



Research article

Determinants of knowledge and perception about menopause among Saudi women: A cross-sectional study

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ABSTRACT

Background: Healthcare professionals and educators closely monitor the occurrence of climacteric symptoms in women's primes. Knowledge and perception of menopause play a crucial role in improving quality of life. This study aimed to assess the knowledge and perceptions of menopause among Saudi women and identify its predictors. This study is the first of its kind in the southern region of Saudi Arabia.

Methods: Conducted in accordance with the STROBE guidelines, this cross-sectional study was carried out in the Jazan region from May 2022 to January 2023 and involved 480 Saudi women who provided consent. Data were collected through interviews using a validated questionnaire and random sampling. The questionnaire consisted of four parts: informed consent, demographics, 21 knowledge questions, and ten menopause perception questions. The validity of the content and the internal consistency were evaluated before data collection. Primary health-care centers were randomly selected from four governorates with a proportional sample size to the population. Descriptive analysis, Pearson correlation, and multivariate logistic regression analyses were performed using IBM-SPSS.

Results: Among the participants, 64 % were under 40 years old, 80 % had experienced menarche between the ages of 10 and 15, 48 % were employed, approximately half held a bachelor's degree, and they had a good family income. The mean knowledge score of the participants was 48.87 ± 11.72 , with a minimum score of 27 and a maximum score of 78. In terms of knowledge categories, 56.3 % of the participants (N = 270) were classified as having low knowledge, while 43.8 % (N = 210) were classified as having high knowledge. Most of the participants had positive perceptions and agreed that menopause is a natural event in women's lives. There was a significant positive correlation between knowledge and perception ($R = 0.219$, $P < 0.01$). Variable findings were observed regarding the role of explanatory variables in women's knowledge of menopause between univariate and multivariate models. The results of the multivariate model showed that age (46–50 years, OR = 0.42), having children (OR = 1.09), residence (OR = 0.45–5.73) and family income categories (medium: OR = 3.98, good: OR = 3.78, and excellent:

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OR = 1.95) had a significant impact on knowledge, highlighting the correlation between demographic factors and knowledge.

Conclusions: Based on the study findings, we recommend implementing workplace and community-based activities to increase women's awareness of menopause and incorporating it as an integral part of counseling sessions for women in this age group. Therefore, the results of the study will be shared with the relevant authorities responsible for women's health, enabling them to effectively support and educate women.

1. Introduction

Menopause is a natural stage in the life of a woman when her ovaries produce less estrogen, resulting in an inability to conceive. The diagnosis was confirmed after 12 consecutive months of missed menses [1]. In Saudi Arabia, most women experience menopause between the ages of 51 and 55 [2]. It is important to note that menopause is not a singular path, as menstruation can cease for various reasons at different stages of life with varying health issues. Hormonal imbalance, specifically insufficient estrogen levels, is the primary cause of menopausal symptoms [3]. Other factors, such as smoking, increased body mass index, economic and social status, and medical treatments such as chemotherapy, radiation therapy, or oophorectomy, can contribute to the early onset of menopause [4]. Menopause is a significant stage in a woman's life and involves physical and psychological changes. How women approach and navigate these changes affects their perceptions and attitudes towards menopause, midlife, and aging. It is beneficial for women to be informed about what to expect and the available choices to help them manage this transition [5–10]. Menopause is characterized by various symptoms, including hot flashes, sleep disturbances, affective disorders, sexual dysfunction, osteoporosis, and weight gain [11, 12].

Although numerous studies have been conducted on menopause among women, most have focused on post-menopausal women [13–15]. Therefore, it is crucial to pay attention to the knowledge and perceptions of menopause among women in the pre- and post-menopausal periods. Women should be familiar with this stage before experiencing it, allowing them to cope effectively with it when the time comes [16–18]. Studies on menopausal knowledge have assessed women's understanding of childbearing potential, menopausal symptoms, menstrual cycle alterations, menopausal age, hormonal changes, the impact of estrogen therapy, perimenopause, postmenopause, and other related topics [19].

Evidence suggests that psychological, societal, cultural, and individual factors can influence menopausal symptoms. Applying the self-regulation paradigm to understand how women conceptualize menopause and manage their symptoms is crucial. This theory emphasizes the motivational system of setting goals, implementing strategies to achieve those goals, evaluating success, and adjusting goals and actions, as needed. Self-regulation models are commonly used to explain health-related behaviors aimed at improving health, such as avoiding stress, seeking health information and medical attention, adhering to medication regimens, and engaging in regular physical activity. The model highlights the importance of feedback, as women who recognize that menopause requires behavioral changes seek information about the outcomes of their actions and take steps to achieve the desired results. This approach also emphasizes self-control, willpower, and the role of emotions in driving and directing behavior [20–24].

