

The Effect of Public Reporting of Acute Myocardial Infarction on the Choice of Hospital

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Abstract

Background

Public reporting of the quality of care delivered in hospitals is thought to improve patients' choice and quality of care. When information about hospital rating is available, consumers may choose good-rated hospitals. To investigate the effect of public reporting of acute myocardial infarction (AMI) care on the people's choice of hospitals.

Methods

We conducted a cross-sectional study using an online questionnaire. The survey questions include the awareness and usage of public reporting, and the impact of the public reporting on the choice of hospitals. The difference in responses before and after acquiring information about public reporting was compared using Wilcoxon Signed Rank test.

Results

The final survey data set includes 740 respondents after a rigorous validity check (response rate: 66.7%). Before providing information about public reporting of AMI care, 62.8% of respondents selected 'nearby hospitals' as the best option for AMI patients, followed by 'famous hospitals' (14.4%), 'usual hospitals' (10.5%) and 'hospitals with good rates' (9.9%). However, after acquiring information about the public reporting of AMI care, 10.3% of respondents changed their original responses to 'hospitals with good rates'. Among the factors of hospital choice that differ before and after obtaining public reporting information, 'nearby hospitals' and 'hospitals with good rates' increased, while 'usual hospitals' and 'famous hospitals' decreased. Compared to the health-related occupation group, the non-health related occupation group showed a significant difference between 'famous hospitals', and 'hospitals with good rates' before and after obtaining information (Famous hospitals $p=0.003$, Hospitals with good rates $p=0.002$).

Conclusions

The publicly available hospital quality ratings influence people's choice of hospital, increasing the risk of selecting a hospital with a good rating than the nearest hospital, which is recommended for AMI patients. Policy-makers need to stress the importance of choosing the nearest hospital when AMI symptoms occur, in addition to hospital ratings, in the public reporting.

Background

Choice of hospitals

With over 90% of privatized hospital in Korea, choosing a hospital for receiving medical care for Koreans can be a complicated and difficult process. Choosing unsuitable facilities may result in delays of treatments, which may increase patient's dissatisfaction with their health care service, and lead to undesirable clinical outcomes [1, 2]. The choice of hospital for patients is influenced by various factors, such as previous experiences or opinions of their acquaintances [3–5], reputations of the hospitals, and recommendations from their general physicians (GPs) [6, 7]. Several studies revealed that hospital quality information have a significant positive impact on patients' choices [8–10]. However, it may mislead patients who are sensitive to the differences in the hospital quality measured by public quality ratings to 'higher-quality' hospitals [11].

The number of beds in Korean public hospitals are far lower than the Organization for Economic Cooperation and Development (OECD) average (12 vs. 4.7 beds per every 1,000 people) [12, 13]. The proportions of patients with uncomplicated, single chronic disease who were unnecessarily utilizing ambulatory care services at hospitals, including tertiary-care hospitals were 18.7% for hypertension, 18.6% for diabetes, and 31.6% for hyperlipidemia [14, 15]. These cases, however, could have successfully been managed at physicians' clinics in the community. Healthcare market competition and functional failure of the care delivery system have led to a large market share for ambulatory care covered by tertiary-care hospitals than community hospitals.

Tertiary-care hospitals, usually located in the metropolitan area, are superior to the other general hospitals in terms of medical personnel, facilities, and equipment [16]. This may potentially be due to the fact that medical expenses are concentrated in the top five tertiary-care hospitals located in Seoul, Korea [17]. The unique feature of the Korean health care system allows patients to freely choose any medical institutions regardless of patient's region or type of medical institution [18]. As a result, patients in Korea are motivated to visit the tertiary-care hospitals rather than small local clinics. The high concentration of patients visiting the top five prestigious hospitals in Seoul is a problem. Although the co-payments were raised for each hospital visit to reduce the number of patients in the top five prestigious tertiary hospitals, patients were not discouraged from visiting these hospitals [15].

