

## 국내 병의원 이용 환자들의 주사제 요청과 관련된 특성에 대한 다수준 분석

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## A Multi-level Analysis of Injection Requests and Associated Patient Characteristics in the Korean Acute-care Outpatient Setting

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**서론:** 주사제 사용을 줄이기 위한 정책의 일환으로 건강보험심사평가원은 의료기관별 주사제 처방률을 통보하고 있으나, 여전히 주사제 처방은 높은 실정이다. 따라서 본 연구에서는 주사제에 대한 환자의 인식수준을 살펴보고, 환자의 주사제 요청에 영향을 미치는 요인을 파악하고자 하였다.

**연구방법:** 본 연구는 최근 6개월 이내에 병의원을 방문한 전국의 20세 이상의 남녀를 대상으로 전화조사한 단면설계 연구이다. 환자의 일반적 특성과 주사제에 대한 태도, 인식을 조사하였고, 환자가 주사제를 요청하는데 영향을 미치는 특성을 규명하기 위해 일반적 특성(성, 연령, 결혼여부, 보험형태, 지역규모, 질환, 교육, 소득 등), 주사제에 대한 인식, 태도를 독립변수로 하고, 주사제 처방 요청여부를 종속변수로 하며, 16개 행정지역을 무작위 효과로 증화한 다수준 분석을 실시하였다. 결과: 연구대상에 포함된 응답자는 997명이었고(응답률 82.2%), 응답자 중 24%가 병원 방문 당시 주사제를 요구했다고 응답했고, 58%가 한번 이상 주사제를 맞은 경험이 있다고 보고했다. 92%가 주사제에 대해 잘못된 인식을 갖고 있었고, 15%는 의사가 부적절하게 주사제를 처방한다고 응답했다. 다수준 로지스틱 회귀분석 결과, 남성의 경우(Odds ratio(OR) 0.71, 95% confidence interval(CI) 0.52-0.99), 고졸이상자(OR 0.63, 95% CI 0.41-0.96), 기혼자(OR 1.72, 95% CI 1.01-2.92)가 주사제를 더 요구하는 것으로 나타났고, 대도시에 비해 농촌지역 환자가(OR 2.12, 95% CI 1.24-3.63), 호흡기계 질환으로 방문한 경우(OR 1.48, 95% CI 1.03-2.12), 주사제를 처방하면 경우에 비해 신뢰감이 생긴다는 응답자의 경우(OR 1.91, 95% CI 1.33-2.73) 주사제를 더 요구하는 것으로 나타났다.

**결론:** 본 연구결과 여성, 기혼자, 농촌 거주자, 호흡기계 질환으로 방문한 환자의 경우와 주사를 맞으면 신뢰감이 생긴다는 잘못된 태도를 가진 환자가 주사제를 요구하는 것으로 나타났고, 이러한 환자특성을 고려하여 주사제 사용을 감소시키기 위한 정책을 실시하는 것이 필요하겠다.

□ Key words - Injections, patient characteristics, knowledge, belief, primary care

Concern has been growing over the widespread misuse of injections, especially in developing countries.<sup>1-4)</sup> The unnecessary use of injections causes healthcare quality and economic problems. The popularity of injections is associated with the quick distribution of injective medicines throughout the body and their faster effect than that of oral

drugs.<sup>4)</sup>

Although the separation of drug prescription and dispensation was introduced in Korea in 2000, injection drugs were prescribed and administered only in clinics and hospitals. More than 90% of the acute-care healthcare organizations in Korea are clinics, and these clinics have played a major role in primary care provision in the Korean healthcare delivery system. The nationwide injection prescription rate in clinics was 30.9% in the fourth quarter of 2004, and this rate has tended to decrease, compared with 39.8% and 32.3% in the same

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period in 2002 and 2003, respectively. The rate in ambulatory clinics was higher than that in tertiary (8.0%) and general (13.8%) hospitals, though.<sup>5)</sup> The government has attempted to reduce the overuse of injection drugs by giving physicians feedback on the frequency of their prescription of injections. Korea still has a high prescription rate for injection drugs, however, which can be used in place of oral drugs in primary care settings.

