Journal of Affective Disorders 296 (2022) 291–297

Contents lists available at ScienceDirect

Journal of Affective Disorders

journal homepage: www.elsevier.com/locate/jad

Research paper

Trends in depression incidence in China, 1990–2019

Ruhai Bai [a,#], Wanyue Dong [b,#], Qiao Peng [c], Zhenggang Bai [a,*]

[a] Evidence-Based Research Center of Social Science & Health, Public Affair School of Nanjing University of Science & Technology, Nanjing 210000, China
[b] School of Health Economics and Management, Nanjing Chinese Medicine University, Nanjing 210000, China
[c] Health Science Center, Xi'an Jiaotong University, Xi'an, Shaanxi, China

ARTICLE INFO

Keywords:
Age–period–cohort analysis
Depression
Elderly
Aging

ABSTRACT

Background: Depression is one of the most widespread health burdens for the general population in China. This study aims to assess the long-term trends of depression incidence in China between 1990 and 2019.
Methods: The incidence data were drawn from the Global Burden of Disease Study 2019, and an age–period–cohort model was used in the analysis.
Results: The net drift was -0.66% (95% CI: -0.79% to -0.53%) per year for both genders. For males, the local drift was lower than 0 ($P<0.05$) in those aged 10-54 years, and higher than 0 ($P<0.05$) in those aged 60–69 years. For females, the local drift was lower than 0 ($P<0.05$) in those aged 10–49 years and higher than 0 ($P<0.05$) in those aged 55-84 years. Females had a higher risk of depression incidence than males. Compared with the 1990-1994 period, the relative risk (RR) of depression incidence in 2015–2019 decreased by 12.2% in males and 12.3% in females, and compared to the 1903–1907 birth cohort, the cohort RRs in the 2008–2012 birth cohort decreased by 42.1% in males and 34.5% in females. Period and cohort RRs all showed an increased tendency in recent periods and birth cohorts.
Limitations: These data are macrolevel estimates at the national level, may have ecological fallacies.
Conclusions: Although the age-standard incidence of depression has declined in China as a whole in the last three decades, the incidence of depression among older individuals has increased. More efforts are needed to promote the mental health of elderly individuals in China.

1. Introduction

Depression is one of the most widespread diseases affecting human physical and mental health (Andrews, 2005). The main symptoms of depression include low mood, lack of interest in ordinary life, insomnia, and inability to enjoy life (Cui, 2015). Additionally, the risk of death in patients with depression will also increase (Yu et al., 2016).

Globally, 350 million people suffer from depression per year, and this condition has been ongoing for several years (Smith, 2014). In the past 30 years, depression has been one of the three top causes of nonfatal health losses (GBD 2017 DALYs and HALE Collaborators, 2018; Ren et al., 2020), and it is expected that depression will become the top cause of the global burden of disease in 2030 (Malhi and Mann, 2018). In China, the world's most populous country, the current situation of depression is not optimistic. It is estimated that the prevalence of depression in China rose from 3224.6/100,000 to 3990.5/100,000 from 1990 to 2017 (Ren et al., 2020). In 2017, there were 56.36 million depression patients in China, accounting for 21.3% of the global cases. The disability-adjusted lifespan caused by depression has reached 8.577 million years, which means that depression has gradually become an important public health problem affecting the Chinese population (Ren et al., 2020).

Previous studies have shown the prevalence trend of depression in China over time (Ren et al., 2020). However, few studies have explored the changes in the incidence of depression among different age groups in China, and the potential effects of age, period, and cohort are still unknown. To address these limitations, this study aims to explore the long-term trend of the incidence of depression in China and to explore the impact of age, period, and cohort effect on the incidence of depression by gender in China by using the age-period-cohort (APC) framework and data from the Global Burden of Disease Study 2019 (GBD 2019). The results are essential supplements to the existing research on the burden of depression in China and provide a scientific basis for evidence-based public health policies and the optimal allocation of

* Corresponding author.
E-mail address: baizhenggang@126.com (Z. Bai).
# Ruhai Bai and Wanyue Dong have equal contributions to this work.

https://doi.org/10.1016/j.jad.2021.09.084
Received 2 February 2021; Received in revised form 28 August 2021; Accepted 26 September 2021
Available online 1 October 2021

health resources.

2. Methods

2.1. Data sources

Data were drawn from the GBD 2019 database. The data provide internally consistent estimates of age- and sex-specific incidence, prevalence, and years lived with disability for 369 diseases and injuries for 204 countries and territories globally, regionally, and nationally from 1990 to 2019 (GBD 2019 Diseases and Injuries Collaborators, 2020). In the GBD 2019, Chinese data come from national censuses, disease surveillance point systems, death cause registration report information systems, demographic surveys, and systematically reviewed the published literature (Xu et al., 2020). The GBD world population was used to age-standardize the incidence of depression (GBD 2019 Diseases and Injuries Collaborators, 2020; Xu et al., 2020).

In this study, depression was divided into two categories according to the Diagnostic and Statistical Manual of Mental Disorders (DSM) or the equivalent diagnosis of recurrent depression in the International Classification of Diseases (ICD), namely, major depressive disorder (DSM-IV-TR: 296.21-24, 296.31-34; ICD-10: F32.0-9, F33.0-9) and dysthymia (DSM-IV-TR: 300.4, ICD-10: F34.) (GBD 2019 Diseases and Injuries Collaborators, 2020). A major depressive disorder is a type of episodic mood disorder that involves the experience of one or more major depressive episodes. Dysthymia is a type of mood disorder caused by chronic depression, in which symptoms are milder than major depressive disorder but last longer (Ren et al., 2020).

