Effect of the Household Type on the Prevalence of Climacteric Syndrome Among Middle-aged Men

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Posted Date: 12 July 2023

doi: 10.20944/preprints202307.0794.v1

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Article

Effect of the Household Type on the Prevalence of Climacteric Syndrome among Middle-Aged Men

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Abstract: *Background and Objectives*: Research on climacteric syndrome among middle-aged men remains scant compared to the research among women. Moreover, limited research has been conducted on climacteric syndrome among older adults living alone, a population that is growing due to accelerated population aging, particularly research on the health interventions for older men living alone who are more vulnerable than older women living alone. This cross-sectional study investigated whether the prevalence of climacteric syndrome is associated with the type of household middle-aged men live in and identified the determinants of climacteric syndrome based on the household type. *Materials and Methods*: We surveyed 600 middle-aged men (those aged between 40 and 64) living in multi-person households and 600 middle-aged men living alone about general characteristics and diet-related factors. Climacteric syndrome was measured using the Aging Males' Symptoms scale. Data were analyzed using Pearson's chi-squared test, Fisher's exact test, and logistic regression. *Results*: The results showed that the risk of climacteric syndrome among middle-aged men living alone is 1.6 times higher than the risk among middle-aged men living in multi-person households ($p = 0.006$). In multi-person households, income and breakfast frequency were found to predict climacteric syndrome ($p < 0.05$), while age, breakfast frequency, dinner frequency, and weekly eating out frequency predicted climacteric syndrome in single-person households ($p < 0.05$). *Conclusions*: In single-person households, dietary factors are more closely linked to the prevalence of climacteric syndrome than in multi-person households. This result highlights the need for climacteric syndrome interventions for middle-aged men whose health concerns may persist into older adulthood.

Keywords: households type; climacteric syndrome; middle aged; dietary factors

1. Introduction

Single-person households are households comprising only one individual. This concept differs from the concept of "single" individuals, and such households are increasing globally [1]. In the 2010s, the average number of single-person households in Asia was lower than those in Europe and North America. However, since then, the number of single-person households has grown most rapidly in Korea among the OECD countries [2]. The reasons for this increase vary widely. They include later first marriages, decreased marriage rates, increased divorce rates, an increased number of single single-person households, and an increased number of older adults living alone due to population aging [3]. Single-person households hold significance in the social structure not only for socioeconomic aspects but also for health aspects.

In Korea, 44% of single-person households comprise middle-aged adults (individuals aged between 40 and 64), and social isolation, a concern considered unique to older adults living alone, is also affecting middle-aged adults now [4]. Middle adulthood is a crucial phase that exposes individuals to various negative experiences, such as stress, climacteric syndrome, and depression. It also makes them vulnerable to social problems, such as alcohol abuse, marital discord, divorce, and social isolation [5]. Notably, an increasing number of middle-aged men live alone and face

 doi:10.20944/preprints202307.0794.v1

socioeconomic difficulties. The challenges individuals face in middle adulthood also affect them in later years, which further emphasizes the importance of middle adulthood [6].

Male climacteric syndrome is also known as late-onset hypogonadism and testosterone deficiency syndrome. It is reported that, in Korea, the prevalence of climacteric syndrome among middle-aged men exceeds 60% [7,8]. While female climacteric syndrome is characterized by unique hormonal changes, male climacteric syndrome does not present clear physical changes. Resultingly, research on female climacteric syndrome is abundant, while the research on male climacteric syndrome remains scant [9,10].

The household type and climacteric syndrome are two crucial determinants of the mental and physical health of middle-aged men. These men are often socially and economically vulnerable, and effectively managing climacteric syndrome may benefit their health in later years. Thus, this study investigates whether the prevalence of climacteric syndrome is associated with the type of household middle-aged men live in and identifies the predictors of climacteric syndrome among middle-aged men based on the household type. We assess climacteric syndrome based on aging males' symptoms, such that climacteric syndrome is diagnosed if symptoms suggest hormonal deficiency. Consequently, we use the aging males' symptoms scale to determine the existence of climacteric syndrome [11]. This study identifies actionable factors associated with the male climacteric in middle adulthood. It shows that the household type and dietary factors are crucial factors in reducing the prevalence of climacteric syndrome among middle-aged men.

