



Biological Analysis of Factors Influencing the Acceleration of Menopause Age in Indonesian Women

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Abstract: Menopause marks the end of a woman's menstrual cycle, typically around age 51 in Indonesia. Early menopause, before age 45, increases the risk of cardiovascular disease, osteoporosis, and mental health issues. This study examined factors affecting menopause age, including BMI, excess weight, menstrual disorders, genetics, collagen supplement use, diabetes history, parity, hormonal contraception, age at menarche, fast food consumption, and nutritional status. Data from 1683 menopausal women were collected through questionnaires, BMI calculations, and analyzed using chi-square tests with SPSS 25. Results showed no significant influence of BMI, excess weight, genetics, collagen supplements, diabetes, fast food, or nutritional status on menopause age ($p > 0.05$). However, parity, hormonal contraception, age at menarche, and menstrual disorders significantly influenced menopause timing ($p < 0.05$). These findings offer insights for improving women's reproductive health and guiding preventive measures.

Keywords: Age at menarche; Menopause; Nutritional status; Obesity; Risk factors

Introduction

State Menopause is the stage in a woman's life when menstruation permanently stops and marks the end of the fertile period. The average age for menopause is between 45 and 55 years. Menopause occurs due to a decrease in the production of reproductive hormones, especially estrogen, by the ovaries (Nappi et al., 2020). These hormonal changes can cause a variety of symptoms and physical changes in women, including changes to the menstrual cycle, vasomotor symptoms (e.g. hot flashes and night sweats), mood changes, increased risk of osteoporosis, and changes in the skin (Cory'ah et al., 2018).

Menopause occurs due to a decrease in the number and function of ovarian follicles, which leads to a decrease in the production of reproductive hormones, especially estrogen and progesterone. At birth, a woman's ovaries contain a number of follicles that

contain egg cells. During the reproductive period, a number of follicles will grow and mature every month (Chou et al., 2018). As the follicles mature, the hormones estrogen and progesterone are produced to prepare the uterus to receive and support pregnancy (Hidayah et al., 2022).

However, as we age, the number of follicles remaining in the ovaries begins to decrease. This process is known as decreased follicle reservation. This decrease in the number of follicles is also accompanied by a decrease in the quality and function of the remaining follicles. When the number of remaining follicles reaches a very low point, the ovaries are no longer able to produce sufficient amounts of estrogen and progesterone to maintain a regular menstrual cycle. This is what causes hormonal changes and ultimately menopause (Hidayah et al., 2022). Every woman has a different time for menopause, namely some come early (age 20-40 years), some experience it late (age over 55

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years) but there are also those who experience the age range of menopause (45-55 years). Women who experience menopause at the age of <40 years (premature menopause) and at the age of 40-44 years (early menopause) will experience an increase in various diseases such as the risk of cardiovascular disease and osteoporosis. Meanwhile, women who experience late menopause, namely >55 years, will increase the risk of ovarian, breast and uterine cancer (Widayana et al., 2021).

Several factors are known to accelerate the onset of menopause, including age at menarche (first menstruation), family history, body mass index, smoking, radiation exposure, as well as stress and excessive physical activity. Therefore, researchers are interested in conducting previous research to summarize it as a whole which is related to accelerating the age of menopause so that understanding these risk factors is important to help prevent and manage early menopause. Therefore, an analysis of the factors that influence the acceleration of the age of menopause in women needs to be carried out. This can provide insight for health workers and the public in efforts to maintain women's reproductive health and prevent the negative impacts that can arise due to early menopause.

Method



Figure 1. Stage of the research

This research was conducted to find out the influence of BMI, excess body weight, history of menstrual cycle disorders, genetics of menopausal age, consumption of collagen supplements, history of diabetes mellitus, parity, history of hormonal birth control, age of menarche, fast food consumption, nutritional status on menopausal age in women. Menopause. The independent variables in this study were BMI, Excess Body Weight, History of Menstrual Cycle Disorders, Genetic Age of Menopause, Consumption of Collagen Supplements, History of Diabetes Mellitus, Parity, History of Hormonal Birth Control, Age of Menarche, Consumption of Fast Food, Nutritional Status and the dependent variable was age of menopause. This study had a sample size of 1683 menopausal female respondents. The data used is primary data obtained from the results of a

questionnaire asking about the assessment of independent and dependent variables and observations of measurements of body weight and height based on the BMI formula. The data analysis used is univariate analysis, bivariate analysis using tests chi square with the SPSS version 25 program.

