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Unmet Dental Care Needs of The Low-Income Elderly in South Korea: Applying the Andersen behavioural model

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Objective: Retirement reduces income and increases dental care needs for the elderly, but there are few studies on unmet dental care needs among the low-income elderly. This study aimed to identify actors associated with unmet dental care needs of low-income elderly people in South Korea. ***Method***: Secondary analysis of 2020 KNHANES data relating to 1,016 elderly individuals (65+) below median income. ***Results***: Unmet dental care needs were higher for women at 28.9% ($p < 0.001$), those with a middle school education at 28.5% ($p < 0.05$), individuals who rated their health as "poor" at 31.3%, those reporting feelings of depression at 44.8% ($p < 0.001$), individuals who rated their oral health as "poor" at 36.2% ($p < 0.001$), and those who experienced toothache at 37.2% ($p < 0.001$). In regression analysis women (Risk Ratio = 1.59, 95% CI 1.09-2.32), people with depression (RR = 2.29, 95% CI 1.01-5.15), those who perceived their oral health as "poor" (3.20, 95% CI 1.90-5.32) and those toothache (1.88, 95% CI 1.27-2.76) had higher unmet dental needs. ***Conclusion***: Substantial unmet dental care needs exist among the low-income retired elderly. Comprehensive public oral health policies and community programs are needed for this population group.

Keywords: *oral health, public policy, South Korea, unmet dental care needs, the low-income elderly, KNHANES*

Introduction

The elderly experience lower income due to retirement, while their need for dental care increases. As of 2020, the income poverty rate among South Korean seniors was 40.4%, approximately three times higher than the OECD average, and the highest among OECD countries (OECD, 2023). Also, the dental health coverage rate was only 33.2% in 2021, which is about half of national rate, leading to out-of-pocket expenses for the elderly (Jung Wook and Ho Joong, 2019). This greatly impacts the utilization of dental services among the elderly, who are more vulnerable to diseases. Oral health should be maintained as part of general health *(*Brennan *et al.,* 2008; Malecki *et al*., 2015; Rosa, 2020). It is a prerequisite for general health, making the accessibility of dental services a global public health issue and a community health challenge to (Jonathan *et al*., 2018; Mohamadi-Bolbanabad *et al*., 2021).

Unmet dental needs are higher among women, those with lower income or educational levels (Rosa, 2020; Xianhua and Hee-jung, 2018), those experiencing more stress or depression (Capurro and Davidsen, 2017), poorer subjective health, activity limitations, poorer subjective oral health status, and those who have experienced toothache (Alkhawaldeh *et al*., 2023). However, these studies investigated adults or the elderly as a whole. In particular, information about income-poor seniors, who are more likely to have unmet dental care needs, are lacking. Therefore, this study aimed to identify actors associated with unmet dental care needs among low-income elderly people in South Korea. The purpose was to identify intervention strategies for unmet dental care utilization this population group by applying the Andersen behavioural model (Andersen and Newman, 1973), which predicts individual healthcare utilization based on predisposing, enabling, and need factors.

Method

This was a secondary analysis of 2020 Korea National Health and Nutrition Examination Survey (KNHANES) data. KNHANES assesses health behaviours, chronic disease prevalence, and dietary and nutrition intake of 7,359 individuals aged one year and older in the Korean population, of whom 1,712 individuals were aged 65 and older. The income-poor elderly were defined as those with disposable income below 50% of the median income, as suggested by the OECD. Thus, this analysis included only the first and second income quintiles, representing 1,016 the income-poor elderly people. "Experience of unmet dental care needs," was determined by the question, "In the past year, did you need a dental examination or treatment but were unable to receive it?" Responses of "yes" and "no" were used as the dependent variable, excluding non-responses. Subjective needs of this type are commonly used to evaluate access to healthcare services as they incorporate personal and social factors (Andersen and Newman, 1973; Moon and Kang, 2016). The independent variables were classified according to the Andersen behavioural model into predisposing, enabling and need factors. Predisposing factors included gender, age, marital status, and education level. Age was categorized as early elderly individuals aged 65-74 and 75 and older. Marital status was classified as married with spouse, married without spouse, and unmarried. Education level was divided into elementary school or below, middle