According to the Saudi 2017 population census, women accounted for 49.06 % of the population. Furthermore, the average lifespan is projected to be 75 years, according to Saudi Vision 2030 [15,25]. Therefore, healthcare providers should strive to develop specialized clinics to promote women's health in this age group, reduce comorbidities, and minimize costs [2,15]. Previous studies conducted in Arar City, KSA, among women aged 40 to 65 who attended primary care clinics showed that the respondents were aware of menopause symptoms, and more than half knew that menopause could occur early [13,26]. However, their knowledge about the treatability of menopausal symptoms was limited, as revealed in a study conducted in Madinah, KSA, among postmenopausal women [13]. Most of the participants in the Madinah study had good knowledge of postmenopausal status, with 71 % obtaining information from physicians. Age, educational level, and employment status were significantly associated with knowledge [14]. The reviewed studies highlight the need for more research on knowledge and perception of menopause among Saudi women. Alharthi et al. (2018) found that about half of the participants had good knowledge about menopause, with factors such as age, marital status, education, and occupation influencing their knowledge levels [27]. Alqaiz et al. (2014) identified that housewives, those living in apartments, those who did not exercise regularly and those who were obese were more likely to experience severe menopausal symptoms [28]. These studies collectively emphasize the importance of conducting more research to improve knowledge about menopause among Saudi women and develop interventions to manage menopausal symptoms effectively.

To our knowledge, no published study has examined the knowledge and perception of menopause among Saudi women in the Jazan region, highlighting the urgency of this research. This study aimed to evaluate the knowledge and perceptions of menopause among Saudi women. It is alarming to note the lack of interventions in the field of menopause and its health challenges for women. The existing primary care package is insufficient for this age group. Conducting such studies is essential to inform healthcare service providers and implement reproductive healthcare packages in the region.

2. Materials and methods

2.1. Study design and population

A cross-sectional study based on the STROBE guidelines was conducted in the Jazan region, which is a port city and one of the 13 regions of the Kingdom of Saudi Arabia (KSA). Jazan is located on the southern coast of the Red Sea, covering an area of 11,671 km with a population of 1,637,361 people, according to the mid-2019 census [29]. The study included Saudi women aged 30–65 years who met the inclusion criteria. This study was conducted from May 2022 to January 2023, adhering to the pertinent standards and regulations of the Declaration of Helsinki. The study followed the STROBE guidelines for cross-sectional studies [Supplementary Materials 1].

2.2. Sampling and sample size calculation

This study utilized a random sampling methodology to ensure the selection of study samples. The sampling process involved randomization at both the cluster and respondent levels. Initially, four regions were randomly selected from 16 governorates in Jazan. Within each chosen region, primary health care centers (PHCCs) were selected as study sites using a random selection process. Three PHCCs were selected for each governorate. Subsequently, study participants were randomly recruited from women seeking medical care in these primary health care centers. Inclusion and exclusion criteria were used to specify the particular types of disease for which patients sought medical care. The sample size distribution by region was calculated on the basis of the population size of each region. The sample size calculation was based on knowledge of the outcome variable. The sample size was determined using the following formula.

$$n = z^2 \frac{P(1-P)}{d^2}$$

where n is the sample size, z is the standard normal distribution corresponding to a confidence level of 95 %, P is the estimated percentage of the primary indicator (0.5), and d is the degree of precision required for the population ($d = 0.05$ or 5 %). The initial sample size was 384. Considering the non-response rate typically observed in cross-sectional studies, a final sample size of 480 participants was determined after accounting for 25 % of the non-response rate. Respondents were randomly selected from among patients who attended health services during the study. The questionnaire was administered through interviews with PHCC attendees who met the inclusion criteria.

2.3. Inclusion and exclusion criteria

The study inclusion criteria included women between the ages of 30 and 65 years who provided their written consent to participate, were not pregnant or nursing, had controlled medical disorders, did not receive cancer therapy or were in remission and had no history of drug misuse. Women undergoing hormone replacement therapy were excluded from the study. These criteria were carefully defined to select eligible participants who met the characteristics and conditions essential for achieving the research objectives.

2.4. Study measures and data collection

Data were collected using an Arabic version of a questionnaire adopted from previous studies [6,8,13,16,19,20,30,31]. The questionnaire consisted of four parts: informed consent, demographic information, questions to determine knowledge about menopausal symptoms and ways to control them, and questions to measure perception toward menopause. The answers to the knowledge questions were coded as correct or incorrect and the knowledge was classified as low or good based on the scores. Perception was measured on a four-point scale of agreement. The trained investigators conducted the interviews in a designated room to ensure privacy.

2.5. Pilot study and validation

The Arabic translation of the questionnaire was conducted by two independent translators. The questionnaire was reviewed by two gynecologists, a professor of public health, experienced healthcare professionals, and language specialists to ensure its validity. After pilot testing with 30 women, nurses, and lecturers, the number of options on the scale was reduced to three: “yes,” “no,” and “don’t know”. Modifications were made to the grading procedure based on the challenges encountered by the participants. The reliability scores (Cronbach’s Alpha) for both the knowledge and perception scales were greater than 0.7, indicating acceptable internal consistency. Cronbach’s alpha values for the knowledge and perception scales were 0.876 and 0.71, respectively.

