

A comprehensive analysis of research trends on andropause among middle-aged South Korean men

Young Hwa Lee ¹, Sun Jung Park ², Hyun Ji Kim ³, Bock Soon Park ³, Hyo Yeol Jang ⁴, Ha Na Cho ⁵, Young Sook Lim ^{2,*}

¹Department of Nursing, Seoul Women's College of Nursing, Seoul, South Korea

²Department of Nursing, Sahmyook Health University, Seoul, South Korea

³Department of Nursing, Songho University, Hoengseong County, South Korea

⁴Department of Nursing, Vision College of Jeonju, Jeonju, South Korea

⁵Department of Nursing, Baekseok Culture University, Cheonan, South Korea

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ABSTRACT

The objective of this study is to establish foundational data for comprehending the dynamics of research on andropause among middle-aged men. Additionally, it aims to identify potential applications for the development of counseling and education programs tailored specifically to this demographic, as well as to outline future directions and implications for further studies on middle-aged men. This study employs a descriptive research approach, analyzing the literature published in Korea over the past decade that pertains to andropause among middle-aged men. Over the course of the decade spanning from 2012 to 2022, a total of 22 papers addressing andropause-related studies among middle-aged men were identified in Korea. By examining the outcomes of these studies, the following four categories were delineated: understanding the nature of andropause in middle-aged men, comparing andropause experiences among middle-aged men, exploring correlations between andropause and other variables, and investigating causality between andropause and other variables. The findings of this study hold promise in raising awareness among the general population regarding the potential occurrence of andropause in men. Currently, societal policies and perceptions predominantly focus on menopausal care for women. By highlighting the physical, social, and mental changes experienced by men, this research can contribute to enhancing overall awareness and understanding of andropause, thus maximizing its impact.

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1. Introduction

Given the development of medical technology and advanced science today, the expected life expectancy has consistently increased, and the proportion of middle-aged people has also consistently increased (Kwon, 2022). According to the statistical data, there are approximately 86.2 million men aged 40 to 59, accounting for 16.6% of the total population and 33.4% of the total population (NSOK, 2020). The men's life expectancy is 80.3 years on average, and as the post-middle age

life increases by more than 40 years, the health issues and quality of life of middle-aged men with the menopausal syndrome have emerged as an important concern (Lee and Park, 2013).

The developmental task of middle age is about achieving the balance between the sense of creation and the sense of sluggishness (Moreno et al., 2020), and men attempt to re-evaluate what they have achieved in their middle age and the value of life, and through the process of readjustment, they complete their period of middle age. Middle-aged men will be able to prepare well for their lives after middle age if growth and maturity are achieved in the process of overcoming and integrating the various changes experienced in middle age (Infurna et al., 2020). At a time when men have to accept such diverse demands of roles and prepare for old age, they undergo physical, mental, and environmental changes due to the andropause associated with aging, their

* Corresponding Author.

Email Address: bun8973@naver.com (Y. S. Lim)

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Corresponding author's ORCID profile:

<https://orcid.org/0000-0002-0065-5328>

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resilience declines, and their quality of life is faced with adverse changes (Jeon and Kim, 2017).

Andropause is an aging phenomenon that occurs mainly between the ages of 40 and 55 due to hormonal declines, which manifest in physical changes, mental and psychological states, and changes across interpersonal relationships and overall social life (Moreno et al., 2020). As andropause progresses, endocrine changes occur, such as andropause among women (Moreno et al., 2020), and as with women, diverse symptoms such as nervousness, hot flushes, depression, decreased libido and erectile strength, and temperamental brain dysfunction are experienced (Moreno et al., 2020). The incidence of depression due to psychological atrophy and menopausal symptoms increased among men over the age of 50 (Kim et al., 2020a), and suicides have occurred more than twice as high as the middle-aged women (Cho and Seo, 2022).

Despite the fact that middle age is an important influential factor related to the quality of life of middle-aged men, middle-aged men in South Korea have not received help given the cultural effect where societal perceptions dictate or where they seek to reduce or hide menopausal symptoms, or where the expression of depression is perceived as weak (Kwon, 2022). Middle-aged men are not recognized as the main subject of research topics compared to middle-aged women. Middle-aged men in Korea experience physical aging and andropause in the midst of the conflict between the rapidly changing social traditional norms and social changes and also experience overall psychological anxiety (Jeon and Kim, 2017). However, there are still significantly fewer studies conducted on middle-aged men than on other genders and generations (Infurna et al., 2020), and only a few trend analytical studies of menopausal-related research among middle-aged men have been performed. The research trend analysis is research that explores domestic research trends at a macroscopic level and is a very useful method for setting the direction of research (Kim and Cho, 2020). Examining the current state of research on trend analysis related to middle-aged men in Korea, it has been conducted only to the extent of middle-aged men's psychology (Seong et al., 2021) and men's job stress (Kim and Choi, 2016). Hence, it seems necessary to actively conduct studies related to andropause among middle-aged men, and systematically organize the studies on andropause of middle-aged men.