2.2. Data analysis

The study used the APC model to assess the incidence trend of depression in China and evaluate the effects of age, period, and cohort on the incidence of depression. In the APC model, the age effect represents the different risks among different age groups. The period effect represents the changes in the incidence, which affects all age groups over time. The cohort effect represents the different risks among different birth cohorts. Then, the following parameters were estimated. Net drift represents the overall change in annual percentage. Local drifts represent the change in annual percentage for each age group. The longitudinal age curve represents the fitted longitudinal age-specific rates in the reference cohort after bias adjustment. Period relative risk (cohort RR) is the relative risk of a period (cohort) concerning a reference period (cohort) after adjusting the effects of age and nonlinear cohort (period). In this study, considering the prevalence rate of depression in females was significantly higher than that of males in China (Ren et al., 2020), we used the APC model on the incidence of depression in different genders.

The depression incidence of China from 1990 to 2019 was included in the analysis. The incidence data were arranged into consecutive 5-year periods from 1990–1994 (median 1992) to 2015–2019 (median 2017). Successive 5-year age intervals from 5 to 9 years to 85 to 89 years were analyzed. Twenty-two consecutive cohorts were divided, including those born from 1903–1907 (median 1905) to 2008–2012 (median 2010). Estimable parameters were estimated by the American National Cancer Institute APC web tool (Biostatistics Branch, National Cancer Institute, Bethesda, MD, USA) (Rosenberg et al., 2014). By default, the tool uses the median age and period range as reference points for calculations. In this study, the central age group (45-49), period (2000 to 2004), and birth cohort (cohort 1953-1957) was defined as the reference. Wald's chi-square test was used to assess the significance of the estimable functions. All statistical tests were 2-sided. Only p-values less than 0.05 were considered statistically significant.

3. Results

3.1. Trends of the incidence rates for depression by sex for the period of 1990 to 2019

Fig. 1 shows the trend of crude incidence rate and age-standardized incidence rate of depression by sex from 1990 to 2019. The crude incidence increased from 2644.6/100,000 in 1990 to 2882.9/100,000 in 2019 for both genders. (increased by 9.0%). The crude incidence of depression in males increased from 1794.1/100,000 in 1990 to 2069.0/100,000 in 2019, the crude incidence of depression in females rose from 3549.5/100,000 in 1990 to 3728.7/100,000 in 2019. The crude rate of depression in males increased by 15.3%, and that in females increased by 5.0% from 1990 to 2019. The age-standardized incidence of depression decreased from 2647.7/100,000 in 1990 to 2301.4/100,000 in 2019 for both genders (decreased by 13.1%). The age-standardized incidence of depression in males dropped from 1831.4/100,000 in 1990 to 1688.8/100,000 in 2019, and the age-standardized incidence of depression in females dropped from 3500.4/100,000 in 1990 to 2922.1/100,000 in 2019. The age-standardized rate of depression in males decreased by 7.8%, and that in females decreased by 16.5% from 1990 to 2019.

3.2. Local drift with net drift values for depression incidence in China

Fig. 2 shows the overall annual percentage change of depression and the annual percentage changes of depression in each age group. The results showed that the net drift for both genders was -0.66% (95% CI: -0.79% to -0.53%), for males was -0.72% (95% CI: -0.84% to -0.60%), and for females was -0.64% (95% CI, -0.78% to -0.50%). For both genders, the local drifts were lower than 0 (significantly with $P<0.05$) in the age group from 10 to 50 years, and higher than 0 (significantly with $P<0.05$) in the age group from 55 to 84 years. For males, the local drifts were lower than 0 (significantly with $P<0.05$) in the age group from 10 to 54 years in men and higher than 0 (significantly with $P<0.05$) in the age group from 60 to 79 years old. For females, local drift was lower than 0 (significantly with $P<0.05$) in the age group from 10 to 49 years old but higher than 0 (significantly with $P<0.05$) in the age group from 55 to 84 years old.

3.3. Longitudinal age curves of depression incidence by gender in China

Fig. 3 shows the longitudinal age curve of the incidence of depression by gender. In the same birth cohort, the incidence of depression in males and females showed an N-shape with aging, a rapid increase after five years old, a decline after 25 years old, and an increase after 35 years for both genders, 30 years for females and 40 years for males. It should be noted that between 5 and 89 years old, the incidences of depression in females were higher than those in males in any age group (significantly with $P<0.05$).

3.4. Period relative risks of depression incidence rate by gender in China

Using the specific results of Wald tests, we found statistically significant period effects for both sexes ($P<0.05$ for all). Fig. 4 shows the estimated period RRs by gender. For both genders and females, the period effect showed V-shaped polylines for incidence, which decreased from 1990-1994 to 2005-2009 and subsequently increased from 2005-2009 to 2015-2019. For males, the period effect showed N-shaped polylines for incidence, which increased from 1990–1994 to 1995–1999, subsequently decreased from 1995–1999 to 2010–2014, and then increased to 2015–2019. From 1990–1994 to 2015–2019, the risk of incidence decreased by 12.2% and 12.3% in men and women, respectively.