2. Materials and methods

We surveyed middle-aged men (men aged between 40 and 64) residing in Seoul, Korea, between October 2022 and November 2022. This survey was administered by a professional survey company using self-report online and offline questionnaires. Only those individuals who provided informed consent were enrolled. The questionnaire was evenly distributed among men aged between 40 and 44, 45 and 49, 50 and 54, 55 and 59, and 60 and 64. A total of 1,832 individuals completed the survey. Among these, 46 individuals dropped out, 209 failed the criterion regarding age and the household type, and 284 provided same answers to questions. Additionally, to equalize the two groups, we sequentially excluded the responses of 93 individuals whose response time was less than the average response time. Resultingly, the responses of 1,200 participants—600 living in multi-person households and 600 living in single-person households—were included in data analysis. Furthermore, the study was approved by the Institutional Review Board of Seoul Medical Center (IRB 2022-07-006).

After obtaining permission from its developer, we used the Korean version of the AMS scale to measure male climacteric syndrome and quality of life [12]. The scale comprises 18 items, with seven items measuring somatic symptoms, five measuring psychological symptoms, and five measuring sexual symptoms. The severity of each symptom is rated on a 1–5 scale. In this study, climacteric syndrome was diagnosed if the total score was 27 (mild symptoms) or higher [13].

We also collected data on participants' characteristics, including age, education level, occupation, income level, whether they smoke, drinking behavior, physical activity, sleep duration, and body mass index (BMI). The income level was classified as high- and low-income levels based on a median of KRW 50 million. Professional, management, office, and service work were considered white-collar occupations, while technical work, agricultural work, manual labor work, and being unemployed were considered blue-collar occupations. Drinking alcohol more than two times a week and having, on average, seven drinks or more in each sitting was considered high-risk drinking behavior. Not indulging in such drinking behavior was considered low-risk drinking behavior. Indulging in moderate-intensity aerobic physical activity for at least 150 minutes or vigorous-intensity aerobic physical activity for at least 75 minutes was considered adequate physical activity. Not having this much physical activity was considered inadequate physical activity. A sleep duration of more than six hours was considered sufficient sleep duration. Furthermore, one whose BMI equaled or exceeded 25 was considered obese. We categorized these variables based on the guidelines prescribed by the World Health Organization and National Sleep Foundation [14,15]. Dietary factors

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were surveyed to examine the influence of lifestyle-related factors. They included the frequency of breakfast, lunch, and dinner, having company when eating, and the frequency of weekly eating out.

Statistical analyses were performed using SPSS version 20. We compared lifestyle factors based on the household type and climacteric syndrome using Pearson's chi-squared test and Fisher's exact test. The effects of general characteristics and dietary factors on climacteric syndrome were analyzed using logistic regression.

3. Results

3.1. General Characteristics Associated with Climacteric Syndrome

The prevalence of climacteric syndrome differed significantly based on participants' age, education level, occupation, income level, smoking status, and household type. In terms of socioeconomic factors, the prevalence of climacteric syndrome was significantly higher among participants with lower education levels, manual labor work, and lower income. In terms of health-related factors, the prevalence of climacteric syndrome differed significantly based only on participants' smoking status. In terms of the household type, the prevalence of climacteric syndrome was significantly higher among the participants living in single-person households than those living in multi-person households (Table 1).

Table 1. General characteristics associated with climacteric syndrome.

Variable		Normal	Climacteric Syndrome	*p*
		n (%)	n (%)	
Age	Less than 50	114 (26.6)	315 (73.4)	0.016*
	50 or more	158 (20.5)	613 (79.5)	
Education level	University	241 (24.7)	736 (75.3)	0.001**
	High school	31 (13.9)	192 (86.1)	
Occupation	White-collar	228 (24.0)	723 (76.0)	0.034*
	Blue-collar	44 (17.7)	205 (82.3)	
Income level	High	156 (25.9)	446 (74.1)	0.007**
	Low	116 (19.4)	482 (80.6)	
Smoking status	Non-smoker	172(24.9)	520(75.1)	0.035*
	Smoker	100(19.7)	408(80.3)	
Drinking behavior	Low-risk	214 (22.5)	738 (77.5)	0.761
	High-risk	58 (23.4)	190 (76.6)	
Physical activity	Adequate	58 (26.0)	165 (74.0)	0.186
	Inadequate	214 (21.9)	763 (78.1)	
Sleep duration	Sufficient	135 (22.5)	466 (77.5)	0.866
	Insufficient	137 (22.9)	462 (77.1)	
BMI	Normal	159 (23.1)	528 (76.9)	0.648
	Obesity	113 (22.0)	400 (78.0)	
Household type	Multi-person	166 (27.7)	434 (72.3)	<0.001***
	Single-person	106 (17.7)	494 (82.3)	

*p < 0.05, **p < 0.01, ***p < 0.001.

