RESEARCH ARTICLE

FACTORS AFFECTING THE AGE OF MENOPAUSE IN PADANG CITY IN 2023

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Abstract

Menopause is characterized by a consecutive period of amenorrhea lasting 12 months without any underlying causes or surgical interventions. The age at which menopause occurs can be influenced by various factors, including menarche, number of childbirths, body mass index, and the utilization of hormonal contraceptives. This study aims to determine the factors that influence the incidence of menopause in Padang. This study is an analytical research with a cross-sectional study design. The research was conducted in the working areas of all primary public health centers in Padang from Januari 2023 to September 2023. The sample consisted of middle-aged women who visited the working areas of all primary public health centers during the study period. This study is using a questionnaire as the research instrument and employing the simple random sampling technique to obtain a sample size of 124 participants. The data analysis was conducted using the Chi- Square test, and utilize the statistical software SPSS. A significant relationship between variables was defined if the p-value < 0.05. The results of this study revealed that the majority of respondents experienced early menarche (36.3%), had multiparous pregnancies (33.9%), had underweight body mass index (33.1%), used hormonal contraceptives (52.4%), and experienced late menopause (40.3%). The analysis showed a significant relationship (p<0.05) between the age of menarche (p=0.036) and parity (p=0.002) with the occurrence of menopause. However, there was no significant relationship (p>0.05) between body mass index (p=0.141) and history of contraceptive use (p=0.069) with the occurrence of menopause. This study found a significant relationship between the age of menarche and parity with the occurrence of menopause, while there was no significant relationship between body mass index and history of contraceptive use with the occurrence of menopause among middle-aged women visiting the primary public health center areas in Padang.

Keywords: Body Mass Index; Contraceptives Utilization; Menopause; Menarche; Parity

INTRODUCTION

Menopause is a natural process that all women will experience. Menopause means the absence of menstruation (amenorrhea period) for 12 consecutive months, not due to surgery or other causes. Menopause begins when ovarian function decreases in the production of estrogen and progesterone. In a survey conducted by the World Health Organization (WHO), the number of perimenopausal women is estimated to reach 1.2 million in 2030, and 76% of them live in developing countries.[1,2] The average age of the menopause period for women in the world is in the range of 48-52 years. In a study, the average age of menopause reported in European countries was 54 years, in North America 51.4 years, in Latin America 48.6 years, and in Asia 51.1 years. A study report in Singapore reported that 90% of women reached menopause at the age of 53 years, and 29.2% of the population between the ages of 45 and 65 years. Meanwhile, in Indonesia itself, the age range for women entering the menopause period is 45 – 55 years.[2,3] Padang City is the city with the largest population in West Sumatra, namely 919,145 people, with the number of women being 457,433 people. Padang City has 23 health centers spread across 11 sub-districts.[4] Based on research conducted in Parupuak Tabiang Village, Padang City, the results showed that 74.5% of respondents experienced menopause at the age of less than 52 years, as many as 25.5% experienced menopause over the age of 52 years, and no women experience menopause under the age of 40 years.[5]

The age at which menopause occurs is different for each woman. The different onset of menopause for each woman can affect the body's metabolism, psychology, urogenital, and several other symptoms that can affect a person's life. A woman who has passed the reproductive period will experience the menopause transition process, usually occurring at an average age of 45-65 years. Decreased estrogen levels and increased progesterone levels will manifest as symptoms of hormonal balance disorders.[6-8]

Menopause can be influenced by various factors. The onset of menopause can be influenced by age at menarche, contraceptive use, parity, Body Mass Index (BMI), smoking, drinking alcohol, physical activity, and other factors. Genetic factors have an important role in the occurrence of menopause. Studies report that women who have a family history of early onset of menopause have a six times greater risk of experiencing early menopause, with a younger age of onset of menopause compared to women without a family history of early menopause.[2]

Women who smoke enter menopause more quickly than women who don't smoke, and other factors that influence the onset of menopause.[2] A research conducted by Natama in 2018 regarding the epidemiology of menopause obtained the results of the average age of women, when experiencing menopause in Medan City is 49.03 years. The prevalence of menopause in each category is in sequence, namely normal menopause (66.70%), followed by early menopause (15.4%), late menopause (13%), and early menopause (4.9%).12 Research in India states that women with fewer parities tend to experience menopause at an older age compared to women with more parities.