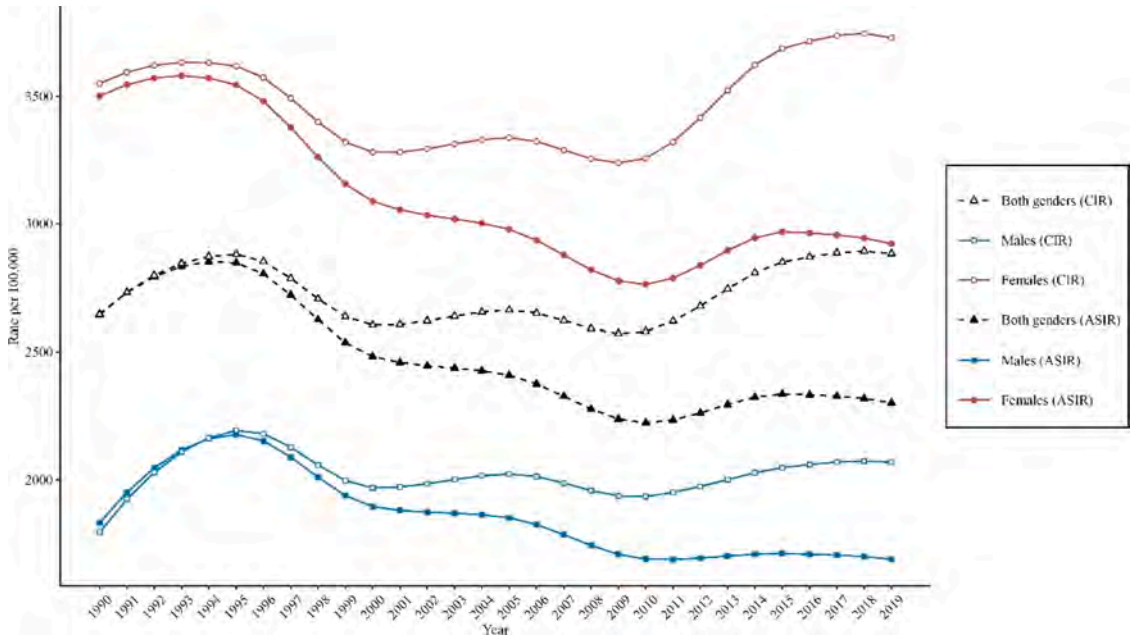

Fig. 1. Trends of the age-standardized incidence rates (ASIR) and the crude incidence rates (CIR) per 100,000 populations for depression by sex in China, 1990 to 2019.
The Global Burden of Disease Study 2019 (GBD 2019) global age-standard population was used.

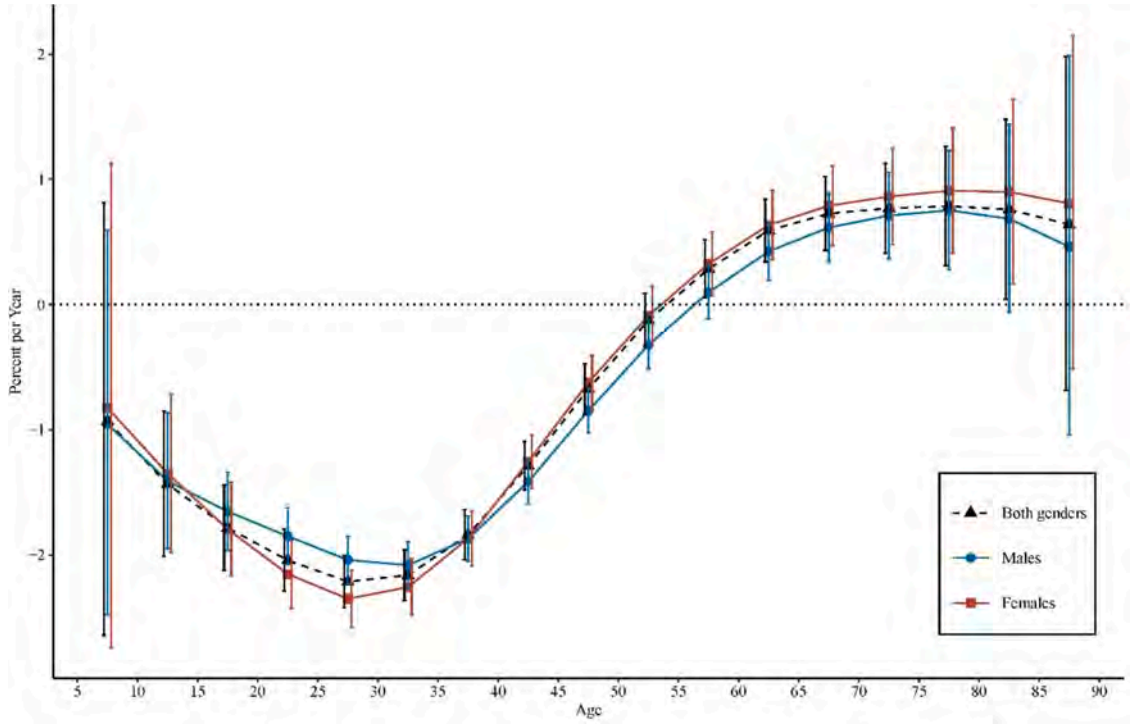

Fig. 2. Local drift with net drift values for depression incidence in China.
Age group-specific annual percent change (local drift) with the overall annual percent change (net drift) in the depression incidence rate and the corresponding 95% confidence intervals.

