Meta-analysis of the correlation between chronic diseases and climacteric syndrome

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Abstract: **Objective:** To evaluate the correlation between chronic diseases and climacteric syndrome (MPS) by using RevMan5.3 software. **Methods:** Cross-sectional studies on the correlation between MPS and chronic diseases were searched by computer, and the references included in the studies were tracked. Two reviewers independently screened, evaluated, and extracted data. **Results:** 19 studies were included, with a total sample of 50076 patients aged 40-65 years. There was statistical difference in the prevalence of MPS between chronic and non-chronic patients. Women with chronic diseases were more likely to have climacteric syndrome [OR $_{combined}$ =1.86, OR $_{combined}$ (95%CI) = (1.74, 1.98), P < 0.001].[OR $_{combined}$ =0.27, OR $_{combined}$ (95%CI) = (0.16, 0.49), P < 0.001]. **Conclusion:** Chronic diseases are risk factors for MPS.

Keywords: Chronic diseases; Climacteric syndrome; Meta-analysis

1. Introduction

MPS refers to a series of physical and psychological symptoms caused by fluctuation or decrease of sex hormones in women before and after menopause.[1-2]About 10 million women in China enter perimenopause every year, and the incidence of MPS is as high as 60%-80%. Chronic diseases are global public health problems, including but not limited to cardiovascular diseases, cancer, etc.[3]Under the influence of aging and living environment, the incidence of chronic diseases is high and on the rise.[4-5]Previous studies suggest that women with chronic diseases are more likely to develop MPS, and some studies suggest that women with chronic diseases have a lower MPS score, which indirectly indicates that there is a certain relationship between the two. Meta-analysis on the correlation between chronic diseases and MPS is rare. This study aims to explore the relationship between the two, so as to provide scientific basis for prevention and treatment of MPS.

2. Materials and Methods

2.1 Literature retrieval

A combination of subject terms and free words was used to search CNKI, China Biomedical Literature Database, Vipu, Wanfang, PubMed, Embase, CochraneLibrary and Webofscience, and track the references included in the study without limitation of time and language. The search terms are shown in the table 1.

Table 1. Chinese and English search terms

Chinese search term	chronic disease OR chronic disease OR illness OR slow disease OR chronic patients OR menopausal syndrome OR menopausal syndrome OR menopause syndrome OR menopause syndrome OR perimenopausal syndrome OR perimenopausal syndrome OR the certificate OR the before and after menopause syndrome before and after menopause OR approved by broken all CARDS OR before and after the break OR the disease before and after menopause symptoms
English search term	Chronic Disease OR Chronic diseases OR Disease, Chronic OR Chronic Illness OR Chronic Illnesses OR Illness, Chronic OR Chronic Condition OR Chronic Conditions OR Condition, Chronic OR Chronically Ill OR Menopausal Syndrome OR Climacteric Syndrome OR Climacteric Symptoms OR Climacteric Complaint OR Climacteric Symptom OR Climacterial DisORder OR Climacterial Syndrome OR Climacterium DisORder OR Menopause Symptoms OR Menopause Syndrome OR Menopause Disorder OR Menopausal DisORder OR Menopausal Distress OR Perimenopausal Symptom OR Perimenopausal Syndrome OR Perimenopause Syndrome OR Postmenopausal Complaint OR Postmenopausal Symptom OR Postmenopausal Syndrome OR Postmenopause Syndrome

2.2 Literature screening

Inclusion criteria: ①The study design was cross-sectional study, case-control study or cohort study. ②The subjects were female patients diagnosed with climacteric syndrome. ③Chronic diseases and climacteric syndrome were studied. ④The outcome indicators were the prevalence of MPS in chronic and non-chronic patients or the odds ratio and 95% confidence interval of the correlation between MPS and chronic

disease. ⑤ The research data are complete and available. Exclusion criteria: ① Reviews, meta-analyses, case reports, animal tests, conference papers. ② Low-quality literature, repeated publication literature. ③ Literature without clear data source and study period. ④ Documents with obvious errors or retracted data.

2.3 Data extraction and quality evaluation

Two evaluators independently extract data and evaluate literature. In case of disagreement, the two sides discuss and resolve it. If no agreement can be reached, the third researcher makes a ruling. Extracted information includes title, author, year, source, study type, study time, study location, assessment tool, sample size, age, and outcome data, etc. The quality of the cross-sectional study was evaluated using the list recommended by the U.S. Agency for Healthcare Research and Quality.[6]

2.4 Statistical analysis

Analysis was performed using RevMan5.4 software with effect sizes of OR and 95%CI. The χ^2 test (α=0.1) and I² were used to assess heterogeneity. If I²≤50% indicates acceptable heterogeneity, the fixed effect model is selected. If I² > 50% indicates large heterogeneity, the random effects model is selected. Sensitivity analysis was used to determine the source of heterogeneity and the stability of results.