Research in Poland states that women with an earlier age at menarche will experience menopause 0.3 years earlier than women with an earlier age at menarche.[9]

The results of other research state that there is a relationship between the age of first birth and the age of menopause women who give birth for the first time under the age of 20 will experience menopause later. Furthermore, the results of a cohort study in the Netherlands proved that the use of high-dose oral contraceptives for ≥ 3 years increased the risk by 1.12 times of experiencing menopause more quickly compared to women who did not use oral contraceptives.[10-12]

Various essential factors influencing menopause can be identified to improve aspects of women's overall health. Various studies report risk factors that influence menopause, but there is no general agreement on each factor, so it is still a matter of debate. This is a public health problem that is important to discuss and pay attention to. So researchers are interested in conducting research on factors such as age at menarche, parity, BMI, history of hormonal contraceptive use, which influence the incidence of menopause in community health centers in the Padang City work area.

METHODS

This research is an analytical research with a cross sectional study design carried out in the Padang City work area from January 2023 until the sample is fulfilled. The sample in this study were women who had gone through menopause and visited community health centers in the Padang City work area within the research period who filled out questionnaires and met the inclusion and exclusion criteria. The dependent variable in this study was the incidence of menopause, while the independent variables were age at menarche, number of parities, body mass index, and use of hormonal contraception. Sampling in this study was carried out using a simple random sampling technique.

- The inclusion criteria in this study are:
    1. Women aged ≤45, 45-55, ≥55 years
    2. Women who have experienced menopause
    3. Willing to take part in this research by signing an informed consent.
- The exclusion criteria in this study are:
    1. Women with a history of hysterectomy and oophorectomy.
    2. Women with a history of malignant disease.
    3. Women with endometriosis.

The minimum sample size required in this study was determined based on the Lemeshow formula as follows: [13-15]

$$n = \frac{Z^2\ p(1-p)}{d^2}$$

Information:
n = minimum number of samples required
Z = normal standard deviation for the degree of significance (1.96)

p = maximum estimated value (0.5)

d = degree of deviation from the population (10% = 0.1)

Based on the sample size calculation above, a minimum sample size of 112 samples was obtained. To anticipate drop out incidents in this study, the authors increased the sample size by 10% of the minimum sample size so that 124 samples were needed in this study.

RESULTS

Respondent Characteristics

Table 1. Frequency Distribution of Respondent Characteristics

Characteristics	Frequency(f)	Percentage (%)
Menarche Age		
Early Menarche	45	36,3
Normal Menarche	43	34,7
Late Menarche	36	29,0
Total	**124**	**100,0**
Number of Parities		
Nulipara	28	22,6
Primipara	40	32,3
Multipara	42	33,9
Grande Multipara	14	11,3
Total	**124**	**100,0**
Body Mass Index		
Underweight	41	33,1
Normal	30	24,2
Overweight	22	17,1
Obesity	31	25,0
Total	**124**	**100,0**
History of Contraceptive Use		
Hormonal Contraception	65	52,4
Non-Hormonal Contraception	59	47,6
Total	**124**	**100,0**
Menopause Status		
Early Menopause	49	39,5
Menopause Normal	25	20,2
Late Menopause	50	40,3
Total	**124**	**100,0**

Table 1 shows that most respondents experienced menarche at the age of less than 10 years (early menarche), namely 45 respondents (36.3%). The highest number of parities were multiparous, namely 42 respondents (33.9%). Most respondents had an underweight BMI, namely 41 respondents (33.1%). The history of respondents' use of contraception was mostly hormonal contraception, namely 65 respondents (52.4%) with the respondent's types of hormonal contraception described in table 2. Based on menopausal status, most respondents experienced late menopause, namely 50 respondents (40.3%), with the distribution of the mean and median age of menopause of respondents described in table 3.

Table 2. Frequency distribution of types of hormonal contraception used by respondents

Hormonal Contraception	Frequency (f)	Percentage (%)
Pill	47	72,3
Injection	14	11,2
Implant	4	3,2
Total	**65**	**100,0**

Table 2 shows that of the 65 respondents who used hormonal contraception, the majority were pill type hormonal contraceptives, namely 47 respondents (72.3%). Table 3 shows that the average age of menopause for respondents is 48.69 years and the median age is 47 years with a standard deviation of 6.22.

Table 3. Distribution of mean and median age of menopause of respondents

Variable	Mean Median	Std. Deviation	Minimal-Maximal
Menopause Age	48,69 47,00	6,22	40-58

Bivariate analysis

Based on the cross-tabulation test (crosstab) in Table 4, of the 45 respondents with early menarche, there were 21 respondents (46.7%) who experienced menopause at the age of <45 years (early menopause). Of the 43 respondents with normal menarche, 16 respondents (37.2%) experienced menopause at the age of >55 years (late menopause). Of the 36 respondents with late menarche, 16 respondents (44.4%) experienced early menopause. From this data, there is a tendency that the sooner the age of menarche, the sooner a woman will experience menopause. Based on the Chi-square test between the age of menarche and the age of menopause, a significance value (p-value) of 0.036 (p<0.05) was obtained, which shows that there is a significant relationship between the age of menarche and the age of menopause.

