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RESEARCH ARTICLE

Comparison of Factors Affecting Perceived and Objective Dental Needs

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Background: With increased interest in oral health, several efforts have been made to improve oral health conditions. To achieve this, needs for oral health must be precisely determined and accurately measured. Therefore, factors influencing both objective unmet dental needs, which were determined by experts, and perceived unmet dental needs, which were determined by patients, were examined in this study.

Methods: Responses of 17,735 respondents aged greater than 19 years from the Korean National Health and Nutrition Survey collected using the fifth (2010～2012) rotation sample survey were analyzed. Based on the information collected from the survey and dental examination, we determined the associations between the independent (sex and socioeconomic level) and dependent variables using a chi-squared test. Moreover, ordinal logistic regression analyses on multiple categorical values were performed using perceived and objective dental needs as the dependent variables.

Results: Generally, factors influencing both perceived and objective dental needs were similar. These included sex, household income, educational level, private insurance, and subjective oral health status. However, the high-income groups had lesser perceived and objective dental needs compared to the low-income groups. Furthermore, factors such as sex, educational level, and marital status had different influence on both needs.

Conclusion: Generally, factors that affect perceived and objective dental needs were similar. To minimize unmet dental needs, factors influencing both perceived and objective dental needs should be examined for a broad dental insurance coverage, and efforts to prevent oral diseases are also required.

Key Words: Objective needs, Oral health, Perceived needs, Unmet needs

Introduction

Generally, unmet needs refer to needs and/or healthcare services that are not timely and properly provided and performed, representing one of the problems of the healthcare system[1)]. Unmet needs are divided into objective dental needs and perceived dental needs depending on the appraising subjects[2)]. Objective needs are needs assessed by healthcare professionals, while perceived dental needs, referred to as medical wants, indicate the subjective dental needs that the patients themselves perceive[3)]. It is possible that in assessing the unmet needs based on the needs perceived by the patients themselves, bias in the process of remembering and reporting experiences by the patients and questions on whether subjective assessment can assure an objective assessment may be observed[1)], with the patients' subjective evaluation and recognition influencing the utilization of healthcare services and treatment compliance.

Particularly, oral health is significantly related to systemic health, and oral diseases, if improperly and untimely treated, lead to worsening of the disease and expensive treatment. Subsequently, economic burden increases. Nevertheless, low utilization rate of dental services and unmet dental needs have been consistently observed worldwide[4-8)].

Recently, there have been studies conducted that examine the unmet dental needs, with studies reporting the

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unmet dental needs for specific groups such as children in the low-income group, children with disabilities, youth, and workers[9-12] or studies determining the factors affecting unmet dental needs[6,9,10]. Only socioeconomic factors such as income or employment status and status of private insurance and dental fear were considered the causes of unmet dental needs, and studies that confirm the difference between subjective dental needs and objective dental needs in unmet dental care were not conducted.

Consequently, this study aimed to confirm the difference between objective dental needs (need) and perceived dental needs (want) in the unmet dental care and to determine the factors that influence objective dental needs and perceived dental needs in Korean adults using the materials of the Fifth Korean National Health and Nutrition Survey. This way, this study was able to widely determine the unmet dental needs and recommend an increased access to dental care services to reduce the unmet dental needs.

Materials and Methods

1. Materials

This study used the materials from the Korean National Health and Nutrition Survey using the fifth (2010～2012) rotation sample survey. The average participation rate in the study over the past 3 years was 80%, comprising 3,800 households from the 192 sampling areas each year with data of all the household members over the age of 1 year in the sampled households[13]. It includes comprehensive information, such as disease morbidity, healthcare utilization, and demographic and socioeconomic characteristics of the subjects in the study. This study was performed to analyze 17,735 adults aged greater than 19 years who had received an oral examination.