2.6. Data analysis

Data analysis was performed using Statistical Package for the Social Sciences (IBM-SPSS) software. A descriptive analysis was conducted to examine demographic characteristics, knowledge, and perceptions. Data transformation was performed to facilitate scoring and categorization. The mean, standard deviation, and minimum and maximum values for knowledge and perception were

obtained, respectively. The Mann-Whitney U test and Kruskal-Wallis nonparametric test were used to assess differences in knowledge and perception scores across demographic characteristics. The Pearson correlation coefficient (r) was calculated to evaluate the linear association between knowledge and perception scores. Multivariate logistic regression was used to examine the relationship between demographic factors and knowledge, initially conducting a univariate logistic regression between knowledge and each independent variable separately, followed by a final analysis to determine their combined effect. Statistical significance was established at a significance level of 0.05.

2.7. Ethical considerations

This study was approved by the Research Ethics Committee of the Jazan Health Directorate, Jazan (JHD-23). Participants were free to withdraw from the study at any stage without negative consequences. The privacy and confidentiality of participant information was ensured. Informed consent was obtained from all participants before administering the questionnaire.

Table 1
Sociodemographic characteristics of the study population (n = 480).

Variables ^a	Frequency (%)	Knowledge score		Perception score	
		Mean	SD	Mean	SD
Age group					
30-35	202 (42.1)	49.48	11.75	23.06	4.11
36-40	107 (22.3)	49.28	10.95	22.28	4.68
41-45	91 (19.0)	49.12	13.15	23.24	4.82
46-50	47 (9.8)	45.79	9.69	22.00	4.21
51-55	21 (4.4)	47.00	13.97	22.48	4.38
56-65	12 (2.5)	48.75	9.07	22.92	3.03
Age at first menstruation					
Less than 10 years	37 (7.7)	47.68	12.21	22.62	3.88
10-12	188 (39.2)	47.79	11.53	22.81	4.58
13-15	237 (49.4)	49.79	11.65	22.84	4.23
16-18	18 (3.8)	50.67	13.24	22.22	5.47
Marital status					
Single	83 (17.3)	52.19 ^a	12.19	22.59	4.44
Married	366 (76.2)	47.92	11.35	22.77	4.22
Divorced	19 (4.0)	53.79	13.36	24.16	5.96
Widow	12 (2.5)	47.58	12.12	22.58	6.05
Children					
Yes	350 (72.9)	47.98 ^a	11.51	22.82	4.37
No	130 (27.1)	51.30	11.98	22.70	4.43
Work					
Private sector	38 (7.9)	47.447 ^a	13.536	22.500	4.909
Public sector	193 (40.2)	46.803	11.352	22.798	4.138
Not working	249 (51.9)	50.707	11.448	22.823	4.503
Residence					
Jazan city	228 (47.5)	46.26 ^a	10.83	22.82	3.74
Sabya	161 (33.5)	52.27	12.30	22.35	5.11
Ahad Al Masarihah	59 (12.3)	46.32	10.83	23.42	4.19
Farasan Island	32 (6.7)	55.19	9.92	23.63	4.92
Education level					
Primary	47 (9.8)	50.83	9.90	21.81	4.11
Intermediate	21 (4.4)	50.95	11.32	21.57	4.91
Secondary	71 (14.8)	50.37	12.66	22.86	5.09
Diploma	80 (16.7)	46.48	9.94	22.86	3.75
Bachelor	250 (52.1)	48.65	12.13	23.01	4.30
Master or higher	11 (2.3)	49.64	14.64	23.27	5.68
Family income					
Low	18 (3.8)	46.06	10.70	20.28	5.40
Medium	269 (56.0)	51.14	11.52	22.72	4.59
Good	58 (12.1)	49.16	10.22	21.64	4.70
Excellent	135 (28.1)	44.63	11.69	23.75	3.32
Total	480 (100)	48.88	11.72	22.79	4.39
Median (Interquartile Range)		47.00 (17.00)		23.00 (5.00)	

^a A cross-sectional study was conducted in the Jazan region from May 2022 to January 2023, involving 480 Saudi women who gave their consent. Data were collected through interviews using a validated questionnaire and random sampling.

3. Results

3.1. Descriptive analysis of demographic factors

Four hundred eighty eligible women were invited to participate in this study, resulting in a 100 % response rate with no missing data. Table 1 presents the demographic characteristics of the respondents. Most of the participants fell within the 30–45 age group (83.4 %), experienced their first menstruation between the ages of 10 and 15 (88.6 %), were married (76.2 %) and had children (72.9 %). In terms of education, most of the participants had obtained a diploma or bachelor's degree (68.8 %). Approximately 56 % of the participants belonged to middle-income families, and 51.9 % were unemployed. The Mann-Whitney U and Kruskal-Wallis nonparametric tests were used to analyze the differences in knowledge and perception scores across various demographic characteristics. Table 1 reveals that sociodemographic variables did not significantly affect the perception score, while the knowledge score demonstrated significant differences in relation to marital status, having children, and place of residence.