3.5. Cohort relative risks of depression incidence rate by gender in China

Based on the specific results of the Wald tests, cohort effects were statistically significant for both sexes ($P<0.05$ for all). Fig. 5 shows the estimated cohort RRs by gender. The cohort effect showed N-shaped polylines for incidence in females and both genders, which increased from the 1903–1907 to 1948–1952 birth cohort, subsequently decreased from 1948–1952 to 2003–2007 birth cohort, and then increased to 2008–2012 birth cohort. For males, the cohort effect showed W-shaped polylines for incidence, which decreased from 1903–1907 to 1908-1912 birth cohort, subsequently increased from 1908–1912 to 1948–1952 birth cohort, then decreased to 2003–2007 birth cohort, and then increased to 2008–2012 birth cohort. From the 1903–1907 to 2008–2012 birth cohorts, the risk of incidence decreased by 42.1% and

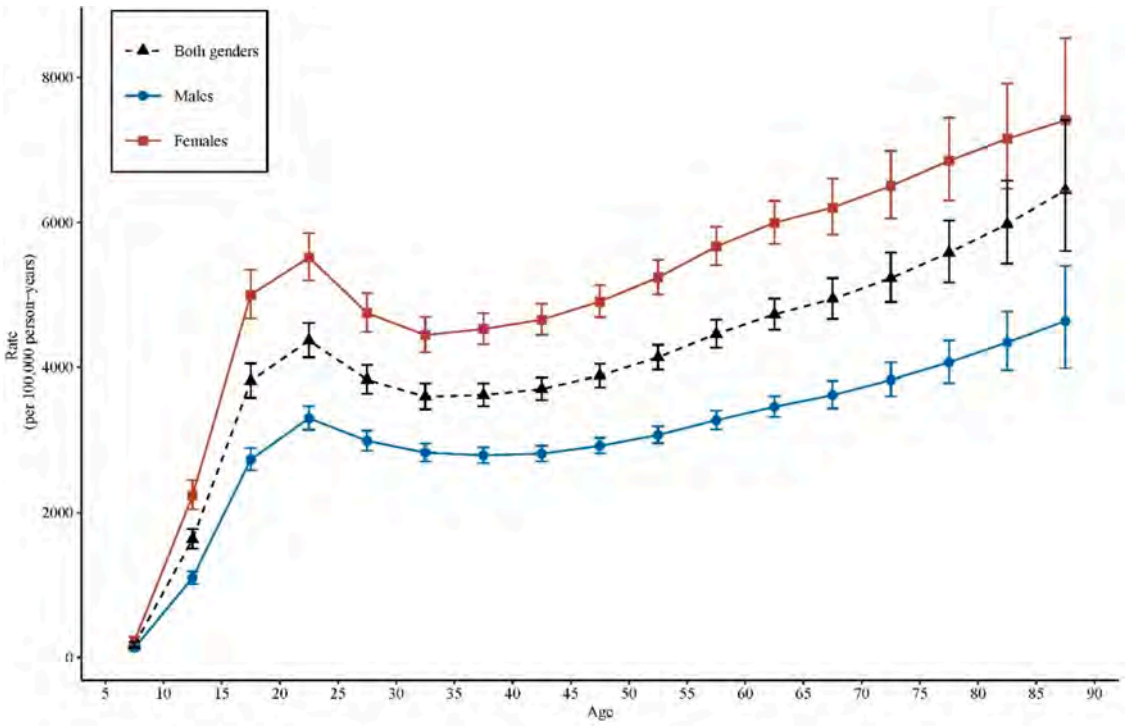

Fig. 3. Longitudinal age curves of depression incidence in China.
Fitted longitudinal age-specific rates of depression incidence (per 100,000 person-years) and the corresponding 95% confidence intervals (some of them were too narrow to show in the figure). Age group 45-49 years as the reference age.