Public reporting on Acute Myocardial Infarction (AMI) care in Korea

The public release of hospital quality information, referred to as public reporting, is intended to improve patients' knowledge about hospital quality and offer potential patients the possibility of making a well-informed choice of their hospital [19]. Patients are provided with comparative information, such as indicators for measuring the quality of various care providers or different healthcare facilities. It expected that patients actively participate in choosing their health care providers in order to benefit from high quality treatment opportunities.

In a preliminary public quality report on AMI care in Korea, the AMI mortality ratio showed regional variations indicating differences in the qualitative and the structure among the medical care benefit agency and in the assessment of the treatment process [20]. Therefore, the Health Insurance Review and Assessment Service (HIRA) assessed the quality of AMI treatment between 2008 to 2013 to improve the quality of AMI care by providing the results of AMI

care process to the public. Evaluation of hospital care quality for AMI were divided into five grades according to their score with smaller scores indicating better hospitals for AMI treatment. The results of the evaluation were disclosed to the public to assist with choosing of a hospital [21].

The purpose of study

The purpose of this study is to observe the effect of public reporting of AMI on people's choice of hospitals when there is no restrictions in choosing a hospital. We compared the effects between individuals with health-related and non-health-related occupations. Furthermore, we compared the factors affecting the choice of hospitals for AMI and cancer treatment to determine whether there were differences in choices of hospital for receiving medical care for acute or chronic diseases.

Methods

Recruitment

Recruitment of patients for the study was conducted using a snowball sampling. We first identified six individuals initially from the authors of this study, consisting of three health-related and three non-health-related workers in their 20s, 30s, or 40s. The six individuals along with other respondents of the survey were asked to share the survey link with local friends and relatives. Each respondent was paid a \$2 e-gift card for their participation.

Online survey

We conducted a cross-sectional study using an online questionnaire. A short background and the objective of the study were presented. This was followed by several questions to investigate the awareness and usage of public reporting, and the impact of the public reporting on the choice of hospitals. The first and second sections of the questionnaire included questions about the effect of the HIRA public reporting on the choice of hospitals for AMI and cancer treatment (i.e., hospital choice before and after acquiring information about public reporting). The third section included questions about the important factors influencing choice of hospitals for AMI care (i.e., people's favorite, proximity, well-known, or good rating, etc.) and where individuals obtained information about AMI treatment (i.e., health professionals, acquaintances, TV, internet, etc.). The final section captured demographic characteristics such as gender, age, marital status, education, residence, income, and occupation. The survey included a Likert scale, score (4 point scale), multiple choice, short-answer, and open-ended questions. The details of the survey are shown in the Additional file 1. The survey took less than 10 minutes to complete and was available from Dec 9, 2020 to Jan 3, 2021.

Data collection

We developed a website for individuals to fill out the questionnaire via a computer or mobile phone. The URL (<http://61.78.109.24/survey/m/s2/>) was distributed to individuals using a free mobile instant messaging application with free text and free call feature (KakaoTalk©) for both Android and iOS users.

Statistical analyses

We compared the demographic characteristics, general knowledge about AMI, hospital choice for AMI or cancer treatment, and factors affecting hospital choice between those participants who had health-related occupation and non-health-related occupation using χ^2 test for categorical variables, and t-test, Mann-Whitney U test for continuous variables. Respondents with family members who have health-related occupations were grouped in the health-related occupation group. This is because these respondents will have more knowledge about the disease or choice of hospital by association than respondents who do not have a family member with health-related occupations. McNemar's test was performed to investigate the change of hospital choice before and after acquiring additional information (i.e., 'usual hospitals', 'nearby hospitals', 'famous hospitals', 'hospitals with good rates') and Wilcoxon Signed Rank test was performed to compare the differences in score of hospital choice. Analyses were performed using SAS Enterprise Guide 7.12. Statistical significance for all analyses was set a priori at $\alpha < 0.05$.

Results

Study Population

Of the 740 individuals who participated in the survey, 494 (66.7%) completed the questionnaires; 241 individuals did not complete their questionnaire and five individuals had errors in their birth dates.

