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Influence of family and social detachment on city-dwelling elderly demographic's risk factors for malnutrition in South Korea

Social detachment and elderly' malnutrition

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Objective. This study investigated the influence of social detachment and its associated factors on the prevalence of malnutrition in elderly residents of South Korean cities.
Methods. We performed secondary analysis using the results of the 2020 Survey of Living Conditions and Welfare Needs of Older Persons in Korea conducted on the elderly population, aged 65 or older, in 969 survey districts, totalling 10,097 people. Hierarchical linear regression modelling was performed to identify the step-by-step influences on the risk for malnutrition.
Results. Based on the baseline survey, two-sevenths of elderly people living alone (ELA), one-fifth living with only their spouse (ELS), and one-fortieth living with children (ELC) were classified as at moderate risk of malnutrition, according to the criteria in the NSI (Nutrition Screening Initiative) Checklist. Physical ($\Delta R^2 = 0.017$ of ELA, $\Delta R^2 = 0.026$ of ELS, $\Delta R^2 = 0.012$ of ELC, $p < 0.001$) and cognitive impairment ($\Delta R^2 = 0.002$ of ELA, $\Delta R^2 = 0.002$ of ELS, $p < 0.01$) appeared to increase the risk for malnutrition in all living arrangements with age. Noticeably, contact with separately living children, as another factor of family social capital, appeared to be associated with a decreased risk for malnutrition in the order of ELA, ELC and ELS, as confirmed in the cross-validated estimates of ΔR^2 ($\Delta R^2 = 0.043$ of ELA, $\Delta R^2 = 0.01$ of ELC, $\Delta R^2 = 0.009$ of ELS, $p < 0.001$). Conjugal relationships appeared to be more important than parent-child relations for nutritional care of the elderly population.
Conclusions. The demographic of elderly people living alone was the most vulnerable, as two-fifths of the ELA population is at double or triple the risk of malnutrition than those living with a spouse or with children. In all groups, social detachment, excluding conjugal relationships, was found to be a significant underlying determining factor connected to malnutrition in the elderly groups investigated in this study.

Key words: malnutrition, elderly, prevalence, living arrangement, social detachment

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INTRODUCTION

The number of elderly people has been increased worldwide, and it took only 17 years for the elderly population, aged over 65, to double in South

Korea [1]. This rise was attributable to the rise in life expectancy, which increased from 76.0 years old in 2000 to 83.3 years old in 2019 for both sexes. Healthy life expectancy, however, increased only 5 years, from 62.0 years in 2000 to 67.0 years in 2019, according to World Health Organization data [1]. The discrepancy between healthy life expectancy and the life expectancy of the elderly population can cause various social and personal problems. It has been found that living a longer life in relatively less healthy conditions is associated with the increased burden of care and medical treatment. Among various factors affecting healthy life expectancy, nutritional status is a crucial factor affecting health outcomes for the elderly [2].

Malnutrition is defined as a nutritional state resulting from an unbalanced intake of nutrients, which may lead to altered body composition or cell mass, which, in turn, may cause muscle and immune dysfunction, anaemia, cognitive impairment, and total degeneration of body function, leaving the individual vulnerable to infectious diseases and cancers. Based on various studies, the prevalence of malnutrition ranges from 8 to 30%, depending on community-dwelling or nursing and clinical care facilities. The elderly population is often vulnerable to malnutrition, generally due to the decline in socioeconomic status along with those of family social capital, physiological and cognitive abilities, etc. [3-7]. These factors may contribute to insufficient dietary intake and, thus, lead to malnutrition. Among various sociodemographic characteristics, gender appears to be related to vulnerability regarding food intake that renders nutritional risk to the elderly [8,9]; males experience great difficulties preparing food after bereavement, since it was customary for females to be responsible for cooking. The other sociodemographic factors affecting nutritional status include residential area, particularly urban areas (regarding availability of and access to food) [10]; a higher educational level (regarding concern for better quality food) [8,11]; participation in economic activity (regarding stimulation of appetite and increase in food purchasing power) [12,13]; and a higher income level (regarding increased purchasing power and affordability of food) [14,15]. The weakening of physical activities and that of physiological functions due to aging impacted dietary habits and were positively associated with the risk for malnutrition [16]. With age, functions related to dietary life, such as chewing, were diminished [17], inducing reductions in total energy intake, thus increasing the risk for malnutrition [7,18].