In this context, it is assumed that the overuse of injection drugs in clinics is related to the assertion that injections attract more patients and thus, increase the income of clinics under a fee-for-service system. In addition, the determinant of the prescription rate of injections is not only the physicians' knowledge and beliefs about injection drugs but also the perceived patient demand for injections in Korean primary care settings.<sup>6)</sup> Thus, taking patients' perspective and exploring the actual patient demand for injections are basic steps in managing the unnecessary use of injections.

Patient preference for injections has been noted in several studies that were conducted mainly in underdeveloped countries.<sup>7-9)</sup> The majority of studies on injections have been focused on injection overuse in relation to unsafe injections and infection transmission.<sup>1-3,8,10,11)</sup> A study found that patients who knew the risks of using unclean needles and had 8 or more years of education were less likely to receive injections.<sup>7)</sup> In a study on injection use rather than on requests for injections, people in rural areas who believed that injections resulted in faster action and quick recovery received more injections.<sup>12)</sup> These findings suggest that patients' characteristics and knowledge of injection drugs may affect their injection requesting behavior. There is little information on patient injection-requesting behavior, though. In addition, patient preferences can differ depending on the social and economic profiles of each country.

According to Hwang *et al.* (2007), a higher rate of injection prescription was related to a perception of higher demand and more requests from patients.<sup>6)</sup> It is thus necessary to investigate if the higher rate of injections at a certain region is due to the compositional effect or the

contextual effect. It is also important to ascertain patient characteristics related to injection requests to be able to develop interventions that would reduce excessive demand for injections. Thus, this study was conducted to examine the frequency and characteristics of injection requests among clinic patients in primary care settings. The findings from this study are expected to help reduce unnecessary use of injections and thus, improve public health.

## MATERIALS AND METHODS

### Study Population

A nationwide cross-sectional survey was conducted using telephone interviews with a structured questionnaire in September 2004, as part of the national drug utilization project of the Health Insurance Review Agency (HIRA). The HIRA data on physicians' characteristics related to injection use have been published elsewhere.<sup>6)</sup> The respondents consisted of 1,000 adults who were selected via random sampling in the Telephone Directory of Households, with the probability proportionate to the population size in 16 national administrative regions based on National Statistical Office population data.

One adult per household was interviewed. If an individual had several clinic visits, he/she was asked to answer with respect to his/her most recent clinic visit. The inclusion criteria were adults aged 20-69 years and individuals who had visited physicians in primary care settings within the past 6 months. If an individual took planned injective medicines due to a known disease or if he/she had intravenous infusions or immunizations during that period, the interview was stopped and he/she was excluded from the survey. In the survey, 10,472 households were called, and 9,256 people who had not visited a clinic in the past six months or whose visits were due to chronic disease management were initially excluded. Therefore, a total of 1,216 respondents were interviewed; 216 people who met the inclusion criteria refused to be interviewed. An explanation of the purpose of this study and assurance of data confidentiality were provided. The verbal informed consent of the par-

ticipants was obtained. Eventually, 997 respondents were included in the final dataset, after incomplete data were excluded. Thus, the response rate was 82.0% (n = 997/1,216).

### Data Collection

A questionnaire was designed to collect information on the patients' knowledge and beliefs regarding injections, perception of the appropriateness of injection use, and frequency of requests of injection drugs. The questions on the knowledge of injections and perception of their appropriate uses were measured using a 5-point Likert scale (5 = strongly agree to 1 = strongly disagree). The questionnaire items were developed through a literature review and meetings with related experts. The validity of the questions was reviewed by a committee of four physicians, five nurses, one pharmacist, and one survey consultant. The survey was performed by a professional agency after pilot testing.

The knowledge and beliefs regarding injections were investigated with respect to the following four items: 'Injection drugs have better treatment effects than oral drugs,' 'Injection drugs result in faster recovery than do oral drugs,' 'Injection drugs decrease complications due to diseases,' and 'Injection drugs have fewer side effects than oral drugs.' In the results, the response to each item was converted into a dichotomous variable to differentiate the misconception. Values of '4' and '5' were coded as '0,' which indicates misconception and faulty beliefs. The other values were coded as '1,' which represents correct knowledge and beliefs about injections. Regarding the overall knowledge, if all the responses to the four items were '1,' the overall knowledge was coded as '1' (correct), and otherwise, as '0' (incorrect).

