Subjective Perceptions of Cardiovascular Disease Risk Among Menopausal Women Residing in Korea: A Q Methodological Study Focused on Korean, Chinese, and Filipino Women

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Article

Subjective Perceptions of Cardiovascular Disease Risk Among Menopausal Women Residing in Korea: A Q Methodological Study Focused on Korean, Chinese, and Filipino Women

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Abstract

Background: This study aimed to explore the subjective perceptions of cardiovascular disease risk among menopausal women residing in Korea. **Methods**: Based on data collected in November 2024, the Q methodology was employed to analyze individual subjectivities. Thirty-five Q-statements were finalized, and 40 participants completed the Q-sorting using a 9-point scale. The participants, comprising menopausal women from Korea, China, and the Philippines, represented diverse perceptions of cardiovascular disease risk across these national groups. The collected data were analyzed using the PC-QUANL program. **Results**: As a result, four distinct types representing the subjective perceptions of cardiovascular disease risk among menopausal women were identified. These types varied by nationality, providing insights into the differences in how women from Korea, China, and the Philippines perceive cardiovascular disease risk. **Conclusions**: The findings of this study offer foundational data for the development of tailored educational programs aimed at preventing cardiovascular disease. Furthermore, the results underscore the importance of policy development that takes into account cultural and social differences in health perceptions across countries.

Keywords: menopause; women; cardiovascular disease; subjective perception

1. Introduction

Cardiovascular and cerebrovascular diseases are among the leading chronic conditions and causes of death in South Korea. According to the 2023 Cause of Death Statistics from Statistics Korea [1], the mortality rate from circulatory system diseases was 132.1 per 100,000 population, with heart disease accounting for 64.8 and cerebrovascular disease for 47.3 deaths per 100,000. Notably, the mortality rate from circulatory system diseases was 1.1 times higher in women (136.3) than in men (127.8), and women had higher mortality rates than men for both hypertensive diseases and cerebrovascular diseases [1]. Numerous studies have investigated the high mortality rates of cardiovascular and cerebrovascular diseases in women, attributing them to physical changes and increased fat accumulation associated with these conditions. It is well-established that the prevalence of cardiovascular and cerebrovascular diseases in women increases significantly after the age of 40, largely due to hormonal changes related to menopause and the aging process [2]. In a study aimed at identifying risk factors and vulnerable groups for cardiovascular and cerebrovascular diseases among middle-aged women, menopause was found to be a significant factor, alongside diabetes,

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body mass index (BMI), and a family history of hypertension [3]. The increased risk of cardiovascular disease in postmenopausal women has been closely linked to hormonal changes associated with menopause. Specifically, the decline in estrogen levels, accompanied by elevated concentrations of follicle-stimulating hormone (FSH) and luteinizing hormone (LH), contributes to the development of dyslipidemia [4]. Prior to menopause, women typically exhibit a more favorable lipid profile than men, characterized by higher levels of high-density lipoprotein (HDL) and lower levels of low-density lipoprotein (LDL). However, the reduction in estrogen following menopause leads to adverse changes in serum lipid and lipoprotein levels, which in turn increase the risk of ischemic heart diseases, such as myocardial infarction and angina, as well as cerebrovascular events, including stroke [5]. Even among premenopausal women, those with coronary artery disease have been found to exhibit lower serum estrogen levels compared to healthy counterparts. Furthermore, women who experience early menopause are at a higher risk of developing cardiovascular disease and exhibit increased mortality rates compared to age-matched women without early menopause [6].

The secretion of female hormones does not persist throughout a woman's lifespan; rather, it begins to decline in the early 40s. This hormonal decline results in shortened menstrual cycles and ultimately leads to menopause [5]. According to a 2018 survey conducted by the Korea Centers for Disease Control and Prevention, the average age of menopause among Korean women was reported to be 49.3 years [7]. The onset of menopause, marked by reduced hormonal levels, is associated with a variety of physiological symptoms. The abrupt decline in female hormones due to menopause leads to a range of symptoms, including vasomotor disturbances, psychological and emotional disorders, skin atrophy, urogenital symptoms, osteoporosis, and atherosclerosis. This reduction in estrogen is particularly significant, as it diminishes its cardioprotective effects, thereby positioning menopause as a recognized risk factor for cardiovascular disease in women [5]. Moreover, metabolic risk factors associated with cardiac health increase significantly in middle-aged women as they enter menopause, compared to premenopausal levels [8]. These risks are reported to quadruple within the first ten years following natural menopause and are known to be higher in women than in men [9,10]. Reflecting these findings, the American Heart Association classifies women over the age of 50 with one or more cardiovascular risk factors as a high-risk group for cardiovascular disease [11].

Promoting the prevention of cardiovascular disease and the management of metabolic syndrome among menopausal women requires the active adoption of health behaviors [12]. However, in reality, the engagement in health-promoting behaviors among middle-aged women undergoing menopause tends to be lower compared to that of younger women or men [13]. This trend is particularly pronounced among middle-aged women in South Korea. Studies have shown that, within the sociocultural context, middle-aged women tend to exhibit lower self-esteem compared to men and often prioritize caregiving for family and others over their own health [14]. Such tendencies may contribute to their relatively low awareness of cardiovascular disease symptoms and risk factors compared to other demographic groups [15]. Among middle-aged women, the greater the number, severity, and duration of menopausal symptoms, the more likely their quality of life is to decline. This issue is not limited to Korean women but is also evident among marriage-immigrant women residing in Korea [16]. With growing societal interest in multiculturalism, there is an increasing focus on the health management of these women. Therefore, it is essential to develop effective programs aimed at raising awareness and promoting cardiovascular health management and disease prevention among middle-aged women living in Korea, including marriage-immigrant women. The prevention and management of cardiovascular disease increasingly emphasize community-based, participant-centered engagement. It has been suggested that incorporating small-group dynamics into health behavior promotion programs for middle-aged women can foster a sense of enjoyment and solidarity in the practice of health behaviors, thereby serving as a motivational factor for sustained engagement [17]. Currently, most studies verifying the effectiveness of health programs aimed at preventing cardiovascular disease and metabolic syndrome among menopausal women have been limited to standardized education and the provision of information. Therefore, this study seeks to assess the target group's awareness of