3. Results and Discussion

3.1 Results

A total of 3014 articles were retrieved and 19 were included.[7-25] The screening flow chart is shown in Figure 1. The basic characteristics and quality of the included documents are shown in Table 2.
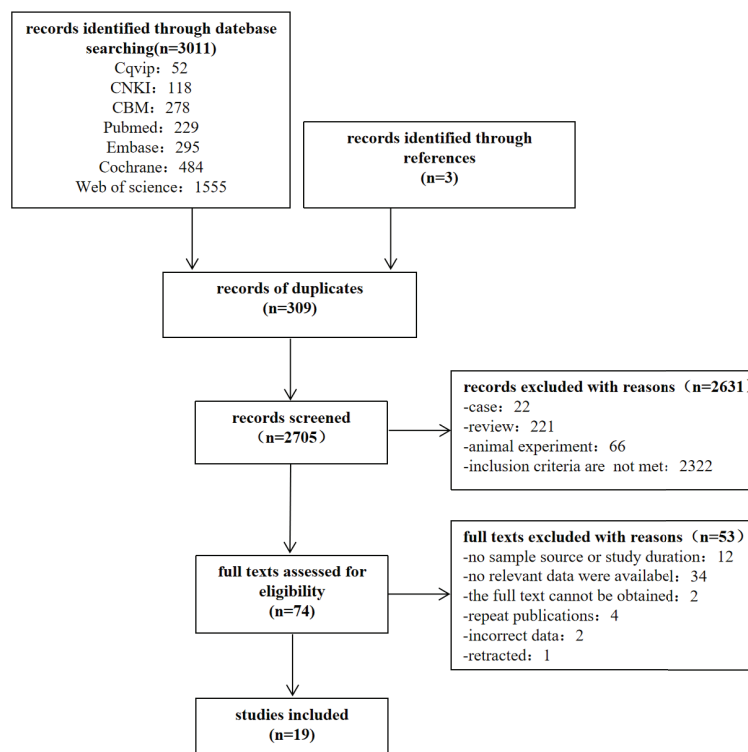

Figure 1. Literature screening flow chart

Table 2. Basic characteristics and quality scores of the included literature

Study	Journal	Type	Time	Age (years)	Sample (cases)	MPS occurrences/total cases		OR (95%CI)	quality evaluation (points)
						Chronic group	Non-chronic group		
DingLi (2022)[7]	Nursing research	cross-sectional	2020.08-2020.12	40-55	933			1.659 (1.095, 2.512)	6
ChenLiang (2021)[8]	Guangzhou Medical	cross-sectional	2019.02-2020.02	40-60	1013			1.740 (1.180, 2.580)	5
ZhangWei (2020)[9]	Chinese Journal of Obstetrics and Gynecology	cross-sectional	2016.01-2016.06	40-60	2018			1.680 (1.300, 2.172)	7

Study	Journal	Type	Time	Age (years)	Sample (cases)	MPS occurrences/total cases		OR (95%CI)	quality evaluation (points)
						Chronic group	Non-chronic group		
Zhang Chen (2016)[10]	Modern preventive medicine	cross-sectional	2014.06-2014.09	40-60	675			1.931 (1.209, 3.085)	5
Hu Yingmin (2017)[11]	Preventive medicine	cross-sectional	2015.01-2016.10	45-55	947			1.450 (1.130, 1.860)	6
Liu Weidong (2015)[12]	maternal and child health care in China	cross-sectional	2012.10-2012.12	40-60	789			2.010 (1.350, 3.010)	6
ChenGuiping (2013)[13]	Chinese General practice	cross-sectional	2012.03-2012.06	40-55	529			1.710 (1.034, 2.827)	7
CaoFengying (2014)[14]	Hebei Medicine	cross-sectional	2012.01-2012.03	40-55	540			3.048 (1.848, 5.025)	6
Lin Li (2012)[15]	Maturitas	cross-sectional	2010.05-2011.10	40-65	20275			1.920 (1.760, 2.100)	5
Wang, X.Y. (2021)[16]	Menopause	cross-sectional	2018.01-2018.12	40-55	6364			1.810 (1.530, 2.140)	5
Koçak, D.Y. (2023)[17]	Obstetrics and Gynaecology Research	cross-sectional	2018.02-2018.11	40-65	435			6.432 (1.696, 24.39)	4
HuMengmeng (2020)[18]	Chinese Medical Innovation	cross-sectional	2017.06-2019.02	45-60	400	224/263	86/137		5
Chen Liping (2007)[19]	maternal and child health care in China	cross-sectional	2005.05-2005.08	40-55	1667	424/732	386/935		4
Ma Xuetao (2023)[20]	Chinese community physicians	cross-sectional	2021.03-2022.03	40-64	2214	1178/1735	144/479		6
QiuZhongjun (2012)[21]	Coal Industry Medicine	cross-sectional	2009.06-2011.12	45-55	2002	762/850	996/1152		4
Guo Laixia (2016)[22]	Journal of Ningxia Medical University	cross-sectional	2013.05-2014.05	40-60	763	206/245	74/518		5
Yao Ling (2019)[23]	maternal and child Health care in China	cross-sectional	2016.05-2016.12	40-65	989	270/391	356/598		6
Wu Di (2022)[24]	maternal and child Health care in China	cross-sectional	2019.03-2019.06	44-56	204	30/36	84/168		6
Wang, L.R. (2021)[25]	BMC Women's Health	cross-sectional	2016.08-2017.05	40-55	7319	985/1074	4784/6245		7