The perception of the appropriateness of injection use was measured with respect to three items: 'Physicians' prescription of injection drugs makes medical care more trustworthy,' 'Physicians prescribe injections for their own profit,' and 'Physicians unnecessarily prescribe injection drugs.' In the results, the response to each item was converted into dichotomous variables.

The values of '4' and '5' were coded as '1' (inappropriate), and the other values, as '0' (appropriate).

The frequency of injection requests was measured using the following five responses: 'Always,' 'Frequently,' 'Sometimes,' 'Never,' and 'I don't know.' The values of 'Always/Frequently/Sometimes' were coded as '1' (request for injections), and 'Never' was coded as '0' (no request for injections). Information was also collected on general characteristics, including the age, gender, education level, marital status, and average monthly income, as well as on medical problems that were the primary reasons for the physician visit and whether or not the injections were received at their clinic visit. The area of residence was determined a priori using the telephone area code, and then the residence location was classified as a large metropolitan city, a smaller city, or a rural area.

### Data Analysis

The data were analyzed using SAS (version 9.2, Cary, NC). The general characteristics of the participants were summarized using descriptive statistics. Chi-square tests were conducted to identify the differences in the injection request behavior according to the general characteristics. The 16 administrative regions were considered to have had a fixed regional effect, and the other variables, including the gender, age, education level, marital status, monthly income, area of residence, and main cause of the clinic visit were treated as having had random effects in the multilevel logistic analysis to determine the factors associated with injection requests. In the analysis, the multilevel logistic analysis was used to control the high variability of the rate of injection prescription among the administrative regions, and the differences in the consumer perspectives within and between regions were tested. The statistical significance level was set at 0.05.

## RESULTS

### General Participant Characteristics and Frequency of Injection Requests

The proportions of females (n = 564, 56.6%), those aged 40-59 years (n = 452, 45.3%), individuals with high school or higher education levels (n = 874, 73.0%), and those with a monthly income of KRW3 million (approximately US\$3,000 at the time of the study) or more (n = 287, 29.9%) were comparatively high. Of the participants, 85% (n = 847) were married and 91.2% (n = 909) lived in urban areas. The main medical problems that were the reasons for the clinical visits were respiratory diseases (n = 373, 37.4%) and musculoskeletal diseases (n = 131, 13.1%). More than half (n = 582, 58.4%)

reported receiving injections at their clinic visit in the previous 6 months (Table 1).

Of the participants, 24% (n = 241) responded that they requested injections. Specifically, 1.4% (n = 14) answered that they 'always' requested injections at their clinic visits. Individuals with 'frequent requests for injections' were 22.0% (n = 220), and those who answered 'I sometimes requested injections' were 20.5% (n = 205). The majority of the participants (n = 756, 75.6%) answered that they never requested injections at their clinic visits. Among 997 respondents, excluding the