The purpose of this study is to investigate and analyze the domestic research trends on andropause, which is socially, psychologically, and physically important, and present the directions for future studies on andropause among middle-aged men while providing substantive and basic materials. Hence, the purpose of this study is to examine the current state of research by summarizing domestic research published on the topic of andropause among middle-aged men according to the frame of analysis. Based on this, it is

sought to create the basic materials for understanding the flow of middle-aged men's climacteric research and provide the points of application for the development of counseling and educational programs for middle-aged men, as well as the directions and implications for future studies on middle-aged men.

2. Research method

This study is a descriptive research study that examines the literature on andropause among middle-aged men published in Korea over the last 10 years and analyzes the relevant research trends.

The specific standards for selecting the papers subject to investigation in this research are the studies on andropause among middle-aged men published in Korea, studies on the variables related to andropause, and the papers published in academic journals and dissertations. The standards of exclusion for the papers subject to research are if the research subjects are not middle-aged men or are not the main variables of andropause if the dissertations are published in an academic journal, if the literature analysis research, summaries, and proceedings of presentations at academic conferences, and the original text cannot be used, or the studies published in Korean or any languages other than English. This research was conducted in the order of selection of search terms, selection of search database, formulation of search strategy, execution of literature search, and selection of literature to be analyzed. The data search was conducted from September 1, 2022, through October 1, 2022, while collecting andropause of middle age-related studies, and as for the search period, they were restricted only to the papers published from October 2012 through September 2022. The search databases include the Research Information Service System (RISS), Korean Studies Information Service System (KISS), DBpia, Korean Medical Database (KM base), National Assembly Library, Nanet), and the National Digital Science Library (NDSL). The search terms were selected as "andropause", "andropause symptoms", "climacteric symptom", or "andropause symptoms" and "middle-aged men" in Korean. A total of 54 pieces of literature were retrieved in this way, and 20 duplicate documents were removed from the expropriated papers by using a document management program (EndNote X8). Thereafter, the titles and abstracts of the 34 pieces of literature were checked based on the selection criteria, and 22 related studies were selected by excluding 12 works of literature that met the exclusion criteria, following which, the originals of the papers were secured, and work was performed to examine them. The entire process of selecting and extracting the data was done independently by 6 researchers, and when the researchers could not reach a consensus, the entire research team intervened and reviewed the original texts together. Lastly, 22 papers were finally selected for analysis. The analytical framework of the papers used for this study was based on the previous paper

analyses and trend studies conducted in the field of nursing in Korea (Choe et al., 2014; Shin et al., 2010), for which, the ones developed by the researchers in line with the purpose of this study were used. The main contents of the analytical framework consisted of the year of publication, type of publication, type of author, source, research method, research subject, the definition of andropause, main variables, and research results, while the detailed contents for each item of the analytical tool and the basis for preparation are based on the previous studies (Choe et al., 2014; Shin et al., 2010).

All of the papers published in the last 10 years from October 2012 through September 2022 were coded into an Excel program by 6 researchers according to the established analytical tool's framework. After reading the research papers related to andropause among middle-aged men, the final analytical framework was determined through the discussion by and among the researchers for the parts that needed correction, and the collected data was analyzed according to the analytical framework using Excel and SPSS/WIN 23.0 statistical programs, thereby obtaining mistakes and percentages.