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cardiovascular risk and utilize the resulting framework as foundational data. Based on this, the study aims to develop structured intervention components that promote effective behavior change, apply the program to the target population, and ultimately evaluate its effectiveness in preventing cardiovascular disease.

As outlined above, menopausal women are at increased risk of developing metabolic conditions such as cardiovascular disease. Although various interventional strategies for cardiovascular disease prevention exist, there remains a lack of research that explores the unique characteristics of menopausal women through subjective assessments of their perceived risk. Understanding these individual perceptions is essential for designing targeted and effective health interventions. Accordingly, the primary aim of this study is to examine the subjective perceptions of cardiovascular disease risk among menopausal women residing in Korea and to systematically categorize these perceptions into thematic domains. This categorization is anticipated to serve as a foundational framework for the subsequent development and implementation of customized intervention programs that reflect the distinct perceptual patterns identified within this population.

2. Purpose of the Study

The purpose of this study is to apply Q methodology to examine the subjective perspectives and attitudes of menopausal women residing in Korea regarding their perceived risk of cardiovascular disease and to identify the distinct characteristics associated with each typology

2.1. Research Design

This study employs Q methodology to explore the subjective viewpoints of menopausal women regarding their perceived risk of cardiovascular disease, including personal thoughts, feelings, attitudes, and opinions. By applying this methodology, the study aims to identify and classify distinct typologies based on shared patterns in individual perceptions.

2.2. Research Methodology

2.2.1. Construction of the Q-Population (Concourse)

The Q-population, which serves as the foundation for developing the Q-sample, can be constructed through a variety of sources, including literature reviews, individual or group in-depth interviews, open-ended questionnaires, newspaper or magazine articles, and topic-related books [18]. In this study, the Q-population was constructed using multiple methods, including a literature review on cardiovascular disease in menopausal women, open-ended questionnaires, and individual in-depth interviews. The literature review was conducted by examining books related to cardiovascular disease risk and the characteristics of menopausal women, as well as by analyzing academic journals to understand their knowledge, attitudes, and perceptions regarding cardiovascular disease risk. Considering that the Q-population in this study consists of menopausal women, and that the primary objective is to explore their subjective perceptions and attitudes toward cardiovascular disease risk—including the diverse perspectives of multicultural menopausal women residing in Korea—general open-ended questions were developed as follows.

- What is your understanding of cardiovascular disease? Please describe the risk factors for cardiovascular disease based on your current knowledge.
- What do you believe are the appropriate treatments and nursing care practices for cardiovascular disease? Please explain based on what you currently know.
- What strategies do you think are effective in preventing cardiovascular disease? Please describe any preventive measures or activities you are aware of.
- In your opinion, why is cardiovascular disease considered particularly risky for women undergoing menopause?

Prior to distributing the open-ended questionnaire, the researcher provided an explanation of the study's purpose and procedures to menopausal women and subsequently requested their

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voluntary participation in completing the questionnaire. From August 1 to August 15, 2024, the researcher, along with two research assistants, visited a group of menopausal women at a church located in a specific region. Ten individuals who voluntarily agreed to participate were invited to freely express their thoughts and opinions through open-ended questionnaires. To encourage broader participation and facilitate data collection, snowball sampling was employed, ultimately involving a total of 20 menopausal women. Data collection continued until thematic saturation was reached—that is, until no new or meaningful information emerged from additional responses. With participants' informed consent, all responses were audio-recorded and transcribed. This process resulted in the construction of a Q-population consisting of 150 distinct statements.

2.2.2. Q-Sample Construction

The construction of the Q-sample is a critical step in Q methodology, as it involves summarizing and condensing the breadth and depth of content derived from the Q-population. The resulting Q-sample is considered representative of the Q-population and serves as an analytical foundation in the research process [18]. It is generally recommended that the number of Q-sample statements range between 20 and 100, with 40 to 60 statements being the most common [19]. In this study, a panel of four experts was assembled to extract the Q-sample. The panel consisted of the principal investigator, one expert in Q methodology, one nursing professor specializing in women's health, and one professor of psychiatric nursing who is also a certified mental health nurse with expertise in subjective perception. The panel thoroughly reviewed the 150 statements comprising the Q-population to assess their content. Through three rounds of in-person meetings and discussions, redundant or ambiguously worded statements were removed, and similar items were consolidated. As a result, a final set of 35 statements was selected to constitute the Q-sample.

2.2.3. P-Sample Selection

The P-sample refers to the actual research participants who are asked to sort the Q-sample statements into a forced distribution, typically following a quasi-normal pattern. In Q methodology, large P-samples may dilute the clarity of each typology by concentrating too many individuals within a single factor. Therefore, based on the principles of small-sample theory, it is generally recommended to include approximately 50 participants or fewer [20]. For this study, the P-sample consisted of 40 menopausal women from a large church located in Seoul. The sample also included women of Filipino and Chinese nationality, allowing for a degree of multicultural representation.