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school, high school, and university or higher (Rosa, 2020). Enabling factors included employment status and region. Metropolitan areas have better access to healthcare facilities, resulting in lower unmet dental care needs (Alkhawaldeh *et al*., 2023), whereas rural elderly tend to have lower unmet medical needs due to longer productive activities and economic independence (Moon and Kang, 2016). Need factors included nutritional status, subjective health perception, subjective oral health perception, activity limitations, chronic diseases, depression, toothache, and experience of tooth injury (Woo-jong *et al.*, 2020). Nutritional status was categorized as good or poor based on dietary conditions, with previous studies indicating that poorer nutritional status correlates with lower health levels. Subjective health and oral health perceptions were classified as good, fair, or poor. Activity limitation was determined by whether physical or mental disabilities restricted daily activities. Chronic diseases included a diagnosis of hypertension, diabetes, dyslipidemia, stroke, arthritis, osteoporosis, tuberculosis, cancer, or kidney disease. Depression was evaluated using Patient Health Questionnaire-9 (PHQ-9, Porras, 2018), with depression assigned to scores of 10 or higher. Toothache was categorized based on the experience of tooth pain in the past year, and tooth injury experience was determined by whether teeth were injured or broken due to exercise or accidents.

To identify differences associated with unmet dental care needs Chi-square tests were performed. For variables associated in the chi-squares, logistic regression analysis was used to determine the odds ratios and 95% confidence intervals for predictors of unmet dental care needs. Analyses were conducted using SAS 9.4. As this study is a secondary data analysis of government-approved data, and it was exempted from review by the Bioethics Committee of Chung-Ang University.

Results

The characteristics of the 1,016 low-income elderly people are presented in Table 1. There were more female participants than men, most had a spouse and were early elderly (aged 65-74 years). Those with elementary school education or less constituted the largest group at 43.0% and most lived in non-metropolitan areas. Almost half (41.3%) reported poor oral health and 21.9% had toothache. Almost one quarter (24.2%) reported having unmet dental care needs in the past year.

In bivariate analyses unmet dental care needs were more common among women, less educated people, those with worse subjective health, worse subjective oral health level and toothache.

In logistic regression, unmet dental care needs were more common in women and those with lower educational attainment (predisposing factors). Among the factors related to need, unmet dental needs were predicted by having depression, perceiving one's oral health to be poor and having experienced toothache (Table 3).

Discussion

This study aimed to identify factors associated with unmet dental care needs among the low-income elderly. As the elderly population increases, income and healthcare become more important social issues (Kim and Lee, 2020). Particularly in South Korea, dental care is greatly affected by income due to the low level of health coverage. The low-income elderly are more exposed to unmet dental care needs due to economic factors, environmental factors, and lack of opportunities to acquire knowledge about general health and oral health (Kim and Ryu, 2023). Our analysis revealed that unmet dental care needs was higher among females, less educated individuals, those with poor subjective health and poor subjective oral health perception and people depression or toothache.

Previous studies have found that women are more likely to have unmet dental care needs (Kim and Ryu, 2023; Kim and Lim, 2022). Among the need factors, depression was associated with higher unmet dental care needs, aligning with findings from previous studies (Herr *et al*., 2014; Malecki *et al.*, 2015). Depression likely reduces cognitive abilities and decreases the desire for dental treatment, which could explain this result. Moreover, studies have shown that individuals with depression experience medical poverty, which supports the finding that low-income elderly people with depression had

Table 1. Characteristics of 1,016 low-income elderly people in South Korea.

Variables		*%*
Gender	Male	43.4
	Female	56.6
Age group	65-74	58.8
	≥75	41.2
Education level	≤Elementary school	43.0
	Middle school	17.3
	High school	24.7
	≥university	15.0
Marital status	Married, lives with partner	71.6
	Divorced/seperated/widowed	28.2
	Never married	0.3
Economic activity status	Yes	38.8
	No	61.2
Region	Metropolitan	44.0
	Non-metropolitan	56.0
Depression	No	96.5
	Yes	3.5
Subjective health level	Good	25.9
	Fair	49.2
	Poor	24.9
Activity restriction	No	87.7
	Yes	12.3
Nutrition status	Good	97.1
	Poor	2.9
Chronic disease	No	30.9
	Yes	69.1
Subjective oral health level	Good	23.3
	Fair	35.4
	Poor	41.3
Toothache	No	78.1
	Yes	21.9
Tooth injury experience	No	88.2
	Yes	11.8
Unmet dental care needs	No	75.8
	Yes	24.2

Table 2. Bivariate analyses of factors associated with unmet dental needs among 1,016 low-income elderly people.