Family social capital, such as individual relationships and social supports, can be considered among the major determinants of the risk for malnutrition [18-22].

Several unfavourable social conditions, such as loneliness, social isolation, or exclusion, may also predispose an individual to malnutrition. It is important to determine high-risk elderly groups, depending on their living conditions (i.e., living alone or living with a spouse or children).

Scrutinizing the magnitude of the problem and underlying contributing factors for malnourished people is an urgently important element of preventive strategies in malnutrition. The authors of this study proposed to analyse the impacts of four different factors, including family social capital, physical impairment, cognitive impairment, and sociodemographic characteristics, on the risk of malnutrition for the elderly living in a community. Specifically, the goal was to investigate the correlation between lessening possible risks for malnutrition and the role of social capital in family detachment by assessing the types of living arrangements of the elderly population; thus, three types of living arrangements, including elderly people living alone (ELA), living with their spouse (ELS), and living with their children (ELC), were applied in this study. We applied hierarchical linear regression modelling to identify the step-by-step risk factors of malnutrition.

METHODS

Population and samples

We analysed the results of the 2020 Survey of Living Conditions and Welfare Needs of Older Persons in Korea, conducted by the Ministry of Health and Welfare in collaboration with the Korea Institute for Health and Social Affairs. The survey included 10,097 people, aged 65 or older, who are living in households within enumeration districts, sampled through multi-stage stratification of cities throughout the country, based on the 2018 Population and Housing Census. Elderly people living in institutions were excluded from the survey.

Classification of living arrangements

In general, the living arrangements of elderly were classified into three types: elderly people living alone (ELA), elderly people living with only their spouse (ELS), and elderly people living with children (ELC). Smaller sample types, such as those living with siblings or non-related people, were excluded from this study.

Malnutrition assessment

In the survey, the nutritional status of the participants was measured using 10 questions, adopting the 'Determine Your Nutritional Health' checklist, designed by the American Academy of Family Physicians and the National Council on Aging, with some parts taken from the Nutrition Screening Initiative (NSI) [23]. Those

Table I. Characteristics of the elderly population by living arrangement and nutritional status.

Variables	ELA (n = 3,137)				ELS (n = 5,131)				ELC (n = 1,829)			
	Well-nourished group	Moderate nutritional risk group	High nutritional risk group	P	Well-nourished group	Moderate nutritional risk group	High nutritional risk group	P	Well-nourished group	Moderate nutritional risk group	High nutritional risk group	P
No. of sampled elderly (%)	56.3	27.8	15.9	***	79.4	15.6	5.0	***	77.5	14.6	7.9	***
Sex: male (%)	19.8	21.8	20.2		54.7	52.5	49.0		35.1	29.7	30.1	
Age (years)	74.6 ± 6.7	76.3 ± 7.1	76.8 ± 6.8		72.0 ± 5.7	73.4 ± 5.9	73.1 ± 5.9		73.5 ± 7.37	75.6 ± 7.6	77.8 ± 8.6	
Educational level (%)												
Primary school or lower	55.4	63.0	71.5		32.8	41.2	44.0		46.3	56.5	66.9	
Middle school or higher	44.6	37.0	28.5		67.2	58.8	56.0		53.7	43/5	33.1	
Household income	1,623	1,260	1,152	***	2,867	2,532	2,028	***	5,065	4,121	3,213	**
Economic activity (%)	34.4	31.7	29.1		40.9	34.1	36.7	**	31.6	24.4	29.3	
Physical impairment (score)	7.1 ± 0.8	7.2 ± 1.2	7.6 ± 1.9	***	7.1 ± 0.7	7.4 ± 1.6	7.9 ± 2.8	***	7.2 ± 1.4	7.6 ± 2.0	8.5 ± 3.3	***
Cognitive impairment (score)	6.0 ± 5.2	7.5 ± 5.5	8.1 ± 5.5	***	4.7 ± 4.9	6.1 ± 5.1	6.3 ± 5.4	***	5.5 ± 5.8	6.7 ± 5.6	6.3 ± 5.3	**
Separated children contact (%)												
Low contact	18.6	25.8	37.7	***6)	17.7	18.7	32.8	***6)	32.1	30.5	37.6	
Moderate contact	25.5	28.2	18.6		31.1	30.8	23.2		25.1	32.1	20.3	
High contact	55.9	46.0	43.7		51.2	50.5	44.0		42.9	37.4	42.1	