Result and Discussion

Results

Univariate Data

Based on table 1, it shows that of the 1683 respondents the majority experienced natural menopause as many as 771 respondents (45.8%), late menopause as many as 582 respondents (34.6%) and early menopause as many as 330 respondents (19.6%).

Table 1. Frequency Distribution of Menopausal Age in Menopausal Women in 2024

Menopause Age	Number (n)	Percentage (%)
Early Menopause	330	19.6
Natural Menopause	771	45.8
Late Menopause	582	34.6
Total	1683	100

Table 2. Frequency Distribution of BMI, Excess Body Weight, History of Menstrual Cycle Disorders, Genetic Age of Menopause, Consumption of Collagen Supplements, History of Diabetes Mellitus, Parity, History of Hormonal Birth Control, Age of Manarche, Fast Food Consumption, Nutritional Status in Menopausal Women

Respondent Characteristics	Number (n)	Percentage (%)
Body Mass Index (BMI)		
Which ones	200	11.8
Normal	500	29.8
Fat	983	58.4
Excessive Weight		
Ideal Body Weight	700	41.6
Light Excess Body Weight	491	29.2
Overweight	492	29.2
History of Menstrual Cycle Disorders		
Amenorrhea	285	16.9
Oligomenarchea	200	11.9
Menorrhage	180	10.7
Regular Cycle	1018	60.5
Genetics of Menopause Age		
No Genetics	813	48.3
Presence of genetics from the mother's family	600	35.7
Genetic Presence from the Father's Family	270	16.0
Take Collagen Supplements		
Never	1038	61.7
Often	245	14.5
Seldom	400	23.8
History of Diabetes Mellitus (DM)		

Respondent Characteristics	Number (n)	Percentage (%)
Having a DM	167	9.9
No DMs	1516	90.1
Parity		
Primipara	180	10.7
Multiparous	723	42.9
Grande Multipara	780	46.4
History of Hormonal Birth Control		
Hormonal	1200	71.3
Not Hormonal	483	28.7
Usia Manarche		
Manarch Dini	140	8.3
Manarche Alami	900	53.5
Slow Manarche	643	38.2
Consume Fast Food		
Often	139	8.2
Seldom	1500	89.1
Never	44	2.7
Nutritional status		
Malnutrition	200	11.8
Normal Nutrition	500	29.8
Excessive Nutrition	983	58.4

Based on univariate analysis conducted on 1683 menopausal maternal respondents, various interesting findings were obtained regarding the frequency distribution of factors related to menopause. First, in terms of Body Mass Index (BMI), the majority of respondents had a fat BMI, namely 983 respondents (58.4%), followed by a normal BMI at 500 respondents (29.8%), and a thin BMI at 200 respondents (11.8%). When looking at body weight, 41.6% of respondents had an ideal body weight, while 29.2% were overweight in both the heavy and light categories. In terms of history of menstrual disorders, the majority of respondents (60.5%) had regular menstrual cycles, while 39.5% experienced menstrual disorders such as amenorrhea (16.9%), oligomenorrhea (11.9%), and menorrhagia (10.7%). Regarding genetic factors, 48.3% of respondents had no genetic history of menopause in the family, while 35.7% inherited genetics from their mother's side and 16% from their father's side.

Consumption of collagen supplements shows that the majority of respondents (61.7%) never consume them, 23.8% rarely consume them, and 14.5% often consume them. Most respondents (90.1%) had no history of diabetes mellitus (DM), while the other 9.9% had DM. Regarding parity, 46.4% of respondents were grande multipara, followed by multipara (42.9%), and primipara (10.7%). The majority of respondents (71.3%) also reported using hormonal contraception, while 28.7% did not use hormonal contraception. In terms of age at menarche, the majority of respondents (53.5%) experienced menarche at normal age, while 38.2% experienced late menarche and 9.3% experienced early menarche. Fast food consumption was also recorded as

low, with the majority of respondents (89.1%) rarely consuming fast food, 8.2% often, and 2.7% never. Finally, in terms of nutritional status, 58.4% of respondents had excessive nutritional status, 29.8% had normal nutrition, and 11.8% had insufficient nutrition. These findings provide an overview of the characteristics of menopausal women based on the factors that have been studied.

