.3	2.2	1.8-2.6	1.0	0.7-1.3	5.9	5.2-6.5	5.5	4.8-6.1	-	-
Total	2.3	1.9-2.7	3.6	3.1-4.1	1.8	1.5-2.2	7.0	6.3-7.7	6.9	6.2-7.6	6.2	5.5-6.9

95%CI: 95% confidence interval.

Table 5

Prevalence of generalized anxiety disorder (GAD) according to sociodemographic characteristics of birth cohorts in Ribeirão Preto (São Paulo State), Pelotas (Rio Grande do Sul State), and São Luís (Maranhão), Brazil, RPS Cohorts.

GAD	1978-1979 cohort (Ribeirão Preto, 37/39 years)		1982 cohort (Pelotas, 30 years)		1994 cohort (Ribeirão Preto, 21/23 years)		1993 cohort (Pelotas, 22 years)		1993 cohort (Pelotas, 18 years)		1997-98 cohort (São Luís, 18/19 years)	
	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI
Sex		**p < 0.05**		**p < 0.05**		**p < 0.05**		**p < 0.05**		**p < 0.05**		**p < 0.05**
Female	13.7	12.8-14.7	14.7	13.7-15.8	12.3	11.4-13.2	21.6	20.4-22.7	14.5	13.5-15.5	4.6	4.1-5.2
Male	4.5	3.9-5.1	5.4	4.8-6.1	5.7	5.0-6.3	9.9	9.1-10.8	5.8	5.1-6.4	2.2	1.8-2.6
Mother's schooling at birth (years)		p > 0.05		**p < 0.05**		p > 0.05		p > 0.05		p > 0.05		**p < 0.05**
0-4	9.3	8.5-10.1	13.4	12.4-14.4	10.9	10.0-11.8	17.5	16.5-18.6	10.8	9.9-11.7	3.1	2.6-3.6
5-8	10.9	10.1-11.8	9.7	8.9-10.6	10.1	9.3-11.0	16.8	15.8-17.9	10.6	9.7-11.5	2.2	1.8-2.6
9-11	8.3	7.5-9.1	9.1	8.3-9.9	7.8	7.1-8.6	13.9	12.9-14.9	9.3	8.5-10.1	3.9	3.4-4.5
≥ 12	6.1	5.5-6.8	5.5	4.8-6.1	10.0	9.2-10.8	13.0	12.0-13.9	7.2	6.5-7.9	7.0	6.3-7.7
Income tertiles at birth		p > 0.05		**p < 0.05**		p > 0.05		p > 0.05		**p < 0.05**		
First	10.5	9.6-11.3	13.9	12.9-14.9	9.1	8.3-9.9	17.4	16.3-18.5	12.4	11.5-13.3	--	--
Second	9.2	8.4-10.1	8.9	8.1-9.7	9.5	8.6-10.3	16.3	15.3-17.4	9.7	8.9-10.6	--	--
Third	9.1	8.3-9.9	8.3	7.5-9.1	7.0	6.3-7.7	14.5	13.5-15.5	8.8	8.0-9.6	--	--
Total	9.3	8.5-10.1	10.4	9.5-11.2	9.6	8.7-10.4	16.5	15.4-17.5	10.2	9.3-11.1	3.5	3.0-4.0

95%CI: 95% confidence interval.

In general, prevalence rates for current and past MDE were lower in Pelotas than in Ribeirão Preto, while suicide risk varied little between the cities or according to age. Meanwhile, social phobia was more prevalent in Pelotas than in the other two cities, independently of age. GAD also differed between the cities, higher in Pelotas, especially among youth, and much higher in adolescents in São Luís. Female gender and lower socioeconomic status were related to higher prevalence rates for current MDE and suicide risk, independently of age and city.

Current MDE was considerably more frequent in adolescents in São Luís than in Pelotas at 18 years of age. Although we lack data on depression at later ages in São Luís, one hypothesis for this difference is that in São Luís, peak levels of this disorder occur after 16 years, similar to a pattern observed in other longitudinal studies with adolescents [28,29,30].