Abbreviations: $p < .01^{**}$, $p < .001^{***}$.

Results are presented as mean (standard deviation) or number (%) with respect to total subjects. ELA: living alone; ELS: living with spouse only; ELC: living with children. Nutrition Screening Initiative (NSI) score ranges from 0 to 21. Values from 0 to 2 indicate well-nourished; 3 to 5, moderate nutritional risk; and 6 or higher, high nutritional risk. One-way ANOVA and chi-square two-tailed test; $p < 0.05$ corresponds to significant differences among living arrangement groups. Significant differences were found in the high nutritional risk group only.

questions addressed the following: (1) change in quantity and kinds of foods; (2) eating less than twice a day; (3) rarely eating fruits, vegetables, or dairy products; (4) drinking more than 3 cups of alcohol every day; (5) difficulty eating because teeth are not good or mouth is torn; (6) sometimes unable to buy the food needed due to lack of money; (7) eating alone almost every time; (8) taking more than three different drugs a day; (9) unintentionally losing or gaining more than 5 kg over the past six months; and (10) sometimes unable to handle grocery shopping, cooking, and eating. We weighted the responses of 10 questions and calculated the NSI score by adding them. A higher NSI score indicates a higher risk for malnutrition, with total scores ranging from 0 to 21. Values from 0 to 2 indicate well-nourished; 3 to 5, moderate nutritional risk; and 6 or higher, high nutritional risk.

Independent variables

Sex, age, place of residence, educational level, household income, and economic activity have been identified as sociodemographic characteristics related to the risk for malnutrition in the elderly [8-11]; thus, these variables were included as covariates in our analysis. Sex (dichotomous variable), age (continuous variable, in years), educational level (recorded as 0: primary school or lower, or 1: middle school or higher), household income (continuous variable, in KRW 1,000), and economic activity (recorded as 0: non-participation, or 1: participation).

In the survey, the limitations of activities of daily living (ADLs), developed by Katz [24], were applied to measure the elderly participants' abilities to live independently. The full score on the scale of limitations of activities of daily life is 21. The seven questions from the ADL survey included the following factors: (1) dressing; (2) washing face and hair and brushing teeth; (3) taking a bath or shower; (4) eating prepared food; (5) lying down, waking up, and leaving the room; (6) entering the bathroom, urinating, wiping, and redressing; and (7) controlling the continence of urine and faeces. Each question was assessed on a three-point scale, including 'totally self-reliant' (1 point), 'partly helped' (2 points), and 'totally helped' (3 points). We calculated each elderly participant's physical impairment by adding the points from the 7 ADL questions. The higher the score (score 1-21), the more severe the physical impairment.

In the survey, the Korean version of the Mini-Mental State Examination for Dementia Screening (MMSE-DS) was applied to measure elderly participants' cognitive impairment [25]. The full score for the MMSE-DS is 30. We measured cognitive impairment by calculating the difference between each elderly person's MMSE-DS score and the full score of 30. The greater the difference, the more severe the cognitive impairment (score range 1-30).