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3.2. Risk of Climacteric Syndrome Based on General Characteristics

We performed bivariate logistic regression with the general characteristics that were significantly related to climacteric syndrome in the univariate analysis as the independent variables and climacteric syndrome as the dependent variable. Climacteric syndrome differed significantly based on participants' age, education level, and household type. More specifically, the risk of climacteric syndrome was nearly 1.4 times higher among men aged 50 or more than those aged less than 50 (OR = 1.376, 95% CI 1.035–1.829, p = 0.028) and approximately 1.6 times higher among high school graduates than among college graduates (OR = 1.557, 95% CI 1.006–2.409, p = 0.047). In terms of household type, the risk of climacteric syndrome was nearly 1.5 times higher among the participants living in single-person households than those living in multi-person households (OR = 1.515, 95% CI 1.125–2.038, p = 0.006) (Table 2).

Table 2. Factors associated with climacteric syndrome.

Variable		B	SE	Wald	*p*	OR	95% CI	
							LLCI	ULCI
Age	50 or more	0.319	0.145	4.833	0.028*	1.376	1.035	1.829
Education level	High school	0.443	0.223	3.953	0.047*	1.557	1.006	2.409
Occupation	Blue-collar	0.058	0.199	0.085	0.770	1.060	0.718	1.564
Income level	Low	0.190	0.150	1.596	0.206	1.209	0.901	1.622
Smoking status	Smoker	0.206	0.146	1.998	0.158	1.229	0.923	1.634
Household type	Single-person	0.415	0.152	7.505	0.006**	1.515	1.125	2.038

SE: standard error, OR: odd ratio, CI: confidence interval, LLCI: lower limit confidence interval, ULCI: upper limit confidence interval. *p < 0.05, **p < 0.01.

3.3. General Characteristics Associated with Climacteric Syndrome Based on the Household Type

Since the household type and the prevalence of climacteric syndrome were found to be significantly associated, we examined the general characteristics related to the prevalence of climacteric syndrome separately for single-person and multi-person households. In multi-person households, the prevalence was significantly higher among low-income men and smokers. In single-person households, the prevalence was significantly higher among older and less-educated men (Table 3).

Table 3. General characteristics associated with climacteric syndrome based on the household type.

Variable		Multi-Person Household			Single-Person Household		
		Normal	Climacteric Syndrome	*p*	Normal	Climacteric Syndrome	*p*
		n (%)	n (%)		n (%)	n (%)	
Age	Less than 50	60 (28.0)	154 (72.0)	0.880	54 (25.1)	161 (74.9)	<0.001***
	50 or more	106 (27.5)	280 (72.5)		52 (13.5)	333 (86.5)	
Education level	University	155 (28.3)	392 (71.7)	0.239	86 (20.0)	344 (80.0)	0.017*
	High school	11 (20.8)	42 (79.2)		20 (11.8)	150 (88.2)	
Occupation	White-collar	147 (28.4)	371 (71.6)	0.327	81 (18.7)	352 (81.3)	0.282

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	Blue-collar	19 (23.2)	63 (76.8)		25 (15.0)	142 (85.0)	
Income level	High	119 (30.5)	271 (69.5)	0.034*	37 (17.5)	175 (82.5)	0.919
	Low	47 (22.4)	163 (77.6)		69 (17.8)	319 (82.2)	
Smoking status	Non-smoker	119 (30.4)	273 (69.6)	0.043*	53 (17.7)	247 (82.3)	1.000
	Smoker	47 (22.6)	161 (77.4)		53 (17.7)	247 (82.3)	
Drinking behavior	Low-risk	136 (28.0)	349 (72.0)	0.674	78 (16.7)	389 (83.3)	0.246
	High-risk	30 (26.1)	85 (73.9)		28 (21.1)	105 (78.9)	
Physical activity	Adequate	36 (29.8)	85 (70.2)	0.566	22 (21.6)	80 (78.4)	0.257
	Inadequate	130 (27.1)	349 (72.9)		84 (16.9)	414 (83.1)	
Sleep duration	Sufficient	82 (28.7)	204 (71.3)	0.600	53 (16.8)	262 (83.2)	0.570
	Insufficient	84 (26.8)	230 (73.2)		53 (18.6)	232 (81.4)	
BMI	Normal	100 (28.7)	248 (71.3)	0.492	59 (17.4)	280 (82.6)	0.848
	Obesity	66 (26.2)	186 (73.8)		47 (18.0)	214 (82.0)	

*p < 0.05, ***p < 0.001.