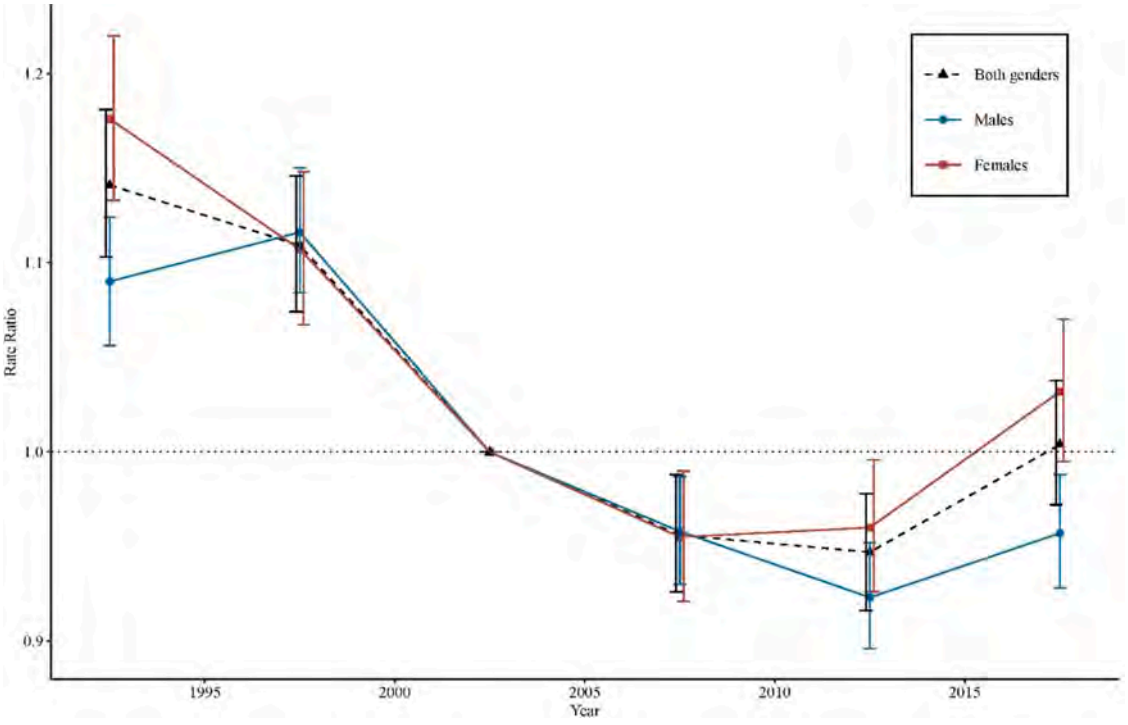

Fig. 4. Period relative risks (RRs) of depression incidence rate by sex in China.
The relative risk of each period compared with the reference period (2000 to 2004) adjusted for age and nonlinear cohort effects and the corresponding 95% confidence intervals.

34.5% in men and women, respectively.

4. Discussion

Our research uses the APC framework to explore the long-term trend of depression incidence in China from 1990 to 2019. To the best of our

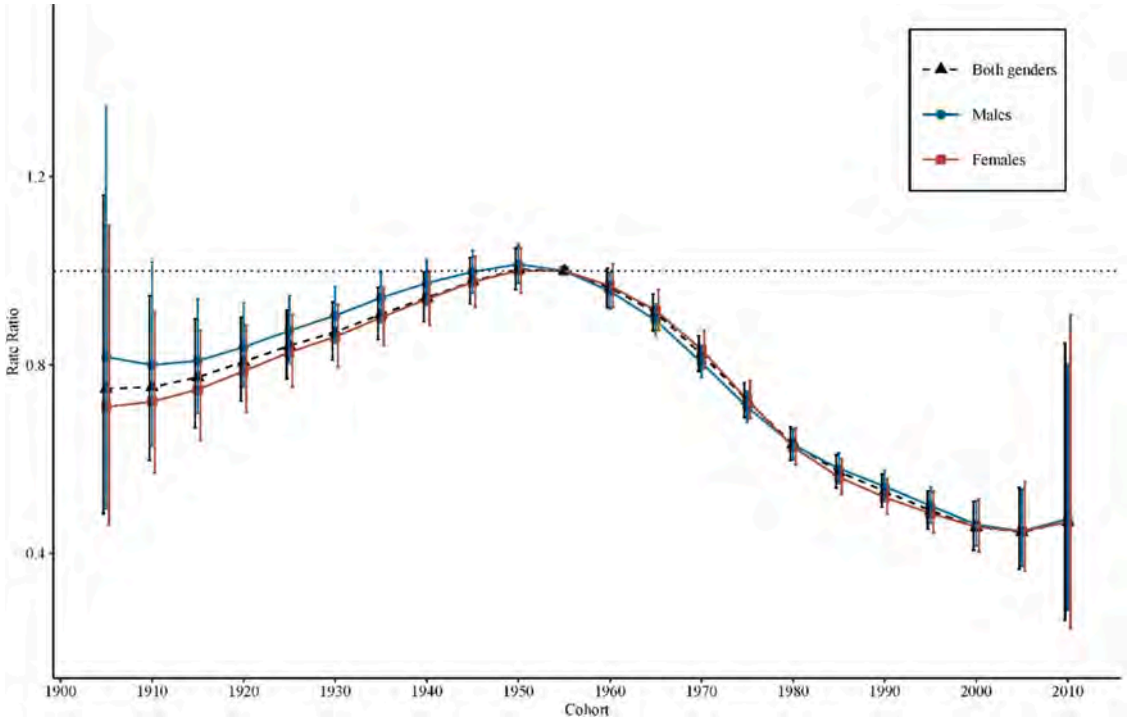

Fig. 5. Cohort relative risks (RRs) of depression incidence rate by sex in China. The relative risk of each cohort compared with the reference cohort (cohort 1953-1957) adjusted for age and nonlinear period effects and the corresponding 95% confidence intervals.

knowledge, this is the first study to use the APC model to explore the trend of depression in China. Our research showed that compared to the increased crude incidence of depression, the age-standardized incidence actually decreased in both sexes in China from 1990 to 2019. However, for each age group, the incidence of depression in the younger generation decreased, but the incidence of depression showed an increasing trend in the elderly population. Although the period and cohort effects decreased overall, the period and cohort effects all showed an unfavorable trend in the recent periods and birth cohorts.