Elderly people living alone (ELA) may have family social capital such as children living separately. Those living with only their spouse (ELS) may have family social capital such as their spouse and separately dwelling children. Those living with children (ELC) may have family social capital such as a spouse, cohabiting children, and separately living children. The effect of social capital from separately living children depends on how often the elderly people have direct contact with them. In the survey, there are seven response items to this question, namely: 1) almost every day; 2) 2-3 times a week; 3) once a week; 4) 1-2 times a month; 5) 1-2 times every 3 months; 6) 1-2 times a year; and 7) almost no contact. These responses were classified into the three following categories: 'high contact' (1-4), 'moderate contact' (5), and 'low contact' (6-7).

Statistical analysis

Descriptive statistics are presented as absolute numbers for the evaluated elderly participants, and as relative frequencies for qualitative variables. Mean values with standard deviation (SD) were utilized for quantitative variables. For assessment of the relationship between the variation in nutritional status and the independent variables, Chi-square tests and analyses of variance (ANOVAs) were used. Hierarchical linear regression modelling was performed to identify step-by-step influences on the risk for malnutrition. For each of the three studied living arrangements, the first model (step 1) included only the sociodemographic characteristics, and the second model (step 2) included physical impairment in addition to the first model. The third model (step 3) included cognitive impairment, and the fourth model (step 4) included the level of contact with children in addition to the previous model. We found from collinearity diagnosis that there was no multi-collinearity among variables for any of the models of each group of the elderly, at TOL (Tolerance) > 0.1 and VIF (variance inflation factor) < 10. The acceptable level of significance was established as $\alpha < 0.05$. We applied SPSS 18.0 for analysis, which was conducted after receiving approval from the Institutional Review Board of the College of Medicine, Hanyang University, South Korea (HYUIRB-202110-004).

RESULTS

Characteristics of the elderly by living arrangement and nutritional status

The distribution of Nutrition Screening Initiative (NSI) scores varied among the three studied living arrangements (Tab. I). The percentages of elderly people who were well-nourished, at moderate nutritional risk, and at high nutritional risk in the ELA group were 56.3, 27.8, and 15.9%, respectively. These nutritional types accounted for 79.4, 15.6, and 5.0%, respectively, in the ELS group. The distribution of these types in the ELC group were 77.5, 14.6, and 7.9%, respectively. When comparing the characteristics among these groups' nutritional statuses, statistically significant differences were found for economic activity in the ELA and ELC groups, as well as the level of contact with children for the ELC group. The

elderly participants were of significantly higher age, lower education level, lower household income level, more severe physical impairment, and more severe cognitive impairment in the high nutritional risk group, followed by the moderate nutritional risk group, and finally by the well-nourished group, regardless of living arrangements. Exceptionally, less participation in economic activity for the ELS group and more severe cognitive impairment in the ELC group were found in the moderate nutritional risk group, followed by the high nutritional risk group, and finally by the well-nourished group. The well-nourished group was in slightly higher contact with children for both the ELA and ELS groups.

Regression analysis of the NSI score increase and the designated variables including contact with separately living children

The NSI score increase was hierarchically regressed based on sociodemographic characteristics, physical impairment, cognitive impairment, and contact with separately living children from Steps 1 to 4, respectively (Tab. II).

For the ELA group, the risk for malnutrition was positively associated with age and economic activity and negatively associated with education level and household income in Model 1-1. In Models 1-2 and 1-3, the risks for malnutrition were positively associated with physical impairment and cognitive impairment, respectively, while the association of sociodemographic characteristics with the risk for malnutrition did not change. The association of sex with the risk for malnutrition appeared only in Model 1-3; being an elderly male was significantly associated with the risk for malnutrition. In Model 1-4, the risk for malnutrition was negatively associated with contact with separately living children. The association of economic activity with the risk for malnutrition appeared to be of no significance in Models 1-1 and 1-4.