**Table 1. General participant characteristics and injection requests**

Variables	No. of Patients with Injection Requests (%)				Total	$\chi^2$ -stat	
	Yes		No				
Gender							
Male	87	(36.1)	346	(45.8)	433	(43.4)	7.0*
Female	154	(63.9)	410	(54.2)	564	(56.6)	
Age (yrs)							
20-39	83	(34.4)	289	(38.2)	372	(37.3)	0.9
40-59	114	(47.3)	338	(44.7)	452	(45.3)	
60-69	44	(18.3)	129	(17.1)	173	(17.4)	
Education level							
Middle school or lower	87	(36.1)	182	(24.1)	269	(27.0)	13.6†
High school or higher	154	(63.9)	574	(75.9)	874	(73.0)	
Marital status							
Yes	218	(90.5)	629	(83.2)	847	(85.0)	7.5*
No	23	(9.5)	127	(16.8)	150	(15.1)	
Monthly income (thousands)							
Less than KRW1,000	60	(24.9)	136	(18.0)	196	(20.4)	7.2
KRW1,000-1,990	60	(24.9)	183	(24.2)	243	(25.3)	
KRW2,000-2,990	49	(20.3)	186	(24.6)	235	(24.5)	
KRW3,000 or more	61	(25.3)	226	(29.9)	287	(29.9)	
Area of residence							
Metropolitan cities	104	(43.2)	383	(50.7)	487	(48.9)	12.2†
Smaller cities	103	(42.7)	319	(42.2)	422	(42.3)	
Rural areas	34	(14.1)	54	(7.1)	88	(8.8)	
Receiving injection							
Yes	144	(59.8)	438	(57.9)	582	(58.4)	0.2
No	97	(40.2)	318	(42.1)	415	(41.6)	
Main causes of clinic visits							
Respiratory diseases	98	(40.7)	275	(36.4)	373	(37.4)	3.1
Musculoskeletal diseases	36	(14.9)	95	(12.6)	131	(13.1)	
Circulatory and endocrine diseases	17	(7.1)	44	(5.8)	61	(6.1)	
Eye, nose, and skin problems	5	(2.1)	27	(3.6)	32	(3.2)	
Others (including dental diseases)	95	(39.4)	346	(45.8)	441	(44.3)	
<b>Total</b>	<b>241</b>	<b>(100.0)</b>	<b>756</b>	<b>(100.0)</b>	<b>997</b>	<b>(100.0)</b>	

\* p < 0.05, † p < 0.001

**Table 2. Patients' knowledge and belief about injections and perception of their appropriate uses**

Variables	No. of Patients with Injection Requests (%)				Total	$\chi^2$ -stat	
	Yes	No	Yes	No			
Better treatment effect than oral drugs							
Yes	177	(73.4)	485	(64.2)	662	(66.4)	7.1*
No (correct)	64	(26.6)	271	(35.8)	335	(33.6)	
Rapid recovery							
Yes	190	(78.8)	505	(66.8)	695	(69.7)	12.5†
No (correct)	51	(21.2)	251	(33.2)	302	(30.3)	
Prevention of complications							
Yes	66	(27.4)	162	(21.4)	228	(22.9)	3.7
No (correct)	175	(72.6)	594	(78.6)	769	(77.1)	
Fewer side effects							
Yes	111	(11.0)	360	(47.6)	471	(47.2)	0.2
No (correct)	130	(90.0)	396	(52.4)	526	(52.8)	
Physicians' prescription of injection drugs makes medical care more trustworthy.							
Yes	184	(76.4)	462	(61.1)	646	(64.8)	18.9†
No	57	(23.7)	294	(38.9)	351	(35.2)	
Physicians prescribe injections for their profit.							
Yes	67	(27.8)	280	(37.0)	347	(34.8)	6.9*
No	174	(72.2)	476	(63.0)	650	(65.2)	
Physicians unnecessarily prescribe injection drugs.							
Yes	63	(26.1)	254	(33.6)	317	(31.8)	4.7*
No	178	(73.9)	502	(66.4)	680	(68.2)	
Total	241	(100.0)	756	(100.0)	997	(100.0)	

\* $p < 0.05$ , † $p < 0.001$ , ‡Perception about the appropriateness of injection use were coded as '1' (correct) if all responses to the four items were '1,' which was converted into dichotomous variables.

individuals ( $n = 3$ ) who answered 'I don't know,' there were significant differences in their injection request behavior according to their gender, education level, marital status, and area of residence (Table 1).

### Knowledge and Beliefs about Injections and Perception of the Appropriateness of Injection Use

As shown in Table 2, those with faulty knowledge and beliefs about injection drugs had a higher proportion of injection requests. Specifically, the proportions of individuals with correct answers were 33.6% ( $n = 335$ ) for 'treatment effect,' 30.3% ( $n = 302$ ) for 'recovery,' 77.1% ( $n = 769$ ) for 'complications,' and 52.8% ( $n = 526$ ) for 'side effects.' Statistically significant differences were found only in two items: the 'treatment effect' and 'recovery.' With regard to injection uses, 64.8% ( $n = 646$ ) respondents agreed that 'Physicians'

prescription of injection drugs makes medical care more trustworthy'; 34.8% ( $n = 347$ ), that 'Physicians prescribe injections for their own profit'; and 31.8% ( $n = 318$ ), that 'Physicians unnecessarily prescribe injection drugs.'