2. Variables

Despite the need for dental treatment, individuals who do not want to receive dental treatment was defined as a perceived dental need. In this case, actual needs (needs or objective dental needs) based on medical diagnosis and subjective dental needs (wants or perceived dental needs) can be distinguished, depending on the patients who require dental care.

In this study, objective dental need is reclassified according to the extent of treatment needed as assessed during oral examination of the teeth into the following: “unneeded of treatment,” “dental conservative treatment needs,” “dental prosthetic treatment needs,” and “extraction needs.” In assessing the patients’ perceived dental needs, the following question was asked: “Haven’t you ever been given dental treatment for 1 year lately in spite of thinking that you needed dental care?,” with a “yes” or “no” answer (Table 1). Regarding the variables considered to be factors that influence dental treatment needs, sex and age were considered as the demographic variables, and region, equivalent income, educational level, marital status, and status of private insurance were considered as the socioeconomic variables.

3. Data analysis

Descriptive statistics were generated to describe the

Table 1. Descriptive Variables

Classification	Detail
Dependent variable	
Perceived needs	0=no, 1=yes
Objective needs	0=treatment unneeded 1=dentist conservation treatment needs 2=dental prosthetic treatment needs 3=teeth extraction needs
Independent variable	
Sex	1=male, 2=female
Age (y)	1= 19～44, 2= 45～64, 3= 65 or older
Region	1=urban, 2=rural
Household income	1=low, 2=mid-low, 3=mid-upper, 4=upper
Educational attainments	1=elementary or less, 2=middle school, 3=high school, 4=college or more
Marital status	1=living together, 2=living apart, 3=bereavement, 4=divorce, 5=unmarried
Private insurance	1=yes, 2=no
Subjective oral health	1=very good, 2=good, 3=medium, 4=poor, 5=very poor
Regular oral examination	1=yes, 2=no

prevalence of perceived (or objective) needs and subjective dental needs for oral health. We determined the associations between the independent and dependent variables using a chi-squared test. Moreover, multiple logistic regression analysis was performed to determine the factors affecting perceived dental needs, with the following two answers: "yes" or "no." Ordinal logistic regression analysis was performed to determine the variables affecting objective dental needs, which had the following multiple categorical values: "unneeded of treatment," "dental conservative treatment needs," "dental prosthetic treatment needs," and "extraction needs." Stata version 11.0 (Stata Co., College Station, TX, USA) was used to perform all the statistical analyses, and $p<0.05$ was considered significant.

Results

1. Comparison between perceived and objective dental needs

Tables 2 and 3 summarize the results regarding the association between perceived dental needs and objective dental needs based on the patients' general characteristics. In the case of perceived dental needs, lower income and worse subjective status of oral health without oral examinations but with private insurance were statistically significant ($p<0.001$). While in the case of objective dental needs, it was statistically confirmed that there was a significantly lower need for dental treatment in urban areas (80.11%) than in rural areas (19.89%) ($p<0.001$).

2. Factors affecting subjective and objective dental needs

The result of determining the variables affecting perceived dental needs and objective dental needs is shown in Table 4. The perceived and objective dental needs were 1.03 times and 1.15 times higher, respectively, for people who live in rural areas than those who live in urban areas ($p<0.01$). Moreover, the high-income groups had lesser perceived and objective dental needs compared to the low-income groups. Regarding educational level, patients who were college graduates or who had advanced degrees had 1.18 times higher perceived dental needs and 0.77 times lower objective dental needs compared to patients with elementary school or lower educational level. Patients who did not undergo oral examination for 1 year had a higher perceived and objective dental need compared to patients who underwent oral examination for 1 year ($p<0.01$).