3.2. Descriptive analysis of knowledge

Table 2 illustrates the respondents' knowledge level on various aspects of menopause among Saudi women. The findings indicated that the participants showed moderate knowledge about the onset of menopause, menstruation disorders, and the influence of genetic background on menopause. However, their understanding of certain aspects was as follows: whether menopause occurs due to increasing sexual hormone levels (51 %), the impact of hormonal changes on mood (83.1 %), the association between menopause and cardiovascular disease (64.8 %), the effect of menopause on bone health (53.1 %), and the role of hormones in regulating body temperature (41.9 %).

Most respondents demonstrated a high level of awareness of preventive measures to alleviate menopausal symptoms and reduce the risk of osteoporosis through regular physical activity (57.5 % and 69 %, respectively). Furthermore, they provided a good understanding of the adverse effects of smoking during menopause. However, they were less aware of whether smoking could worsen the severity of their symptoms and complications (49.4 % and 42.9 %, respectively). On the contrary, participants acknowledged that menopause affects sexuality, stress levels, depression, and cognitive abilities such as concentration and memory (63.5 %, 67.9 %, and 47.9 %, respectively). They also demonstrated a good level of understanding of the physical effects of menopause on a woman's body, including vaginal dryness, painful sexual intercourse, skin dryness, wrinkling, and hot flashes (54 %, 61.9 %, and 49.8 %, respectively). Regarding the association between menopause and various diseases, respondents recognized an increase in body weight and the appearance of osteomalacia (46.9 % and 56.5 %, respectively). However, it is unclear whether menopause contributes to urinary frequency, dysuria, or different types of cancer (45.2 % and 39.8 %, respectively).

Table 2
Descriptive analysis of knowledge^a.

Response ^b Variable ^c	Yes		No		Don't know	
	N	%	N	%	N	%
At the time of menopause, menstruation stops suddenly	135	28.1	245	51.0	100	20.8
Saudi women become menopausal usually after 50 years	399	83.1	32	6.7	49	10.2
Most of the women experience menstruation disorder before menopause occurrence.	311	64.8	60	12.5	109	22.7
Hereditary background affects the time of menopause occurrence	255	53.1	104	21.7	121	25.2
Menopause occurs in women due to increasing sexual hormones	114	23.8	165	34.4	201	41.9
Menopause symptoms are preventable and curable	276	57.5	89	18.5	115	24.0
Regular physical activity is effective in preventing osteomalacia in menopausal women	331	69.0	43	9.0	106	22.1
Smoking affects the time of menopause occurrence	237	49.4	59	12.3	184	38.3
Smoking does not affect the severity of symptoms and complications of menopause	74	15.4	200	41.7	206	42.9
Sexualities change in menopausal women	305	63.5	42	8.8	133	27.7
The level of stress and depression feelings increases in menopausal women	326	67.9	50	10.4	104	21.7
Menopause affects the power of concentration and memory of women	230	47.9	108	22.5	142	29.6
Menopause causes vaginal dryness and painful sexual intercourse	259	54.0	44	9.2	177	36.9
Menopause causes dryness and skin shrivel in women	297	61.9	67	14.0	116	24.2
Most of the women experience hot flashes in the menopause period	239	49.8	56	11.7	185	38.5
Menopause in women increases weight and obesity	225	46.9	118	24.6	137	28.5
Menopause increases osteomalacia in women	271	56.5	91	19.0	118	24.6
Menopause causes urinary frequency and dysuria.	144	30.0	119	24.8	217	45.2
Menopause causes different types of cancer in women.	97	20.2	192	40.0	191	39.8
Menopause in women decreases genital infections.	172	35.8	127	26.5	181	37.7
Menopause increases extra hair on women's face	151	31.5	157	32.7	172	35.8
Knowledge score (Mean ± SD, minimum, and maximum)	48.87 ± 11.72 (27, 78)					
Knowledge categories (N, %)	Low knowledge		270, 56.3 %			
	High knowledge		210, 43.8 %			

^a Data were collected through interviews using a validated questionnaire and a random sampling technique.

^b Questions were coded correct or incorrect, and participant knowledge was divided into two categories based on these scores.

^c A cross-sectional study was conducted in the Jazan region from May 2022 to January 2023, involving 480 Saudi women who gave their consent. Data were collected through interviews using a validated questionnaire and random sampling.

The average knowledge score obtained was 48.87 ± 11.72 , ranging from a minimum of 27 to a maximum of 78. Based on the scores, 56.2 % of the participants fell into the low-knowledge category, while 43.8 % demonstrated high-knowledge (Table 2).

3.3. Descriptive analysis of perception

Table 3 presented below demonstrates the overall positive perception of the participants about menopause. Most of the respondents agreed that menopause is a natural occurrence in the life of a woman (91 %), and they viewed it as an opportunity for a delightful new phase (67 %) and a second stage of maturity (84 %). They also acknowledged that menopause is a period where they can focus on self-care through training and necessary adjustments, and they no longer have to worry about menstruation or pregnancy issues (86 % and 89 %).

Furthermore, respondents had positive perceptions, disagreeing with the notion that menopause represents a period of loneliness (65 %), the beginning of disablement (75 %), or a decline in a woman's physical appearance (76 %). In terms of sexuality and marital, participants expressed positive perceptions because they disagreed with the idea that a woman's interest in and attention to her husband's sexuality decreased during menopause (78 % and 73 %, respectively). Overall, the results indicated a positive perception among participants, as reflected in the scoring categories for perception.