3. Research results

3.1. General characteristics

The final analysis of 22 works for this study is summarized in Table 1 and Table 2 classifies and details their general characteristics by publication year, type of publication, type of author, source, research method, research subject, and presence or absence of andropause definition. A total of 22 papers were published in the 10-year period from

2012 to 2022 regarding andropause-related research on middle-aged men in Korea. The number of publications by the year of publication was 5 (22.7%) for 2012-2015, 7 (31.8%) for 2016-2019, and 10 (45.5%) for 2020-2022, increasing consistently by year. Seven master's theses (31.8%) were published, and 15 (68.2%) were published in academic journals, most of which were published in academic journals. As for the type of author, 9 papers (40.9%) had only university professors participate, 8 papers (36.4%) were student papers, 4 papers (18.2%) were papers in which university professors and students participated together, and 1 paper (4.5%) had university professors and lecturers participated together. Analyzing the source of the academic journals of the analysis target works, 2 of the Korean Journal of Adult Nursing (9.1%), 1 of the Journal of the Nursing Academic Association of Ewha Womans University (4.5%), 3 of the Journal of Korean Academy of Nursing, and 2 of the Journal of Digital Convergence (9.1%), 2 of the Journal of the Korea Academia-Industrial Cooperation Society (9.1%), and 1 each of the other papers (4.5%) were published in various academic journals. In terms of research design type, 21 (95.5%) were quantitative studies, of which 17 were predictive studies (77.3%), 3 were correlation studies (13.6%), and 1 descriptive study (4.5%) in their respective order, and there was 1 (4.5%) qualitative study. All 22 studies targeted middle-aged men, yet 5 of them (22.7%) targeted middle-aged working men. Eighteen papers (81.8%) had middle age and menopausal andropause defined, and four papers (18.2) did not have them defined (Table 1).

Table 1: General characteristics of literature (N=22)

Variable	Categories	n(%)
Publication year	2012~2015	5(22.7)
	2016~2019	7(31.8)
	2020~2022	10(45.5)
Publication type	Master's thesis	7(31.8)
	Journal	15(68.2)
Author(s)	Professor	9(40.9)
	Professor and instructor	1(4.5)
	Professor and student	4(18.2)
	Student	8(36.4)
	East And Central Asia Economic And Business Association	1(4.5)
	Health And Nursing	1(4.5)
	Journal of Digital Convergence	2(9.1)
	Journal of Industrial Convergence	1(4.5)
	Journal of The Korea Academia-Industrial Cooperation Society	2(9.1)
	Journal of The Korea Convergence Society	1(4.5)
	Journal of The Korea Society of Computer and Information	1(4.5)
	Journal of The Korean Data Analysis Society	1(4.5)
	Journal of The Korean Society of Occupational Health Nursing	1(4.5)
Publication source	Korean Journal of Adult Nursing	2(9.1)
	The Korean Society Fisheries and Sciences Education	1(4.5)
	The Korean Society of Stress Medicine	1(4.5)
	Master's thesis	7(31.8)
	Qualitative research	1(4.5)
	Phenomenological convergence study	1(4.5)
	Quantitative research	21(95.5)
	Descriptive research	1(4.5)
	Descriptive correlational research	3(13.6)
	Predictive correlational research	17(77.3)
Participants	Middle-age men	17(77.3)
	Middle-age men workers	5(22.7)
Definition of Climacterium	Yes	18(81.8)
	No	4(18.2)

3.2. Analysis of the key variables

As a result of analyzing the variables used together for the middle-aged andropause-related studies in Korea for this study, a total of 29 variables were analyzed, excluding the andropause-related variables (Table 3). The main variables were grouped into three high-level categories, the first being physiological variables, the second being psychological variables, and the third being coping-related variables. Eight (27.6%) of the analyzed physiological variables were erectile dysfunction, degree of obesity, hormones, neurotransmitter activity, metabolic syndrome, physical symptoms, quality of sleep, and subjective health status, while 16 (55.2%) psychological variables were stress, job stress, self-esteem, depression, quality of life, psychological crisis, suicidal thoughts, retirement anxiety, family ties, subjective well-being, resilience, sense of middle-aged crisis, social support, and marital intimacy. The last five variables (17.2%) related to the middle-aged menopausal responsive behavior were cognitive emotional regulation strategy, recovery elasticity, post-aging readiness, health promotion behavior, and responsive behavior (Table 2).

Table 2: Classification of key variable (n=22)

Variable	Categories	n(%)
Physiological variables	Erectile dysfunction(2)	8(27.6)
	Body mass index	
	Testosterone level	
	Neural transmitter	
	Metabolic syndrome	
	Physical symptoms	
	Sleep quality	
	Subjective health status	
	Stress(5)	
	Occupational stress(4)	
Psychological variables	Self-esteem(2)	16(55.2)
	Depression(6)	
	Quality of life(8)	
	Mid-life crisis(3)	
	Preparedness for retirement	
	Psychological crisis(2)	
	Suicidal ideation(2)	
	Retirement anxiety	
	Family bond	
	Subjective happiness	
Coping related variables	Social support	5(17.2)
	Marital intimacy	
	Hardiness	
	Family relation	
	Cognitive emotion regulation strategies	
	Resilience	5(17.2)
	Preparedness for retirement	
	Health promotion(2)	
	Coping behaviors	