In our study, there was a certain difference between the crude incidence and the age-standardized incidence of depression in China from 1990 to 2019, which may be related to the rapid increase in the elderly population in China (Zhou et al., 2019). Crude rates are calculated based on the population under study as a whole, which was influenced by the underlying age distribution of the population. In comparison, standardized rates are based on a standard age structure, which should not be affected by any changes in the distribution of the population by age. With the increase in life expectancy, the elderly population is gradually increasing in China. By the end of 2018, China's elderly population aged 60 and above had reached 249 million, accounting for approximately 17.9% of the total population (He et al., 2019), and it is estimated that there will be 400 million elderly people over 65 years old in China by 2050 (Fang et al., 2015). Additionally, depression is common among elderly individuals in China (Zeng, 2012); more than 39% of elderly individuals reported experiencing depression in China (Yu et al., 2012), and among the oldest elderly individuals, the prevalence of depression has risen to approximately 45% (Yu et al., 2012). The aging of the population and higher risk in olders all leads to an increase in the overall number of patients, and contributes to higher CIR.

Although in this study, the age-standardized incidence of depression is generally declining for both sexes, considering the rapidly increasing elderly population and the reality of serious depression problems among this age group, depression may have a huge impact on the Chinese health system. It should be noted that contrary to the decrease in the incidence of depression in young generations, the incidence of depression in elderly individuals showed an increase from 1990 to 2019. Depression among elderly individuals usually leads to more serious consequences. For example, depression may increase the risk of death in patients with cardiovascular and cerebrovascular diseases, and depression is also an important risk factor for Alzheimer's disease and stroke in the elderly (Ren et al., 2020; Yu et al., 2012). Our results suggest that more attention should be paid to the physical and mental health of Chinese elderly individuals, where relevant policies should be formulated and preventive measures should be taken.

Age is an important risk factor in a series of demographic factors that affect the incidence of depression. Depression can occur at all ages throughout the life cycle due to genetic, biological, environmental, and psychological factors (Mirowsky and Ross, 1992). The results show that in the same birth cohort, the incidence of depression exhibits an "N"-shape with aging after correcting the period deviation, which is consistent with the results of previous studies (Mirowsky and Ross, 1992; Wight et al., 2004). The high incidence of depression in adolescence may be related to the emotional difficulties encountered during adolescence (Wight et al., 2004), and the increase in the incidence of depression in the elderly may be related to the decline of physical function and the loss of social status (Mirowsky and Ross, 1992). It is worth noting that our research shows that the incidence of depression in females is higher than that in males in most age groups, which is consistent with previous research (Wight et al., 2004). These gender differences in depression can be interpreted by different theories. Sociological theory emphasizes that poverty, violence, and gender inequality are factors that lead to gender differences in depression (Salk et al., 2017). Social structure theory believes that the division of labor between different genders leads to gender differences in depression (Salk et al., 2017).

In this study, period and cohort effects were all statistically significant, connoting the changes in disease incidence across time periods and birth cohorts. The period effect reflects the immediate impact of social factors on the incidence of disease (Yang et al., 2018), and the cohort effects reflect changes in disease risk in a particular birth cohort (Yang et al., 2018). Under certain restrictions, period effect and cohort effect can be estimated as period RR and cohort RR, respectively. Yet, it is not

easy to interpret them separately in real settings, because when the period effect affects all age groups at the same time, it often affects a certain age group more or less, which leads to a cohort effect to a certain extent (Huang et al., 2021). The cohort effect reflects various risks in different birth cohorts, but in reality, different cohorts were born in different periods, thus, inevitably have a confounding impact on the period effect to some extent (Wang et al., 2017). Therefore, we comprehensibly analyzed the reasons for the period effect and cohort effect trends during this period. The results show that both period effect and cohort effects showed an overall decreasing trend. This may be related to one or more of China's achievements in mental health.

Since the 1950s, China has developed various mental health treatment models in different regions to solve the problem of managing patients with severe mental illness (Ma, 2012). With the gradual promotion, China's mental health-related departments have signed a series of plans and set a series of detailed goals. In 2004, the Chinese government included mental health in the scope of public health services (Liu et al., 2011), and then, the mental health reform plan was funded by the Ministry of Finance (Ma, 2012). The government's continued attention and investment partially explained the continued decline in the period and cohort effects as the period and the birth queue moved forward. Although the period and cohort effects decreased overall in both men and women, the burden of risk factors of depression is increasing (Ren et al., 2020). Social stress is one of the risk factors for depression (Smith, 2014). China's economy has been booming in the recent four decades, which increases competition in all walks, and increases social stress (Ren et al., 2020). China has witnessed rapid changes in socio-cultural structures, and individualistic values prevail, which increased the prevalence of depression in China to some extent (Sun and Ryder, 2016). China is undergoing rapid urbanization, resulting in mass migration from rural areas to cities. Previous studies have revealed that psychological pressure among the migrant population is higher than the non-migrant population (Chen, 2011; Li and Rose, 2017). Besides, China's non-communicable diseases prevalence is accelerating (Min et al., 2015), and many non-communicable diseases are risk factors for depression(Campbell Burton et al., 2013; Semenkovich et al., 2015; Sotelo et al., 2014). Family dysfunction is also one factor that cannot be ignored for depression (Peng et al., 2021), the number of divorces in China over the past two decades has risen dramatically (Zheng et al., 2019). In addition, more willingness among patients to acknowledge symptoms, previously, many were more likely to conceal their symptoms due to social stigmas (Huang et al., 2019). These may all have an impact on the incidence of depression to a certain extent. In this study, the period and cohort effects all showed an unfavorable trend in the recent periods and birth cohorts. This evidence may provide a warning call for more attention to depression and avoid the reverse of the decreasing trend of depression incidence in China.

