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A Big Data Analysis of Factors Influencing the Quality of Life Among Middle-Aged Women

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ABSTRACT

Introduction: Advancements in science and medicine have led to increased life expectancy, contributing to a growing middle-aged population. Middle-aged women, in particular, experience a range of physical, psychological, and social changes. These transitions underscore the need for targeted interventions to support their well-being and enhance their quality of life.

Objectives: This study utilized data from 12,268 respondents, selected from a total of 24,269 participants in the 2016–2018 National Health and Nutrition Examination Survey.

Methods: The objective was to identify key factors influencing the quality of life among middle-aged women, with a focus on self-perceived economic status. Analyses were conducted using IBM SPSS 22.0, applying a weighted complex sample design and setting the level of significance at 0.05. Variables examined included general characteristics, physical conditions, and psychological states.

Results: Participants were categorized based on perceived economic status—high, normal, or low. Distinct patterns emerged in the determinants of quality of life across these groups.Among women perceiving themselves as having high economic status, significant predictors included education level, average sleep duration, depression, subjective body image, and perceived health status, collectively explaining 35.2% of the variance ($F = 6.8$, $p < .001$). For those with a normal perceived economic status, quality of life was significantly influenced by age, education level, depression, and perceived health status, accounting for 28.4% of the variance ($F = 7.5$, $p < .001$). In the low economic status group, determinants included economic activity, stress, depression, subjective body image, and perceived health status, which together explained 40.2% of the variance ($F = 16.6$, $p < .001$).

Conclusions: The findings highlight the importance of developing stratified and individualized health promotion strategies tailored to the economic perceptions of middle-aged women. Such targeted interventions can more effectively enhance their quality of life by addressing specific needs within each socioeconomic context.

Keywords: General characteristics, Middle-aged Women, National Health and Nutrition Examination Survey, Physical attributes, Psychological aspects, Quality of Life.

INTRODUCTION

As Korea faces a rapidly aging population, the life expectancy of Korean women has risen significantly, now ranking third globally [1]. This demographic shift has sparked increased attention to health and well-being, especially during middle age—a life stage gaining prominence for its role in shaping future quality of life. Typically defined as ages 40 to 65, middle age represents a pivotal transitional phase for women, marked by the onset of menopause, physical aging, and accompanying psychological and emotional changes [2]. These biological and psychosocial transitions can elicit feelings of confusion, vulnerability, and crisis, often exacerbated by diminished self-confidence and body image dissatisfaction stemming from menopausal symptoms [3].

Middle-aged women also encounter substantial social changes, including altered family dynamics as children gain independence or marry, and the emotional burden of caregiving or loss due to aging parents and peers. These shifts can lead to emotional states such as emptiness, role confusion, conflict, and low self-worth. Women who find it

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difficult to adapt to these changes may face psychological challenges, including elevated levels of stress and depression [4]. Research indicates that middle-aged married women are particularly vulnerable, experiencing psychological distress at approximately twice the rate of men, with women in other age groups also reporting higher levels of stress and emotional strain [5].

This life stage is not only significant in and of itself but also foundational to later life outcomes. It involves reappraising life experiences, reevaluating values, and forming new strategies to navigate current and future challenges [6]. How women manage these midlife transitions can profoundly influence not only their own health and happiness but also the well-being of their families and communities [7]. Therefore, there is a critical need for targeted interventions that address the physical and psychological challenges specific to middle-aged women in order to promote well-being and long-term quality of life [8].

Quality of life (QoL) is a multidimensional construct encompassing physical health, psychological state, level of independence, social relationships, personal beliefs, and environmental context. At its core, QoL involves the subjective evaluation of overall life satisfaction and happiness [9]. Related concepts include subjective well-being, psychological health, and life satisfaction. Individuals with a high QoL typically demonstrate self-acceptance, autonomy, meaningful social connections, goal-directed living, environmental mastery, and self-actualization. For middle-aged women, happiness is especially tied to self-acceptance, fulfilling relationships, personal growth, and purposeful living [10].

QoL reflects not only objective conditions but also personal perceptions of life satisfaction across physical, mental, and social dimensions. Those with high QoL tend to cultivate positive relationships, maintain a sense of life purpose, exert control over their environment, and strive for personal fulfillment [11]. Among middle-aged women, these qualities are especially dependent on maintaining social harmony, self-growth, and the pursuit of meaningful goals [12].

Economic status is a critical determinant of QoL. Poverty has consistently been linked to poorer well-being, especially for women, who may face compounded challenges in lower socioeconomic strata [13]. Economic hardship often undermines decision-making capacity, emotional regulation, and conflict resolution, increasing the risk of adverse health outcomes. Despite this, few studies have specifically explored how economic perceptions shape the quality of life among middle-aged Korean women [14].

In response, this study analyzes data from 12,628 middle-aged women extracted from the 2016–2018 National Health and Nutrition Examination Survey [15]. Participants were categorized by self-reported economic status—high, medium, or low—to identify and compare key factors influencing their quality of life.