3.3. Analysis of the middle-aged andropause-related research results

Following the analysis of the research results related to middle-aged andropause, understanding of the essence of middle-aged andropause, comparison by middle-aged andropause, correlation between the middle-aged andropause and other variables, causality between middle-aged andropause and other variables were classified into

four categories (Table 4). For the first category, 1 literature (4.5%) researched the understanding of the essence of middle-aged men's andropause, and the andropause experienced by middle-aged men through qualitative research was divided into and explained the categories such as physical changes, psychological changes, changes in job performance, positive changes, triggers for menopausal awareness, and overcoming andropause.

One study (4.5%) that analyzed differences due to andropause among middle-aged men who corresponded to the second category showed significantly higher levels of depression and lower levels of health promotion behavior than those without menopausal symptoms.

Third, three studies (13.6%) investigated the correlations between andropause in middle age and other variables. Specifically, menopausal symptoms, erectile dysfunction, and depression among middle-aged men were positively correlated, while family relationships, health promotion behavior, and quality of life were negatively correlated. Furthermore, no significant correlation was found between the subjective symptoms of middle-aged andropause and the degree of obesity. The largest number of 17 studies (77.3%) that researched the causality of the fourth category, andropause in middle age, and other variables, may be summarized as follows. First, the andropause-related variables among the middle-aged men operated as independent variables along with other variables. The menopausal symptoms among middle-aged men have been reported to affect the quality of life of menopausal symptoms, as well as stress, quality of sleep, depression, social support, marital intimacy, sense of ego respect, and erectile dysfunction. Furthermore, menopausal symptoms among middle-aged men were shown to affect recovery elasticity and retirement anxiety, and subjective symptoms of andropause increased depression along with stress. When examining the effect of menopausal symptoms among middle-aged men on suicide accidents, one study showed that the results were significant only when depression was mediated, while another study showed that menopausal symptoms directly affect suicide accidents, demonstrating different results. Second, menopausal syndrome among middle-aged men served as a parameter. In the process of job stress affecting psychological crisis, menopausal syndrome, and the old age preparation plan operate as parameters, and in other studies, job stress and menopausal syndrome increase psychological crisis with cognitive emotion regulation strategies as parameters. Lastly, a study that described menopausal symptoms among middle-aged men as a dependent variable reported that job stress and subjective health status influence menopausal symptoms (Table 3 and Table 4).

4. Discussion

This study has demonstrated a consistent increase in the number of studies examining

andropause among middle-aged men. This reflects a growing concern for the maintenance, management, and improvement of the health of middle-aged men, who occupy critical positions in social, psychological,

and physical domains. The findings of this research can be summarized and discussed based on the following research problem.

Table 3: Summary of the literature

Author (year)	Research design	Participants	Definition of Climacterium	Key variable
Baek et al. (2014)	Correlational research	231 Middle-age Men	No	Andropause symptoms Depression Suicidal Ideation
Kim et al. (2020b)	Correlational research	87 Middle-age Men	Yes	Andropause Syndrome Resilience Retirement Anxiety
Cho and Seo (2022)	Correlational research	135 Middle-age Men	Yes	Andropause Syndrome Quality of Life Family Bond
Kwon and Oh (2020)	Correlational research	154 Middle-age Men Workers	No	Subjective Health Status Job Stress Andropause Symptoms
Kwon (2022)	Correlational research	202 Middle-age Men	No	Quality of Life Andropause Symptoms Depression Stress
Kim and Sung (2021)	Correlational research	199 Middle-age Men	Yes	Andropause symptom Suicidal Ideation Subjective Happiness
Cho and Ha (2021)	Correlational research	135 Middle-age Men	No	Menopausal Symptoms Social Support Marital Intimacy
Jeon and Kim (2017)	Qualitative research	9 Middle-age Men	Yes	Quality of life Andropause experience
Kim and Sung (2018)	Correlational research	198 Middle-age Men	Yes	Andropause Symptoms Stress Self-esteem Quality of Life
Heo and Im (2012)	Descriptive research	189 Middle-age Men Workers	Yes	Climacteric Syndrome Depression Health Promotion
Kim et al. (2014)	Correlational research	121 Middle-age Men Workers	Yes	Subjective Health Status Climacteric Symptoms Coping Behaviors Mid-Life Crisis
Lee and Park (2013)	Correlational research	343 Middle-age Men Workers	Yes	Hypogonadism Erectile Dysfunction Depression Quality of Life

