

BMJ Open Impact of continuous Medical Aid utilisation on healthcare utilisation: unique insight using the 2008–2012 Korean Welfare Panel Study (KOWEPS)

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ABSTRACT

Objectives: Although there has been considerable discussion about the social safety net, few studies related to effect of duration of continuous receipt of Medical Aid on healthcare utilisation have been conducted. Therefore, we investigate whether the duration of receiving Medical Aid affected medical care utilisation.

Setting: Data were collected from the Korean Welfare Panel Study conducted from 2008 to 2012.

Participants: We included 11 783 samples.

Interventions: Estimating changes in their healthcare utilisation during specific time intervals (1, 2 and ≥ 3 years) after they switched from National Health Insurance to Medical Aid.

Primary and secondary outcome measures: Number of outpatient visits.

Results: The number of outpatient visits per year was 0.0051-fold higher (p value: 0.434) among those who were Medical Aid beneficiaries for a continuous period of 1 year, 0.0267-fold higher (p value: 0.000) among those who were beneficiaries for a continuous period of 2 years, and 0.0562-fold higher (p value: <0.0001) among those who were beneficiaries for a continuous period of 3 years than it was among those who were beneficiaries of National Health Insurance.

Conclusions: Our results reflect an association between the number of consecutive years of receiving Medical Aid and number of outpatient visits. Since duration of dependence is correlated with reduced exit rates, limits on length of benefits should be considered to strengthen the incentive to return to work.

INTRODUCTION

The National Health Insurance (NHI) system was introduced in South Korea in 1977, and it has been gradually extended to the self-employed, finally covering the entire population in July 1989.¹

Additionally, the government created Medical Aid, a social safety net similar to Medicaid in the USA, to support the low-

Strengths and limitations of this study

- This study used nationwide survey data of community dwelling people. A large population sample size was representative of the adolescent population, so the results can be generalised to the adolescent population in South Korea.
- Respondents' reports were subjective and were imperfect measures potentially affected by perception bias and adaptation of resources.
- We used cross-sectional nature data for our estimates. Therefore, the results are possibly subject to reverse-causation problems.
- Since data on various mental disorders or the general mental health of the study participants were not available, controlling for the possible contributions from mental health or disorders was difficult.

income groups that occupy a 'blind spot' in the NHI system. The Medical Aid programme classifies beneficiaries into two categories, Types 1 and 2, based on general functioning (those younger than 18 or older than 65 years of age, disabled individuals) and ability to work, respectively.² According to the law, both types of Medical Aid beneficiaries are compensated by the government for all medical expenses, except copayments.²

As of December 2009, Medical Aid beneficiaries represented ~3.8% of the country's population. Although the number of Medical Aid beneficiaries fluctuates annually, the portion of all NHI expenditures attributable to Medical Aid payments has increased annually, indicating that the rapid increase in these expenditures may threaten other social welfare programmes.³

According to the 2012 National Basic Livelihood Security Recipients Report,⁴ individuals who were National Basic Livelihood Security beneficiaries for less than 1 year accounted for 12.4%, those who were

beneficiaries for 1–2 years accounted for 14.5%, and those who were beneficiaries for more than 10 years accounted for 24.5% of the total number of beneficiaries.

In the USA, Temporary Assistance for Needy Families (TANF) was introduced as an effort to reform Aid for Families with Dependent Children (AFDC), a public assistance programme that has been operating since 1996, to enhance the incentive to work and reduce welfare dependence.⁵ The new programme encourages beneficiaries of public assistance to become self-sufficient by offering incentives for working and imposing sanctions and time limits. Indeed, the primary goal of these welfare reforms is to help people escape from public assistance.⁶ These reforms emerged in the context of social concerns about welfare dependence.⁶ In fact, a previous study indicated that the probability of relinquishing Medical Aid decreases as a function of time in South Korea.⁶

Although there has been considerable discussion about reforming social assistance policies,⁵ few studies related to effect of duration of continuous receipt of Medical Aid on healthcare utilisation have been conducted.

Therefore, the purpose of our study was to investigate whether the duration of receiving Medical Aid affected medical care utilisation, focusing on the number of outpatient visits. Unlike decisions about hospitalisation, which are made by physicians, decisions about outpatient visits are made by patients.

METHODS

Study sample and design

The data analysed in this study were drawn from the 2008 (wave 3) Korean Welfare Panel Study (KOWEPS). KOWEPS, which is conducted by the Korea Institute for Health and Social Affairs and Seoul National University, is an annual longitudinal panel survey that began in 2006. It uses proportional systematic stratified cluster sampling to select a representative sample of households in South Korea. Multiple interviews are conducted in the same household to enable all members of the household 15 years or older to complete the questionnaire when possible.