3.4. Dietary Factors Associated with Climacteric Syndrome Based on the Household Type

Similar to the results obtained from examining participants' general characteristics, the prevalence of climacteric syndrome differed significantly based on the household type when we examined participants' dietary factors. In multi-person households, the prevalence was significantly higher among those who eat breakfast four or fewer times a week than those who eat breakfast five or more times a week. No other significant differences were found in the prevalence of climacteric syndrome based on dietary factors ($p < 0.05$). However, in single-person households, the prevalence of climacteric syndrome was significantly higher among those who eat breakfast and dinner four or fewer times a week and those who eat out three or more times a week (Table 4).

Table 4. Dietary factors associated with climacteric syndrome based on the household type.

Variable		Multi-Person Household			Single-Person Household		
		Normal	Climacteric Syndrome	*p*	Normal	Climacteric Syndrome	*p*
		n (%)	n (%)		n (%)	n (%)	
Breakfast frequency	Five or more times a week	92 (33.1)	186 (66.9)	0.006**	33 (28.2)	84 (71.8)	0.001**
	Four or fewer times a week	74 (23.0)	248 (77.0)		73 (15.1)	410 (84.9)	
Shared breakfast	Together	86 (30.6)	195 (69.4)	0.131	8 (16.0)	42 (84.0)	0.747
	Alone	80 (25.1)	239 (74.9)		98 (17.8)	452 (82.2)	
Lunch frequency	Five or more	146 (28.9)	360 (71.1)	0.132	88 (17.0)	430 (83.0)	0.274

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	times a week						
	Four or fewer times a week	20 (21.3)	74 (78.7)		18 (22.0)	64 (78.0)	
Shared lunch	Together	123 (29.6)	292 (70.4)	0.106	70 (16.4)	357 (83.6)	0.199
	Alone	43 (23.2)	142 (76.8)		36 (20.8)	137 (79.2)	
Dinner frequency	Five or more times a week	150 (28.6)	374 (71.4)	0.168	87 (21.2)	324 (78.8)	0.001**
	Four or fewer times a week	16 (21.1)	60 (78.9)		19 (10.1)	170 (89.9)	
Shared dinner	Together	142 (28.9)	350 (71.1)	0.162	37 (16.3)	190 (83.7)	0.493
	Alone	24 (22.2)	84 (77.8)		69 (18.5)	304 (81.5)	
Eating out	Two or fewer times a week	107 (28.3)	271 (71.7)	0.647	57 (23.9)	181 (76.1)	0.001**
	Three or more times a week	59 (26.6)	163 (73.4)		49 (13.5)	313 (86.5)	

**p < 0.01.

3.5. Predictors of Climacteric Syndrome Based on the Household Type

Table 5 shows the results of bivariate logistic regression that determined the predictors of climacteric syndrome based on household type by using the general characteristics and dietary factors associated with the prevalence of climacteric syndrome in univariate analyses. In multi-person households, the risk of climacteric syndrome was 1.5 times higher among low-income men than among high-income men (adj. OR = 1.553, 95% CI 1.031–2.339, p = 0.035) and 1.6 times higher among those who eat breakfast four or fewer times a week than those who eat breakfast five or more times a week (adj. OR = 1.659, 95% CI 1.131–2.433, p = 0.010). In single-person households, the risk of climacteric syndrome was nearly 1.9 times higher among men aged 50 or more than those aged less than 50 (adj. OR = 1.871, 95% CI 1.199–2.919, p = 0.006). Furthermore, the risk of climacteric syndrome was 1.8 times higher among those who eat breakfast four or fewer times a week than those who eat breakfast five or more times a week (adj. OR = 1.806, 95% CI 1.099–2.970, p = 0.020). The risk was also 2.2 times higher among those who eat dinner four or fewer times a week than those who eat dinner five or more times a week (adj. OR = 2.240, 95% CI 1.293–3.882, p = 0.004). In terms of the frequency of eating out, the risk of climacteric syndrome among those who eat out at least three times a week was nearly double the risk among those who eat out two or fewer times a week (adj. OR = 1.991, 95% CI 1.276–3.106, p = 0.002) (Table 5).