Tabel 4. Relationship between Menarche Age and Menopause Events

Menarche Age	Frequency (n)								Analysis Statistic
	Early		Normal		Late		Total		P value
	N	%	N	%	N	%	N	%	
Early Menarche	21	46,7	4	8,9	20	44,4	45	100,0	0,036
Normal Menarche	12	27,9	15	34,9	16	37,2	43	100,0	

Late Menarche	16	44,4	6	16,7	14	38,9	36	100,0
Total	**49**	**39,5**	**25**	**20,2**	**50**	**40,3**	**124**	**100,0**

In Table 5, of the 28 respondents who were nulliparous, 17 respondents (60.7%) experienced menopause at the age of <45 years (early menopause). Of the 40 primipara respondents, 22 respondents (55.0%) experienced menopause at <45 years of age (early menopause). Of the 42 multiparous respondents, 24 respondents (57.1%) experienced menopause at the age of >55 years (late menopause). Of the 14 respondents with grand multipara, 8 respondents (57.1%) experienced menopause at the age of >55 years (late menopause). From this data, there is a tendency that the greater the number of parities, the longer it will take a woman to experience menopause. Based on the Chi-square test between the number of parities and the age of menopause, a significance value (p-value) of 0.002 (p<0.05) was obtained, which shows that there is a significant relationship between the number of parities and the age of menopause.

Table 5. Relationship between Parity Number and Menopause Events

Number of Parities	Frequency (n)								Analysis Statistic
	Early		Normal		Late		Total		P value
	N	%	N	%	N	%	N	%	
Nulipara	17	60,7	5	17,9	6	21,4	28	100,0	
Primipara	22	55,0	6	15,0	12	30,0	40	100,0	0,002
Multipara	7	16,7	11	26,2	24	57,1	42	100,0	
Grande Multipara	3	21,4	3	21,4	8	57,1	14		
Total	**49**	**39,5**	**25**	**20,2**	**50**	**40,3**	**124**	**100,0**	

In Table 6, of the 41 respondents with underweight BMI, it was found that 21 respondents (51.2%) experienced menopause at the age of <45 years (early menopause). Of the 31 respondents with normoweight BMI, it was found that 14 respondents (46.7%) experienced menopause at the age of > 55 years (late menopause). Of the 22 respondents with overweight BMI, 10 respondents (45.5%) experienced early menopause. Of the 31 respondents with an obese BMI, it was found that 15 respondents (48.4%) experienced menopause at the age of > 55 years (late menopause). Based on the Chi-Square test between BMI and the incidence of menopause, a value of p=0.141 (p>0.05) was obtained, which shows that there is no significant relationship between BMI and the incidence of menopause.

Table 6. Relationship between Body Mass Index and Menopause Events

Body Mass Index	Frequency (n)								Analysis Statistic
	Early		Normal		Late		Total		P value
	N	%	N	%	N	%	N	%	
Underweight	21	51,2	7	17,1	13	31,7	41	100,0	
Normoweight	12	40,0	4	13,3	14	46,7	30	100,0	
Overweight	10	45,5	4	18,2	8	36,4	22	100,0	0,141

Obesity	6	19,4	10	32,3	15	48,4	31	
Total	**49**	**39,5**	**25**	**20,2**	**50**	**40,3**	**124**	**100,0**

In Table 9, of the 59 respondents with a history of using hormonal contraception, 29 respondents (49.2%) experienced menopause at the age of <45 years (early menopause). Of the 65 respondents with a history of using non-hormonal contraception, 28 respondents (43.1%) experienced menopause at the age of >55 years (late menopause). Based on the Chi-square test between history of contraceptive use and age of menopause, a significance value (p-value) of 0.069 (p>0.05) was obtained, which indicates that there is no significant relationship between history of contraceptive use and age of menopause.

Table 9

Contraception	Frequency (n)								Analysis Statistic
	Early		Normal		Late		Total		P *value*
	N	%	N	%	N	%	N	%	
Nonhormonal	29	49,2	8	13,6	22	37,2	59	100,0	0,069
Hormonal	20	30,8	17	26,2	28	43,1	65	100,0	
Total	**49**	**39,5**	**25**	**20,2**	**50**	**40,3**	**124**	**100,0**	

DISCUSSION

Relationship between Age of Menarche and Menopause Events

Based on the results of the statistical test analysis listed in table 6, a significance value (p-value) of 0.036 (p<0.05) indicates that there is a significant relationship between the age of menarche and the age of menopause. Where the sooner a woman experiences menarche, the sooner she will enter menopause.