### Relationship between Patient Characteristics and Injection Request

A multilevel logistical regression analysis was performed for injection requests as dependent variables. The significant factors associated with injection requests were the gender, education level, area of residence, and knowledge and beliefs about injection drugs. Males (OR 0.71, 95% CI 0.52-0.99) and individuals with high school or higher education levels (OR 0.63, 95% CI 0.41-0.96) were less likely to ask for injection drugs. Those who lived in rural areas (OR 2.12, 95% CI 1.24-3.63) were more likely to request injection drugs than

**Table 3. Multilevel logistic analysis results for injection requests**

Variables	Adjusted Odds Ratio (95% Confidence Interval)*	
Gender (reference: female)	0.71*	(0.52-0.99)
Age (reference: 20-39 yrs)		
40-59 yrs	0.81	(0.54-1.21)
60-69 yrs	0.62	(0.35-1.10)
Education level (reference: middle school or lower)		
High school or higher	0.63*	(0.41-0.96)
Marital status (reference: unmarried)	1.72*	(1.01-2.92)
Monthly income (reference: less than KRW1,000 thousand)		
KRW1,000-1,990 thousand	0.84	(0.53-1.33)
KRW2,000-2,990 thousand	0.73	(0.44-1.21)
KRW3,000 or more thousand	0.84	(0.51-1.38)
Area of residence (reference: metropolitan cities)		
Smaller cities	1.12	(0.80-1.55)
Rural areas	2.12*	(1.24-3.63)
Main causes of clinical visits (reference: others)		
Respiratory diseases	1.48*	(1.03-2.12)
Musculoskeletal diseases	1.19	(0.70-2.02)
Circulatory diseases	1.43	(0.73-2.81)
Eye, nose, and skin problems	1.11	(0.39-3.16)
Better treatment effect than oral drugs	1.42	(0.83-2.44)
Rapid recovery	1.33	(0.82-2.16)
Prevention of complications	0.83	(0.60-1.15)
Fewer side effects	1.27	(0.92-1.74)
Physicians' prescription of injection drugs makes medical care more trustworthy.	1.91†	(1.33-2.73)
Physicians prescribe injections for their profit.	0.72	(0.48-1.08)
Physicians unnecessarily prescribe injection drugs.	0.94	(0.62-1.43)
Receiving injections in the past 6 months	0.87	(0.63-1.21)

Note: OR and 95% CI by multilevel logistical analysis

\*p < 0.05, †p < 0.001

those in metropolitan cities. Those who visited clinics to treat respiratory diseases (OR 1.48, 95% CI 1.03-2.12) were more likely to request injection drugs than those with other medical problems. People who agreed that 'Physicians' prescription of injection drugs makes medical care more trustworthy' were 1.91 times more likely to request injection drugs at their clinic visits (OR 1.91, 95% CI 1.33-2.73) (Table 3).

## DISCUSSION

This research represents a first step toward understanding patient characteristics related to requests for injection drugs in Korea. The study findings showed

that about a quarter of clinic patients asked physicians for injections. This reflects patient preference for injections, consistent with previous reports.<sup>7-9)</sup> Furthermore, this demonstrated that there was a difference between physicians' perceived demand and actual patient demand for injections, compared with physicians' responses in a primary care physician survey that a majority of patients (489/608, 80.4%) wanted injections.<sup>6)</sup> The frequency of injection requests in this study was at a higher level than the finding that only 10% (19/198) of the patients of a university clinic in Pakistan had asked for injections.<sup>7)</sup>