Meanwhile, in Pelotas and Ribeirão Preto, prevalence of current MDE was slightly higher in people in their thirties compared to younger people. A birth cohort in Dunedin, New Zealand, showed a similar pattern for this disorder, probably as a consequence of inherent uncertainties and difficulties in the transition from early adulthood to individuals' thirties [31], when these rates tend to drop [30,32]. Considering the disorder's severity and stability in the trajectory of the depressive symptoms at the individual level, there appears to be important heterogeneity and also different patterns in the disorder's occurrence, depending on the region and context.

Regardless of age at follow-up, current and past MDE were less prevalent in Pelotas than in the other cities. This result may reflect not only individual etiological differences, but also intrinsic contextual differences in the study sites, as observed in other locations [10,34]. The higher prevalence of current depression in adolescents in São Luís may reflect the region's socioeconomic determinants, since São Luís, capital of the state of Maranhão, is located in the poorest region of Brazil and had the Lowest Human Development Index [35] and the highest inequality of the three cities in the study (Departamento de Informática do SUS. Índice Gini da renda domiciliar *per capita* segundo Município. http://tabnet.datasus.gov.br/cgi/ibge/censo/cnv/ginibr.def, accessed on 03/Jul/2019).

The results for current MDE at the 18 and 22-year waves in the Pelotas 1993 cohort were similar to those reported in a population-based study in the same city using the same diagnostic instrument [36]. Munhoz e al. [7], using data from the *Brazilian National Health Survey* (PNS), which estimated depression with a different test, found that prevalence was higher in the South of Brazil (where Pelotas is located).

Due to the negative consequences associated with suicide risk, the high prevalence rates reported in this study are worrisome, independently of life phase and city. The most extreme consequence of suicide is obviously death, and suicide is a major cause of violent death in Latin America as a whole and in Brazil specifically, especially from 10 to 30 years of age [37,38,39]. Suicide also frequently causes harm to persons close to the direct victim, including ideation, planning, suicide attempts, psychiatric morbidity such as depression, and/or physical health problems, further overloading health services, especially those providing mental healthcare [40]. The high percentage of individuals with suicide risk in these studies thus has evident practical connotations, with the need to expand and qualify prevention strategies, mainly among youth, women, and socioeconomically vulnerable persons [41].

It was noteworthy that socioeconomic status did not appear to be clearly associated with prevalence of social phobia, which was higher in adolescents and relatively lower in adults, suggesting that this event peaks in adolescence. In Pelotas, prevalence at 18 and 22 years of age in the 1993 cohort, in which the data were collected outside the participants' homes, was slightly higher than in a population-based study in the same city that found 4% prevalence in youth 18 to 24 years of age, using home interviews [36]. Among other possibilities, the discrepancy between the two studies could stem from methodological differences in the data collection.

Although social phobia can involve significant chronic psychosocial impairment and is among the most prevalent mental disorders in the general population, little is known about its life-course distribution and risk factors [42,43,44]. Few studies have assessed its magnitude and associated factors in Brazil, generally limited to specific vulnerable groups such as university students, in whom its prevalence appears to be even higher, and with more evident harm in women [44].

The low prevalence of GAD among adolescents in São Luís (3.5%) was surprising, especially when compared to adolescents in Pelotas, where it was nearly three times higher. Possible explanations for this discrepancy include cultural and regional differences in understanding the terms employed

to characterize the symptoms listed in the MINI, besides a potential information bias. Although low prevalence rates are not rare in adolescents [45,46], in the general population the prevalence of anxiety disorders in the previous 12 months is nearly 10% [47], similar to prevalence in the other two cities in this study, except at 22 years of age in Pelotas, where prevalence was 16.5%. Importantly, GAD estimated by MINI refers to the previous six months rather than to 12 months prior to the interview or even lifetime estimates, which are the time frames used in studies on GAD.