The results of this research are in line with research conducted by Indahsari et al. in 2020, which stated that the age of menarche has a significant relationship with the incidence of age of menopause with a p-value of 0.000 and a significant value of α = 0.05.[16] Other research that is in line with these results is research meta-analysis conducted by Bjellaand et al., which shows that many studies have a close relationship between the age of menarche and the age of menopause, this is because the age of menarche causes the activation of the ovum to increase, assuming the same number of follicle cells will be degenerated during the ovulation stage, so that it will continue to decrease, which will lead to faster menopause.[17] Another study by Mishra et al. showed that women with a menarche age of less than 13 years had twice the risk of experiencing early menopause (RRR 1.80, 95% CI 1.53-2.12).[18]

Menopause occurs because the reserves of primordial follicles in the ovaries have been exhausted. Ovarian follicles form in utero, and the follicles will begin to experience atresia. At birth, each woman has approximately 500,000 to 1,000,000 follicles. About 40% of these follicles will disappear when a woman enters puberty, around 400 follicles will jovulate. Women with menarche at a young age, or earlier, have lower levels of the AMH hormone, causing a reduction in egg cells so that menopause occurs more quickly.[5,10] Research by

Handoko et al. in 2021 shows different results. There is no relationship between the age of menarche and the incidence of menopause (p= 0.191). It can happen because the age of menopause is not only influenced by factors such as age but is influenced by other factors such as psychological factors, marital status, use of contraceptives, and smoking.[19]

Relationship between Parity Number and Menopause Events

Based on the results of statistical test analysis of the number of parities on the incidence of menopause listed in table 7, a significance value (p-value) of 0.002 (p<0.05) indicates that there is a significant relationship between the number of parities and the age of menopause, where the more the number of parities, the longer it will take a woman to experience menopause.

The results of this study are supported by previous research by Mishra et al., which stated that nulliparous women had twice the risk of experiencing early menopause, a 32% higher risk of experiencing early menopause (RRR 2.26, 1.84–2.77). Reproductive factors in the form of parity and fewer menstrual cycles in fertile women are associated with greater oocyte reserves resulting in longer exposure to estrogen. The higher a woman's parity number, the more frequent and longer the anovulation period which is also related to the persistence of ovarian follicle reserves.[18]

The latest research in 2022 conducted by Grimes et al., explains that the duration of breastfeeding is associated with a later age of menopause due to the mechanism of preventing depletion of ovarian follicles and maintaining ovarian function. In this study, they observed that longer duration of breastfeeding was associated with higher AMH levels. Likewise, higher parity numbers are associated with higher AMH levels.[20]

Another study by Grasiah et al. in 2022 shows that there are significant differences in parity groups regarding the age of menopause. The average age of menopause in primiparous, multiparous, and grande multiparous women was 49.5 years, 52.0 years, and 52.5 years respectively (p= 0.023). The higher the parity number, the longer menopause occurs.[21] The results of this study are supported by several studies that have been conducted previously. Zamaniyan et al.ewq reported that the number of parities, duration of breastfeeding, education level, place of residence, thyroid disorders, and body mass index significantly influence the age of menopause in women in Iran through the Tabari Cohort Study (TCS) database. Interestingly, Zamaniyan et al. reported that the number of parities (p=0.025) remained significant after justifying the confounding variables, where the number of parities was directly proportional to the age of menopause.[22]

Apart from that, research conducted by Astikasari & Tuszahroh in Kalirejo Village, Malang reported that the number of parities significantly influences the age of menopause is reflected in the p value of the logistic regression test results, namely 0.043 (p<0.05). The relationship between the number of parities and the age of menopause is related to the reserve of ovarian follicles possessed by women with a high number of parities. In women

with high parity, it is possible to have more ovarian follicle reserves and reduce the risk of early menopause.[23]

Relationship between Body Mass Index and Menopause

Based on the results of the statistical test analysis of body mass index on the incidence of menopause listed in table 8, the value of p=0.141 (p>0.05) indicates no significant relationship between BMI and the incidence of menopause.