Bivariate Data

Bivariate data results: Influence of BMI, excess body weight, history of menstrual cycle disorders, genetics, age of menopause, consumption of collagen supplements, history of diabetes mellitus, parity, history of hormonal birth control, age of menarche, consumption of fast food, nutritional status on age of menopause. Research on factors that influence the age of menopause in women show various interesting findings that may provide deeper insight into this biological process. The results of the analysis of Body Mass Index (BMI) on age of menopause using Chi-square showed a significance value of 0.653, which means there is no significant influence between BMI and accelerated age of menopause. Likewise, the analysis of excess body weight against age of menopause produced the same significance value, indicating that excess body weight does not have a significant effect on the acceleration of menopause.

On the other hand, a history of menstrual disorders shows a significant influence on the acceleration of the age of menopause, with a significance value of 0.04 (p-value < 0.05). This shows that women who experience menstrual disorders tend to experience menopause more quickly. The genetic factor of age at menopause, however, did not show a significant influence on the acceleration of age at menopause, with a significance value of 0.521. Consumption of collagen supplements also did not show a significant effect on age of menopause, with a significance value of 0.312. Apart from that, a history of diabetes mellitus does not have a significant effect on the age of menopause, shown by a significance value of 0.523.

However, history of using hormonal birth control showed a significant influence on the age of menopause, with a significance value of 0.00 (p-value < 0.05). This shows that the use of hormonal birth control can affect the age of menopause in women. Parity, or the number of births a woman experiences, also shows a significant influence on age at menopause, with the same significance value. The age of menarche, or the age when menstruation first occurs, also has a significant influence on the age of menopause, with a significance value of 0.000. This suggests that an earlier or later age at menarche may influence when a woman will enter menopause. On the other hand, fast food consumption

does not show a significant effect on age of menopause, with a significance value of 0.080. Nutritional status, which was also analyzed in this study, did not show a significant influence on age at menopause, with a significance value of 0.364.

Table 3. Influence of BMI, Excess Body Weight, History of Menstrual Cycle Disorders, Genetic Age of Menopause, Consumption of Collagen Supplements, History of Diabetes Mellitus, Parity, History of Hormonal Birth Control, Age of Manarche, Consumption of Fast Food, Nutritional Status on Age of Menopause in Menopous Women