Table 2. Relation between General Characteristics and Perceived Dental Needs (n=17,735)

Classification	No	Yes	p-value
Sex			
Male	4,932 (43.70)	2,586 (40.10)	<0.000
Female	6,354 (56.30)	3,863 (59.90)	
Age (y)			
19~44	4,557 (40.38)	3,041 (47.15)	<0.000
45~64	3,747 (33.20)	2,143 (33.23)	
65 or older	2,982 (26.42)	1,265 (19.62)	
Region			
Urban	8,943 (79.24)	5,100 (79.08)	0.803
Rural	2,343 (20.76)	1,349 (20.92)	
Household income			
Low	2,684 (24.07)	1,634 (25.56)	0.006
Mid-low	2,787 (24.99)	1,593 (24.92)	
Mid-upper	2,771 (24.85)	1,639 (25.64)	
Upper	2,910 (26.09)	1,527 (23.89)	
Educational attainments			
Elementary or less	3,016 (26.78)	1,551 (24.12)	0.001
Middle school	1,229 (10.91)	700 (10.89)	
High school	3,684 (32.71)	2,195 (34.14)	
College or more	3,335 (29.61)	1,984 (30.86)	
Marital status			
Living together	8,419 (74.65)	4,661 (72.30)	<0.000
Living apart	59 (0.52)	41 (0.64)	
Bereavement	1,066 (9.45)	579 (8.98)	
Divorce	243 (2.15)	215 (3.33)	
Unmarried	1,491 (13.22)	951 (14.75)	
Private Insurance			
Yes	7,822 (70.16)	4,584 (71.95)	0.012
No	3,327 (29.84)	1,787 (28.05)	
Subjective oral health			
Very good	171 (1.54)	33 (0.52)	<0.000
Good	1,757 (15.78)	356 (5.60)	
Medium	5,042 (45.27)	1,927 (30.30)	
Poor	3,539 (31.78)	3,159 (49.68)	
Very poor	628 (5.64)	884 (13.90)	
Regular oral examination			
No	8,111 (72.83)	5,100 (80.21)	<0.000
Yes	3,026 (27.17)	1,258 (19.79)	

Values are presented as n (%).
p-values by chi-square test.

Table 3. Relations between General Characteristics and Objective Dental Needs (n=17,735)

Classification	0	1	2	3	p-value
Sex					
Male	4,925 (40.11)	950 (43.03)	305 (44.20)	1,456 (51.56)	<0.000
Female	7,353 (59.89)	1,258 (56.97)	385 (55.80)	1,368 (48.44)	
Age (y)					
19～44	4,909 (39.98)	1,242 (56.25)	278 (40.29)	1,180 (41.78)	<0.000
45～64	4,196 (34.17)	662 (29.98)	249 (36.09)	809 (28.65)	
65 or older	3,173 (25.84)	304 (13.77)	163 (23.62)	835 (29.57)	
Region					
Urban	9,836 (80.11)	1,674 (75.82)	541 (78.41)	2,154 (76.27)	<0.000
Rural	2,442 (19.89)	534 (24.18)	149 (21.59)	670 (23.73)	
Household income					
Low	2,933 (24.20)	473 (21.62)	195 (28.68)	843 (30.32)	<0.000
Mid-low	3,071 (25.34)	558 (25.50)	149 (21.91)	653 (23.49)	
Mid-upper	2,931 (24.18)	585 (26.74)	187 (27.50)	752 (27.05)	
Upper	3,186 (26.28)	572 (26.14)	149 (21.91)	532 (19.14)	
Educational attainments					
Elementary or less	3,138 (26.22)	397 (18.46)	180 (26.99)	821 (30.37)	<0.000
Middle school	1,293 (10.81)	232 (10.79)	84 (12.59)	298 (11.02)	
High school	3,857 (32.23)	838 (38.96)	222 (33.28)	880 (32.56)	
College or more	3,678 (30.74)	684 (31.80)	181 (27.14)	704 (26.05)	
Marital status					
Living together	9,155 (74.68)	1,590 (72.08)	499 (72.42)	1,981 (70.32)	<0.000
Living apart	64 (0.52)	14 (0.63)	5 (0.73)	24 (0.85)	
Bereavement	1,240 (10.12)	118 (5.35)	77 (11.18)	309 (10.97)	
Divorce	286 (2.33)	60 (2.72)	16 (2.32)	101 (3.59)	
Unmarried	1,514 (12.35)	424 (19.22)	92 (13.35)	402 (14.27)	
Private insurance					
Yes	8,573 (70.78)	1,658 (75.85)	462 (68.04)	1,736 (62.45)	<0.000
No	3,540 (29.22)	528 (24.15)	217 (31.96)	1,044 (37.55)	
Subjective oral health					
Very good	162 (1.32)	26 (1.18)	4 (0.58)	15 (0.53)	<0.000
Good	1,718 (14.01)	208 (9.44)	49 (7.12)	194 (6.88)	
Medium	5,303 (43.23)	869 (39.43)	192 (27.91)	781 (27.71)	
Poor	4,270 (34.81)	924 (41.92)	350 (50.87)	1,354 (48.05)	
Very poor	813 (6.63)	177 (8.03)	93 (13.52)	474 (16.82)	
Regular oral examination					
No	8,904 (73.66)	1,723 (79.44)	500 (73.96)	2,237 (81.52)	<0.000
Yes	3,184 (26.34)	446 (20.56)	176 (26.04)	507 (18.48)	