For the ELS group, the risk for malnutrition was positively associated with age and negatively associated with sex and household income in Model 2-1. In Models 2-2 and 2-3, the risks for malnutrition were positively associated with physical impairment and cognitive impairment, respectively, while the association of the sociodemographic characteristics with the risk for malnutrition did not change; the only exception was that the association of economic activity appeared to be significant. In Model 2-4, the risk for malnutrition was negatively associated with contact with separately living children, while the association of age appeared to be insignificant. In all models for the ELS group, education level did not show statistical significance in affecting the risk for malnutrition in the elderly participants.

For the ELC group, the risk for malnutrition was positively associated with age and economic activity, and negatively associated with education level and household income in Model 3-1. However, the relationship between the risk for malnutrition and sex appeared to be insignificant. The risk for malnutrition appeared to be positively associated with physical impairment in Model 3-2.

However, the relationship between the risk for malnutrition and cognitive impairment appeared to be insignificant in Model 3-3. The risk for malnutrition appeared to be negatively associated with contact with separately living children in Model 3-4.

For the ELA group, increases in NSI scores was attributed mainly to contact with separately living children (4.3%), followed by sociodemographic characteristics (3.2%), physical impairment (1.7%), and cognitive impairment (0.2%); all increases were significant. For the ELS group, increases in NSI scores were mainly attributed to physical impairment (2.6%), followed by sociodemographic characteristics (1.0%), contact with separately living children (0.9%), and cognitive impairment (0.2%); all were significant increases. For the ELC group, the increases in NSI scores attributed to sociodemographic characteristics, physical impairment, and contact with separately living children were 4.5, 1.2, and 1.0%, respectively, but cognitive impairment of this group did not significantly affect NSI score variation. Because of the difference in family social capital among living arrangements, contact with separately dwelling children appeared to be important for decreasing the risk for malnutrition in the ELA, ELC, and ELS groups, in order of significance. This was also confirmed in the cross-validated estimates of R^2 obtained from hierarchical regression analysis (Tab. III).

DISCUSSION

In this study, the prevalence of malnutrition risk appears to be relevant more in groups of lower social capital attachment situations, such as those living alone or living with only a spouse. The need to screen malnutrition risk groups reveals the importance of conjugal relationships as a form of family social capital for the nutritional care of the elderly. South Korea faces two challenges related to the rapid increase in its elderly population; one is the continued aging of the elderly population, due to a continued increase in longevity; the other is the aging of the household. The former plays a principal role in increasing the number of elderly people vulnerable to physical and cognitive impairment, and the aging of the household results in an increase in the number of elderly living alone or with only a spouse. The aging of the elderly population affects their nutritional status through the aggravations of

Table II. Hierarchical linear regression analyses (β) of NSI scores and the variables of sociodemographic characteristics, physical and cognitive impairment, and contact with separately living children by living arrangement.

Variables	ELA				ELS				ELC			
	Group-model				Group-model				Group-model			
	1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4	3-1	3-2	3-3	3-4
Sex(female) male	0.033	0.035	0.039*	0.010	-0.043**	-0.046**	-0.043**	0.043**	0.009	0.011	0.010	0.015
Age	0.080***	0.074***	0.060**	0.070**	0.059***	0.040*	0.032*	0.026	0.110***	0.091**	0.096**	0.097**
Education (primary school or lower)												
Middle sch. or higher	-0.110***	-0.105***	-0.098***	-0.087***	-0.031	-0.030	-0.024	-0.022	-0.114***	-0.111***	-0.114***	-0.111***
Household income	-0.065***	-0.064	-0.061**	-0.045**	-0.044**	-0.044**	-0.039**	-0.034*	-0.090***	-0.089***	-0.089***	-0.092***
Economic activity (non-participation)												
Participation	0.036	0.047*	0.049*	0.033	0.021	0.034*	0.037*	0.032*	0.079**	0.084**	0.084**	0.074**
Physical impairment		0.130***	0.129***	0.121***		0.164***	0.156***	0.115***		0.114***	0.117***	0.121***
Cognitive impairment			0.055**	0.047*			0.050**	0.043**			-0.017	-0.018
Degree of separated children contact (Low contact)												
Moderate contact				-0.192***				-0.115***				-0.085**
High contact				-0.251***				-0.126***				-0.118***
F	20.538***	26.436***	23.910***	35.673***	10.082***	31.396***	28.643***	27.940***	14.969***	16.081***	13.833***	12.880***
R2	0.032	0.049	0.051	0.094	0.010	0.036	0.038	0.047	0.045	0.057	0.058	0.068
d.f	5, 3,106	1, 3105	1, 3104	2, 3102	5, 5048	1, 5047	1, 5046	2, 5044	5, 1584	1, 1583	1, 1582	2, 1580