IMT	Menopause Age						Total	Asymp. Sign (2 - sided)	
	Menopause Religion	Natural Menopause	Late Menopause						
	n	%	n	%	n	%	n	%	
Which ones	59	29.5	78	39	63	31.5	200	100	0.653
Normal	150	30	175	35	175	35	500	100	
Fat	329	33.5	360	36.6	294	29.9	983	100	
Excessive Weight	Menopause Age						Total	Asymp. Sign (2 - sided)	
	Menopause Religion	Natural Menopause	Late Menopause						
	n	%	n	%	n	%	n	%	
Ideal Body Weight	175	25	330	47.1	195	27.9	700	100	0.653
Mild excess weight	160	32.6	225	45.8	106	21.6	491	100	
Being overweight	300	60.9	39.1	43.3	0	0	492	100	
History of Menstrual Disorders	Menopause Age						Total	Asymp. Sign (2 - sided)	
	Menopause Religion	Natural Menopause	Late Menopause						
	n	%	n	%	n	%	n	%	
experiencing menstrual cycle disorders	135	47.3	50	17.5	100	35.2	285	100	0.04
Do not experience menstrual cycle disorders	100	9.8	800	78.6	118	11.6	1018	100	
Genetics of Menopause Age	Menopause Age						Total	Asymp. Sign (2 - sided)	
	Menopause Religion	Natural Menopause	Late Menopause						
	n	%	n	%	n	%	n	%	
No genetics	200	24.6	400	49.2	213	26.2	813	100	0.521
Presence of genetics from the mother's family	180	30	300	50	120	20	600	100	
Presence of genetics from the father's family	172	63.7	98	36.3	0	0	270	100	
Take Collagen Supplements	Menopause Age						Total	Asymp. Sign (2 - sided)	
	Menopause Religion	Natural Menopause	Late Menopause						
	n	%	n	%	n	%	n	%	
Never	202	19.6	357	34.2	479	46.2	1038	100	0.312
Often	0	0	150	61.2	95	38.8	245	100	
Seldom	100	25	220	55	80	20	400	100	
History of Diabetes Mellitus (DM)	Menopause Age						Total	Asymp. Sign (2 - sided)	
	Menopause Religion	Natural Menopause	Late Menopause						
	n	%	n	%	n	%	n	%	
Having a DM	30	17.9	37	22.2	100	59.9	167	100	0.523
No DMs	320	20.5	578	36.9	667	42.6	1565	100	
Parity	Menopause Age						Total	Asymp. Sign (2 - sided)	
	Menopause Religion	Natural Menopause	Late Menopause						
	n	%	n	%	n	%	n	%	
Primipara	40	22.2	100	55.6	40	22.2	180	100	0.000
Multiparous	100	13.8	300	41.5	323	44.7	723	100	
Grande Multipara	120	15.3	87	11.2	573	73.5	780	100	
History of Hormonal Birth Control	Menopause Age						Total	Asymp. sign(2 - sided)	
	Menopause Religion	Natural Menopause	Late Menopause						
	n	%	n	%	n	%	n	%	
Hormonal	600	50	300	25	300	25	1200	100	0.000
Not Hormonal	0	0	283	58.6	200	41.4	483	100	

IMT	Menopause Age						Total		Asymp. Sign (2 - sided)
	Menopause Religion		Natural Menopause		Late Menopause		n	%	
	n	%	n	%	n	%			
Which ones	59	29.5	78	39	63	31.5	200	100	0.653
Normal	150	30	175	35	175	35	500	100	
Fat	329	33.5	360	36.6	294	29.9	983	100	
Usia Manarche	Menopause Age						Total		Asymp. Sign (2 - sided)
Manarche Dini	Menopause Religion		Natural Menopause		Late Menopause		n	%	
	n	%	n	%	n	%			
Manarche Alami	40	4.4	500	55.6	360	40	900	100	0.000
Slow Manarche	300	46.6	143	22.2	200	31.2	643	100	
Consume Fast Food	Menopause Age						Total		
Settings	Menopause Religion		Natural Menopause		Late Menopause		n	%	
	n	%	n	%	n	%			
	39	28.2	50	35.9	50	35.9			139
Seldom	200	13.3	500	33.3	800	53.4	1500	100	0.080
Never	10	22.7	30	68.2	4	9.1	44	100	
Nutritional status	Menopause Age						Total		Asymp. Sign (2 - sided)
Malnutrition	Menopause Religion		Natural Menopause		Late Menopause		n	%	
	n	%	n	%	n	%			
	30	15	70	35	100	50			200
Normal Nutrition	130	26	225	45	145	29	500	100	0.364
Excessive Nutrition	100	10.2	386	39.3	497	50.5	983	100	

Overall, the results of this study indicate that factors such as history of menstrual disorders, use of hormonal birth control, parity, and age of menarche have a significant influence on age of menopause. Meanwhile, other factors such as BMI, excess body weight, genetics, consumption of collagen supplements, history of diabetes mellitus, consumption of fast food, and nutritional status do not show a significant influence on the acceleration of menopause. These findings highlight the complexity of factors influencing age at menopause and the importance of considering multiple aspects in understanding this biological process.

Discussion

The Influence of BMI on the Age of Menopause in Menopausal Women

Analysis using Chi-square shows that Body Mass Index (BMI) does not have a significant influence on the acceleration of the age of menopause, with a p-value of 0.653 (p-value > 0.05). This finding is consistent with previous research by Ningsih et al. (2022), which stated there was no relationship between BMI and length of menopause in women aged 40-60 years. Likewise, research by Ju et al. (2018) found that although obesity increased the risk of early menopause, the relationship was not significant. Widayana et al. (2021), Arinkan et al. (2021), and Zhu et al. (2018) explains that menopause is a natural process due to a decrease in ovarian function and is not directly influenced by BMI. Suparni et al. (2016) added that menopause occurs due to a decrease

in the production of the hormones estrogen and progesterone, not because of BMI. Although there are studies that show a correlation between BMI and age at menopause, this correlation does not mean there is a cause-and-effect relationship. Theoretically, menopause is more influenced by hormonal and genetic factors than by BMI. Therefore, BMI does not directly accelerate menopause.