2.2.4. Validity and Reliability Verification of the Q-Sample

To verify the validity of the Q-sample in this study, content validity was assessed through a comprehensive review of literature and previous studies on cardiovascular disease in menopausal women conducted by the researcher, as well as through expert evaluation of the appropriateness of the 35 selected statements by a panel of four specialists. Face validity was established through in-person meetings with the expert panel, during which statements were revised and refined for clarity and relevance. To assess Q-sorting validity, a test–retest procedure was employed using the finalized set of 35 statements. Five menopausal women who voluntarily expressed interest in the reliability verification process participated in the Q-sorting. They were asked to sort the statements, and one week later, they completed the same sorting task under identical conditions. The appropriateness of wording and phrasing was also reviewed during this process. The resulting Pearson correlation coefficient exceeded .80, thereby confirming the reliability of the Q-sample.

2.2.5. Q-Sorting Procedure

The Q-sorting procedure was conducted from November 1 to November 30, 2024. Participants were asked to perform a forced distribution of the finalized Q-sample statements using a Q-sort distribution grid. Given that the number of statements was fewer than 40, a 9-point scale ranging

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from –4 to +4 was applied [19]. On this scale, positive values ('+') represented agreement or favorable views toward the statement, '0' indicated a neutral stance, and negative values ('–') reflected disagreement or unfavorable views. In this study, participants were first instructed to read all 35 Q-sample statements and initially sort the Q-cards into three broad categories: agree, neutral, and disagree. Once this preliminary grouping was completed, participants were then asked to rank the statements on a forced-distribution grid based on a 9-point scale ranging from –4 to +4, reflecting the degree to which each statement aligned with their personal views. Specifically, they were instructed to place 2 cards each at the +4 and –4 positions, 3 cards each at +3 and –3, 4 cards each at +2 and –2, 6 cards each at +1 and –1, and 7 cards at the 0 (neutral) position for the final distribution. Notably, the two cards placed at each extreme end of the distribution scale (+4 and –4) represent the participant's strongest agreement and strongest disagreement, respectively. These statements provide valuable insights into individual perspectives and are particularly useful for interpreting and understanding each factor or typology. As such, they may be directly quoted in the presentation of results [21]. Based on this rationale, participants in the present study were asked to provide written comments explaining their reasoning for selecting the extreme statements. This process took approximately 30 minutes to complete.

2.3. Ethical Considerations

This study was conducted following approval from the Institutional Review Board (IRB) of Kangwon National University (Approval No. KWNUIRB-2024-10-003-001). To ensure participants' anonymity and autonomy, all individuals were fully informed of the study's purpose and procedures. Detailed explanations regarding the in-depth interviews, Q-sorting process, and test–retest procedure were provided in the form of a written information sheet. Participants were assured that all data collected would be used solely for research purposes. Moreover, it was clearly stated that they could withdraw from the in-depth interviews or Q-sorting process at any point without any disadvantage.

2.4. Data Analysis

Data were analyzed using QUANL, a software package specifically designed for Q methodological research. The 35 statements sorted on the Q-distribution grid were first converted into standardized scores and coded accordingly. Principal component factor analysis with Varimax rotation was then conducted using QUANL. During the factor extraction process, factors with an eigenvalue greater than 1.0 were retained, resulting in the identification of four distinct types. The statements loaded on each factor were expressed as standardized scores (Z-scores), and only those with a Z-score of 1.0 or higher were considered significant for interpretation.

3. Results

3.1. General Characteristics of Menopausal Women

A total of 40 menopausal women participated in this study. The majority were of Korean nationality (n = 31, 77.5%), followed by participants from the Philippines (n = 5, 12.5%) and China (n = 4, 10.0%).

Regarding age, 16 participants (40.0%) were in their 40s, while 24 participants (60.0%) were aged 50 or older. The age at menopause onset varied: 5 participants (12.5%) experienced menopause before the age of 40, 27 participants (67.5%) in their 40s, and 8 participants (20.0%) at age 50 or older. Menstrual cessation (complete menopause) occurred before the age of 40 in 5 participants (12.5%), in their 40s for 27 participants (67.5%), and after age 50 in 8 participants (20.0%). In terms of perceived health status, 27 participants (67.5%) rated their health as average or better. However, when comparing their current health to one year ago or to peers, more than half of the participants reported their health as average or worse. Among the participants, 25 individuals (62.5%) reported having one

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or more medical conditions, with the most common being hypertension, followed by diabetes and joint disorders (Table 1).

Table 1. General Characteristics in Subjects (N = 40).

Variables		N	%
Nationality	Korean	31	77.5
	Filipino	5	12.5
	Chinese	4	10
Age	40-45	5	12.5
	46-50	11	27.5
	51-55	11	27.5
	55 or Older	13	32.5
Age of Menopause Onset	Before 40	5	12.5
	41-45	20	50.0
	46-50	7	17.5
	51-55	8	20.0
Age of Menstrual Cessation	Before 40	5	12.5
	41-45	16	40.0
	46-50	11	27.5
	51-55	8	20.0
Religion	Christian	14	35.0
	Buddhist	12	30.0
	Catholic	4	10.0
	None	10	25.0
Self-rated Health Status	Very poor	2	5
	Poor	11	27.5
	Fair	16	40
	Good	10	25
	Very good	1	2.5
Health Status Compared to One Year Ago	Very poor	1	2.5
	Poor	21	52.5
	Fair	15	37.5
	Good	3	7.5
	Very good	0	0
Health Status Compared to Others	Very poor	2	5
	Poor	11	27.5
	Fair	20	50
	Good	7	17.5
	Very good	0	0
Presence of Medical Condition	None	15	37.5
	Hypertension	10	25.0
	Diabetes	7	17.5
	Cardiovascular disease	1	2.5