Abbreviations: R2: coefficient of determination; p < .05*, p < .01**, p < .001**; NSI: Nutrition Screening Initiative Score. ELA: living alone; ELS: living with spouse only; ELC: living with children. All groups (Group 1, ELA; Group 2, ELS; and Group 3, ELC) are divided into 4 subgroups, according to 4 model types, as described below (1-1 indicates ELA Group with Model 1, and so forth). Model 1 includes sociodemographic characteristics, Model 2 includes physical impairment in addition to the first model, Model 3 includes cognitive impairment, and Model 4 includes the level of contact with children in addition to the previous model.

physical and cognitive impairment, and vice versa. The aging of the household also affects elderly individuals' nutritional status, through care deficiency as a result of the lessening use of family social capital. In this context, we examined the impacts of physical impairment and cognitive impairment, as well as family social capital, in groups of elderly people, with respect to living alone, the presence of spouse, and cohabitation with children, on malnutrition risk for elderly people aged 65 or older dwelling in a community. Additionally, socioeconomical backgrounds, including close ties with children living separately from parents, were investigated.

We found that the proportion of elderly people within the high nutritional risk group was 15.9% in the group of individuals living alone, which was higher than those of the groups living with their spouse or living with children (5.0 and 7.9%, respectively). Individuals living alone were found to have less desirable dietary patterns compared to those living with family members. People living alone appear to consume foods of lower nutritional quality, and they are less content with their diets and irregular dietary habits. The proportion of elderly people living alone (19.8%) or living with only a spouse (58.4%) in Korea in 2020 increased from the previous decade, whereas the proportion of elderly people living with their children (20.1%) decreased [26]. If elderly people, under spatial separation from their adult children, were suffering from limitations on their daily activities

Table III. Hierarchical regression analysis summary for NSI score increase according to sociodemographic characteristics, physical impairment, cognitive impairment, and separated children contact.

		ELA			ELS			ELC		
		R^2	ΔR^2	ΔF	R^2	ΔR^2	ΔF	R^2	ΔR^2	ΔF
Step 1	Sociodemographic characteristics	0.032	0.032	20.538***	0.010	0.010	10.082***	0.045	0.045	14.969***
Step 2	Physical impairment	0.049	0.017	54.171***	0.036	0.026	136.608***	0.057	0.012	20.706***
Step 3	Cognitive impairment	0.051	0.002	8.373**	0.038	0.002	11.724**	0.058	0.001	0.384
Step 4	Children contact level	0.094	0.043	72.965***	0.047	0.009	24.547***	0.068	0.010	9.052***

Abbreviations: R2: coefficient of determination; ΔF: Change in F; ΔR2: change in R2; p < .01**, p < .001***; ELA: living alone; ELS: living with spouse only; ELC: living with children.

due to chronic diseases and/or disabilities, the resulting vulnerability in their dietary lifestyle and the inadequacy of their food intake may render serious consequences, such as increased disease and lower quality of life for these elderly populations.

It was found that elderly males had a lower risk of malnutrition than elderly females in the ELS group, but no statistical significance between the two sexes was found in the ELA and ELC groups. This is in agreement with the results from previous studies [10,16,27]. It is of note that the lower risk for malnutrition within the ELS group was applied to elderly males rather than elderly females. This may be attributed to the cultural factor that women tend to be the meal providers, rather than males [8,9].