The panel consists of 18 856 individuals from a national probability sample of 7072 households in South Korea who have been surveyed annually since 2006. The sample was selected using systematic two-stage stratified cluster sampling on 2005 census data. KOWEPS also used post-stratification weights based on 2005 census data, and data were weighted by (1) a primary sampling unit, and (2) to intentionally oversample low-income households.

Further details of the sample design, methods and data sets can be found elsewhere (<http://www.koweps.re.kr/>). Since data for the current study are publicly available, no approval related to the ethics of the research was needed.

The samples for waves 3 (2008) to 7 (2012) were obtained from a total of 16 613 individuals from 6314 households, 16 255 individuals from 6207 households,

15 625 individuals from 6207 households, 14 696 individuals from 6034 households, and 14 604 individuals from 5735 households, respectively.

Among the 2008 baseline data, we included health insurance beneficiaries at baseline and excluded 3239 individuals without information on socioeconomic status variables and health status variables. Thus, the 2008 data included a total of 11 783 individuals.

To investigate the impact of duration of receipt of Medical Aid on healthcare utilisation, our target population consisted of those who were health insurance beneficiaries in 2008 and continued on the panel for 5 years. Since 2008, we estimated the healthcare utilisation rates for three groups who switched from NHI to Medical Aid: those who were beneficiaries of Medical Aid for a continuous period of 1 year, those who were beneficiaries for a continuous period of 2 years, and those who were beneficiaries for a continuous period of 3 years or more.

Study variables

In this study, we analysed the number of outpatient visits per year as the dependent variable. Age, sex, educational level, residential region, occupation, marital status, economic activity and number of chronic diseases were included as covariates.

Educational level was categorised into four groups: elementary school or lower, middle school, high school, and college or higher. Residential region was analysed in terms of urban (Seoul, Daejeon, Daegu, Busan, Incheon, Kwangju or Ulsan) or rural (not classified as a city). Occupational status was divided into two categories: employed and unemployed (including housewives and students). Individuals were classified as currently or never married, with the latter group including those who had been married, widowed and divorced. Number of chronic diseases and perceived health status were also included in our models. Number of chronic diseases was operationalised into two categories: 0 and ≥ 1 . Economic activity was categorised as yes (blue collar and white collar) or no (housewife, students).

Statistical analysis

Analysis of variance and longitudinal data analysis were used to investigate associations between the number of consecutive years of receiving Medical Aid and healthcare utilisation (ie, number of outpatient visits per year). We used a generalised linear mixed model with a Poisson distribution to investigate the number of outpatient visits per year.

The use of a generalised linear mixed model was required in order to handle the unbalanced data with correlated outcomes and missing data. In all mixed models presented, only the intercept was allowed to vary between participants, and the regression slopes were assumed to be fixed effects; random intercept models were applied to our data. The random intercept variance is reported as σ^2 (Arrandale, Koehoorn, MacNab, and Kennedy, 2009). We ran a generalised linear mixed

model with a Poisson distribution. The strength of a generalised linear mixed model is that it is a very flexible approach to analyse correlated data from the same participants over time (Homish *et al*, 2010; Liang and Zeger, 1993). It controls for characteristics that change over time, such as confounding variables other than gender. Thus, the number of outpatient visits per year was the outcome variables in our models. To determine whether the probability of the number of outpatient visits per year changed over time, we included time (year) in the model as a categorical covariate; the regression coefficient was used to estimate both the change in probability of the number of outpatient visits per year and independent variables annually (Arrandale *et al*, 2009).

For all analyses, the criterion for significance was $p \leq 0.05$, two tailed. All analyses were conducted using the SAS statistical software package, V.9.2 (SAS Institute Inc., Cary, North Carolina, USA).

RESULTS

Table 1 presents the general characteristics of the participants at baseline (2008) and shows that 11 783 respondents had NHI.