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	Gastrointestinal disease	1	2.5
	Joint disorders	3	7.5
	Other	3	7.5

3.2. Formation of the Q-Types

Subjective perceptions of cardiovascular disease risk among menopausal women were analyzed using Q factor analysis, which yielded four distinct types. These four types collectively accounted for 48.28% of the total variance. Specifically, Type 1 explained 27.55% of the variance, followed by Type 2 with 8.72%, Type 3 with 6.38%, and Type 4 with 5.64% (Table 2). The intercorrelations among the four types are presented in Table 3, indicating moderate relationships with correlation coefficients ranging from r = ±.05 to .67. These results suggest that the types are relatively independent and exhibit distinct patterns of perception.

Table 2. Eigen Value, Variance, and Cumulative Percentage (N=40).

Variables	Type I	Type II	Type III	Type IV
Eigen value	11.02	3.49	2.55	2.26
Variance (%)	27.55	8.72	6.38	5.64
Cumulative variance	0.27	0.36	0.42	0.48

Table 3. Correlation Matrix between Types (N=40).

Variables	Type I	Type II	Type III	Type IV
Type I	1.00			
Type II	0.21	1.00		
Type III	0.67	0.34	1.00	
Type IV	-0.31	-0.05	-0.12	1.00

3.3. Characteristics of the Types

The distribution of participants across the four types revealed that 15 individuals belonged to Type 1, 7 to Type 2, 10 to Type 3, and 8 to Type 4. The demographic characteristics and factor weights of participants in each type are presented in Table 4. Within each type, participants with higher factor weights are considered to exhibit the most prototypical characteristics of that type, thus serving as representative cases. To analyze the subjective perceptions of cardiovascular disease risk among menopausal women by type, the interpretation focused on statements showing strong agreement (Z score ≥ +1) and strong disagreement (Z score ≤ −1) among the 35 Q-sample statements. The characteristics of each type were identified based on statements for which the standardized scores of a specific type differed markedly from those of the other types. Based on these analytical criteria, the identified typologies of menopausal women's perceptions regarding cardiovascular disease risk are presented below (Table 5).

Participants with a high factor loading (≥ 0.8) on a specific factor are regarded as representative cases of that Q type. As such, particular attention was given to their responses, demographic characteristics, and perspectives, as they serve as key exemplars of the typology. This principle was

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applied in the present study to classify menopausal women's perceptions of cardiovascular disease risk. Accordingly, four distinct Q types were identified, each represented by participants with the highest factor loadings within their respective groups (Table 5).

Table 4. Demographic Characteristics and Factor Weight for P-sample (N=40).

Type	Var No.	Factor Weight	Nationality	Age	Age of Menopause Onset	Age of Menstrual Cessation	Religion	Medical Condition	Name of Medical Condition
Type I (n=15)	3	4.29	Korean	50s	40s	40s	None	Yes	Hypertension
	4	3.13	Korean	40s	40s	40s	None	Yes	Other
	13	0.34	Korean	50s	40s	40s	Buddhist	Yes	Hypertension
	15	2.16	Korean	50s	30s	30s	Buddhist	Yes	Hypertension
	16	2.74	Korean	40s	40s	40s	None	Yes	Other
	17	1.83	Korean	40s	40s	40s	Christian	No	-
	24	1.63	Korean	50s	40s	40s	Christian	No	-
	25	0.70	Chinese	50s	30s	30s	Christian	Yes	Other
	28	1.04	Chinese	50s	40s	40s	None	No	-
	29	0.74	Chinese	50s	40s	40s	Christian	Yes	Joint disorders
	31	1.75	Filipino	50s	40s	40s	None	No	-
	32	0.75	Korean	50s	50s	50s	Catholic	Yes	Hypertension
	36	1.43	Korean	40s	40s	40s	None	No	-
	39	0.78	Korean	40s	40s	40s	Buddhist	No	-
	40	1.45	Korean	40s	40s	40s	Christian	No	-
Type II (n=7)	5	0.23	Filipino	50s	40s	40s	Christian	No	-
	8	0.59	Korean	50s	40s	40s	Buddhist	Yes	Hypertension
	9	0.91	Korean	50s	30s	30s	Buddhist	Yes	Diabetes
	19	0.69	Korean	50s	50s	50s	Buddhist	Yes	Diabetes