Table 1 shows the general characteristics of the overall respondents, as well as for those who have health-related and non-health-related occupation. The mean age of respondents was 38.7 (SD:11.8) years old and 75.3% were females. The age groups of respondents were 26.3% in the 20s, 23.5% in the 30s, 30.0% in the 40s, and 20.2% in the 50s. Participants living in the metropolitan area accounted for 73.7% of the respondents and 75.1% had a university or higher education. There were 163 (33%) respondents who were in the health-related occupation, of which 52.1% were nurses, 14.7% were hospital staffs, and 11.0% were medical doctors. There was significant difference in the mean age, age groups, and gender between those with health-related and non-health-related occupation. The age of those with health-related occupation is younger (35.8 vs. 40.2, $p < 0.001$) than non-health-related. The Female proportion of those with health-related occupation is greater than non-health-related (83.4% vs. 71.3%, $p = 0.003$). Greater proportion of those with health-related occupation lived in the metropolitan area (81.0% vs. 70.1%, $p = 0.010$) and had university or higher education (27.6% vs. 13.9%, $p < 0.001$).

Table 1. General characteristics of the respondents (N, %)

Characteristics	Total (n = 494)	Health related occupation		<i>p value</i>
		Yes (n = 163)	No (n = 331)	
	494 (100)	163 (33.0)	331 (67.0)	
Age, mean (SD), y	38.7 (11.8)	35.8 (12.3)	40.2 (11.4)	< 0.001
Age group				
20 ~ 29	130 (26.3)	64 (39.3)	66 (19.9)	< 0.001
30 ~ 39	116 (23.5)	34 (20.9)	82 (24.8)	
40 ~ 49	148 (30.0)	36 (22.1)	112 (33.8)	
50 ~	100 (20.2)	29 (17.8)	71 (21.5)	
Gender				
Male	122 (24.7)	27 (16.6)	95 (28.7)	0.003
Female	372 (75.3)	136 (83.4)	236 (71.3)	
Residency				
Metropolitan area	364 (73.7)	132 (81.0)	232 (70.1)	0.010
Other than metropolitan area	130 (26.3)	31 (19.0)	99 (29.9)	
Education level				
High School or lower	123 (24.9)	43 (26.4)	80 (24.2)	< 0.001
Undergraduate	280 (56.7)	75 (46.0)	205 (61.9)	
Graduate school or higher	91 (18.4)	45 (27.6)	46 (13.9)	

General knowledge about AMI

Table 2 shows respondents' general knowledge about AMI. There were 49.4% of respondent who selected little or not at all when asked about awareness of the symptoms, coping, and treatment methods for AMI. This differed by either having health-related or non-health-related occupation (24.6% vs 61.6%, $p < 0.001$). Majority of the respondents obtained their information about AMI through 'Mass media, such as TV' (40.6%) or 'Internet or books' (34.8%). People in non-health-related occupation were more likely to obtain their source of information about AMI through 'Mass media, such as TV' (51.1% vs. 20.2%, $p < 0.001$) and less likely through health professionals (6.6% vs. 31.3%; $p < 0.001$). The most useful information to cope with AMI was 'early symptoms and self-diagnosis' (75.1%), followed by 'preventive measures' (38.9%), 'hospital information for AMI treatment' (30.6%) and 'hospital ratings based on the public reporting of AMI care quality' (9.9%). People with non-health-related occupation found 'Early symptoms and self-diagnosis of AMI' -less useful (72.2% vs. 81.0%, $p = 0.034$) and 'Hospital ratings for AMI care quality' most useful information for coping with AMI (12.7% vs. 4.3%, $p = 0.003$).

Table 2. General knowledge about AMI (N, %)