Table 4: Analysis of research results (n=22)

Result	Author (year)
Andropause experience	Jeon and Kim (2017)
Difference between depression and health-promoting behavior according to climacteric symptoms	Heo and Im (2012)
Andropause symptoms influence suicidal ideation by mediating depression	Baek et al. (2014)
Andropause symptoms and resilience affect retirement anxiety	Kim et al. (2020b)
Andropause syndrome affects the quality of life by mediating family bonds	Cho and Seo (2022)
Job stress and subjective health status affect andropause symptoms	Kwon and Oh (2020)
Depression and stress affect the quality of life	Kwon (2022)
In the effects of andropause symptoms on suicidal ideation, subjective happiness has a mediating effect	Kim and Sung (2021)
Menopausal symptoms, social support, and marital intimacy affect the quality of life	Cho and Ha (2021)
Self-esteem, stress, and andropause symptoms affect the quality of life	Kim and Sung (2018)
Climacteric symptoms and responsive behaviors affect mid-life crises	Kim et al. (2014)
Hypogonadism, erectile dysfunction, and depression affect the quality of life	Lee and Park (2013)

Firstly, an analysis of the temporal distribution of research on andropause among middle-aged men reveals that 5 studies (22.7%) were conducted between 2012 and 2015, 7 studies (31.8%) between 2016 and 2019, and 10 studies (45.5%) between 2020 and 2022, indicating a consistent annual increase. This suggests that the interest in addressing health issues related to menopausal maladjustment among middle-aged men will likely continue to receive attention in the field of nursing as researchers' interest in andropause among this population continues to grow.

Secondly, an analysis of the research methods employed in the studies on andropause among

middle-aged men reveals that quantitative approaches were predominantly utilized, with 21 quantitative studies and only 1 qualitative study. Among the quantitative studies, 17 focused on predictive analyses, 3 examined correlations, and 1 employed a descriptive approach.

In terms of the topics covered in the studies, they can be classified into four categories: understanding the essence of middle-aged andropause, comparisons of andropause among middle-aged men, correlations between andropause and other variables, and causality between andropause and other variables. Notably, only one study aimed to understand the essence of middle-aged andropause,

revealing that middle-aged men experience changes in body shape due to physical transformations, perceive physiological changes different from their past experiences, and experience a decline in sexual function.

In conclusion, this study highlights the increasing attention given to andropause among middle-aged men through a growing number of research studies. It emphasizes the need for continued exploration of health issues related to menopausal maladjustment among this population. The predominance of quantitative research methods suggests a focus on predictive analyses, while the limited research on understanding the essence of andropause among middle-aged men calls for further investigation in this area (Jeon and Kim, 2017). The psychological changes included emptiness, inability to regulate anger, increased depression and tears, and changes in the ability to perform tasks, such as decreased ability to concentrate and difficulty adjusting (Jeon and Kim, 2017). The opportunities triggering the awareness of andropause include child puberty, the death of parents, difficulties in marital relationships, and economic problems, and it was confirmed that they need to practice treatment to enhance sexual function and support their family and friends while continuing their health care to cope with their andropause (Jeon and Kim, 2017). Therefore, it is crucial to identify the physical symptoms of menopause experienced by middle-aged men in order to detect and address them early, thereby preventing the deterioration of these symptoms. Additionally, it is important to create a supportive environment that allows individuals to freely express their feelings in response to psychological changes. To achieve this, the activation of programs in workplaces and community health centers can be beneficial, leading to improved management of menopausal symptoms in men and resulting in positive changes in their work performance, as well as physical and psychological well-being.

A study investigating the variations in menopausal symptoms among middle-aged men examined a specific group and found a significantly higher prevalence of depression and lower engagement in health promotion behaviors compared to those without menopausal symptoms. Furthermore, the study revealed that as the severity of menopausal symptoms increased, so did stress and depression levels. Additionally, men experiencing more stress due to menopausal symptoms exhibited greater severity of depression.