Values are presented as n (%).
p-values by chi-square test.
0: unneeded of treatment, 1: dental conservative treatment needs, 2: dental prosthetic treatment needs, 3: extraction needs.

Discussion

This study aimed to distinguish between perceived dental needs and objective dental needs based on the unmet dental needs for adults and to determine the factors influencing perceived and objective dental needs.

Several factors that influence perceived and objective dental needs were determined. These included sex, individual income, educational level, status of private insurance, and subjective oral health status. According to sex, females showed higher perceived dental needs than males. On the contrary, males had higher objective dental needs than females. These results show that females are more concerned about their oral health than males, and

Table 4. Factors Affecting Perceived and Objective Dental Needs

Classification	Perceived dental needs[a]	Objective dental needs[b]
	OR (95% CI)	OR (95% CI)
Sex		
Male	-	-
Female	1.185 (1.105~1.271)	0.690 (0.645~0.739)
Age (y)		
19~44	-	-
45~64	0.749 (0.683~0.822)	0.632 (0.576~0.694)
65 or older	0.458 (0.401~0.523)	0.501 (0.440~0.570)
Region		
Urban	-	-
Rural	1.028 (0.944~1.120)	1.148 (1.057~1.246)
Household income		
Low	-	-
Mid-low	0.883 (0.800~0.975)	0.848 (0.770~0.934)
Mid-upper	0.912 (0.828~1.005)	0.958 (0.872~1.052)
Upper	0.809 (0.729~0.897)	0.758 (0.685~0.840)
Educational attainments		
Elementary or less	-	-
Middle school	1.101 (0.970~1.250)	0.971 (0.858~1.099)
High school	1.073 (0.959~1.200)	0.878 (0.786~0.980)
College or more	1.177 (1.039~1.334)	0.774 (0.684~0.876)
Marital status		
Living together	-	-
Living apart	1.235 (0.799~1.907)	1.511 (1.002~2.279)
Bereavement	1.148 (1.006~1.309)	1.064 (0.932~1.216)
Divorce	1.363 (1.109~1.675)	1.322 (1.083~1.613)
Unmarried	0.982 (0.883~1.091)	1.135 (1.026~1.256)
Private Insurance		
Yes	-	-
No	1.085 (0.991~1.186)	1.207 (1.107~1.317)
Subjective oral health		
Very good	-	-
Good	1.037 (0.697~1.544)	0.936 (0.658~1.333)
Medium	1.868 (1.271~2.743)	1.249 (0.888~1.756)
Poor	4.704 (3.205~6.905)	2.307 (1.642~3.242)
Very poor	7.782 (5.243~11.551)	3.666 (2.581~5.206)
Regular oral examination		
No	-	-
Yes	0.627 (0.578~0.680)	0.742 (0.685~0.804)