The Effect of Excessive Weight on Menopausal Age in Menopausal Women

Analysis using Chi-square shows that excess body weight does not have a significant effect on accelerating the age of menopause, with a p-value of 0.653 (p-value > 0.05). This finding is different from the research of Saini et al. (2019), which states that menopause occurs more often in women who are overweight compared to those who have a normal weight (p = 0.033). According to the theory of Landi et al. (2013) in Veranita et al. (2023), normal aging is associated with an increase in adipose tissue and muscle loss, or sarcopenia, which is accelerated by changes in lifestyle, diet and genetic factors. Researchers assume that although several studies show a link between body weight and age of menopause, obesity does not directly cause earlier menopause. Menopause is a natural process that is mainly influenced by age and decreased production of the hormone estrogen, not body weight (Fenton, 2021; Hart, 2022; Moccia et al., 2022; Monteleone et al., 2018). Therefore, women who are overweight will not always

experience menopause more quickly than women who have a normal weight. In conclusion, although there is a relationship between body weight and age of menopause, excess body weight is not the main factor that accelerates menopause.

The Influence of a History of Menstrual Cycle Disorders on the Age of Menopause in Menopausal Women

Analysis using Chi-square shows that a history of menstrual disorders has a significant influence on the acceleration of the age of menopause, with a p-value of 0.04 (p-value < 0.05). These results are consistent with previous research showing that menstrual disorders such as irregular cycles, amenorrhea, and oligomenorrhea can increase the risk of early menopause. Menstrual disorders indicate a hormonal imbalance that can accelerate the depletion of follicular reserves in the ovaries (Bae et al., 2018). Medical conditions such as PCOS, hyperprolactinemia, and hypothyroidism, which disrupt hormonal balance, can also accelerate premature menopause (Shah et al., 2021). Untreated hormonal disorders accelerate the depletion of follicles, causing menopause to occur earlier than the average age (45-55 years). This research shows that women with a history of irregular menstrual cycles are more at risk of experiencing early menopause compared to women with regular menstrual cycles. This is caused by interference with the function of the ovaries in producing the hormones estrogen and progesterone, which accelerates the process of depleting follicular reserves in the ovaries and causes premature menopause.

Genetic Influence of the Age of Menopause on the Age of Menopause in Menopausal Women

Analysis using Chi-square shows that genetic factors do not have a significant influence on accelerating the age of menopause, with a p-value of 0.521 (p-value > 0.05). This shows that the genetic age of menopause does not have a direct effect on the occurrence of early menopause. According to Efendi Yunus' theory (2020), genetics is a branch of biology that studies inherited and inherited traits, but gene inheritance is influenced by various factors such as genetic recombination, natural selection, genetic mutation, epigenetics, and chance, which produces unique gene combinations in every individual. (Ceylan et al. (2015) research shows that women with a family history of early menopause have a 2-3 times higher risk of experiencing it, indicating a genetic predisposition. However, because the process of gene inheritance is not always direct and is influenced by many factors, each woman has a different combination of genes, which influences the age of menopause uniquely. Although genetics plays an important role in determining

inherited traits, there is no significant influence of genetics on age of menopause based on the results of this study.

The Effect of Consuming Collagen Supplements on Menopausal Age in Menopausal Women

The results of the analysis show that consumption of collagen supplements does not have a significant effect on age of menopause (p-value = 0.312). This research is in line with the theory that collagen, although important for healthy skin and tissue, is not directly related to the female reproductive system. The menopause process is more related to a decrease in the hormones estrogen and progesterone, not collagen. Although collagen supplements can improve skin elasticity and moisture and reduce wrinkles, collagen does not affect the biological mechanisms that cause menopause. Therefore, although collagen supplements have benefits for the skin, there is no scientific evidence to support that collagen can speed up or delay menopause. Collagen that comes from external sources such as bones or fish has a different metabolic process from the body's natural collagen, and its effects on health still require further research. Overall, collagen does not have a direct relationship with age at menopause.