3.4. Pearson's correlation

The Pearson correlation coefficient (r) was computed to determine the linear relationship between knowledge and perception scores. The analysis revealed a significant positive correlation between these two variables, with an R^2 value of 0.219 ($P < 0.001$) based on a sample size of 480 participants. The correlation was significant at the 0.01 level (2-tailed).

3.5. The role of demographic factors in knowledge: a multivariate logistic modeling

A multivariate logistic modeling approach was used to explore the association between knowledge and demographic factors. This analytical method allows the examination of the relationship between the response variable (knowledge) and explanatory variables (demographic factors) while considering their combined effects. The 21 knowledge-related items were combined into a new "low and high knowledge" factor, which served as the outcome or response variable. The analysis included eight demographic factors treated as independent explanatory variables (see Table 4 for details).

The analysis results presented in Table 4 indicate the individual statistical significance of each demographic factor in relation to knowledge. Crude odds ratios (OR), confidence intervals, and significance levels were calculated for each factor. The findings of the univariate logistic regression analysis revealed that specific categories of age, marital status, residence, and education significantly influenced the knowledge of women in this study. However, the remaining variables need to demonstrate such an impact. In the multivariate logistic regression model, all variables were simultaneously included in a single model (Table 4). This allowed the calculation of adjusted odds ratios. The results indicated that women in the age group 46–50 years had a 0.42 probability ($p < 0.05$, C. I.: 0.18–0.95) of being less knowledgeable compared to the reference group (30–35 years). Residence, family income, and having children were significant factors for predicting knowledge levels.

4. Discussion

The primary objective of this study was to evaluate the understanding and perspectives on menopause among Saudi women who

Table 3
Descriptive analysis of perception^{a,b}.

Statement ^c	Strongly agree		Agree		Disagree		Strongly disagree	
	N	%	N	%	N	%	N	%
Menopause is a usual and natural phenomenon in women's life.	365	76.0	74	15.4	22	4.6	19	4.0
Woman's life in the menopause period is more delightful than before menopause.	180	37.5	139	29.0	105	21.9	56	11.7
Menopause is the beginning of another life and second maturity of women.	255	53.1	149	31.0	44	9.2	32	6.7
Every woman can care for herself through training and necessary tendance.	305	63.5	110	22.9	45	9.4	20	4.2
Menopause is period of eradicating problems of menstruation and preventing pregnancy	250	52.1	127	26.5	65	13.5	38	7.9
Menopause is the period of woman loneliness	83	17.3	127	26.5	118	24.6	152	31.7
Menopause is the beginning of the period of women's disablement	60	12.5	108	22.5	115	24.0	197	41.0
Menopause decreases the grace of woman's appearance.	50	10.4	112	23.3	114	23.8	204	42.5
In the menopause period, interest and attention of woman to husband decreases	58	12.1	97	20.2	159	33.1	166	34.6
Woman's menopause decreases husband's sexuality	59	12.3	120	25.0	154	32.1	147	30.6
Perception score (Mean \pm SD, minimum, and maximum)	22.79 ± 4.39 (10, 40)							

^a Data were collected through interviews using a validated questionnaire and a random sampling technique.

^b A cross-sectional study was conducted in the Jazan region from May 2022 to January 2023, involving 480 Saudi women who provided consent. Data were collected through interviews using a validated questionnaire and random sampling.

^c Perception questions were measured on a 4-point scale of agreement.

Table 4
The role of demographic factors in knowledge: a multivariate logistic modeling.

Variables ^b	Univariate analysis			Multi-variate analysis		
	Crude OR	95 % CI		Adjusted OR	95 % CI	
		Lower	Upper		Lower	Upper
Age group						
30-35 (Ref)						
36-40	1.09	0.68	1.74	1.05	0.62	1.80
41-45	0.90	0.54	1.48	1.11	0.62	1.98
46-50	0.46*	0.23	0.92	0.42*	0.18	0.95
51-55	0.74	0.29	1.85	0.68	0.24	1.97
56-65	1.67	0.51	5.45	0.69	0.16	2.93
Age at first menstruation						
Less than 10 years (Ref)						
10-12	1.14	0.55	2.35	1.38	0.60	3.19
13-15	1.42	0.70	2.90	1.54	0.67	3.52
16-18	1.64	0.53	5.13	2.09	0.57	7.70
Marital status						
Single (Ref)						
Married	0.62*	0.38	0.99	0.76	0.35	1.62
Divorced	1.22	0.44	3.34	1.39	0.43	4.54
Widow	0.63	0.19	2.16	0.59	0.13	2.64
Children						
Yes (Ref)						
No	1.54^a	1.03	2.31	1.09	0.56	2.10
Work						
Private sector (Ref)						
Public sector	0.67	0.33	1.36	0.66	0.30	1.50
Not working	1.53	0.77	3.04	1.51	0.70	3.28
Residence (Ref)						
Jazan city						
Sabya	1.78*	1.18	2.68	1.85*	1.15	2.98
Ahad Al Masarihah	0.50*	0.26	0.95	0.45*	0.22	0.93
Farasan Island	4.07*	1.80	9.19	5.73*	2.29	14.36
Education level (Ref)						
Primary (Ref)						
Intermediate	0.99	0.35	2.79	0.76	0.24	2.43
Secondary	0.57	0.27	1.21	0.45	0.18	1.13
Diploma	0.44*	0.21	0.93	0.51	0.20	1.31
Bachelor	0.55	0.29	1.02	0.49	0.21	1.16
Master or higher	0.42	0.11	1.65	0.51	0.10	2.49
Family income						
Low (Ref)						
Medium	2.70	0.94	7.78	3.98*	1.20	13.21
Good	2.99	0.94	9.46	3.78*	1.05	13.63
Excellent	0.98	0.33	2.95	1.95*	0.55	6.93