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	20	0.63	Chinese	50s	50s	50s	Christian	Yes	Diabetes
	33	0.96	Korean	40s	40s	40s	Christian	No	-
	37	0.18	Korean	50s	50s	50s	Catholic	Yes	Cardiovascular disease
Type III (n=10)	1	0.23	Filipino	50s	40s	40s	Christian	No	-
	2	0.91	Korean	40s	40s	40s	None	No	-
	10	0.44	Korean	50s	30s	30s	Buddhist	Yes	Diabetes
	18	0.51	Korean	50s	50s	50s	None	No	-
	23	0.62	Korean	50s	40s	40s	Christian	Yes	Gastrointestinal disease
	26	0.72	Korean	40s	40s	40s	None	No	-
	27	0.45	Chinese	50s	30s	30s	Christian	Yes	Other
	30	0.09	Korean	50s	40s	40s	Catholic	Yes	Joint disorders
	35	1.21	Korean	40s	40s	40s	Christian	No	-
	38	1.10	Korean	40s	40s	40s	Buddhist	Yes	Hypertension
Type IV (n=8)	6	1.46	Filipino	50s	50s	50s	Christian	Yes	Hypertension
	7	0.68	Korean	50s	50s	50s	Buddhist	Yes	Hypertension
	11	0.50	Korean	50s	40s	40s	Buddhist	Yes	Hypertension
	12	0.35	Korean	40s	30s	30s	Buddhist	Yes	Diabetes
	14	0.75	Korean	40s	40s	40s	Christian	Yes	Diabetes
	21	1.01	Korean	50s	50s	50s	Christian	Yes	Hypertension
	22	0.69	Korean	40s	40s	40s	Buddhist	Yes	Diabetes
	34	1.73	Korean	40s	40s	40s	None	No	-

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Table 5. Representative Q-samples and Z-scores in Types (N=40).

Type	No.	Statement	Z-score
Type 1 Heightened Awareness of Cardiovascular Disease	n=15	3. After menopause, a slower metabolism increases the likelihood of weight gain.	1.81
		4. Physical and emotional stress resulting from menopause negatively affects cardiovascular health.	1.79
		2. After menopause, increased blood pressure and cholesterol levels may raise the risk of cardiovascular disease.	1.49
		5. I try to maintain healthy lifestyle habits to prevent cardiovascular disease after menopause.	1.44
		6. I am concerned that hormone replacement therapy may increase the risk of cardiovascular disease.	1.25
		29. I try to consume sufficient amounts of calcium, and vitamins E, B, and D.	-1.00
		30. I try to avoid wearing tight-fitting clothing such as skinny jeans, pantyhose, and body-shaping undergarments.	-1.03
		33. I try to get at least seven hours of sufficient sleep each day.	-1.54
		31. I openly express emotional and cognitive discomfort, such as anxiety, depression, or forgetfulness.	-1.60
		32. I try to avoid spicy and hot foods.	-1.65
		34. I consistently take medication as prescribed by my physician.	-2.00
Type 2 Low Perception of Cardiovascular Disease Risk’	n=7	15. I believe that regular health checkups are necessary for the early detection and prevention of cardiovascular disease.	2.26
		16. I recognize that hypertension is a major risk factor for cardiovascular disease and regularly monitor my blood pressure.	1.74
		14. I am aware that quitting smoking and reducing alcohol consumption are essential for the prevention of cardiovascular disease.	1.56
		31. I openly express emotional and cognitive discomfort, such as anxiety, depression, or forgetfulness.	1.18
		27. I am aware that hormonal changes after menopause can affect cardiovascular disease risk.	-1.01
		23. I seek cardiovascular disease prevention strategies that are tailored to women.	-1.15
		19. I recognize the importance of stress management.	-1.20

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		24. I am aware of the major causes of cardiovascular disease.	-1.23
		22. I actively seek information about the risk factors and prevention methods of cardiovascular disease.	-1.25
		20. I believe that practices such as yoga, meditation, and deep-breathing exercises help maintain cardiovascular health.	-1.29
		26. It is recognized that cardiovascular disease poses a heightened risk for menopausal women.	-1.36
		7. Menopausal women consult doctors about their cardiovascular health.	-1.52
		21. I obtain information related to cardiovascular disease through the internet, health magazines, or medical institutions.	-1.72
Type 3 Emphasis on Healthy Lifestyle	n=10	11. I believe that a diet rich in vegetables, fruits, fiber, and adequate protein intake is important.	2.09
		12. I tend to reduce the intake of saturated fats and trans fats.	1.97
		10. Middle-aged women recognize the importance of healthy lifestyle habits in preventing cardiovascular disease.	1.70
		35. I try to manage stress effectively.	1.43
		9. Menopausal women recognize that cardiovascular disease is a major health concern.	1.22
		5. I try to maintain healthy lifestyle habits to prevent cardiovascular disease after menopause..	1.19
		30. I try to avoid wearing tight-fitting clothing such as skinny jeans, pantyhose, and body-shaping undergarments.	-1.10
		32. I try to avoid spicy and hot foods.	-1.32
		2. After menopause, increased blood pressure and cholesterol levels may raise the risk of cardiovascular disease.	-1.48
		31. I openly express emotional and cognitive discomfort, such as anxiety, depression, or forgetfulness.	-1.52
		1. Estrogen levels drop sharply during menopause.	-2.32
Type 4 Interest in Proper Information Management	n=8	22. I actively seek information about the risk factors and prevention methods of cardiovascular disease.	1.91
		35. I try to manage stress effectively.	1.75
		21. I obtain information related to cardiovascular disease through the internet, health magazines, or medical institutions.	1.56

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		23. I seek cardiovascular disease prevention strategies that are tailored to women.	1.51
		5. I try to maintain healthy lifestyle habits to prevent cardiovascular disease after menopause..	1.35
		24. I am aware of the major causes of cardiovascular disease.	1.26
		20. I believe that practices such as yoga, meditation, and deep-breathing exercises help maintain cardiovascular health.	1.00
		32. I try to avoid spicy and hot foods.	-1.01
		16. I recognize that hypertension is a major risk factor for cardiovascular disease and regularly monitor my blood pressure.	-1.02
		17. I monitor my blood cholesterol levels and try to maintain a balance between LDL and HDL cholesterol.	-1.08
		31. I openly express emotional and cognitive discomfort, such as anxiety, depression, or forgetfulness.	-1.16
		33. I try to get at least seven hours of sufficient sleep each day.	-1.21
		13. I recognize that regular aerobic exercise is beneficial for cardiovascular health	-1.35
		14. “I am aware that quitting smoking and reducing alcohol consumption are essential for the prevention of cardiovascular disease.	-1.40
		34. I consistently take medication as prescribed by my physician.	-1.58