The Influence of a History of Diabetes Mellitus on Menopausal Age

Analysis of history of diabetes mellitus showed that there was no significant effect on age of menopause (p-value = 0.523). Menopause is a natural process that occurs due to a decrease in ovarian function and the production of the hormones estrogen and progesterone, which is influenced by genetic and environmental factors. Diabetes mellitus, on the other hand, is a metabolic disorder involving insulin and glucose, and is not directly related to reproductive hormones. Although diabetes mellitus can affect overall health, including reproductive health, there is no evidence that a history of diabetes mellitus directly influences the acceleration or delay of the age of menopause. Therefore, it is important for women with diabetes to maintain their health, but not to worry that diabetes will directly affect their menopause age.

Effect of Parity on Menopausal Age

The results of the analysis show that there is a significant influence between parity (number of births) and age at menopause (p-value = 0.000). This research found that women with high parity tend to experience menopause at a later age than women with low parity or who have never given birth. Several studies support these findings, showing that pregnancy and childbirth can stimulate ovarian function, thereby delaying menopause. However, other factors such as age at last

birth also play a role. Mothers who give birth at the age of more than 35 years have a higher risk of experiencing abnormal menopause. However, parity is not the only factor that influences the age of menopause. Genetics, lifestyle and environmental factors also play an important role. Therefore, although the number of children one has can influence the age of menopause, this is only one of many factors that influence the process.

Effect of Hormonal Birth Control History on Menopausal Age

The results of the analysis showed that there was a significant influence between history of using hormonal birth control and age at menopause (p -value = 0.00). This research found that the use of hormonal contraception, which contains estrogen and progesterone, can delay the age of menopause. These hormones suppress ovarian function, thereby reducing egg production and prolonging the menstrual period until the egg cells run out. Other research also supports these findings, showing that women who use hormonal contraception have a greater chance of experiencing menopause at an older age compared to those who do not use hormonal contraception. Therefore, the use of hormonal birth control may be a factor in delaying menopause, making it an important consideration in family planning.

Influence of Menarche Age on Menopause Age

The results of the analysis show that there is a significant influence between the age of menarche (age of first menstruation) and the age of menopause (p -value = 0.000). This study found that women who experienced menarche at a younger age tended to experience menopause later, which was associated with higher levels of Anti-Mullerian Hormone (AMH). AMH is a hormone that plays a role in the growth of ovarian follicles and can influence the length of a woman's reproductive period. Other research also supports these findings, showing that the age of menarche influences the number of eggs available in the ovaries, which in turn influences the age of menopause. Therefore, earlier menarche may be associated with a longer reproductive lifespan, while later menarche may accelerate menopause. These findings provide important insights for pre-menopausal women to understand the relationship between age at menarche and menopause.

The Effect of Fast Food Consumption on Menopausal Age in Menopausal Women

This study examines the relationship between fast food consumption and age of menopause in women at the Gunung Kaler Community Health Center in 2024. Analysis using Chi-square produces a significance value of 0.080, indicating there is no significant influence between fast food consumption and age of menopause

(p -value > 0, 05). Menopause is a natural process in which the ovaries stop producing the hormones estrogen and progesterone, causing the menstrual cycle to stop. Regular consumption of fast food can lead to weight gain and risk of heart disease, but has not been shown to affect the hormonal processes that lead to menopause. The researchers concluded that hormonal and genetic factors have a greater influence on the age of menopause than fast food consumption patterns. Other factors such as lifestyle, medical conditions and environment are also thought to have a greater influence. Therefore, fast food consumption does not have a direct or significant relationship with the age of menopause in women.