Higher education levels and higher household incomes were associated with a decreased risk for malnutrition in all three types of living arrangements. Increasing age was generally associated with an increased risk of malnutrition, with the exception of the ELS group, in which the effect of aging appeared to be insignificant (Model 2-4). In this group, the effect of aging might decrease due to strong family social capital, including contact with separately living children. The effect of educational levels on the risk for malnutrition unexpectedly appeared to be insignificant in the ELS group.

There were significant positive associations between economic activities, rather than economic status, and risk for malnutrition in all three living styles. Working elderly people may be under less desirable conditions for proper meal intake, possibly due to a desperate need to work in order to maintain household income.

As expected, physical and cognitive impairment were associated with an increased risk of malnutrition in all living styles, as found in other studies [11,19,28-31]. The only exception was in elderly people living with children (ELC), for whom the effect of cognitive impairment on risk for malnutrition appeared to be insignificant; a possible reason for this result may be that the relationship between cognitive impairment and malnutrition becomes irrelevant due to nutritional care from cohabiting children.

Finally, our results suggest that contact with separately living children played an important role in decreasing the risk for malnutrition in all living arrangements. It is evident that such a role was rather crucial for elderly people living alone (ELA); ΔR^2 (Change in R^2) affected by contact with children was higher in the ELA group (4.3%) than in the ELC (1.0%) and ELS groups (0.9%). ΔR^2 affected by contact with separately living children was the lowest in the ELS group; it is worthwhile to note that conjugal relationships, as a form of family social capital, was more important than a parent–child relationship for nutritional care of elderly people [32,33].

Limitations

The present study has both limitations and strengths. Among the limitations of this study was its inability to ascribe a direct cause-and-effect relationship between the examined characteristics and malnutrition, due to the cross-sectional design of the data used. Specifically, the purposes of contact (meeting, visiting, etc.) between the elderly and children were not specified. Nevertheless, the results of the Survey on Living Conditions and Welfare Needs of Older Persons in Korea have been widely used in many studies regarding the risks for malnutrition in the elderly [27,34-36].

As for the strengths of the study, we used a representative sample of community-dwelling older adults, in contrast with other studies that used specific subgroups of older people. Furthermore, some studies used broad age groups, and, consequently, conclusions cannot be drawn regarding elderly people in particular. We connected the significance of family social attachment to the nutritional status of the elderly who are exposed to vulnerability and separated from children in housing. As this phenomenon becomes more commonplace in the Korean context, the results would suggest political implications in aging societies. Although this study has not more clearly analysed the nature of social detachment and further confounding factors on the risk for malnourishment in the elderly population under study, it has a significance in the potential of utilizing the data collected in this study for adopting propensity score matching, as well as identified covariates in the present study. Further longitudinal and prospective studies for gathering more

extensive data, including further subgrouping, detailed health, and living conditions, are warranted.

CONCLUSIONS

Two-fifths of elderly people living alone and one-fifth of elderly people living with only their spouse were found to be at risk of malnutrition. Aging may cause declines in physical and cognitive function. The more severe the physical and cognitive impairment, the higher the risk for malnutrition in the elderly. Policies in response to aging should place focus on factors that can reduce the risks of malnutrition for the elderly dwelling in a community. The government should support the families of elderly people to take care of their nutrition, specifically for those living alone or with only their spouse within a community.

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Conflict of interest statement

The authors declare no conflict of interest.

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Author contributions

J-GL: data collection, statistical analysis, and writing; W-KC: manuscript compilation and data analysis; A-SO: study design, planning, and overall review.

Ethical consideration

This study was approved by the Institutional Ethics Committee (Institutional Review Board of the College of Medicine, Hanyang University, South Korea) (HY-UIRB-202110-004).

The research was conducted ethically, with all study procedures being performed in accordance with the requirements of the World Medical Association's Declaration of Helsinki.

Written informed consent was obtained from each participant/patient for study participation and data publication.

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