

## Analysis of the average menopause age of Bangladeshi women: A public health perspective

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### Abstract

**Background and aims:** Menopause is a natural process in nature; hence, changes in the age of menopause are not to be anticipated. Consequently, the purpose of the research was to obtain accurate estimates of the age of menopause in Bangladesh and to determine regional differences in the age of women at menopause.

**Methods:** A search was undertaken for studies using a Cross-Sectional Design, and those that included women aged 40-60 years from various areas of Bangladesh between 2009-2019, the average age at menopause, and had identical inclusion and exclusion criteria were selected for meta-analysis. The research materials consisted of cross-sectional investigations conducted in various regions of Bangladesh. STATA-16 Statistical Software was used to create a forest plot using cross-sectional study data in order to illustrate the variance of menopause age determined from separate research. The variance was assessed relative to the weighted average age at menopause. I<sup>2</sup> data represent the heterogeneity of menopause age in the studies.

**Results:** The average age of menopause in Bangladesh is 46.7 years (95% CI: 44.84, 48.9). As shown by the Funnel Plot and Egger's test, the standard deviation in one research was slightly over 1.97. Minimum mean age was 44.70 years (95% CI: 35.02, 54.38) and highest mean age was 48.96 years (95% CI: 42.30, 55.62) In addition, the age at menopause did not differ significantly by age at menarche, despite a strong correlation.

**Conclusions:** Age at menopause correlated positively with age at menarche. During the period 2009-2020, the median age in Bangladesh was 46.7 years, which was much lower than in many wealthy nations. There was no information on the distribution of age at menopause in the papers analyzed for this meta-analysis, therefore the discrepancies may be methodological.

**Keywords:** Menopause; Average Age; Women; Bangladesh

### 1. Introduction

Menopause is a physiological condition that signifies the end of a woman's reproductive years. Menopause is accompanied by a variety of symptoms, including hot flashes, nocturnal sweats, urinary and vaginal abnormalities, dyspareunia, and sleeplessness, among others. Natural menopause occurs between the ages of 45 and 55 over the world [1]. In developed nations, the average age of women reaching menopause is around 51 years, but in developing nations, it varies from 42 to 48 years [2,3].

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It has been observed that early menopause increases the risk of cardiovascular disorders, osteoporosis, venereal malignancies, and even Alzheimer's disease. Late menopause increases the risk of breast and endometrial malignancies [4]. A woman residing in rural areas of a developing country, in disadvantaged socio-economic conditions, with limited access to essential health services, and at a higher altitude is more likely to experience natural menopause earlier than her counterpart residing in urban areas of a developed country and at a lower altitude [5]. Women whose menstrual cycle is fewer than 26 days between the ages of 20 and 36 are 1.4 years more likely to experience natural menopause than those with a cycle duration between 26 and 32 days [6]. Women having menstrual cycles of 33 days or more had a late natural menopause.

The average age of natural menopause varies by location in Bangladesh. In Eastern Bangladesh, it is 47.4 years, in Western Bangladesh it is 46 years, in Northern Bangladesh it is 45 years, in Southern Bangladesh it is 46.2 years, and in Central Bangladesh it is 47.9 years. Between North and East, North and Centre, West and Centre, and between South and Central Bangladesh, significant disparities in the average age at natural menopause were detected, with estimations range [7-16]. Using meta-analysis, the current research attempts to fill the void created by the lack of credible estimates of age at menopause for Bangladesh.

## 2. Methods

### 2.1. Inclusion and exclusion criteria

A search was undertaken for studies using a Cross-Sectional Design, and those that included women aged 40-60 years from various areas of Bangladesh between 2009-2019, the average age at menopause, and had identical inclusion and exclusion criteria were selected for meta-analysis.

### 2.2. Data extraction

The extracted data from each selected study consisted of the authors' last names, the year of publication, the sample size, the age group(s) of the participants, the location of the study, the mean age at menopause, the Standard Deviation, and the average age at menarche. These data were then analysed to determine the mean age at menopause (with 95% Confidence Interval).

### 2.3. Statistical analysis

The research materials consisted of cross-sectional investigations conducted in various regions of Bangladesh. STATA-16 Statistical Software was used to create a forest plot using cross-sectional study data in order to illustrate the variance of menopause age determined from separate research. The variance was assessed relative to the weighted average age at menopause.  $I^2$  data represent the heterogeneity of menopause age in the studies ( $I^2$  less than 50% indicates moderate heterogeneity;  $I^2$  more than 50% indicates significant variability).

$$I^2 = \frac{Q - df}{Q} \times 100$$

where, df ¼ K-1 ¼ degrees of freedom of Q-statistic and  
Q - chi-squared statistic.

$$Q = \sum_{k=1}^K \frac{(\widehat{b}_k - \widehat{\bar{b}}_k)^2}{\widehat{\sigma}_k^2} .$$

$\widehat{b}_k$  - Estimated effects, which vary from study to study

$\widehat{\sigma}_k$  - Standard Error of estimated effect

$\widehat{\bar{b}}_k$  - Precision-weighted average of the estimated effects

$$\widehat{\bar{b}}_k = \frac{\sum_{k=1}^K \widehat{\sigma}_k^{-2} \widehat{b}_k}{\sum_{k=1}^K \widehat{\sigma}_k^{-2}}$$

$I^2$  - Identifies the proportion of variance in effect estimates attributable to heterogeneity as opposed to chance (or sampling error). To examine publishing preferences, the weighted average age at menopause with 95% Confidence Interval, Funnel Plot, and Egger's test were calculated

## 3. Results

Only 10 of the 202 studies from Bangladesh that met the inclusion criteria after being filtered from the database. Table 1's meta-analysis data by research year demonstrates that, contrary to expectations, the age of menopause differs geographically.