The Influence of Nutritional Status on the Age of Menopause in Menopausal Women

This study evaluated the relationship between nutritional status and age of menopause in women at the Cisoka Community Health Center in 2024. The results of analysis using Chi-square showed that there was no significant influence between nutritional status and age of menopause (significance value 0.364, p -value > 0.05). Menopause occurs due to a decrease in the production of the hormones estrogen and progesterone by the ovaries, due to a reduction in the number of follicles with age. Several other studies have shown a relationship between nutritional status and early menopause, but the results are not always consistent. Researchers believe that menopause is dominated by hormonal factors rather than nutritional status. Although poor nutritional status can cause negative effects on health, this study did not find sufficient evidence to conclude that nutritional status plays a significant role in accelerating menopause. Hormonal factors remain the main determinant in the menopause process in women.

Conclusion

In research on factors that influence the age of menopause in women, it was found that several variables have a significant influence on the age of menopause. History of menstrual cycle disorders, parity, history of hormonal contraceptive use, and age of menarche show a significant influence on age of menopause in women. Menstrual cycle disorders including amenorrhea, oligomenorrhea, and menorrhagia can accelerate menopause, perhaps due to hormonal imbalances that occur during the menstrual cycle. Parity, or number of births, also plays an important role, with women with more children tending to experience menopause at different ages compared to women with few or no children. A history of using hormonal contraception can affect the age of menopause because the influence of hormones in contraception can

change the pattern of the menstrual cycle and the menopause process. In addition, the age of menarche, namely the age when menstruation first begins, also influences the timing of menopause; women who experience menarche earlier or later may experience menopause at different ages. In contrast, factors such as Body Mass Index (BMI), excess body weight, genetics, age of menopause, consumption of collagen supplements, history of diabetes mellitus, consumption of fast food, and nutritional status did not show a significant influence on age of menopause. Statistical analysis shows that the p-value for these factors is greater than α (p-value > 0.05), so there is no significant relationship between these factors and the age of menopause in women. This suggests that although these factors may have an impact on general health, they do not directly influence the timing of menopause. This research suggests that hormonal and genetic factors may be more dominant in determining the age of menopause than other factors.

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Conflicts of Interest

The authors declare no conflict of interest.

References

- Arinkan, S. A., & Gunacti, M. (2021). Factors influencing age at natural menopause. *Journal of Obstetrics and Gynaecology Research*, 47(3), 913–920. <https://doi.org/10.1111/jog.14614>
- Bae, J., Li, Y., Zhang, J., Zhou, X., Zhao, F., Shi, Y., Goodenough, J. B., & Yu, G. (2018). A 3D Nanostructured Hydrogel-Framework-Derived High-Performance Composite Polymer Lithium-Ion Electrolyte. *Angewandte Chemie International Edition*, 57(8), 2096–2100. <https://doi.org/10.1002/anie.201710841>
- Ceylan, B., & Özerdoğan, N. (2015). Factors affecting age of onset of menopause and determination of quality of life in menopause. *Journal of Turkish Society of Obstetric and Gynecology*, 12(1), 43–49. <https://doi.org/10.4274/tjod.79836>
- Chou, C.-H., & Chen, M.-J. (2018). The Effect of Steroid Hormones on Ovarian Follicle Development. In *Vitamins and Hormones* (pp. 155–175). <https://doi.org/10.1016/bs.vh.2018.01.013>
- Cory'ah, F. A. N., & Wahyuni, I. G. A. P. S. (2018). Hubungan Sindrom Menopause Dengan Tingkat Kecemasan Ibu Menopause Di Wilayah Kerja Puskesmas Ubung Kabupaten Lombok Tengah Tahun 2018. *Jurnal Kebidanan*, 3(1), 8–16. Retrieved from <http://e-jurnal-akbidjember.ac.id/index.php/jkakj/article/view/19/14>
- Fenton, A. (2021). Weight, Shape, and Body Composition Changes at Menopause. *Journal of Mid-Life Health*, 12(3), 187–192. https://doi.org/10.4103/jmh.jmh_123_21
- Hart, D. A. (2022). Sex Differences in Biological Systems and the Conundrum of Menopause: Potential Commonalities in Post-Menopausal Disease Mechanisms. *International Journal of Molecular Sciences*, 23(8), 4119. <https://doi.org/10.3390/ijms23084119>
- Hidayah, N., & Hartatik. (2022). Usia Menopause, Riwayat Kontrasepsi, Berat Menopause Di desa Angkatanlor Tambakromo. *Jurnal Ilmu Keperawatan Dan Kebidanan*, 13(1), 368–374. <https://doi.org/10.26751/jikk.v13i1.1362>
- Ju, J., Zhu, A., & Yuan, P. (2018). Progress in targeted therapy for breast cancer. *Chronic Diseases and Translational Medicine*, 4(3), 164–175. <https://doi.org/10.1016/j.cdtm.2018.04.002>
- Landi, E., Young, P. R., Dere, K. P., Del Zanna, G., & Mason, H. E. (2013). Chianti – an atomic database for emission lines. Xiii. Soft x-ray improvements and other changes. *The Astrophysical Journal*, 763(2), 86. <https://doi.org/10.1088/0004-637X/763/2/86>
- Moccia, P., Belda-Montesinos, R., Monllor-Tormos, A., Chedraui, P., & Cano, A. (2022). Body weight and fat mass across the menopausal transition: hormonal modulators. *Gynecological Endocrinology*, 38(2), 99–104. <https://doi.org/10.1080/09513590.2021.2004395>
- Monteleone, P., Mascagni, G., Giannini, A., Genazzani, A. R., & Simoncini, T. (2018). Symptoms of menopause – global prevalence, physiology and implications. *Nature Reviews Endocrinology*, 14(4), 199–215. <https://doi.org/10.1038/nrendo.2017.180>
- Nappi, R. E., & Cucinella, L. (2020). *Long-Term Consequences of Menopause*. https://doi.org/10.1007/978-3-030-03594-5_17-1
- Ningsih, P. W., Chalil, M. J. A., Akbar, A., & Wildani, H. (2022). Pengaruh Konsumsi Kafein terhadap