Questions	Total (n = 494)	Health related occupation (including family member)		p value
		Yes (n = 163)	No (n = 331)	
1. Awareness of the symptoms, coping and treatment methods for AMI				
Very well	48 (9.7)	32 (19.6)	16 (4.8)	< 0.001
Some	202 (40.9)	91 (55.8)	111 (33.5)	
Little	190 (38.5)	36 (22.1)	154 (46.5)	
Not at all	54 (10.9)	4 (2.5)	50 (15.1)	
2. Information resource of AMI				
Health professionals	73 (14.8)	51 (31.3)	22 (6.6)	< 0.001
Acquaintances	41 (8.3)	11 (6.7)	30 (9.1)	
Mass media such as TV	202 (40.9)	33 (20.2)	169 (51.1)	
Internet or books	172 (34.8)	64 (39.3)	108 (32.6)	
Other	6 (1.2)	4 (2.5)	2 (0.6)	
3. Most useful information to cope with AMI (multi-selectable)				
Preventive measure of AMI	192 (38.9)	64 (39.3)	128 (38.7)	0.899
Early symptoms and self-diagnosis of AMI	371 (75.1)	132 (81.0)	239 (72.2)	0.034
Hospital information for AMI treatment	151 (30.6)	46 (28.2)	105 (31.7)	0.427
Hospital ratings for AMI care quality	49 (9.9)	7 (4.3)	42 (12.7)	0.003
Other	5 (1.0)	1 (0.6)	4 (1.2)	0.534

Public Reporting and Hospital Choice

Table 3 shows the hospital choice before and after acquiring information on public reporting and clinical information of AMI. There were 37.4% of respondents who selected 'little' and 23.7% who selected 'not at all' when asked about their awareness of the HIRA public reporting, and this differed by having a health-related or non-health-related occupation (little: 34.4% vs. 39.0%; Not at all: 13.5% vs. 28.7%, $p < 0.001$). Before providing information about public reporting and clinical information about AMI, 62.8% of respondents selected 'nearby hospitals (close)' as the best option for AMI patients, followed by 'famous hospitals recommended by acquaintances (famous)' (14.4%), 'usual hospitals (favorite)' (10.5%), and 'hospitals that received good rating for AMI treatment by the HIRA (good rate)' (9.9%), no difference found between hospital choice and health-related or non-health-related occupation. There were no difference found between the score of hospital choice and health-related or non-health-related occupation group.

After providing a detailed information about the hospital ratings regarding the AMI care by the HIRA in the public reporting, majority of respondents answered they would consider this information for their future hospital choice to some extent (42.1%) or considerably (49.8%). This did not differ by the whether they had a health occupation or not ($p = 0.497$). After acquiring information about the public reporting of the HIRA, 11.5% of non-health occupation and 8% of health occupation group changed their original responses to 'hospitals that received good rates from the HIRA (good rate)', but the difference between health-related occupation and non-health-related occupation group was not statistically significant ($p = 0.160$) (Table 3).

Table 3. Hospital choice for AMI treatment (N, %)

Questions	Total (n = 494)	Health related occupation (including family member)		
		Yes (n = 163)	No (n = 331)	p value
4. Awareness of Public reporting of the HIRA				
Very well	35 (7.1)	16 (9.8)	19 (5.7)	< 0.001
Some	157 (31.8)	69 (42.3)	88 (26.6)	
Little	185 (37.4)	56 (34.4)	129 (39.0)	
Not at all	117 (23.7)	22 (13.5)	95 (28.7)	
5. Which of the following hospital will you visit if you or your family have AMI?				
Usual hospitals (Favorite)	52 (10.5)	16 (9.8)	36 (10.9)	0.238
Nearby hospitals (Close)	310 (62.8)	102 (62.6)	208 (62.8)	
Famous hospitals recommended by acquaintances (Famous)	71 (14.4)	29 (17.8)	42 (12.7)	
Hospitals that received good rating for AMI treatment by the HIRA (Good rate)	49 (9.9)	15 (9.2)	34 (10.3)	
No idea	12 (2.4)	1 (0.6)	11 (3.3)	
5 - 1. How will you rate your hospital choice for the following hospitals? (mean, SD)				
Favorite	2.10 (1.13)	2.13 (1.14)	2.08 (1.12)	0.721
Close	2.77 (1.04)	2.80 (1.08)	2.75 (1.03)	0.586
Famous	2.51 (0.97)	2.50 (1.01)	2.51 (0.95)	0.903
Good rate	2.63 (1.20)	2.58 (1.13)	2.65 (1.24)	0.459
Public reporting on AMI care*: Since AMI requires immediate treatment, hospital care quality of AMI treatment is evaluated whether the treatment (oral medication, stents, etc.) was done in a reasonable time. The results of the public reporting are classified into five grades according to the score. Smaller numbers indicate better hospitals for the AMI treatment.				
6. To what extent would you consider hospital rating for your future hospital choice for AMI treatment?				
Considerably	246 (49.8)	75 (46.0)	171 (51.7)	0.497
Some	208 (42.1)	74 (45.4)	134 (40.5)	
Not at all	40 (8.1)	14 (8.6)	26 (7.9)	
Clinical Information about AMI**: AMI is a life-threatening condition that occurs when blood flow decreases or stops to a part of the heart, causing damage to the heart muscle. The most common symptom is chest pain or discomfort which may travel into the shoulder, arm, back, neck, or jaw. AMI is high-mortality disease and requires immediate treatment.				
7. Which of the following hospital will you visit if you or your family have AMI?				
Favorite	32 (6.5)	10 (6.1)	22 (6.6)	0.160
Close	287 (58.1)	101 (62.0)	186 (56.2)	
Famous	66 (13.4)	24 (14.7)	42 (12.7)	
Good rate	100 (20.2)	28 (17.2)	72 (21.8)	
No idea	9 (1.8)	0 (0.0)	9 (2.7)	
7 - 1. How will you rate your hospital choice for the following hospitals? (mean, SD)				
Favorite	1.94 (1.06)	1.93 (1.03)	1.94 (1.08)	1.000
Close	2.88 (1.03)	2.95 (1.06)	2.84 (1.01)	0.223
Famous	2.43 (0.96)	2.47 (0.98)	2.40 (0.95)	0.430
Good rate	2.76 (1.16)	2.65 (1.14)	2.82 (1.17)	0.118
* This information was presented to respondents before question No. 6., ** This information was presented to respondents before question No.7.				