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Table 5. Predictors of climacteric syndrome based on household type.

Variable		Multi-Person Household				Single-Person Household			
		OR	95% CI		*p*	OR	95% CI		*p*
			LLCI	ULCI			LLCI	ULCI	
Age	50 or more	1.155	0.775	1.721	0.480	1.871	1.199	2.919	0.006**
Education level	High school	1.131	0.547	2.338	0.739	1.520	0.857	2.696	0.152
Occupation	Blue-collar	1.293	0.719	2.328	0.391	1.096	0.630	1.905	0.746
Income level	Low	1.553	1.031	2.339	0.035*	1.049	0.654	1.682	0.844
Smoking status	Smoker	1.461	0.979	2.182	0.063	0.889	0.573	1.379	0.599
Breakfast frequency	Four or fewer times a week	1.659	1.131	2.433	0.010*	1.806	1.099	2.970	0.020*
Dinner frequency	Four or fewer times a week	1.370	0.752	2.496	0.303	2.240	1.293	3.882	0.004**
Eating out	Three or more times a week	1.204	0.818	1.772	0.346	1.991	1.276	3.106	0.002**

*p < 0.05, **p < 0.01.

4. Discussion

Unlike in the past, household structures have diversified today, making socioeconomic, physical, and mental health issues concerning single-person households salient concerns. The characteristics of single-person households vary across generations. Young adults tend to live alone voluntarily because of work and school. However, middle-aged adults are likely to have come to live alone due to reasons such as divorce and widowhood and will probably continue to live alone in later years. Furthermore, single-person households tend to have lower household income and education level than multi-person households, and education level, along with age, is closely associated with the prevalence of climacteric syndrome [16]. In this study, age, education level, and household type were found to be associated with the prevalence of climacteric syndrome among middle-aged men in Korea, suggesting that the household type may be as important as age and education level in the development of climacteric syndrome.

Climacteric syndrome refers to the physical, mental, and sexual changes that naturally occur during aging. The male climacteric is diagnosed based on declining physical abilities, such as energy, muscle strength, endurance, and sexual decline, and mental health problems, such as depression, anxiety, and increased stress [17]. Unlike climacteric syndrome among women, the male climacteric is not accompanied by pronounced physical or physiological changes. Thus, it is difficult to recognize and should be diagnosed based on a multidimensional assessment examining physical, mental, and physiological aspects. The AMS scale used in this study evaluates not only sexual factors but also physical and psychological factors related to changes in the male climacteric, which increases its usefulness for diagnosing climacteric syndrome [18].

While lifestyle differences between single-person and multi-person households cannot be solely diet-based, diet is an important feature distinguishing different types of households. It is reported that compared to high-income individuals, low-income individuals have a poorer standard of living, are at an elevated risk of stress and depression, and are likely to fall into a negative life cycle by spending a large percentage of their income on meeting basic needs, such as food [19]. Studies have also found that single-person households spend a large percentage of their income on buying food and tend to purchase more processed foods because of their convenience and simple use [20]. Notably, this study found that differences in the dietary factors of households are also linked to the

prevalence of climacteric syndrome. It also discovered that the risk of developing climacteric syndrome nearly doubles when the frequency of eating out is at least three times a week than when one eats out less than three times weekly in single-person households. A previous study reported that single-person households tend to skip breakfast more frequently than multi-person households, and *honbap* (eating alone) leads to excessive sodium intake and nutritional imbalance, which affects health [21]. However, we found that skipping dinner is a more critical risk factor for climacteric syndrome than skipping breakfast. This may be because the syndrome is diagnosed after assessing not only one's physical health but also one's mental and sexual health [18]. If left unaddressed, sustaining such dietary habits may harm the health of middle-aged adults, which may hamper their health in older adulthood. In fact, the 2014 National Survey of Older Koreans showed that 24% of older adults living alone skip breakfast, which is higher than the percentage among older adults living with a spouse (10%) and older adults living with their children (11.2%) [22].