^a Significant at $P < 0.05$; OR: odds ratio; CI: confidence intervals; Ref: Reference category.

^b A cross-sectional study was conducted in the Jazan region from May 2022 to January 2023, involving 480 Saudi women who gave their consent. Data were collected through interviews using a validated questionnaire and random sampling.

resides in the Jazan region. In particular, there is currently a dearth of published research on this subject within a specific geographical context, underscoring the importance of this study. By shedding light on the knowledge and perception of menopause among Saudi women in the Jazan region, this research endeavor seeks to provide crucial insights that can improve healthcare care provision and support systems tailored to women's needs during this pivotal life stage.

Menopause is a significant stage of life for women and knowledge of it is crucial to their health and well-being. Understanding menopausal symptoms allows women to manage physical and psychological changes effectively, thus improving their quality of life. Knowledge of the health risks associated with menopause empowers women to adopt preventive measures and make informed decisions about their healthcare. Psychological well-being during menopause can be supported through awareness and access to appropriate interventions. Overall, knowledge about menopause enhances women's empowerment, support seeking behaviors, and the ability to navigate this transitional phase effectively [9,16,30,31].

Table 1 shows the age at first menstruation in Saudi women. Most women (39.2 %) had their first menstruation between the ages of 10 and 12 years. The mean age at the first menstruation was 47.79 years. The standard deviation was 11.53 years. The minimum age at first menstruation was less than 10 years. The maximum age at the first menstruation was 18 years. These results are similar to those of other studies conducted on the age at first menstruation in Saudi Arabia. For example, a study conducted in Riyadh found that the mean age at the first menstruation was 13.08 ± 1.1 years old [32]. The findings of the current study are consistent with those reported in studies conducted in various regions, including Nepal [33,34], the USA [35], Greece [36], and France [37]. These global studies

have yielded similar results, indicating a convergence of findings across different geographic locations. Age at first menstruation is influenced by several factors, including genetics, nutrition, and health status. In general, overweight or obese girls tend to have their first menstruation earlier than healthy girls. Girls with a family history of early menstruation were also more likely to have their first menstruation early. The age of first menstruation can also be affected by exposure to certain environmental factors such as pesticides and endocrine disruptors. These chemicals can interfere with hormones in the body and can cause early menstruation. Early menstruation can have several negative consequences for girls, including an increased risk of breast cancer, ovarian cancer, and endometriosis. It can also lead to psychological problems, such as anxiety and depression [32,38]. Parents should be aware of the factors that can affect age in the first menstruation and should talk to their daughters about the importance of maintaining a healthy weight and avoiding exposure to harmful chemicals. Early intervention can help prevent the negative consequences of early menstruation.

Natural menopause typically occurs gradually between the ages of 47 and 55. It is identified by the absence of menstrual cycles for 12 consecutive months, with no discernible medical or physiological causes [13,15]. The typical duration of menopause among Saudi women is approximately 49 years [39]. Regarding the knowledge of the study population, the findings of this study demonstrated a good understanding of the onset of menopause among Saudi women (Item 2 and Table 2), menstruation disorders (Item 3 and Table 2), and the influence of genetic background on menopause (Item 4 and Table 2). These findings align with those of similar studies conducted in Iran and Congo [9,16]. The results of our study also indicated that the surveyed women had a good understanding of the depression and anxiety associated with menopause, which is consistent with a study conducted in Iran [9] but differs from a survey conducted in Congo [16], which reported lower awareness of depression related to menopause. It is important to note that the concept of menopause encompasses a collection of related ideas rather than a single abstract piece of knowledge [14,19]. Participants' performance on these specific questions indicated familiarity with these topics only, rather than a comprehensive understanding of all aspects of menopause. To address this knowledge gap, further education and education programs are necessary.