Beyond the inequalities in the prevalence of GAD, its co-occurrence with other mental disorders is not uncommon, especially with depression [48,49,50]. The co-occurrence of GAD and depression tends to be associated with greater severity of the conditions, as well as lower response or treatment dropout and additional risk of suicide [50,51].

In general, mental disorders assessed in this study showed considerably higher prevalence in women, across the three study sites and different age brackets, corroborating other studies showing differences between males and females in the occurrence of these mental disorders (higher in women) [34,52]. Women's greater susceptibility to depression and anxiety is still poorly understood, although frequently related to cultural and social determinants, as well as to neuroendocrine factors, especially the influence of sex hormones and their fluctuations [53,54]. It is also possible that part of the excess in mental disorders among women in Brazil is explained by issues related to gender violence, whether or not perpetrated by the intimate partner. Recent studies in the states of São Paulo and Rio Grande do Sul have called attention to the high risk of violence against women, especially femicide [55,56]. In addition, the World Health Organization not only acknowledges violence against women as a public health problem with epidemic proportions, but also points to its consequences for mental disorders such as depression and anxiety, for example [57].

As for socioeconomic determinants, our results agree with those of other longitudinal studies that also point to educational levels and income as important determinants of adults' mental health [58,59,60,61,62], especially in low and middle-income countries [63]. These findings underline the need to improve these two components of socioeconomic status, which are associated mainly with suicide risk. It is also necessary to reduce inequities in access to mental health services [64], as observed in other countries.

One of this study's strength was its large sample size, with more than 12 thousand individuals, as well as the comprehensive description of prevalence rates for mental disorders in birth cohorts from different regions of Brazil and in different stages of the life cycle. Besides, the five mental disorders were estimated with a similar instrument, allowing subsequent prospective analyses. However, the interpretation of this study's results should take some limitations into account, such as non-standardization of the interviewers for data collection on mental disorders in the three cites, possibly leading to a measurement bias. Prevalence rates for mental disorders among adults from Pelotas and Ribeirão Preto may not have been directly or easily comparable, due to the time lapse of approximately eight years between the ages at follow-up. It is also impossible to rule out cultural/regional differences in the symptoms' description (individual's subjective report) and interpretation (by the interviewer), which could explain part of the observed differences in the estimates of mental disorders between the three sites.

Finally, the high prevalence of mental disorders underlines the need for more investment to deal with the problem in Brazil, especially in primary care [65,66], providing access for users in different life stages and with specialized support for priority groups such as women with postpartum depression or victims of gender violence, as well as programs for suicide prevention among youth and adolescents [67]. The expansion and qualification of mental health services [68] not only reduces the burden of mental disorders on individuals, families, and the community, but also helps reduce avoidable expenditures in the health sector and prevent workforce losses [67,68,69,70,71].

Contributors

J. D. Y. Orellana participated in the conceptualization, interpretation, and final draft of the manuscript. M. R. C. Ribeiro, M. A. Barbieri, M. C. Saraiva, V. C. Cardoso, H. Bettiol, A. A. M. Silva, F. C. Barros, H. Gonçalves and F. C. Wehrmeister participated in the interpretation and critical revision of the manuscript. A. M. B. Menezes and C. M. Del-Ben participated in the conceptualization, interpretation, and critical revision of the manuscript. B. L. participated in the conceptualization, interpretation, and final draft of the manuscript, as well as the critical revision.