This study was subject to some limitations. First, the completeness and accuracy of the data on depression may lead to some bias. Although the GBD 2019 has carried out many corrections and adjustment steps to enhance data comparability, including incompleteness, underreporting, and misclassification corrections (Kassebaum et al., 2014), as well as the redistribution of the garbage codes, it is still difficult to completely avoid bias (Mortality and Causes of Death, 2015). However, it is fair to say that the bias in this study has been reduced to a certain extent compared with the study that used the original data without taking those correction and adjustment steps (Cao et al., 2019). Second, as with other studies using the APC model, our research may have ecological fallacies. This limitation is inevitable because the interpretation of the results at the population level may not be applicable at the individual level, so the relevant hypotheses proposed in our study need to be further confirmed in future individual-based studies.

In conclusion, our research shows that although the age-standardized incidence of depression in both genders showed a decline for the last 30 years in China, the crude incidence of depression increased, and the period and cohort effects all showed an unfavorable trend in the recent periods and birth cohorts. In addition, the incidence of depression among older individuals increased from 1990 to 2019. Taking into account the high incidence of depression in the elderly population and the aging of China's population (Fang et al., 2015; Flaherty et al., 2007), it is necessary to pay attention to depression in the elderly population in China, and some policies need to be formulated to promote the mental health of the elderly population.

Contributors

Ruhai Bai initially conceived the research idea, designed the study, performed data collection, management, and analysis, and provided administrative support. Ruhai Bai and Qiao peng drafted the original manuscript. Wanyue Dong and Zhenggang Bai critically revised the manuscript. All co-authors have read and approved the final manuscript.

Funding

This work was financially supported by the MOE (Ministry of Education in China) Project of Humanities and Social Sciences (No. 19YJCZH001).

Declaration of Competing Interest

We declare no competing interests.

Acknowledgements

We are grateful to individuals who participated in the study.

References

Andrews, G., 2005. Lifetime risk of depression: restricted to a minority or waiting for most? Br J Psychiatry 187, 495–496.
Burton, Campbell, Murray, C.A., Holmes, J., Astin, J., Greenwood, F., Knapp, D., 2013. Frequency of anxiety after stroke: a systematic review and meta-analysis of observational studies. Int J Stroke 8, 545–559.
Cao, J., Eshak, E.S., Liu, K., Gero, K., Liu, Z., Yu, C., 2019. Age-period-cohort analysis of stroke mortality attributable to high sodium intake in China and Japan. Stroke 50, 1648–1654.
Chen, J., 2011. Internal migration and health: re-examining the healthy migrant phenomenon in China. Soc Sci Med 72, 1294–1301.
Cui, R., 2015. Editorial: a Systematic Review of Depression. Current neuropharmacology 13, 480.
Fang, E.F., Scheibye-Knudsen, M., Jahn, H.J., Li, J., Ling, L., Guo, H., Zhu, X., Preedy, V., Lu, H., Bohr, V.A., Chan, W.Y., Liu, Y., Ng, T.B., 2015. A research agenda for aging in China in the 21st century. Ageing Res Rev 24, 197–205.
Flaherty, J.H., Liu, M.L., Ding, L., Dong, B., Ding, Q., Li, X., Xiao, S., 2007. China: the aging giant. J Am Geriatr Soc 55, 1295–1300.
GBD 2017 DALYs and HALE Collaborators, 2018. Global, regional, and national disability-adjusted life-years (DALYs) for 359 diseases and injuries and healthy life expectancy (HALE) for 195 countries and territories, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet 392, 1859–1922.
GBD 2019 Diseases and Injuries Collaborators, 2020. Global burden of 369 diseases and injuries in 204 countries and territories, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019. Lancet 396, 1204–1222.
He, X., Song, M., Qu, J., Guo, Y., Cao, H., Sun, R., Liu, G.-H., Shen, Y., Major Program Expert, G., 2019. Basic and translational aging research in China: present and future. Protein Cell 10, 476–484.
Huang, H., Li, M., Fan, H., Bai, R., 2021. Temporal trend of urolithiasis incidence in China: an age-period-cohort analysis. International journal of general medicine 14, 2533–2539.
Huang, Y., Wang, Y., Wang, H., Liu, Z., Yu, X., Yan, J., Yu, Y., Kou, C., Xu, X., Lu, J., Wang, Z., He, S., Xu, Y., He, Y., Li, T., Guo, W., Tian, H., Xu, G., Xu, X., Ma, Y., Wang, L., Wang, L., Yan, Y., Wang, B., Xiao, S., Zhou, L., Li, L., Tan, L., Zhang, T., Ma, C., Li, Q., Ding, H., Geng, H., Jia, F., Shi, J., Wang, S., Zhang, N., Du, X., Du, X., Wu, Y., 2019. Prevalence of mental disorders in China: a cross-sectional epidemiological study. Lancet Psychiatry 6, 211–224.
Kassebaum, N.J., Lopez, A.D., Murray, C.J., Lozano, R., 2014. A comparison of maternal mortality estimates from GBD 2013 and WHO. Lancet 384, 2209–2210.
Li, J., Rose, N., 2017. Urban social exclusion and mental health of China's rural-urban migrants - a review and call for research. Health Place 48, 20–30.
Liu, J., Ma, H., He, Y.L., Xie, B., Xu, Y.F., Tang, H.Y., Li, M., Hao, W., Wang, X.D., Zhang, M.Y., Ng, C.H., Goding, M., Fraser, J., Herrman, H., Chiu, H.F., Chan, S.S., Chiu, E., Yu, X., 2011. Mental health system in China: history, recent service reform and future challenges. World Psychiatry 10, 210–216.