Table 1 General characteristics of the study participants at the baseline (2008)

	N	Per cent	Per cent *
Type of insurance			
Health insurance	11 783	100.00	100.00
Gender			
Male	5361	45.50	47.49
Female	6422	54.50	52.51
Age			
≤19	2611	22.16	25.56
20–39	2717	23.06	27.90
40–59	3030	25.72	27.46
≥60	3425	29.07	19.07
Residential region			
Urban	5000	42.43	45.45
Rural	6783	57.57	54.55
Marital status			
Married	6498	55.15	54.45
Single (including divorced, separated)	5285	44.85	45.55
Education level			
≤Elementary	4748	40.30	32.50
Middle school	1559	13.23	12.15
High school	3002	25.48	27.76
≥College	2474	21.00	27.59
Number of chronic diseases			
0	7254	61.56	68.42
1	412	3.50	4.13
≥2	4117	34.94	27.45
Economic activity status			
≥Yes	5033	42.71	43.14
≥No (including housewife)	6750	57.29	56.86

*%: weighted %.

Table 2 presents the general characteristics of participants according to duration of receipt of Medical Aid benefits. The weighted mean number of outpatient visits at baseline (under NHI) was 10.37 (SD: 1126.91) per year. The weighted mean number of outpatient visits by those receiving Medical Aid for a continuous period of 1 year was 18.54 per year (SD: 1578.56). The weighted mean number of outpatient visits by those receiving Medical Aid for a continuous period of 2 years was 24.20 per year (SD: 1335.78). The weighted mean number of

Table 2 Association between variables and health insurance status change (2008–2012)

	Number of outpatient visits		p Value
	Mean*	SD†	
Consecutive year of Medical Aid beneficiary			<0.0001
Baseline	10.37	1126.91	
1 year	18.54	1578.56	
2 years	24.20	1335.78	
3 years or more	23.23	1526.89	
Gender			<0.0001
Male	8.30	899.43	
Female	12.34	1283.33	
Age			<0.0001
≤19	7.82	628.77	
20–39	5.35	731.79	
40–59	9.03	1035.87	
≥60	24.82	1437.54	
Residential region			0.1902
Urban	9.87	1111.38	
Rural	10.86	1144.39	
Marital status			0.009
Married	11.10	1167.37	
Single (including divorced, separation)	9.58	1082.62	
Education level			<0.0001
≤Elementary	17.56	1311.49	
Middle school	11.94	1120.71	
High school	8.05	928.16	
≥College	6.33	861.66	
Number of chronic diseases			<0.0001
0	5.02	540.02	
1	10.85	743.26	
≥2	23.63	1516.60	
Economic activity status			<0.0001
Yes	8.31	971.04	
No (including housewife)	12.30	1230.62	
Year			0.0003
2008	11.04	1127.86	
2009	10.08	1100.06	
2010	10.29	1125.69	
2011	10.19	1140.77	
2012	10.50	1158.85	
Total	13.58	1127.86	

*Mean: weighted mean.

†SD: weighted SD.

outpatient visits by those receiving Medical Aid for a continuous period of 3 years was 23.23 per year (SD: 1.526.89) (table 2).

Table 3 shows the association between the continuous period of Medical Aid utilisation and healthcare utilisation patterns. The number of outpatient visits per year was 0.051-fold higher (p value: 0.434) among those who were Medical Aid beneficiaries for a continuous period of 1 year, 0.267-fold higher (p value: 0.000) among those who were beneficiaries for a continuous period of 2 years, and 0.562-fold (p value: <0.0001) higher among those who were beneficiaries for a continuous period of 3 years compared with the baseline statistics (table 3).

Table 3 Adjusted effect of study variables on healthcare utilisation pattern

	Number of outpatient visits	
	Estimate	p Value
Consecutive year of Medical Aid beneficiary		
Baseline	ref	
1 year	0.051	0.434
2 years	0.267	0.000
3 years or more	0.562	<0.0001
Gender		
Male	ref	
Female	0.221	<0.0001
Age		
≤19	ref	
20–39	−0.043	0.115
40–59	0.051	0.043
≥60	0.320	<0.0001
Residential region		
Urban	0.000	0.992
Rural	ref	
Marital status		
Married	0.027	0.062
Single (including divorced, separated)	ref	
Education level		
≤Elementary	0.466	<0.0001
Middle school	0.147	<0.0001
High school	0.034	0.067
≥College	ref	
Number of chronic diseases		
0	ref	
1	0.741	<0.0001
≥2	1.269	<0.0001
Economic activity status		
Yes	ref	
No (including housewife)	0.088	<0.0001
Year		
2008	ref	
2009	−0.070	0.000
2010	0.001	0.957
2011	−0.028	0.123
2012	−0.012	0.503

DISCUSSION

The results of this study show that those who continuously received Medical Aid for a longer period of time tended to have an increased number of outpatient visits compared with when they were NHI beneficiaries and had lower levels of coverage. These associations were independent of sociodemographic characteristics (age, sex, residential region, marital status, educational level and employment status), health status (number of chronic diseases) and year.

