

SEXUAL MEDICINE

Meta-Analysis of Prevalence of Erectile Dysfunction in Mainland China: Evidence Based on Epidemiological Surveys

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ABSTRACT

Introduction: The epidemiologic characteristics of erectile dysfunction (ED) in mainland China remain incompletely understood.

Aim: To evaluate the overall prevalence and determine the severity of ED in mainland China.

Methods: An extensive database search was performed of PubMed, Embase, the Chinese National Knowledge Infrastructure (CNKI) database, the WanFang database, the Chinese Biological Medical Literature (CBM) database, and the Chongqing VIP using the following terms: *erectile dysfunction*, *prevalence*, *epidemiology*, *epidemiological*, and *China*. Study quality was assessed using the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines. Data were pooled for the random-effects model. Sensitivity analyses were conducted to assess potential bias.

Main Outcome Measures: All survey studies reporting on the prevalence of ED in mainland China were included. Data extraction was performed independently by two of the authors, and conflicts were resolved by another author.

Results: Of 2,155 retrieved articles, 25 were included in this meta-analysis with a total of 48,254 participants. The pooled prevalence of ED in men was 49.69% (95% CI = 39.29–60.10). The occurrence rates of ED in age groups younger than 30, 30 to 39, 40 to 49, 50 to 59, 60 to 69, and at least 70 years were 20.86%, 25.30%, 40.48%, 60.12%, 79.10%, and 93.72%, respectively. The severity-specific prevalences of mild, moderate, and severe ED were 32.54%, 9.86%, and 13.97%, respectively. Moreover, the prevalences reported by different diagnostic methods were 14.19% for self-reports, 44.60% for the Chinese Index of Erectile Function, and 49.91% for the International Index of Erectile Function–5. The prevalence map based on a geographic information system showed an unequal geographic distribution.

Conclusion: ED is highly prevalent in mainland China, and its prevalence increases with age. More high-quality surveys on ED with larger samples throughout mainland China are needed to confirm these findings.

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Key Words: Erectile Dysfunction; Prevalence; China; Meta-Analysis

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INTRODUCTION

As the population ages, genitourinary problems in the elderly have attracted increasing attention. Erectile dysfunction (ED), defined as the persistent inability to attain or maintain a penile erection sufficient for satisfactory sexual performance, is better understood and the most studied sexual problem worldwide, which primarily affects men older than 40 years.¹ Although it is not life-threatening, evidence has shown that it seriously impairs quality of life.² Many patients feel embarrassed, ashamed, and depressed about ED; therefore, it is appropriate to say that ED has a broad impact on a man's life beyond the inability to have sex.³ It is noteworthy that ED is a public health problem with a significant impact on male psychosocial health that cannot be ignored. Moreover, the financial burden directly or indirectly

caused by ED is very significant. In previous studies, a loss of £7.0 million annually has been attributed to ED in the United Kingdom.⁴ Another study showed that this cost reaches \$15 billion in the United States.⁵

The prevalence of ED, first reported by Feldman et al⁶ using a population-based study conducted in 1993, has been estimated at 52% in the United States. Many subsequent studies have been performed during the past two decades. However, the prevalence varies greatly across different populations and regions. According to results of the Global Online Sexuality Survey (GOSS), rates are 45.1% in the Middle East⁷ and 37.7% in the United States.⁸ Previous studies have indicated that ED is prevalent in mainland China; however, existing prevalence reports vary considerably, ranging from 17.1% in five provinces (Beijing, Guangzhou, Shaanxi, Gansu, and Anhui)⁹ to 92.3% in Gansu.¹⁰ These divergent results can be explained in many ways; thus, the results of individual cross-sectional studies might lack representativeness.

Considering the huge population and the increased proportion of elderly men, the prevalence of ED might be significant. According to the sixth national census, the population reached 1.37 billion in 2010, and more than 13.26% of the population was older than 60 years (http://www.stats.gov.cn/tjsj/tjgb/rkpcgb/qgrkpcgb/201104/t20110428_30327.html). This percentage is estimated to reach 26.8% in 2050. To assess the disease burden and develop relevant policies, understanding the prevalence and epidemiologic characteristics of ED is essential. Moreover, evidence suggests that the prevalence of ED in China might continue to increase with age. Hence, the age-specific prevalence is necessary. In addition, oral drug therapy, the most frequently used treatment, shows a far better effect on mild rather than on severe ED.¹¹ In this respect, the severity-specific prevalence also is needed.

To date, a national epidemiologic survey of ED has never been performed in mainland China. This first meta-analysis was conducted to evaluate the overall prevalence and determine the severity of ED in mainland China. In addition, prevalence was stratified by age, severity, location, and year to identify potential risk factors for ED. This strategy can highlight directions for future research and provide an epidemiologic basis for planning and implementing public health policies as necessary.

METHODS

Literature Search

The present meta-analysis was performed according to the Meta-Analysis of Observational Studies in Epidemiology (MOOSE) guidelines.¹² In this meta-analysis, we targeted survey studies conducted in mainland China and published in Chinese or English. PubMed, Embase, the Chinese National Knowledge Infrastructure (CNKI) database, the WanFang database, the Chinese Biological Medical Literature (CBM) database, and the Chongqing VIP database were searched using the following

search terms: *erectile dysfunction, prevalence, epidemiology, epidemiological, and China*. In addition, we added the keywords *male sexual dysfunction* and *impotence* to avoid omissions because there were several synonymous or nearly synonymous terms in Chinese. In addition, relevant articles in the reference lists were identified to ensure no related studies were overlooked. To expand the retrieval scope, the publishing period was not limited. Searching was completed on March 31, 2016. All related articles were selected by two independent investigators.

Inclusion and Exclusion Criteria

The studies included in this meta-analysis met the following criteria: (i) cross-sectional study design; (ii) a study that was conducted in mainland China (not including Taiwan, Hong Kong, and Macao); (iii) a study that was based on a community or a population; (iv) a study that reported the prevalence of ED or available data for the prevalence calculation (eg, total sample size and number of ED cases); and (v) a study published in Chinese and/or English. If several articles were based on the same surveys, the article with the most detailed data was selected after a careful review by the investigators.

Studies were excluded if they met any of the following criteria: (i) a study focused on a specific population such as military personnel or individuals with high-level intelligence; (ii) the sample method was non-random; (iii) the article was a review or reported only secondary data; (iv) the prevalence of ED was estimated only by self-reporting or the prevalence was not available; (v) the diagnosis was not based on the International Index of Erectile Function—5 (IIEF-5) or the Chinese Index of Erectile Function (CIEF; eTable 1) or the items of IIEF-5; and (vi) a duplicated study or study that used a sample already investigated in another study.

Data Extraction

In this meta-analysis, we extracted the following data from the original articles: author, year of publication, type of survey (based on a community or a population), sampling method, age range, province where the study was performed, sample size, response rate, identity of investigators, location (urban or rural), diagnostic method of ED, prevalence of ED, and the prevalence stratified by age and severity. If self-reporting was one of the diagnostic standards in the original article, then we also extracted the prevalence by self-reports to compare different methods in the diagnosis of ED.

All data were extracted by two investigators independently, and disagreement was resolved by discussion or by consultation with another investigator until a consensus was reached.

Quality Assessment

All 25 included articles were assessed using the Strengthening of Reporting of Observational Studies in Epidemiology (STROBE) guideline.¹³ The risk of bias was assessed by scoring

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