OBJECTIVES

The overarching aim of this study was to identify determinants of quality of life among middle-aged women, with particular attention to differences based on perceived economic status. The specific research objectives were:

1. To identify the general characteristics of the study population.
2. To examine physical and psychological factors relevant to quality of life.
3. To analyze the relationship between perceived economic status and factors influencing quality of life.

METHODS

To explore the multifaceted factors influencing quality of life among middle-aged women, this study analyzed data from 12,268 women, selected from a total of 24,269 participants in the 2016–2018 Korea National Health and Nutrition Examination Survey (KNHANES) [15]. KNHANES is a nationally representative survey designed to assess the health and nutritional status of the Korean population. It plays a pivotal role in generating statistical evidence that supports the development, evaluation, and refinement of national health policies.

The survey's objectives include monitoring health and nutrition trends, identifying at-risk populations requiring targeted interventions, and assessing the effectiveness of public health programs. Moreover, it provides comprehensive lifestyle statistics—such as smoking habits, alcohol consumption, physical activity, and obesity

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prevalence—meeting the data needs of organizations such as the World Health Organization (WHO) and the Organisation for Economic Co-operation and Development (OECD). Specifically, KNHANES supports the formulation of national health goals, monitors risk behaviors (e.g., smoking, alcohol use, and sedentary lifestyle), manages chronic diseases, and evaluates quality of life in relation to disease and disability.

This study focused exclusively on data from the 7th cycle of KNHANES (2016–2018). To identify factors affecting quality of life among middle-aged women, participants were stratified by their self-perceived economic status (high, medium, or low). The analysis incorporated a wide range of variables, including general demographics, physical health indicators, and psychological characteristics. Data analysis was performed using IBM SPSS Statistics version 22.0, utilizing a weighted complex sample design. Statistical significance was set at $p < 0.05$.

The variables examined in this study were categorized as follows:

- **General characteristics:** age, education level, household size, marital status, employment status, annual weight change, average sleep duration, obesity status, and self-reported quality of life.
- **Physical factors:** presence of hypertension or diabetes, smoking status, body mass index (BMI), reproductive history (menstruation and childbirth), and participation in aerobic physical activity.
- **Psychological factors:** levels of stress, presence of depression, subjective perception of body image, and self-rated health status.

RESULTS

1. Demographic Characteristics of the Subjects

Table 1 outlines the demographic characteristics of the study participants, categorized by self-perceived economic status (high, normal, and low).

Among individuals who perceived their economic status as high, the majority (75%) were aged 61–65 years. Most respondents (57.9%) had completed only elementary school. More than half (51.6%) reported not having a spouse, and 57.8% were not engaged in economic activities. Regarding body weight, 65.8% indicated no significant change over the previous year. In terms of sleep, 45.8% reported an average duration of 7 to 8 hours per night. Obesity prevalence was classified as 'normal' in 69.9% of cases. The average quality of life score in this group was 0.87.

In the group perceiving their economic status as normal, the largest age group was 41–50 years (34.6%). High school graduation was the most common educational level (30.7%). Nearly half (48.2%) reported having a spouse, and 59.9% were currently engaged in economic activities. A majority (65.6%) indicated no change in body weight. Regarding sleep, 50.8% reported averaging 7 to 8 hours per night, and 75.1% had a 'normal' obesity classification. The average quality of life score for this group was 0.95.

Among those perceiving their economic status as low, 43.9% were aged 41–50 years. The most frequently reported education level was college graduation (46.2%). Slightly over half (50.6%) had a spouse, and 65.5% were employed or involved in economic activities. A lower percentage (48.5%) reported no weight change. A majority (57.5%) slept an average of 7 to 8 hours per night, and 80.2% were classified as having a normal obesity level. The quality of life score in this group was highest at 0.97.

Table 1: Demographic Characteristics

Characteristics		Low (N=2402)	Middle (N=6678)	High (N=3548)	$F/x^2(p)$
		N(weight %)/ Mean	N(weight %)/ Mean	N(weight %)/ Mean	
Age(yr)	41-50	145(10.2)	1023(34.6)	762(43.9)	28.88

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Research Article

	51-60	240(14.8)	1055(31.8)	735(40.3)	(<.001)
	61-65	1630(75.0)	1447(33.5)	378(15.8)	
Education level	≦Elementary school	1466(57.9)	2195(28.2)	745(17.0)	32.21
	Middle school	273(12.6)	753(11.8)	268(8.4)	(<.001)
	High school	349(20.1)	1798(30.7)	910(28.5)	
	≧College	151(9.4)	1708(29.3)	1511(46.2)	
Number of household members	1	856(29.0)	469(6.3)	91(2.5)	40.21
	02-Mar	1195(51.6)	3267(48.2)	1626(46.9)	(<.001)
	4	351(19.5)	2942(24.5)	1831(50.6)	
With or without a spouse	Yes	962(38.2)	3726(55.1)	2208(60.5)	20.34
	No	1440(61.8)	2952(44.9)	1340(39.5)	(<.001)
Economic activity status	Yes	989(42.2)	4110(59.9)	2397(65.5)	5.64
	No	1413(57.8)	2568(40.1)	1151(34.5)	(<.001)
Weight change status	No change	1635(65.8)	4529(65.6)	2403(48.5)	4.9
	Weight Loss	320(13.2)	633(10.1)	301(25.8)	(<.001)
	Weight gain	387(18.1)	1465(23.5)	819(24.9)	
	etc.	60(2.9)	51(0.8)	25(0.8)	
Average Sleep Time	≦6	612(25.5)	1315(19.7)	585(16.5)	11.43