OR: odds ratio, CI: confidence interval, -: reference.
[a]By multilple logistic regression. [b]By ordinal logistic regression.

women's higher perceived dental needs indicate that they fully utilize dental care services. Both perceived dental needs and objective dental needs decreased as age increased. In the unmet healthcare needs, the highest perceived dental needs were observed in patients in their 20s to 40s, with dental needs decreasing with increasing age[14]. Thus, unmet dental needs should be reduced by performing preventive treatment such as using fluoride (e.g., water or salt fluoridation) and conducting repetitive oral health education regarding oral health and its cost-effectiveness even to children.

Particularly, objective dental needs in rural areas are slightly higher than in urban areas. Neighborhood socioeconomic status poses several risks on health[15]. People living in areas that lack diverse social infra-structures may have difficulty accessing health care because of insufficient healthcare facilities and healthcare personnel in their area[16]. Unmet dental needs of adults and children[6] who live in rural areas are higher than those in urban areas because of regional vulnerabilities[17]. Perceived dental needs and objective dental needs of the low-income groups were 1.20 times and 1.25 times higher than the high-income groups, respectively. That is, as income level increases, unmet dental needs significantly decrease[4-6,18]. Consistent to the results of the study by Kim et al.[4], in the low-income groups, inability to undergo dental care due to financial constraints can be considered as objective dental needs. Patients who were college graduates or had advanced degrees had higher perceived dental needs and lower objective dental needs than those patients with elementary school or less educational level. It is considered that educational level has significant effects on the knowledge, attitudes, and behaviors on oral health. The higher the level of education, the higher the interest on oral health. That is, it appears that patients with higher educational level had higher perceived dental needs and lower objective dental needs due to regular oral examination resulting in early treatment than patients with lower educational level. Moreover, oral health education should be repeatedly conducted to individuals with low educational level as it affects the oral health of children and young people[4].

Regarding marital status, individuals living with a spouse showed the lowest objective dental needs among all the marital statuses. Generally, married individuals are healthier than the unmarried individuals because the interest or caring for a spouse influences him or her to keep sound and healthy[19]. The result of the study based on

the National Health Interview Survey suggests that married individuals are economically richer compared to unmarried individuals[10]. Objective dental needs were higher in individuals with private insurance than in individuals with no private insurance. However, this study was not able to determine the effect of private insurance on the perceived dental needs of the individuals. However, in some studies, unmet dental needs of subjects without private insurance were higher (odds ratio, 1.6～3.5) than the unmet dental needs of subjects with private insurance[4,19]. It is thought that such a difference resulted from not specifying the information on private insurance used for dental care in this study. Hence, determining the subjects with private dental insurance to assure the availability of private dental insurance scheme is required in future studies.

According to this study, generally, the factors influencing perceived dental needs and objective dental needs were similar. In conclusion, efforts to strengthen dental health insurance and to prevent oral diseases have to be continued to reduce the unmet dental needs. Hence, it is necessary to improve the knowledge and attitudes of the individuals by providing proper information on the need for dental care and implementing the appropriate oral care to the medical consumers[20]. Maintaining good health is not just an individual effort but a collaboration with the nation and society that recognize their co-responsibility and implement strategies and efforts to maintain the individuals' health. Improvement in policies should be established to provide timely and appropriate healthcare services for the individuals. Using the oral health projects in schools, which is considered the most efficient strategy to improve an individual's knowledge, attitudes, and behaviors on oral health, we suggest that dental health rooms should be established in elementary schools to improve oral health education and preventive treatment.

Notes

Conflict of interest

No potential conflict of interest relevant to this article was reported.

Ethical approval

The study was reviewed and approved by the Institutional Review Board of Eulji University (Seongnam, Korea), which also approved the secondary data analysis (approval No. EUIRB2016-32).

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