3.3.1. Type 1: ‘Heightened Awareness of Cardiovascular Disease’

Participants classified under Type 1 expressed the highest level of agreement with the statements, “After menopause, a slower metabolism increases the likelihood of weight gain” (Z = 1.81), “Physical and emotional stress resulting from menopause negatively affects cardiovascular health” (Z = 1.79), and “Following menopause, elevated blood pressure and increased cholesterol levels may heighten the risk of cardiovascular disease” (Z = 1.49). In contrast, Type 1 participants showed the strongest disagreement with the following statements: “I consistently take prescribed medication as directed by my cardiologist” (Z = –2.00), “I try to avoid spicy and hot foods” (Z = –1.65), and “I openly express emotional and cognitive discomfort, such as anxiety, depression, or forgetfulness” (Z = –1.60).

Based on these results, menopausal women classified under Type 1 were aware of the symptoms associated with metabolic changes following menopause and recognized the impact of both physical and psychological issues on cardiovascular health. They perceived cardiovascular health as an important concern after menopause and demonstrated a strong tendency to engage in preventive health behaviors. Accordingly, this group was identified as having a heightened sense of vigilance and was thus labeled as the “Heightened Awareness of Cardiovascular Disease” type.

3.3.2. Type 2 ‘Low Perception of Cardiovascular Disease Risk’

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Participants in Type 2 showed the highest level of agreement with the following statements: "I believe that regular health checkups are necessary for the early detection and prevention of cardiovascular disease" (Z = 2.26), "I recognize that hypertension is a major risk factor for cardiovascular disease and regularly monitor my blood pressure" (Z = 1.74), and "I am aware that quitting smoking and reducing alcohol consumption are essential for the prevention of cardiovascular disease" (Z = 1.56). On the other hand, Type 2 participants showed the strongest disagreement with the following statements: "I get information about cardiovascular disease through the internet, health magazines, or medical institutions" (Z = –1.72), "Menopausal women consult doctors about their cardiovascular health" (Z = –1.52), "It is recognized that cardiovascular disease poses a heightened risk for menopausal women"(Z=-1.36).

Based on these results, participants in Type 2 appeared to recognize the importance of regular health checkups but showed relatively low engagement in consulting with physicians or acknowledging cardiovascular disease as a major health concern. Although they perceived cardiovascular disease as a health issue, their practical intention to engage in preventive measures seemed comparatively low. Therefore, this group was labeled as the "Low Perception of Cardiovascular Disease Risk" type.

3.3.3. Type 3 'Emphasis on Healthy Lifestyle'

Participants in Type 3 placed strong emphasis on the role of healthy habits in preventing cardiovascular disease. They most strongly agreed with the view that 'I believe that a diet rich in vegetables, fruits, fiber, and adequate protein intake is important.(Z=2.09), This was followed by agreement with 'I tend to reduce the intake of saturated fats and trans fats.(Z=1.97)', 'Middle-aged women recognize the importance of healthy lifestyle habits in preventing cardiovascular disease.(Z=1.70). On the other hand, Type 3 participants showed the strongest disagreement with the following statements: "Estrogen levels drop sharply during menopause" (Z = –2.32), "I openly express emotional and cognitive discomfort, such as anxiety, depression, or forgetfulness" (Z = –1.52), and "After menopause, increased blood pressure and cholesterol levels may raise the risk of cardiovascular disease" (Z = –1.48).

Based on these findings, participants in Type 3 demonstrated a strong interest in diet and healthy lifestyle practices, and showed a clear tendency to engage in behaviors such as dietary control and regular exercise to maintain cardiovascular health. Accordingly, this group was designated as the "Emphasis on Healthy Lifestyle" type.

3.3.4. Type 4 'Interest in Proper Information Management'

Participants classified under Type 4 expressed a strong interest in acquiring accurate information related to cardiovascular health. They showed the highest level of agreement with the statement, "I actively seek information about risk factors and prevention methods for cardiovascular disease" (Z = 1.91). This was followed by strong agreement with "I try to manage stress effectively" (Z = 1.75), and "I obtain information related to cardiovascular disease through the internet, health magazines, or medical institutions" (Z = 1.56). On the other hand, Type 4 participants showed the strongest disagreement with the following statements: "I consistently take medication as prescribed by my physician" (Z = –1.58), "I am aware that quitting smoking and reducing alcohol consumption are essential for the prevention of cardiovascular disease" (Z = –1.40), and "I recognize that regular aerobic exercise is beneficial for cardiovascular health" (Z = –1.35).

Based on these results, participants in Type 4 placed a strong emphasis on seeking preventive factors and actively acquiring information through sources such as the internet. They appeared highly interested in obtaining accurate information and were motivated to stay informed as a means of preventing cardiovascular disease. Accordingly, this group was designated as the "Interest in Proper Information Management" type.