In conclusion, it is essential to recognize and address the physical and psychological symptoms of menopause in middle-aged men. By implementing supportive programs and interventions, such as those in workplaces and community health centers, the effective management of menopausal symptoms can be enhanced, leading to improved overall well-being and work performance. The findings of a study focusing on menopausal differences among middle-aged men highlight the association between menopausal symptoms, stress, and depression,

underscoring the importance of addressing men's mental health during this stage of life (Kwon, 2022). The group with menopausal symptoms also showed a lower health promotion behavior than the group without menopausal symptoms, and the group with menopausal symptoms showed lower behaviors such as self-realization and support for interpersonal relationships (Heo and Im, 2012). Qualitative and hybrid studies are needed to cause more analyses of menopausal symptom-related factors to be conducted in the future. Furthermore, it would be necessary to confirm the stress factors, psychological factors, and mental factors that affect the severity of depression, and actively work to reduce depression to ensure that they may reach middle age and old age in good health, as the development of a comprehensive self-nursing management program is required.

Three studies were conducted to examine the correlation between middle-aged men's andropause and various variables. The findings of these investigations revealed significant associations between menopausal symptoms, erectile dysfunction, and depression among middle-aged men. Moreover, a negative correlation was observed between family relationships, health promotion behavior, and quality of life.

Specifically, middle-aged men experiencing menopausal symptoms exhibited lower engagement in health promotion behaviors. However, they reported higher levels of interpersonal relationships, self-realization, and stress, which could be attributed to their desire for achievement and the increased frequency of stress experienced during middle age.

The presence of menopausal syndrome in middle-aged men in Korea was found to significantly impact the health-related quality of life through its effects on family ties. Additionally, family ties were identified as both direct and indirect mediators of the relationship between menopausal syndrome among middle-aged men and health-related quality of life, thus indicating the existence of a direct and indirect mediation effect.

In conclusion, these findings highlight the interplay between menopausal symptoms, various psychosocial factors, and health-related quality of life among middle-aged men. The results underscore the importance of considering family relationships and addressing the specific needs and challenges associated with menopausal syndrome in order to improve the overall well-being and quality of life of middle-aged men (Cho and Seo, 2022). Therefore, it is imperative to develop a family cohesion improvement program that incorporates strategies to address andropause and involves family support. This program can help mitigate potential crises within the family unit and contribute to the overall well-being of middle-aged men. Additionally, it is essential to recognize the gender-specific health issues faced by middle-aged men and utilize appropriate tools to assess the presence or absence of menopausal symptoms. Positive self-management strategies should be implemented based on the

individual's symptom severity, taking into account their unique characteristics and coping abilities. Sustained attention and educational interventions focused on improving depression and managing menopausal symptoms among middle-aged men are crucial. This includes providing support and family education to foster positive relationships, particularly in terms of intimate marital relationships.

Interestingly, the studies reviewed did not include any research on mediation counseling and education programs. These findings highlight the necessity for future research that investigates effective counseling approaches and programs aimed at providing physical and psychological support, as well as effective coping strategies, specifically tailored to address andropause-related challenges among middle-aged men.

Overall, the current emphasis on menopausal care predominantly revolves around women's health. Consequently, it is vital to increase awareness and understanding among the general population that men also experience significant physical, social, and psychological changes during middle age. By broadening the perspective and enhancing awareness, the potential impact of interventions can be maximized to improve the well-being of middle-aged men.

5. Conclusion and recommendations

Emerging during middle age, andropause is often viewed as a natural part of the aging process. However, its prevalence rate is estimated to be 60% or higher, and research has confirmed a continuous increase in its occurrence. Consequently, there is a need for heightened attention to andropause (Heo and Im, 2012). This study aimed to enhance our understanding of andropause by reviewing the existing literature on this topic among middle-aged men in Korea over the past decade. Through this research, several key findings emerged, including comparisons of andropause among middle-aged men, the identification of correlations between andropause and other variables, investigations into causality between andropause and various factors, and the recognition of the necessity for developing and implementing menopausal education and intervention programs specifically tailored for middle-aged men. Moreover, the study emphasized the importance of creating appropriate assessment tools for andropause and conducting validation research, while also emphasizing the significance of comprehending the learning effects of educational interventions employing menopausal education and mediation programs.

However, this study has certain limitations. It is important to acknowledge the inadequacy of not presenting various research methodologies in the analysis of previous studies on the research trends of andropause among middle-aged men in Korea. Consequently, future research should strive to enhance the validity of menopausal research in this

population by expanding the research period and conducting more comprehensive investigations utilizing a variety of research analytical methods, including those employed in previous studies on menopausal trends among middle-aged men in Korea. Moving forward, it is essential to promote active research on andropause among middle-aged men within the field of nursing education in Korea. To systematically address the challenges associated with andropause and enhance understanding of this phenomenon, the development, and implementation of educational programs targeting both the general public and healthcare professionals should also be prioritized.

Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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