- Premenstrual Syndrome pada Mahasiswi Fakultas Kedokteran Universitas Muhammadiyah Sumatera Utara. *Jurnal Implementa Husada*, 3(2). <https://doi.org/10.30596/jih.v3i2.9680>
- Saini, N., & Singhania, M. (2019). Performance relevance of environmental and social disclosures. *Benchmarking: An International Journal*, 26(6), 1845–1873. <https://doi.org/10.1108/BIJ-04-2018-0114>
- Shah, W. H., Rasool, A., Saleem, S., Mushtaq, N. U., Tahir, I., Hakeem, K. R., & Rehman, R. U. (2021). Understanding the Integrated Pathways and Mechanisms of Transporters, Protein Kinases, and Transcription Factors in Plants under Salt Stress. *International Journal of Genomics*, 2021, 1–16. <https://doi.org/10.1155/2021/5578727>
- Suparni, I. E., & Astutik, R. Y. (2016). *Menopause Masalah dan Penanganannya*. Yogyakarta: Deepublish.
- Veranita, Mira, & Hatimatunnisani, H. (2023). Pengaruh Mutu Pelayanan Terhadap Kepuasan Pasien: (Studi Kasus Pada Pasien Rawat Jalan Di Rumah Sakit Mata Bandung Eye Center). *Business Preneur: Jurnal Ilmu Administrasi Bisnis*, 5(1), 362–368. Retrieved from <https://journal.unpas.ac.id/index.php/businesspreneur/article/view/5975> <https://journal.unpas.ac.id/index.php/businesspreneur/article/download/5975/2840>
- Widayana, M. K., Dwiningsih, S. R., & Herawati, L. (2021). Hubungan Antara Indeks Massa Tubuh (IMT) Dan Paritas Terhadap Usia Menopause Di Surabaya. *Jurnal Ilmiah Mahasiswa Kesehatan Masyarakat*, 6(1). <https://doi.org/10.37887/jimkesmas.v6i1.16388>
- Zhu, D., Chung, H.-F., Pandeya, N., Dobson, A. J., Kuh, D., Crawford, S. L., Gold, E. B., Avis, N. E., Giles, G. G., Bruinsma, F., Adami, H.-O., Weiderpass, E., Greenwood, D. C., Cade, J. E., Mitchell, E. S., Woods, N. F., Brunner, E. J., Simonsen, M. K., & Mishra, G. D. (2018). Body mass index and age at natural menopause: an international pooled analysis of 11 prospective studies. *European Journal of Epidemiology*, 33(8), 699–710. <https://doi.org/10.1007/s10654-018-0367-y>