Ma, H., 2012. Integration of hospital and community services –the '686 Project'–is a crucial component in the reform of China's mental health services. Shanghai Archives of Psychiatry 24, 172–174.
Malhi, G.S., Mann, J.J., 2018. Depression. Lancet 392, 2299–2312.
Min, Y., Jiang, L.-X., Yan, L.-J.L., Wang, L.-H., Basu, S., Wu, Y.-F., Stafford, R.S., 2015. Tackling China's noncommunicable diseases: shared origins, costly consequences and the need for action. Chin Med J (Engl) 128, 839–843.
Mirowsky, J., Ross, C.E., 1992. Age and depression. J Health Soc Behav 33, 187–205 discussion 206-112.
Mortality, G.B.D., Causes of Death, C., 2015. Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. Lancet 385, 117–171.
Peng, L., Yang, L.S., Yam, P., Lam, C.S., Chan, A.S., Li, C.K., Cheung, Y.T., 2021. Neurocognitive and behavioral outcomes of Chinese survivors of childhood lymphoblastic leukemia. Front Oncol 11, 655669.
Ren, X., Yu, S., Dong, W., Yin, P., Xu, X., Zhou, M., 2020. Burden of depression in China, 1990-2017: Findings from the global burden of disease study 2017. J Affect Disord 268, 95–101.
Rosenberg, P.S., Check, D.P., Anderson, W.F., 2014. A web tool for age-period-cohort analysis of cancer incidence and mortality rates. Cancer Epidemiol Biomarkers Prev 23, 2296–2302.
Salk, R.H., Hyde, J.S., Abramson, L.Y., 2017. Gender differences in depression in representative national samples: meta-analyses of diagnoses and symptoms. Psychol Bull 143, 783–822.
Semenkovich, K., Brown, M.E., Svrakic, D.M., Lustman, P.J., 2015. Depression in type 2 diabetes mellitus: prevalence, impact, and treatment. Drugs 75, 577–587.
Smith, K., 2014. Mental health: a world of depression. Nature 515, 181.
Sotelo, J.L., Musselman, D., Nemeroff, C., 2014. The biology of depression in cancer and the relationship between depression and cancer progression. Int Rev Psychiatry 26, 16–30.
Sun, J., Ryder, A.G., 2016. The chinese experience of rapid modernization: sociocultural changes, psychological consequences? Front Psychol 7, 477.
Wang, Z., Hu, S., Sang, S., Luo, L., Yu, C., 2017. Age-period-cohort analysis of stroke mortality in China: data from the Global Burden of Disease Study 2013. Stroke 48, 271–275.
Wight, R.G., Sepulveda, J.E., Aneshensel, C.S., 2004. Depressive symptoms: how do adolescents compare with adults? J Adolesc Health 34, 314–323.
Xu, T., Wang, B., Liu, H., Wang, H., Yin, P., Dong, W., Li, J., Wang, Y.X., Yusufu, M., Briant, P., Reinig, N., Ashbaugh, C., Adelson, J., Vos, T., Bourne, R., Wang, N., Zhou, M., 2020. Prevalence and causes of vision loss in China from 1990 to 2019: findings from the Global Burden of Disease Study 2019. The Lancet Public Health 5, e682–e691.
Yang, J., Zhang, Y., Luo, L., Meng, R., Yu, C., 2018. Global mortality burden of cirrhosis and liver cancer attributable to injection drug use, 1990-2016: an age-period-cohort and spatial autocorrelation analysis. Int J Environ Res Public Health 15.
Yu, J., Li, J., Cuijpers, P., Wu, S., Wu, Z., 2012. Prevalence and correlates of depressive symptoms in Chinese older adults: a population-based study. Int J Geriatr Psychiatry 27, 305–312.
Yu, Y., Hu, M., Liu, Z.W., Liu, H.M., Yang, J.P., Zhou, L., Xiao, S.Y., 2016. Recognition of depression, anxiety, and alcohol abuse in a Chinese rural sample: a cross-sectional study. BMC Psychiatry 16, 93.
Zeng, Y., 2012. Towards Deeper Research and Better Policy for Healthy Aging –Using the Unique Data of Chinese Longitudinal Healthy Longevity Survey. China Economic J 5, 131–149.
Zheng, S., Duan, Y., Ward, M.R., 2019. The effect of broadband internet on divorce in China. Technological Forecasting and Social Change 139, 99–114.
Zhou, M., Wang, H., Zeng, X., Yin, P., Zhu, J., Chen, W., Li, X., Wang, L., Wang, L., Liu, Y., Liu, J., Zhang, M., Qi, J., Yu, S., Afshin, A., Gakidou, E., Glenn, S., Krish, V.S., Miller-Petrie, M.K., Mountjoy-Venning, W.C., Mullany, E.C., Redford, S.B., Liu, H., Naghavi, M., Hay, S.I., Wang, L., Murray, C.J.L., Liang, X., 2019. Mortality, morbidity, and risk factors in China and its provinces, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet 394, 1145–1158.