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	07-Aug	1100(45.8)	3392(50.8)	2040(57.5)	(<.001)
	≧9	690(28.7)	1971(29.5)	923(26.0)	
Prevalence of obesity	Underweight	105(4.4)	340(5.1)	234(6.6)	8.98 (<.001)
	Normal	1678(69.9)	5015(75.1)	2845(80.2)	
	Obesity	619(25.7)	1323(19.8)	469(13.2)	
Quality of life		0.87±0.001	0.95±0.001	0.97±0.001	8.98 (<.001)

2. Factors Influencing the Quality of Life

To identify the determinants impacting quality of life among middle-aged women, a comprehensive analysis was conducted, incorporating a range of general, physical, and psychological variables. General characteristics included age, education level, household size, marital status, economic activity status, annual weight change, average sleep duration, obesity status, and self-reported quality of life. Physical factors comprised the presence of hypertension and diabetes, current smoking status, body mass index (BMI), reproductive history (including menstruation and childbirth), and participation in aerobic physical activities. Psychological factors included perceived stress levels, depressive symptoms, subjective body image, and self-rated health status.

As summarized in Table 2, distinct factors influenced the quality of life depending on self-perceived economic status:

- Among participants who perceived themselves as having a **high economic status**, the significant predictors of quality of life were educational attainment, average sleep duration, depressive symptoms, subjective body image, and subjective health status. These variables collectively explained 35.2% of the variance in quality of life ($F = 6.8$, $p < .001$). Specifically, higher educational levels, optimal sleep duration, more positive body image, and better perceived health status were associated with enhanced quality of life.
- For those who perceived their economic status as **normal**, the key influencing variables included age, educational attainment, depressive symptoms, and subjective health status, accounting for 28.4% of the variance ($F = 7.5$, $p < .001$). Younger age, higher levels of education, lower depression levels, and better perceived health were all positively correlated with improved quality of life.
- Among respondents who identified as having a **low economic status**, significant determinants of quality of life included economic activity status, stress levels, depressive symptoms, subjective body image, and self-rated health status. These variables accounted for 40.2% of the variance ($F = 16.6$, $p < .001$). Engagement in economic activities, lower stress and depression levels, and more favorable body image and health perceptions were strongly associated with a higher quality of life.

These findings underscore the complex interplay between psychological well-being, socioeconomic perception, and health-related behaviors in shaping the quality of life among middle-aged women.

Table 2. Factors influencing quality of life

Variables		β	t	p	R^2	F	p
High	Age	-.02	-0.19	0.98	0.352	6.8	<.001

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	Education level	.12	3.28	.011			
	Economic activity status	.03	0.25	0.89			
	Average Sleep Time	.22	2.54	.012			
	Depression	,21	3.21	.021			
	Stress	.02	1.01	0.88			
	Subjective body image	.14	2.44	.031			
	Subjective health status	.12	3.32	.022			
Middle	Age	-.01	-3.25	.022	0.284	7.5	<.001
	Education level	.15	3.57	.013			
	Economic activity status	.02	0.75	0.78			
	Average Sleep Time	.03	0.79	0.91			
	Depression	.13	2.11	.021			
	Stress	.01	0.19	0.69			
	Subjective body image	.02	1.10	0.78			
	Subjective health status	.14	3.23	.032			
Low	Age	-.03	-0.39	0.89	0.402	16.6	<.001
	Education level	.02	1.09	0.90			
	Economic activity status	.11	3.02	.011			
	Average Sleep Time	.02	0.18	0.83			
	Depression	.03	0.32	0.87			
	Stress	.02	4.75	.021			
	Subjective body image	.04	3.89	.032			
	Subjective health status	.15	5.01	.011			

DISCUSSION

This study identified significant variations in the factors influencing the quality of life among middle-aged women, depending on their self-perceived economic status. These findings highlight the necessity of utilizing such differentiated insights as a foundation for the development of customized intervention programs tailored to the specific needs of each subgroup.

Enhancing quality of life in middle-aged women contributes not only to improved emotional well-being but also to increased autonomy and resilience in managing the complexities of daily life. A higher quality of life may promote a constructive life transition marked by personal reflection, evolving interpersonal relationships, reassessment of life goals, and the pursuit of renewed identities and perspectives on time and purpose.

Therefore, the strategic design and implementation of interventions that address both common and status-specific determinants—spanning physical, psychological, and socioeconomic dimensions—carry meaningful implications for both academic research and practical application. Such efforts are essential to fostering healthier, more fulfilling lives for middle-aged women and, by extension, to promoting broader societal well-being.

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