Table 4 shows that hospital choice significantly changed before and after obtaining public reporting information ($p < 0.001$). Respondents who did not change their pre_response to 'good rate' were 7.6% for non-health occupation group and 7.4% for health-related occupation group. Among the non-health occupation group who changed their pre_response to 'good rate', 9.1% of their pre_response of hospital choice was 'close', the health occupation group is 4.9%. Compared to the health-related occupation group ($p = 0.095$), there was difference in pre_response of hospital choice among respondents whose post response was changed by non-health-related occupation group ($p < 0.001$).

Among the factors of hospital choice that differ before and after obtaining public reporting information, 'close' and 'good rate' increased, while 'favorite' and 'famous' decreased. (Close p = 0.002, Good rate p = 0.001, Favorite p < 0.001, Famous p = 0.011). Compared to the health-related occupation group, 'good rate' in the non-health-related occupation group significantly increased, and the 'famous' decreased significantly (Good rate p = 0.002, Famous p = 0.003) (Table 5).

Table 4. Change of hospital choice by pre response of hospital choice (N, %)

Pre response*	Post response**														
	Total						Health related occupation (including family member)								
	Favorite	Close	Famous	Good rate	No idea	p value	Yes			No					
Favorite							Close	Famous	Good rate	p value	Favorite	Close	Famous		
Favorite	22 (4.5)	14 (2.8)	7 (1.4)	9 (1.8)	0 (0.0)	<0.001	6 (3.7)	4 (2.5)	3 (1.9)	3 (1.9)	0.095	16 (4.8)	10 (3.0)	4 (1.2)	
Close	7 (1.4)	241 (48.8)	22 (4.5)	38 (7.7)	2 (0.4)		2 (1.2)	85 (52.5)	7 (4.3)	8 (4.9)		5 (1.5)	156 (47.1)	15 (4.5)	
Famous	2 (0.4)	23 (4.7)	33 (6.7)	13 (2.6)	0 (0.0)		1 (0.6)	10 (6.2)	14 (8.6)	4 (2.5)		1 (0.3)	13 (3.9)	19 (5.7)	
Good rate	1 (0.2)	9 (1.8)	1 (0.2)	37 (7.5)	1 (0.2)		1 (0.6)	2 (1.2)	0 (0.0)	12 (7.4)		0 (0.0)	7 (2.1)	1 (0.3)	
No idea	0 (0.0)	0 (0.0)	3 (0.6)	3 (0.6)	6 (1.2)							0 (0.0)	0 (0.0)	3 (0.9)	