Additional informations

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Acknowledgments

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Resumo

Embora se reconheça que depressão e ansiedade resultem em incapacidades, bem como em prejuízos laborais e para os sistemas de saúde, pesquisas de base populacional são escassas no Brasil. Este estudo avaliou a prevalência de transtornos mentais em adolescentes, jovens e adultos e sua relação com características sociodemográficas em cinco coortes de nascimento (RPS): Ribeirão Preto (São Paulo), Pelotas (Rio Grande do Sul) e São Luís (Maranhão), Brasil. Episódio depressivo, risco de suicídio, fobia social e transtorno de ansiedade generalizada foram avaliados usando-se o Mini International Neuropsychiatric Interview. *Intervalos de confiança* bootstrap *foram estimados e prevalências estratificadas por sexo e nível socioeconômico no programa R. Foram incluídos 12.350 participantes das coortes. Episódio depressivo maior atual foi mais prevalente em adolescentes de São Luís (15,8%; IC95%: 14,8-16,8) e nos adultos de Ribeirão Preto (12,9%; IC95%: 12,0-13,9). As maiores prevalências para risco de suicídio ocorreram nos adultos de Ribeirão Preto (13,7%; IC95%:12,7-14,7), fobia social e ansiedade generalizada nos jovens de Pelotas com 7% (IC95%: 6,3-7,7) e 16,5% (IC95%: 15,4-17,5), respectivamente. As menores prevalências de risco de suicídio ocorreram nos jovens de Pelotas (8,8%; IC95%: 8,0-9,6), fobia social nos jovens de Ribeirão Preto (1,8%; IC95%: 1,5-2,2) e ansiedade generalizada nos adolescentes de São Luís (3,5%; IC95%: 3,0-4,0). Em geral, os transtornos mentais foram mais prevalentes nas mulheres e naqueles com menor nível socioeconômico, independentemente do centro e idade, reforçando a necessidade de maior investimento em saúde mental no Brasil, sem desconsiderar determinantes de gênero e socioeconômicos.*

Transtornos Mentais; Estudos de Coortes; Fatores Socioeconômicos; Gênero e Saúde; Estágios do Ciclo de Vida

Resumen

A pesar de que se reconozca que la depresión y ansiedad provoquen incapacidades, así como perjuicios laborales y problemas para los sistemas de salud, las investigaciones de base poblacional son escasas en Brasil. Este estudio evaluó la prevalencia de trastornos mentales en adolescentes, jóvenes y adultos, y su relación con características sociodemográficas en cinco cohortes de nacimiento (RPS), en Ribeirão Preto (São Paulo), Pelotas (Rio Grande do Sul) y São Luís (Maranhão), Brasil. Episodio depresivo, riesgo de suicidio, fobia social y trastorno de ansiedad generalizada se evaluaron usando el Mini International Neuropsychiatric Interview. *Se estimaron los intervalos de confianza* bootstrap *y las prevalencias fueron estratificadas por sexo y nivel socioeconómico en el programa R. Se incluyeron a 12.350 participantes de las cohortes. Un episodio actual depresivo mayor fue más prevalente en adolescentes de São Luís (15,8%; IC95%: 14,8-16,8) y en adultos de Ribeirão Preto (12,9%; IC95%: 12,0-13,9). Las mayores prevalencias para el riesgo de suicidio se produjeron en los adultos de Ribeirão Preto (13,7%; IC95%:12,7-14,7), fobia social y ansiedad generalizada en los jóvenes de Pelotas con 7% (IC95%: 6,3-7,7) y 16,5% (IC95%: 15,4-17,5), respectivamente. Las menores prevalencias de riesgo de suicidio se produjeron en los jóvenes de Pelotas (8,8%; IC95%: 8,0-9,6), fobia social en los jóvenes de Ribeirão Preto (1,8%; IC95%: 1,5-2,2) y ansiedad generalizada en los adolescentes de São Luís (3,5%; IC95%: 3,0-4,0). En general, los trastornos mentales fueron más prevalentes en las mujeres y en aquellos con menor nivel socioeconómico, independientemente del centro y edad, reforzando la necesidad de una mayor inversión en salud mental en Brasil, sin desconsiderar determinantes de género y socioeconómicos.*

Trastornos Mentales; Estudios de Cohortes; Factores Socioeconómicos; Género y Salud; Estadios del Ciclo de Vida