In addition to their nutritional aspect, dietary factors are closely linked to mental health indicators, such as stress, sleep, and depression. Eating alone has already been established as a predictor of depression, and dining with family members is known to facilitate family bonding and social support and maintain mental health [23]. Furthermore, eating dinner alone significantly increases the rate of depressive mood and suicidal ideation, the effects being more prevalent among men [24]. However, unlike the results of previous studies, we did not find a statistically significant relationship between sharing a meal and the prevalence of climacteric syndrome. This may be because the mental health aspect of the AMS scale is not appropriate or inadequate for assessing overall mental health. Another limitation of this study is that we could not examine the effects of nutrient intake and the loneliness and depression caused by eating alone. Therefore, it is necessary to further study how different dietary factors in different household types affect nutritional deficiencies and health.

5. Conclusions

The household type and dietary factors cannot be conclusively established as the risk factors for climacteric syndrome owing to the variations in diet based on customs and races. Nevertheless, the type of household and the consequent differences in dietary factors may be crucial factors for middle-aged men in not only preventing climacteric syndrome but also managing health. Barring non-modifiable or less-modifiable risk factors, such as age, education level, and income, the household type and dietary factors may be considered vital aspects in reducing the prevalence of climacteric syndrome among middle-aged men. Therefore, this study identified potential intervenable factors associated with the male climacteric in middle adulthood, a period in which individuals have financial independence and can engage in activities improving health. This study is also meaningful because it presents actionable risk factors that may also have an impact on the mental and physical health of older adults, particularly those living alone.

Author Contributions: Conceptualization, K.K.; methodology, K.K.; validation, M.J.; formal analysis, M.J. and D.H.K.; investigation, D.H.K.; data curation, S.L.; writing—original draft preparation, D.H.K.; writing—review and editing, K.K.; project administration, S.L. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the Research Institute of Seoul Medical Center, grant number #23-C02.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board of Seoul Medical Center (IRB 2022-07-006, August 10, 2022).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data that support the findings of this study are not openly available due to reasons of sensitivity and are available from the corresponding author upon reasonable request.

Acknowledgments: None.

Conflicts of Interest: The authors declare no conflict of interest. The funder had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