Eleven cross-sectional studies provided an OR (95%CI) of chronic diseases associated with MPS, with a sample size of 34, 518 cases. The results showed that there was no statistical heterogeneity (I^2=22%, P=0.23), and the total effect size was on the right side of the null line [OR combined =1.86, OR combined (95%CI) = (1.74, 1.98), P < 0.001], indicating that MPS was more likely to occur in patients with chronic diseases. The forest map is shown in Figure 2.
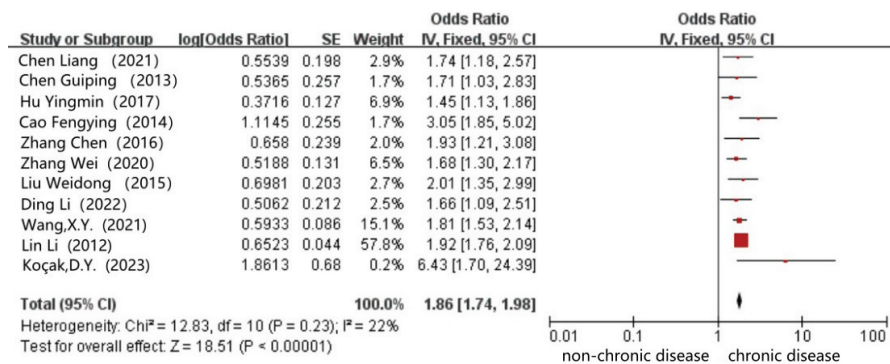

Figure 2. Forest map

Eight cross-sectional studies provided the number of cases of MPS in both groups, with a sample size of 15, 558 patients. The results showed that there was statistical heterogeneity (I2=97%, P < 0.001), and the sensitivity analysis I^2 fluctuated between 93% and 97%, and the results were stable. The total effect size was on the right side of the null line [OR $_{combined}$ =0.27, OR $_{combined}$ (95%CI) = (0.16, 0.49), P < 0.001], that is, chronic disease had an effect on the occurrence of MPS. The forest map is shown in Figure 3.
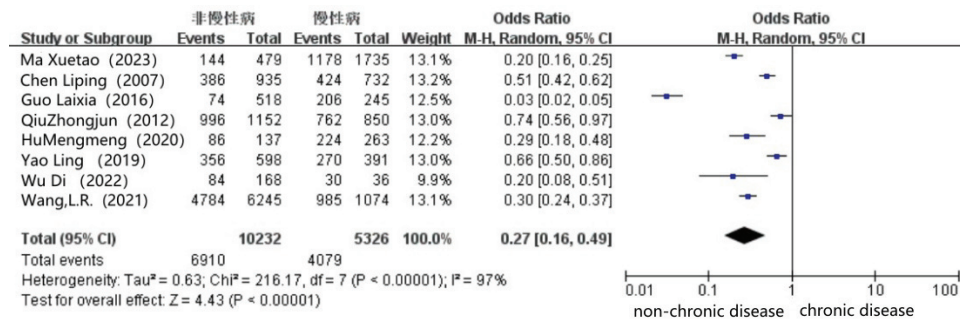

Figure 3. Forest map

3.2 Discuss

About a third of a woman's life is spent in menopause, and MPS can have a negative impact on a woman's life that can range from interfering with daily life to requiring medical help. Systemic vasomotor symptoms are typical cluster symptoms, in addition, depression and anxiety, urinary and reproductive system symptoms are common symptoms. MPS reduces the quality of life of middle-aged and elderly women and affects family harmony.[26-27]In China, few people with MPS take the initiative to seek medical treatment, which may be due to insufficient understanding of the disease.[28]Therefore, it is particularly important to identify the related risk factors of climacteric syndrome and increase the attention of high-risk groups to MPS.

Both chronic diseases and MPS are associated with aging. This study is a cross-sectional study, and it is impossible to determine the causal relationship between the two. Menopause is prone to negative emotions due to a series of symptoms caused by hormonal disorders, whereas negative emotions may aggravate physical discomfort, and there seems to be a more complex relationship between the two.[29-30]Patients with chronic diseases may be more prone to depression, insomnia and other climacteric symptoms at this special stage of menopause because the disease affects physical and mental fatigue. Attention should be paid to middle-aged and elderly women suffering from chronic diseases.

The shortcomings of this study include limited number of included literatures, medium quality, and statistical heterogeneity in some studies, which may lead to a certain risk of bias. It is expected that future studies can systematically list the types of chronic diseases and find specific diseases related to MPS, so as to carry out more accurate prevention and treatment education.

4. Conclusion

The results showed that the prevalence of MPS was statistically different between chronic and non-chronic patients. Therefore, it is concluded that chronic diseases are risk factors for MPS, and middle-aged and elderly women with chronic diseases are more likely to have climacteric syndrome. Middle-aged and elderly women with chronic diseases need to pay more attention to their menopausal symptoms and actively prevent and treat them.

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