Zhu et al. in 2018 in their research stated that underweight women had a higher risk of experiencing early menopause (RRR 2.15, 95% CI 1.50-3.06), while overweight women (1.52, 1.31-1.77) and obesity (1.54, 1.18-2.01) were at increased risk of late menopause. Overweight and obesity were also significantly associated with an increased risk of menopause at ages 52–53 and 54–55 years, respectively. Underweight women have twice the risk of experiencing early menopause, while overweight and obese women have a more than 50% higher risk of experiencing delayed menopause.[24]

Obese women exhibit a more estrogenic environment than lean women because of the greater conversion of androstenedione to estrone and the higher concentration of free estradiol in response to a decrease in the amount of sex hormone-binding globulin. Obese women have higher levels of estrone produced by fat tissue. So, the greater the BMI, the later the age of menopause will be entered.[5]

The research results obtained differ from the hypothesis based on the theory above, possibly because the body weight that is part of the calculation of the Body Mass Index is a dynamic body measurement and the body weight taken in this study is the body weight at the time of the study as well.

Relationship between history of contraceptive use and menopausal events

Based on the results of the statistical test analysis of the history of contraceptive use on the incidence of menopause as listed in table 9, a significance value (p-value) of 0.069 (p>0.05) indicates that there is no significant relationship between the history of contraceptive use and the age of menopause. The results of this study are not in accordance with existing theories. In several theories, the use of hormonal contraception in women for a long period of time tends to make the woman enter menopause later or at an older age. It occurs due to the work of contraception, which suppresses ovarian function, causing egg production not to occur. The longer duration of hormonal contraceptive use will reduce Antral Follicle Count (AFC) levels and ovarian volume, as well as a significant increase in AMH levels. The differences in the results of this study indicate that the age of menopause is influenced by many factors. In this study, the more prominent factors are the age of menarche and the number of parities.

In this study, it was found that respondents who used hormonal contraceptives experienced earlier menopause. It is contrary to the theories put forward by previous researchers. The use of hormonal contraception, whether oral or injection, contains the

hormones estrogen, progesterone, or both. The mechanism of action of this hormonal contraceptive, where estrogen suppresses FSH secretion, blocks the maturation of follicles and ovaries. The hormone progesterone will strengthen the action of estrogen to prevent ovulation. Apart from that, estrogen also speeds up the journey of the ovum and makes it difficult for implantation in the endometrium, and progesterone can interfere with sperm penetration into the ovum.

Research results that contradict this theory can occur because there are several things that need to be considered regarding contraceptive use that affect menopause, including the length of contraceptive use. The dose of hormonal contraception also plays a role in the incidence of menopause as well as regularity and compliance in contraceptive use, especially oral contraceptives. The use of high-dose oral contraceptives greatly suppresses FSH concentrations due to the high doses of estrogen and progestin. Use of high-dose oral contraceptives (>0.05 milligrams) for at least 3 months containing estrogen and progesterone can delay menopause.[5]

The age of menopause is influenced by follicles experiencing ovulation and atresia. This atresia can reduce estrogen production and speed up menopause. Follicles experiencing atresia are thought to be influenced by a woman's hormonal status which is regulated by the neuroendocrine system. Stress can affect the neuroendocrine system and may be one of the factors influencing follicular atresia.[7] Based on a study by Raodah et al., the age of menopause was later in women who used hormonal contraception (87.1%) compared to non-hormonal contraceptive users (12.9%), with the results of statistical tests there is a significant relationship between the use of hormonal contraception and the age of entering menopause.[13,14]

Research Limitations

1. This research only relies on respondents' memory when filling out the questionnaire, so this can influence the research results.
2. This research cannot represent the general population in Padang City because the research was only conducted on menopausal women who visited community health centers in the working area of Padang City, so women who did not visit community health centers during the research period were not properly captured.
3. This study did not examine other factors that also influence the age of menopause.

CONCLUSION

1. Frequency distribution of the age of menarche in menopausal women who visit community health centers in the Padang City work area. The majority experience early menarche.
2. Frequency distribution of parities among menopausal women who visit community health centers in the Padang City work area. Most of them are multiparous.
3. Frequency distribution of BMI in menopausal women who visit community health centers

in the Padang City work area is more likely to have underweight nutritional status.

4. Frequency distribution of hormonal contraceptive use among menopausal women who visit community health centers in the Padang City work area, the majority of whom use non-hormonal contraception.

5. The age of menarche has a significant relationship with the age at which menopause occurs in menopausal women who visit community health centers in the Padang City work area. The earlier the age of menarche, the earlier the age of menopause.

6. The number of parities has a significant relationship with the age at which menopause occurs in menopausal women who visit community health centers in the Padang City work area. The higher the number of parities, the longer it takes for a woman to experience menopause.

7. There is no relationship between body mass index and the age at which menopause occurs in menopausal women who visit community health centers in the Padang City work area.

8. There is no relationship between the use of hormonal contraception and the age at which menopause occurs in menopausal women who visit community health centers in the Padang City work area.

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