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3.4. The Items Agreed or Disagreed upon by Every Type

Based on the above results, the subjective perceptions of cardiovascular disease risk among menopausal women can be classified into four distinct types, each demonstrating clear and distinguishable characteristics. However, there were certain statements regarding cardiovascular disease risk that were commonly agreed or disagreed upon across all four types, as presented in Table 6. Among the statements showing overall disagreement regarding the perception of cardiovascular disease risk in menopausal women were: "I believe that menopause affects the risk of cardiovascular disease" and "I am aware that hormonal changes after menopause can affect cardiovascular disease risk." These findings suggest that while menopausal women may acknowledge the general importance of cardiovascular disease risk and its management, they may lack awareness of the direct impact menopause itself can have on cardiovascular health.

Table 6. Consensus Items and Average Z-scores (N=40).

Q-statement		Z-scores
Q25	I believe that menopause affects the risk of cardiovascular disease.	-0.44
Q27	I am aware that hormonal changes after menopause can affect cardiovascular disease risk.	-0.70

4. Discussion

This study aimed to identify the types of perceived cardiovascular disease risk among menopausal women residing in Korea and to explore the characteristics associated with each type. The analysis revealed four distinct typologies: "Heightened Awareness of Cardiovascular Disease," "Low Perception of Cardiovascular Disease Risk," "Emphasis on Healthy Lifestyle," and "Interest in Proper Information Management."

The majority of participants in this study were of Korean nationality (77.5%), followed by individuals from the Philippines (12.5%) and China (10.0%). This distribution reflects the nature of the study, which focused on menopausal women residing in Korea. By including women from multicultural backgrounds, the study provides a foundation for discussing potential differences in the perception of cardiovascular disease risk based on cultural context. The majority of participants were aged 50 and above (60.0%), and both the onset and completion of menopause were most commonly reported to have occurred during their 40s. This finding is consistent with previous research, which has indicated that physiological changes associated with menopause are closely linked to an increased risk of cardiovascular disease [4]. Although 67.5% of participants rated their subjective health status as "average or above," more than half perceived their health as "average" or "poor" when compared to one year ago or to their peers. Additionally, 62.5% of participants reported having chronic conditions such as hypertension, diabetes, or joint disorders. These findings highlight the need for targeted health education on the importance of cardiovascular disease prevention and management among postmenopausal women. The findings of this study provide foundational data for comparing perceptions of cardiovascular disease risk among women of various nationalities. The results also suggest that cultural factors may influence health perceptions and behaviors, underscoring the significance and relevance of this research. Filipino and Chinese women residing in Korea may differ in their perceptions and responses to cardiovascular disease due to variations in healthcare accessibility, use of health information, and culturally rooted health beliefs. Therefore, future research should incorporate more in-depth analyses that take cultural factors into account.

In this study, Type 1 was labeled as the "Heightened Awareness of Cardiovascular Disease" type. Participants in this group demonstrated strong agreement with the notion that weight gain is more likely due to a decline in metabolism after menopause (Z = 1.81), that physical and emotional stress can negatively affect cardiovascular health (Z = 1.79), and that increased blood pressure and

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cholesterol levels following menopause can elevate the risk of cardiovascular disease (Z = 1.49). These findings reflect a clear awareness of cardiovascular vulnerability after menopause and a heightened sensitivity to related risk factors. In contrast, participants in this group showed strong disagreement with the following statements: "I consistently take medication as prescribed by my physician" (Z = –2.00), "I try to avoid spicy and hot foods" (Z = –1.65), and "I openly express emotional and cognitive discomfort, such as anxiety, depression, or forgetfulness" (Z = –1.60). These responses suggest that while the participants are highly aware of the risks associated with cardiovascular disease, they tend to be less proactive in practicing health-related behaviors or expressing emotional difficulties. This finding is consistent with previous studies reporting that, although menopausal women often demonstrate high disease awareness, various personal and social barriers hinder their transition into health-promoting behaviors [22]. In particular, physical changes and emotional instability associated with menopause have been identified as key factors that hinder the practice of health-promoting behaviors [23]. Therefore, for women classified under the "Heightened Awareness of Cardiovascular Disease" type, it is essential to not only maintain and strengthen their level of awareness but also to implement concrete and structured intervention strategies that promote the translation of awareness into action. In particular, tailored educational programs focused on cardiovascular disease prevention, emotional support systems, and interventions aimed at enhancing self-efficacy should be developed and provided.

In this study, Type 2 was identified as the "Low Perception of Cardiovascular Disease Risk" type. Participants in this group strongly agreed with the importance of regular health check-ups for the early detection and prevention of cardiovascular disease (Z = 2.26), recognized hypertension as a major risk factor and reported monitoring their blood pressure regularly (Z = 1.74), and acknowledged that smoking cessation and reduced alcohol consumption are essential for prevention (Z = 1.56). These findings suggest that individuals in this type possess basic knowledge of cardiovascular disease prevention and engage in some related health behaviors. However, participants in this group showed strong disagreement with statements such as "I get information about cardiovascular disease through the internet, health magazines, or medical institutions" (Z = -1.72), "Menopausal women consult doctors about their cardiovascular health" (Z = -1.52), and "It is recognized that cardiovascular disease poses a heightened risk for menopausal women" (Z = -1.36). These responses indicate a low level of overall risk perception, limited engagement in information-seeking, and minimal participation in professional consultations. This finding is consistent with previous studies reporting that, although middle-aged women are aware of cardiovascular disease, their perception of personal risk and the seriousness of the condition remains low, resulting in inadequate preventive behavior [24]. In particular, despite the increased risk of cardiovascular disease due to biological changes during menopause, menopausal women often show limited access to relevant information and insufficient communication with healthcare professionals, which hinders the translation of awareness into preventive action [25]. Therefore, for women classified under the "Low Perception of Cardiovascular Disease Risk" type, it is essential to first provide education that clearly communicates the severity of cardiovascular disease and its connection to menopause. In addition, programs should be developed to actively facilitate access to information and promote engagement with healthcare professionals. Motivation-enhancing strategies should also be incorporated to support the transition from awareness to preventive health behaviors.