Variables	*Categories*	*Unmet dental care needs (%)*	
		Yes	*No*
Total		24.2	75.8
Predispoing Factors			
Gender	Male	18.2	81.8
	Female	28.9*	71.1
Age group	65-74	22.3	77.7
	≥75	27.0	72.9
Education level	≤Elementary school	27.9*	72.1
	Middle school	28.5*	71.5
	High school	19.4*	80.6
	≥university	16.8	83.2
Marital status	Married, lives with partner	22.4	77.6
	Divorced/seperated/widowed	28.9	71.1
	Never married	33.3	66.7
Enabling Factors			
Economic activity	Yes	27.2	72.7
	No	22.3	77.6
Region	Metropolitan	23.1	76.8
	Non-metropolitan	25.1	74.9
Need Factors			
Depression	Yes	44.8*	55.2
	No	23.4	76.6
Subjective health level	Poor	31.3*	68.7
	Fair	25.2*	74.8
	Good	16.0	84.0
Activity restriction	Yes	31.1	68.9
	No	23.2	76.8
Nutrition status	Good	24.7	75.3
	Poor	18.2	81.8
Chronic disease	Yes	24.6	75.4
	No	23.4	76.6
Subjective oral health level	Poor	36.2*	63.7
	Fair	18.2*	81.8
	Good	13.4	86.6
Toothache	Yes	37.2*	62.8
	No	20.9	79.1
Tooth injury experience	Yes	28.4*	71.5
	No	23.7	76.3

* $p < 0.05$. Chi square

Table 3. Best Logistic Regression model for predictors of unmet dental care needs among 1,016 low-income elderly people.

Variables	*Categories*	*OR*	*95% CI*
Predisposing Factors			
Gender	Male	ref.	
	Female	1.59	1.09-2.32
Education level	≥university	ref.	
	High school	0.80	0.42-1.50
	Middle school	1.28	0.67-2.44
	≤Elementary school	1.08	0.60-1.94
Need Factors			
Depression	No	ref.	
	Yes	2.29	1.01-5.15
Subjective health level	Good	ref.	
	Fair	1.45	0.92-2.30
	Poor	1.29	0.76-2.18
Subjective oral health level	Good	ref.	
	Fair	1.42	0.83-2.45
	Poor	3.20	1.90-5.32
Toothache	No	ref.	
	Yes	1.88	1.27-2.76

higher unmet dental care needs. Retirement may reduce income and social participation, resulting in isolation and possible depression. This affects the use of unmet dental care needs, resulting in a deterioration of oral health.

Older people with poor subjective oral health or toothache were more likely to have unmet dental care needs. Despite their higher need for dental care, these individuals faced barriers accessing dental care services. Thus, individual level and community level approaches should be taken at the same time to address unmet dental care needs among low-income elderly.

For example, dental health coverage could be extended, identifying and supporting low-income elderly people within the community.

Educational level did not predict unmet dental care needs. In contrast, Malecki et al. (2015) found that lower educational levels were associated with higher unmet dental care needs. These contrasting results could be due to the specific focus on low-income people in this study, which might have restricted the effect of education in the analysis.

This study has limitations, including the use of cross-sectional data that prevent establishing causal relationships and the use of subjective indicators of unmet dental care needs. Nevertheless, this study is significant in identifying factors influencing unmet dental care needs among the low-income elderly across South Korea.

This study is novel as it identifies factors associated with unmet dental care needs among the low-income elderly. Despite their economic, psychological and social vulnerability and their poor oral health, unmet dental needs remain high. Unmet dental care needs among the low-income elderly could be reduced by expanding dental health coverage and supporting these individuals in the community Oral health promotion of oral health awareness may be of benefit. Furthermore, multi-dimensional public oral health policies should be developed, including support for the socio-physical environment of the community and the development of community oral health programs.

Conclusion

This study applied the Andersen behavioural model to identify the factors associated unmet dental care needs among the low-income elderly. Gender, depression, subjective oral health status, and toothache predicted unmet dental care needs. A variety of measures could be employed to address unmet dental care needs among the low-income elderly.

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