Menopause often causes anxiety in women, and weight gain is a significant concern. Obesity and metabolic syndrome are three times more prevalent in women during menopause than before [40,41]. In contrast to the survey conducted in Congo, which found lower awareness about weight gain and obesity [16], and a study in Iran, which showed good knowledge of these issues [9], our research revealed only a moderate level of awareness of weight gain and obesity. A study in China reported that most Chinese women were aware of menopause, but believed that menopausal symptoms should not be addressed [13,30]. However, when we asked participants whether menopausal symptoms were preventable and curable, 57.5 % responded affirmatively. In an Iranian study, 67 % of women expressed the same view [9]. Ninety percent of the participants in another Saudi study did not know of any menopausal diseases, and 89 percent did not know of any menopausal treatment options [42]. Gynecologists and other physicians should remain informed about the risk profile of hormonal and nonhormonal therapies to help postmenopausal women make well informed decisions about the management of menopausal symptoms [43,44].

The results of national studies, such as a similar survey conducted among women in the city of Arar, revealed that 72.3 % of the participants were aware that menopause is an inability to conceive, and 68.6 % classified hot flashes as menopausal symptoms [13]. In another study that examined the awareness and perception of menopause among 738 Saudi women in 2018, the results on the most prominent menopausal symptoms showed that the majority of women (31.9 %) believed that psychological problems would be more apparent, while the menopausal group believed that hot flashes would be the most prominent symptom (38.5 %) [2]. In a Saudi study in the Najran region, most women believed that menopause was a matter of physiological changes and was not associated with any fear of the future or feelings of sadness [2]. It is crucial to use the findings of this study, along with other local studies, to draw on global research and societies with similar backgrounds. This approach will facilitate the development of exceptional health care services and impactful awareness initiatives.

The preceding section provides a comprehensive analysis of the components of the knowledge scale. This study examined the proportion of knowledge in the overall sample. The present study found that 56.3 % of the participants ($n = 270$) had little knowledge, while 43.8 % ($n = 210$) had a high knowledge (Table 2). In another Saudi study in the Al-Rayid region, Al-Harithi found that among 374 women, approximately half of the population (51.38 %) had good knowledge [42]. A survey conducted in the city of Arar revealed that 72.3 % of women know about menopause as a state of unable to conceive, while 21 % of women lacked awareness regarding this matter [13]. Approximately 70 % of the respondents in Najran, Saudi Arabia, indicated a lack of adequate knowledge of menopause [2]. Typically, when assessing knowledge levels on menopause, researchers choose the arithmetic mean or the percentage. This study used both metrics to provide a direct comparison with previous research. The average knowledge in the present study was 48.87 ± 11.72 (with a range 27–78). A study conducted in Mecca [45] found that the average score for menopausal knowledge was 75.5 ± 17.75 (with a range of 34–100). The variation in menopausal knowledge in different regions of Saudi Arabia requires concerted awareness initiatives by relevant authorities to educate women on a national scale.

Several studies have consistently shown that women's perceptions of menopause and how they are viewed by their culture or community can be contradictory. This observation has been reported in studies conducted in various regions, including Asia and other parts of the world. The present study also reached similar conclusions, with more than half of the women interviewed expressing uncertainty or an inability to articulate their perceptions of menopause [31,46–50]. Research conducted in Riyadh's basic health clinics found that 97.23 percent of participants had a favorable impression of the situation [42].

Research conducted in different countries has consistently revealed that the majority of women have a positive perception of menopause. In this study, a significant proportion of the participants (76 %) had a favorable perception of menopause, agreeing that it is a natural event in the life of a woman. On the contrary, less than 10 % of the participants disagreed with this statement. A study conducted in Iran reported that 37.25 % of the participants (149 of 400) fully agreed with this statement [30]. Furthermore, more than half of the participants in our study agreed that menopause signifies the beginning of another phase in a woman's life, representing a

second stage of maturity, the cessation of menstruation-related issues and the prevention of pregnancy. This perception is closely aligned with a study conducted in Thailand in which women expressed a sense of freedom during this period [51].

According to a study conducted in Malaysia, participants perceive menopause as a process of aging and declining health [17]. The participants fully embraced the idea that menopause signifies the end of life. However, aging is often associated with physical and mental decline, loss of independence, and feelings of burden. Most Malaysian women reported that the most noticeable changes during menopause were related to their body image, skin, and facial features. They held a negative perception of menopause, seeing it as a time when women's beauty, youth and femininity diminish as they grow older [17].

Knowledge can have various effects on perception, including facilitating recognition and interpretation, enabling differentiation between similar category members, enriching perceptual experiences, providing internal solutions for solving perceptual puzzles, and recalibrating tactile and visual sensations. To form initial perceptions, bottom-up processes must first be influenced by previous experience through top-down processes [52]. In the current study, a significant positive correlation was found between the two variables ($R = 0.219$, $P < 0.001$), indicating a meaningful relationship. The correlation was significant at the 0.01 level. Perception allows us to acquire knowledge and justification regarding both the physical world and normative matters such as moral obligations [53].