In South Korea, the cost of Medical Aid payments accounts for 16.9% of total NHI expenditures, and the total medical expenditures related to Medical Aid increased dramatically from 3.9 trillion won in 2006 to 5.1 trillion won in 2011.³ Although the number of Medical Aid beneficiaries in South Korea increased by only ~4.5% from 2005 to 2008, national expenditures for Medical Aid beneficiaries increased by 71.7% during the same period.⁷

Experience as a Medical Aid beneficiary in the past increased the probability of being a beneficiary in the future and decreased the probability of leaving this system as a function of the previous duration of benefits. The following three explanations can be offered for these findings.⁸

First, current status as a beneficiary may reduce future employment opportunities, increasing the probability of continuing as a beneficiary. Since work experience is typically considered a major determinant of wages, less work experience today may lead to lower wages and fewer job opportunities tomorrow. Second, participation as a beneficiary may change one's household composition in ways that increase the likelihood of future welfare use. There has been an ongoing controversy over the extent to which welfare usage decreases marriage rates, increases divorce rates and increases family size. A third possibility is that experience as a beneficiary leads people to rely on and prefer benefits over earned income. An alternative explanation of this phenomenon is that people in deprived situations lose a sense of hope or control, leading to reduced efforts to seek alternative earning opportunities over time.

Our findings suggest that continuous reliance on Medical Aid is associated with a gradual increase in the number of outpatient visits, which is consistent with a previous report^{9 10} that exit rates decreased as a function of duration of receiving benefits. It is possible that reduced exit rates are evidence of duration dependence. If exit rates do indeed decline over time, policymakers should devote more attention to the early years of dependence on Medical Aid. Moreover, the vast majority of beneficiaries are long-termers.

In the context of the present results and those of previous research, we should consider limiting the length of time that benefits are available as an approach to strengthening the incentive to work.¹¹ The experience of TANF in the USA demonstrates the effects of time limits on the incentive to work as this approach significantly

reduced the number of beneficiaries. Although increased earnings were not enough to escape from poverty, implementation of TANF contributed to increasing both the income of, and the employment rate among, beneficiaries.¹² In addition, a German study,⁴ which examines whether investments in education provide sufficient resources to escape the risk of poverty in the low-income sector, showed that individuals benefit economically from investing in education. This is especially the case for women with lower levels of education.

We expect that the earnings of beneficiaries will increase and that the number of beneficiaries and their medical care expenditures will decrease by limiting the duration of Medical Aid benefits in South Korea due to the correlation between duration dependence and reduced exit rates.

Therefore, further research to prove that people retained in the programme for longer years were not sicker than those who quit the programme earlier is required because a reduced length of benefits might restrict the accessibility of necessary care to those vulnerable enrollees.

This study has several strengths and limitations. One strength is that the sample was large and may have been representative of the overall population. Nevertheless, we acknowledge the possibility of sample bias. First, since certain KOWEPS questions solicit self-reported number of outpatient visits, these data were subjective and subject to recall bias; additionally, these data were not corroborated by medical records due to the cost and scope of the work that would have entailed. Second, cyclic fluctuations in healthcare utilisation have been frequently observed and reported,^{13 14} particularly during winter and summer holidays and weekends. Although our study included dummy years from 2008 to 2012, we could not consider seasonal factors due to lack of information. Third, in an ideal system, demand should dictate healthcare utilisation in emergencies (unplanned services), whereas supply should be the primary contributor to healthcare utilisation for elective, planned services.^{15 16} However, we could not determine whether the increased healthcare utilisation of Medical Aid beneficiaries was caused by physicians or the patients themselves. Fourth, we could not include characteristics of medical facilities such as size and location because of lack of information. Fifth, although we used a generalised linear mixed model for longitudinal data analysis, the results possibly reflect reverse causality and bidirectional relations.

CONCLUSION

We found differences in healthcare utilisation (ie, number of outpatient visits) according to the number of consecutive years of receiving Medical Aid. Therefore, additional efforts are needed to increase self-sufficiency by providing genuine opportunities to, and needed support for, beneficiaries.

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Contributors J-HK, NRK and E-CP carried out the acquisition of data, performed the experiments and participated in the drafting of the manuscript. J-HK and E-CP participated in the design of the study and performed the statistical analysis. J-HK, SGL, K-TH and YC conceived of the study participated in its design and coordination and helped to draft the manuscript. All authors read and approved the final manuscript.

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