Considering this finding, injections might become the main purpose of clinic visits for some people. Although patient requests for injections were not the only deter-

minant of physicians' prescription decision, physicians' perceptions of patient demand influenced their injection drug prescription rate.<sup>6)</sup> In particular, medically inappropriate patient demand can put pressure on physicians, due to the concern that unmet demand creates a conflict between the physician and the patient, which will affect adherence to physicians' recommendations or continuity of care. Furthermore, a study showed that physicians reported that patients sought care in different facilities or returned for further treatment if they refused to prescribe injections.<sup>8)</sup> Thus, the necessity of community education on the risks of injection overuse has been suggested.<sup>7,9)</sup>

Among patient characteristics, the gender, education level, marital status, disease type, and area of residence were found to be significant factors of injection requests. This finding was similar to the report from physician interviews that elderly women often requested injections.<sup>8)</sup> People with higher education levels were less likely to request injections, which was consistent with the previous study finding.<sup>7)</sup> Unlike another previous study finding, however, married people had a higher rate of injection requests in this study. This result may be linked to their social roles, particularly their family caregiving roles. People with respiratory diseases were also more likely to ask for injections. This can be related to the high use by primary care physicians of injections for patients with upper respiratory infections.<sup>13)</sup> In addition, individuals who lived in rural areas requested injections more than those in metropolitan areas or smaller cities. This finding may be related to the accessibility of health services due to the imbalanced distribution of healthcare organizations. Since most clinics (88.5%,  $n = 20,852$ ) are located in urban areas, persons who live in rural areas, with relatively limited physical access to health services, are likely to request injection prescriptions during their physician visit. Age was not a significant factor, after the adjustment for other factors. This differs from the report on an earlier study that older adults had a higher prevalence of injections,<sup>8)</sup> which can be due to the exclusion in this study of patients aged over 70 years to improve the accuracy of

communication via telephone interviews.

Furthermore, faulty knowledge and beliefs about injections were associated with injection requests. Specifically, people who agreed that 'Physicians' prescription of injection drugs makes medical care more trustworthy' were more likely to ask for injections than the others. This was similar to the findings of previous studies that people preferred injections because of their faster curative effect.<sup>3,8,12,14)</sup> On the other hand, many respondents reported awareness of the side effects of injections, unlike a previous finding that few people recognized the adverse events from or the risks of injection use.<sup>8)</sup>

The findings of this study suggest practical implications for promoting appropriate utilization of injection drugs. To decrease unnecessary demand for injections, educational interventions are required to correct patient misconceptions of the effectiveness of injection drugs. Considering that most injection drugs can be replaced with corresponding oral drugs,<sup>5)</sup> if awareness of the indications of injection use is raised, injection-requesting behavior can be diminished. The indications of the need for injection prescription, according to the National Health Insurance Reimbursement Regulations, are as follows: (1) patient conditions that prevent the administration of medications via the oral route, (2) severe conditions that require emergency treatment, or (3) the inability to replace injection drugs with other drugs.

Moreover, educational interventions to reduce unnecessary injection requests must target females and people who live in rural areas. Empowering them to be more informed healthcare consumers could decrease unnecessary demand for injection drugs. Various approaches, including the use of mass media and the Internet, can support information provision and behavior change.<sup>15,16)</sup> For instance, healthcare providers may directly give information on and explain the efficacy and indications of injection drugs during patient visits, or they can display posters or leaflets inside their clinics as guides to promoting appropriate drug utilization.

This study had several limitations. First, the study population consisted of patients aged 20-69 years as

clinic users in primary care settings. Talaat *et al.*<sup>8)</sup> found that older adults had a higher prevalence of injections. Thus, further studies are needed that include patients 70 years old or older. Second, self-reporting measures can have recall bias. This suggests that the injection-requesting behavior over six months may have been more frequent than stated. Hence, a future study is suggested that will use different methodologies such as observation studies and documentation review. In addition, interventional studies on the decrease of unnecessary demand for injections among patients are suggested.

In summary, approximately one out of four patients asked for injection drugs in their physician visits. Significant factors associated with their injection request were their gender, area of residence, and knowledge and beliefs about injections. Considering these patient characteristics, effective interventions should be designed to reduce overuse of injections in primary care settings and to guide appropriate health service utilization.

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