Our study observed a relationship between women's knowledge and certain demographic characteristics. Specifically, higher education levels were found to positively influence women's knowledge of menopause. This finding aligns with previous studies [7,8,13,54,55] that have consistently shown a correlation between higher education level and greater knowledge perception of menopause ($OR > 1.0$). A study by Noroozi et al. reported similar findings [9]. In a study conducted in the Riyadh region, women with housewives and women educated at the primary or middle level had higher levels of knowledge than other women, as did married participants in their thirties [42]. The findings of the present study also showed a correlation between marriage and menstruation quality, corroborating a previous study conducted in Mecca [45]. Another study conducted in Madinah found that the educational level significantly affected knowledge about menopause [14]. Moreover, in our study, residency was found to be significantly related to the knowledge of the participants. The age group of 46–50 years also demonstrated a significant relationship with change in knowledge, which is consistent with the findings from the Asmara study [54]. However, there was no significant relationship between residency and participant knowledge in our study, and the relationship with age was similar to that observed in the Asmara study [2]. It should be noted that variable findings on the role of demographic factors in women's knowledge of menopause were observed between the univariate and multivariate models, possibly due to the interaction of independent variables. The results indicated that employment, residency, and family income significantly affected knowledge, highlighting the correlation between demographic factors and knowledge.

5. Limitations

This study had several limitations that should be acknowledged. First, during data collection, some respondents appeared reluctant to answer questions that could be considered sensitive, particularly those related to sexuality. This hesitancy may be attributed to cultural norms in Saudi Arabia, where women might be reluctant to openly discuss such topics. Second, the results should be interpreted with caution, as the research was based on observational data obtained through a cross-sectional approach. This study design restricts our ability to establish the directionality of the relationship between knowledge and predictors, as causality cannot be determined.

6. Strength of the study

The strength of this study lies in its contribution to addressing the knowledge gap and raising awareness about menopause among Saudi women. By investigating women's knowledge and perceptions of menopause, this study provides valuable information on an important but often overlooked phase of women's lives. These findings shed light on the moderate level of knowledge among participants, highlighting the need for better dissemination of information and dedicated health services for menopausal women. Furthermore, this study emphasizes the positive understanding of menopause as a natural occurrence, which can potentially empower women to improve their quality of life through increased knowledge and effective coping strategies. The study's focus on workplace and community-based activities as potential avenues for raising awareness provides practical recommendations for promoting women's health in this age group. By addressing the lack of data on menopausal knowledge and perceptions in Saudi Arabia, this study contributes to the existing literature and provides a foundation for future research and interventions in women's health. The findings of this study can inform health care professionals, women's health organizations, and policymakers in developing targeted educational programs and support services for menopausal women. In general, the strength of the study lies in its relevance, potential impact on healthcare practices, and contribution to filling the knowledge gap surrounding menopause among Saudi women.

7. Conclusions

Women's knowledge about menopause and their ability to adapt to associated changes and challenges are crucial to improving their quality of life during this phase. The findings of this study indicated that participants had a moderate level of knowledge of the causes of menopause, its symptoms, related disorders, and the influencing factors. This moderate level of knowledge can be attributed to the failure of healthcare providers to provide women with essential information and the lack of dedicated health centers that cater to the needs of menopausal women. Additionally, this information was not included in the school curriculum. However, most of the

participants had a positive understanding of menopause as a natural occurrence in the life of a woman. This suggests that by expanding their knowledge and becoming more aware of effective strategies to cope with this stage and overcome challenges, women can improve their quality of life. This study aimed to address the lack of data by disseminating menopausal knowledge and perceptions among Saudi women. This study can serve as a foundation for future associated studies by identifying knowledge gaps, exploring cultural influences, assessing perception determinants, informing intervention strategies, enhancing cultural competence, and facilitating cross-cultural comparisons. These advances can contribute to a more complete understanding of menopause and improve the overall well-being of women at this stage of life. Based on the study findings, it is recommended that workplace and community-based initiatives raise awareness about menopause and include discussions on the topic in counseling sessions for women in this age group. These findings highlight the importance of health care professionals and women's health organizations in providing support and education to women with accurate and high-quality information.

Institutional review board statement

This study was approved by the Research Ethics Committee of the Jazan Health Directorate, Jazan (JHD-23). Informed consent was obtained from the participants for the publication of all their data.

Consent for publication

Permission was granted to the publisher to publish our work.

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Informed consent statement

A written consent form was obtained from all participants. Informed consent was obtained from the participants for the publication of all their data.

Data availability statement

Data are shared as a supplementary file with the article.

CRedit authorship contribution statement

Amani Osman Abdelmola: Software, Project administration, Methodology, Investigation, Data curation. **Rufaydah Mohammad Mesawa:** Writing – original draft, Investigation, Data curation. **Alia'a Mohammed Hakami:** Writing – original draft, Investigation, Conceptualization. **Razan Faiez Ageeli:** Writing – original draft, Investigation, Data curation. **Ola Abdo Khawaji:** Writing – original draft, Investigation, Data curation. **Halimah Mohammed Ageeli:** Writing – original draft, Investigation, Data curation. **Zainab Mohammed Alabood:** Writing – original draft, Investigation, Data curation. **Hadi Dhafer Hassan Kariri:** Writing – review & editing, Supervision, Funding acquisition. **Siddig Ibrahim Abdelwahab:** Writing – review & editing, Validation, Supervision, Project administration, Funding acquisition, Formal analysis.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.heliyon.2024.e32935>.

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