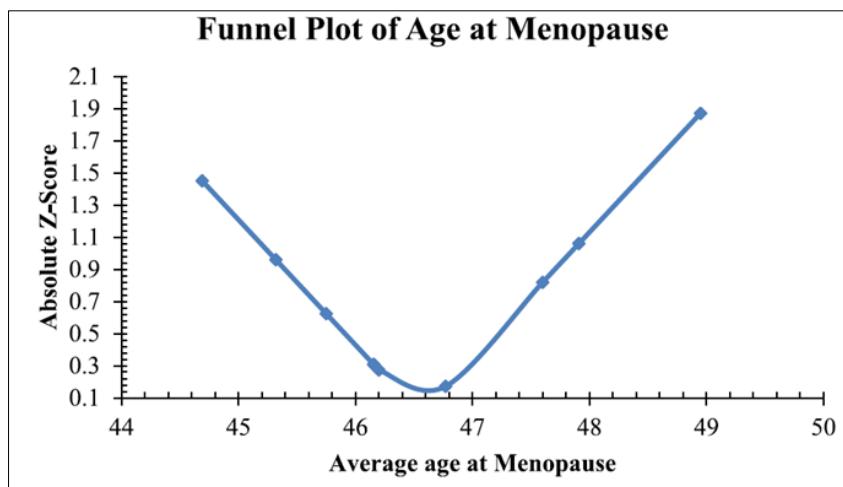
The Forest plot for the average age at menopause in Bangladesh, revealing the distribution of age at menopause among the 10 studies included in this meta-analysis. The mean age at menopause was 46.64 years (95% confidence interval:

44.84 to 48.45 years). In addition, minimal heterogeneity was seen across studies, with the mean age ranging from 44.69 to 48.96 (95% CI: 35.01 to 54.35) years. Subgroup analysis by average age at menarche revealed that the pooled average age at menopause for women with age at menarche of less than 12, 12-13, and 13.5+ years was 46.14 (95% CI: 43.23, 49.05), 46.60 (95% CI: 43.08, 50.13), and 47.23 (95% CI: 44.18, 50.29) years.

The absence of the predicted normalcy in the estimates of age at menopause in the Funnel plot in Figure 1 is indicative of publication bias. In addition, there was variation in the spread that was mostly on the low end of expectations. Possible causes of variance in spread include bias in data collecting, statistical technique, or publishing.

**Table 1** Menopausal Age in Various Bangladeshi Regions

Sample Size	Age group	Place	Mean	SD	Age at menarche	Average age at menarche groups
184	40-60	Sylhet	46.16	4.37	13.35	12-13
566	40-60	Chittagong	47.92	3.17	14.21	13.5+
402	40-60	Khulna	46.21	1.62	11.96	<12.5
2050	40-60	Dhaka	46.17	4.90	13.10	12-13
502	40-55	Rajshahi	45.76	3.84	12.11	< 12.5
102	40-65	Mymensingh	44.70	4.95	13.87	13.5+
402	40-60	Jashore	45.33	2.80	13.11	12-13
234	40-50	Bogura	46.78	3.53	13.57	13.5+
232	48-52	Cumilla	48.96	3.41	13.23	12.5-13.5
156	46-59	Noakhali	47.61	2.30	14.21	13.5+



**Figure 1** Funnel plot: Average menopause age

#### 4. Discussion

Ahuja (2016) found that the average age of menopause in Bangladesh's regions ranged from 45.5 years in Northern Bangladesh to 47.8 years in Central Bangladesh [7]. Menopause is physiological in nature, hence such variances in menopause age are not anticipated. To get a more precise estimate of the age of menopause in Bangladesh, a systematic review and meta-analysis were performed. Our data also indicates that the disparity in menopausal age between industrialized and developing nations is more than anticipated. This conclusion may indicate the necessity for a similar age distribution of women in global research populations. Such an approach will aid in gaining a better knowledge of the age of menopause onset among women in different nations, as well as facilitating comparisons.

This research employed a random effect model based on the premise that all meta-analysis data was acquired from randomly chosen samples. The nominal heterogeneity identified in this research was a result of the nominal physiological variety in the study populations, as well as the diversity of places, cultures, and socioeconomic positions of the participants.

In the research, the average age of menopause among women whose age at menarche was less than 12.5 years was 46.1 years. It was 46.59 years for women whose age at menarche was 12.5-13.5 years and 47.22 years for women whose age at menarche was 13.5+ years. Therefore, there is a correlation between age at menarche and age at menopause. Singh (2018) found a similar correlation between age at menopause and age at menarche. Stanford et al. (1987) identified differences in the connection between parity, menstrual irregularity, and breastfeeding behaviours [13,17] in previous research. Other studies have shown a correlation between age at menopause and sociocultural, economic, lifestyle, and lifestyle-related disorders, as well as other elements of reproductive women's health [18-22].

## 5. Conclusion

This study's meta-analysis estimated the mean age of menopause for Bangladeshi women to be 46.65 years, with a 95% confidence interval (44.84, 48.45) and low evidence of publication bias, as shown by the Funnel plot and Egger's test. Age at menopause correlated positively with age at menarche. Therefore, further research is essential to determine the reasons for the disparities in age at menopause and to satisfy women's healthcare requirements.

## Compliance with ethical standards

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### *Disclosure of conflict of interest*

Authors have declared that no conflict interests exist.

### *Statement of ethical approval*

The ethical approval for this study was considered by the District Civil Surgeon Office, Chuadanga, Bangladesh, under the Ministry of Health, Government of Peoples Republic of Bangladesh.

### *Statement of informed consent*

Before the survey, the researchers outlined the study's goals and participants' rights and responsibilities. They signed informed consent if they agreed.

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