References

1. Palmer, G. *Single person households;* Joseph Rowntree Foundation: York, United Kingdom, 2006.
2. OECD. OECD Family Database. Available online: https://www.oecd.org/els/family/database.htm (accessed on 7 November 2020).
3. Kang, E.T.; Kang, J.K.; Ma, K.R. Subjective well-being of one-person households: Focus on non-married and married one-person households. *J. Soc. Sci.* **2016,** *27*, 3–23. http://dx.doi.org/10.16881/jss.2016.01.27.1.3
4. Chang, O.J. A study on the experience of social capital formation process of middle-aged single man householders. *Fam. Cult.* **2015,** *27*, 67–100.
5. Park, J.H. The influence of depression on the life satisfaction of the middle aged males: A moderating effect of problem drinking. *Korean J. Soc. Welf. Res.* **2012**, *33*, p1–p20.
6. Lee, S. Employment and decent jobs for the Korean mid-old age. *Korean Soc. Policy Rev.* **2008**, *15*, 181–216.
7. PARK, N.C. A manual of 2008 ISA, ISSAM, EAU, EAA and ASA recommendations: investigation, treatment and monitoring of late-onset hypogonadism in males. *Korean J Androl* **2009**, 63-73.
8. Lee, M.W.; Park, H. A study on late-onset of hypogonadism, erectile dysfunction, depression, and quality of life among middle-aged male worker. *Korean J. Adult Nurs.* **2013**, *25*, 483–493. http://dx.doi.org/10.7475/kjan.2013.25.5.483
9. Zolfaghari, S.; Yao, C.; Thompson, C.; Gosselin, N.; Desautels, A.; Dang-Vu, T.T.; Postuma, R.B.; Carrier, J. Effects of menopause on sleep quality and sleep disorders: Canadian Longitudinal Study on Aging. *Menopause* **2020**, *27*, 295–304. http://dx.doi.org/10.1097/GME.0000000000001462
10. Matsumoto, A.M. Andropause: clinical implications of the decline in serum testosterone levels with aging in men. *J. Gerontol. A: Biol. Sci. Med. Sci.* **2002**, *57*, M76–M99. https://doi.org/10.1093/gerona/57.2.M76
11. Heinemann, L.A.J.; Zimmermann, T.; Vermeulen, A.; Thiel, C.; Hummel, W. A new 'aging males' symptoms' rating scale. *Aging Male* **1999**, *2*, 105–114. https://doi.org/10.3109/13685539909003173
12. Heinemann, L.A.J.; Saad, F.; Zimmermann, T.; Novak, A.; Myon, E.; Badia, X.; Potthoff, P.; T'sjoen, G.; Pöllänen, P.; Goncharow, N.P. The Aging Males' Symptoms (AMS) scale: Update and compilation of international versions. *Health Qual. Life Outcomes* **2003**, *1*, 1–5. https://doi.org/10.1186/1477-7525-1-15
13. Daig, I.; Heinemann, L.A.J.; Kim, S.; Leungwattanakij, S.; Badia, X.; Myon, E.; Moore, C.; Saad, F.; Potthoff, P.; Thai, D.M. The Aging Males' Symptoms (AMS) scale: Review of its methodological characteristics. *Health Qual. Life Outcomes* **2003**, *1*, 1–12. https://doi.org/10.1186/1477-7525-1-77
14. World Health Organization. WHO guidelines on physical activity and sedentary behaviour. Available online: https://www.who.int/publications/i/item/9789240015128 (accessed on 25 November 2020).
15. Hirshkowitz, M.; Whiton, K.; Albert, S.; Alessi, C.; Bruni, O.; DonCarlos, L.; Hazen, N.; Herman, J.; Adams Hillard, P.; Katz, E.; Kheirandish-Gozal, L.; Neubauer, D.N.; O'Donnell, A.E.; Ohayon, M.; Peever, J.; Rawding, R.; Sachdeva, R.C.; Setters, B.; Vitiello, M.V.; Ware, J.C. National Sleep Foundation's updated sleep duration recommendations: final report. *Sleep. Health* **2015**, *1*, 233–343. https://doi.org/10.1016/j.sleh.2015.10.004
16. Yeung, W.J.J.; Cheung, A.K.L. Living alone: One-person households in Asia. *Demogr. Res.* **2015**, *32*, 1099–1112. http://dx.doi.org/10.4054/DemRes.2015.32.40
17. Ho, C.C.K.; Tong, S.F.; Low, W.Y.; Ng, C.J.; Khoo, E.M.; Lee, V.K.M.; Zainuddin, Z.M.; Tan, H.M. A randomized, double-blind, placebo-controlled trial on the effect of long-acting testosterone treatment as assessed by the Aging Male Symptoms scale. *BJU Int.* **2012**, *110*, 260–265. https://doi.org/10.1111/j.1464-410X.2011.10755.x
18. Heinemann, L.A.J.; Saad, F.; Heinemann, K.; Thai, D.M. Can results of the Aging Males' Symptoms (AMS) scale predict those of screening scales for androgen deficiency? The Aging Male **2004**, *7*, 211–218. https://doi.org/10.1080/13685530400004223
19. Piekut, M. Living standards in one-person households of the elderly population. *Sustainability* **2020**, *12*, 992. https://doi.org/10.3390/su12030992
20. Jo, P.K. The effects of the economic characteristics of single-person households on the food service industry. *Korean J. Community Nutr.* **2016**, *21*, 321–331. https://doi.org/10.5720/kjcn.2016.21.4.321
21. Lee, S.L.; Lee, S.J. The effects of eating habit and food consumption lifestyles on dietary life satisfaction of one-person households. *J. Consum. Cult.* **2016**, *19*, 115–133.
22. KOSIS. Living Profiles of Elderly People Survey. Available online: https://kosis.kr/ (accessed on 18 October 2022).
23. Kuroda, A.; Tanaka, T.; Hirano, H.; Ohara, Y.; Kikutani, T.; Furuya, H.; Obuchi, S.P.; Kawai, H.; Ishii, S.; Akishita, M. Eating alone as social disengagement is strongly associated with depressive symptoms in Japanese community-dwelling older adults. *J. Am. Med. Dir. Assoc.* **2015**, *16*, 578–585. https://doi.org/10.1016/j.jamda.2015.01.078

24. Lee, S.A.; Park, E.C.; Ju, Y.J.; Nam, J.Y.; Kim, T.H. Is one's usual dinner companion associated with greater odds of depression? Using data from the 2014 Korean National Health and Nutrition Examination Survey. *Int J Soc Psychiatry* **2016**, *62*, 560–568. https://doi.org/10.1177/0020764016654505