In this study, Type 3 was labeled as the "Emphasis on Healthy Lifestyle" type. Participants in this group showed strong agreement with the importance of a diet rich in vegetables, fruits, fiber, and adequate protein intake (Z = 2.09), efforts to reduce the consumption of saturated and trans fats (Z = 1.97), and the recognition among middle-aged women of the need for healthy lifestyle habits to prevent cardiovascular disease (Z = 1.70). These results suggest that individuals in this type tend to actively engage in specific dietary practices and health behaviors aimed at preventing cardiovascular disease. In contrast, participants in this group showed strong disagreement with statements related to the decline in estrogen levels during menopause (Z = -2.32), openly expressing emotional and cognitive discomfort (Z = -1.52), and recognizing the increased cardiovascular risk due to elevated

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blood pressure and cholesterol levels after menopause (Z = -1.48). These findings suggest that individuals in this type tend to focus more on concrete and visible lifestyle changes, rather than on physiological changes or emotional aspects associated with menopause. These findings are consistent with previous studies indicating that while middle-aged women recognize the importance of tangible lifestyle changes for preventing cardiovascular disease, their understanding and acceptance of biological changes and emotional challenges related to menopause may be relatively limited [26]. Accordingly, for individuals classified under then "Emphasis on Healthy Lifestyle" type, it is important to reinforce the significance of maintaining healthy lifestyle habits while also providing education on physiological changes during menopause and offering emotional support programs in parallel.

In this study, Type 4 was identified as the "Interest in Proper Information Management" type. Participants in this group strongly agreed with actively seeking information about cardiovascular disease risk factors and prevention strategies (Z = 1.91), making efforts to manage stress (Z = 1.75), and obtaining cardiovascular-related information through sources such as the internet, health magazines, and medical institutions (Z = 1.56). These responses indicate that individuals in this group exhibit a proactive attitude toward accessing information for the prevention of cardiovascular disease. In contrast, participants in this group showed strong disagreement with statements such as taking medication as prescribed by a physician (Z = -1.58), recognizing the importance of smoking cessation and alcohol reduction (Z = -1.40), and acknowledging the benefits of regular aerobic exercise (Z = -1.35). These findings suggest that while individuals in Type 4 are proactive in seeking information, they may be relatively passive when it comes to translating that knowledge into concrete health behaviors. This aligns with previous studies that have pointed to a disconnect between information acquisition and the actual practice of health-promoting behaviors [27]. Therefore, for individuals classified under the "Interest in Proper Information Management" type, it is essential to move beyond simple information provision and implement behavior change strategies that support the translation of acquired knowledge into actual health practices. In particular, programs should be developed to enhance the credibility of information and promote action-oriented engagement.

The findings of this study indicate that middle-aged women exhibit diverse patterns of awareness and behavior related to cardiovascular disease prevention, highlighting the need for tailored intervention strategies for each identified type. In particular, for individuals who require reinforcement of preventive behaviors, programs that enhance awareness of cardiovascular disease risk while increasing motivation for action are essential. For those who are already proactive in seeking information, greater emphasis should be placed on providing practical support to help translate acquired knowledge into behavior. The significance of this study lies in its contribution to the development of health promotion programs for middle-aged women by underscoring the need for a segmented approach that reflects the distinct characteristics and needs of each type.

5. Conclusions

This study analyzed the perception types related to cardiovascular disease prevention among middle-aged women using Q methodology and classified them into four distinct types: "Heightened Awareness of Cardiovascular Disease," "Low Perception of Cardiovascular Disease Risk," "Emphasis on Healthy Lifestyle," and "Interest in Proper Information Management.." Each type demonstrated distinct characteristics in terms of perception and preventive behaviors related to cardiovascular disease, emphasizing the need for tailored intervention strategies. To strengthen cardiovascular disease prevention practices among middle-aged women, it is essential to adopt educational approaches and behavior-enhancing strategies that are appropriate for each typology. Strategies aimed at narrowing the gap between awareness and action are particularly necessary. This study provides important foundational data for the development of effective health promotion programs targeting cardiovascular disease prevention in this population.

This study focused on categorizing the perceptions of cardiovascular disease prevention among middle-aged women; however, its findings may have limited generalizability due to the specific

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regional and sample constraints. Additionally, as the data were collected through self-reported surveys, they reflect the participants' subjective perceptions and do not incorporate objective indicators of actual preventive behaviors, which represents a notable limitation. Future research should incorporate objective data on the actual implementation of cardiovascular disease prevention behaviors to more accurately assess the effectiveness of intervention programs. Additionally, as this study employed a cross-sectional design over a short period, longitudinal research is needed to better understand changes in perception and behavior over time. To promote cardiovascular disease prevention among middle-aged women, it is essential to develop tailored educational programs and collaborate with healthcare institutions to encourage regular check-ups and ongoing health management. For postmenopausal women, prevention programs should also include mental health education and counseling to support overall cardiovascular well-being. Future research should expand to include women from diverse regions and age groups to enhance the generalizability of the findings. Additionally, examining psychological factors is important to identify and address barriers to preventive behaviors. Long-term studies are also needed to evaluate changes in cardiovascular disease prevention practices over time.

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