* Responses before acquiring information, ** Responses after acquiring information, Excluded 'No idea' of post response of health-related occupation

Table 5. The pre and post score of hospital choice by the health occupation group (mean, SD)

Score of hospital choice	Total			Health related occupation (including family member)					
	Pre *	Post **	p value	Yes			No		
				Pre	Post	p value	Pre	Post	p value
Favorite	2.10 (1.13)	1.94 (1.06)	< 0.001	2.13 (1.14)	1.93 (1.03)	0.002	2.08 (1.12)	1.94 (1.08)	< 0.001
Close	2.77 (1.04)	2.88 (1.03)	0.002	2.80 (1.08)	2.95 (1.06)	0.015	2.75 (1.03)	2.84 (1.01)	0.043
Famous	2.51 (0.97)	2.43 (0.96)	0.011	2.50 (1.01)	2.47 (0.98)	0.632	2.51 (0.95)	2.40 (0.95)	0.003
Good rate	2.63 (1.20)	2.76 (1.16)	0.001	2.58 (1.13)	2.65 (1.14)	0.217	2.65 (1.24)	2.82 (1.17)	0.002

* Responses before acquiring information, ** Responses after acquiring information

Differences in hospital choice criteria between AMI and Cancer

Table 6 shows hospital choice for cancer treatment. There were 28.9% of respondents who selected 'Hospitals recommended by acquaintances (famous)' as the best option for cancer treatment, followed by 'Hospitals that received good rates for cancer treatment by the HIRA (good rate)' (27.7%), 'No idea' (22.7%). The non-health occupation were 'Hospitals that received good rates for cancer treatment by the HIRA (good rate)' as the best option for cancer treatment, followed by 'Hospitals recommended by acquaintances (famous)', 'No idea'. The health occupation was 'Hospitals recommended by acquaintances (famous)' as the best option for cancer treatment, followed by 'No idea', 'Hospitals that received good rates for cancer treatment by the HIRA (good rate)'. The difference between health-related occupation and non-health-related occupation group was statistically significant (p = 0.016). After acquiring the information of public reporting on cancer treatment by the HIRA, 58.5% of respondents answered 'considerably' and 35.8% responded 'some' when asked to what extent they would consider the information of public reporting for their future hospital choice for cancer treatment.

Table 6. Hospital choice for cancer treatment N (%)

Questions	Health related occupation (including family member)			
	Total	Yes	No	p value
8. Which of the following hospitals will you visit if you or your family have cancer?				
Favorite	19 (3.8)	8 (4.9)	11 (3.3)	0.016
Close	83 (16.8)	21 (12.9)	62 (18.7)	
Famous	143 (28.9)	53 (32.5)	90 (27.2)	
Good rate	137 (27.7)	34 (20.9)	103 (31.1)	
No idea	112 (22.7)	47 (28.8)	65 (19.6)	
9. To what extent would you consider hospital rating for your future hospital choice for cancer treatment?				
Considerably	289 (58.5)	87 (53.4)	202 (61.0)	0.141
Some	177 (35.8)	63 (38.7)	114 (34.4)	
Not at all	28 (5.7)	13 (8.0)	15 (4.5)	

The most important factor influencing the choice of hospital for both AMI and cancer treatment was good rates reported by the HIRA (AMI: 57.3%; Cancer: 69.8%). While the distance to the hospital with traffic (AMI:17.2%; Cancer: 3.2%) is the next important factor, the size and facilities of the hospital was also important when choosing a hospital. While no difference in occupational group for choosing hospital for AMI treatment, there was significant difference in the occupational group for the selection of hospital for cancer treatment ($p = 0.045$) (Table 7).

Table 7. Factors affecting consumer's hospital choice for AMI vs. cancer (N, %)

Factors affecting hospital choice	Health related occupation (including family member)			
	Total	Yes	No	p value
AMI				
Reasonable price	17 (3.4)	3 (1.8)	14 (4.2)	0.162
Hospitals received good rates for AMI or AMI treatment from the HIRA	283 (57.3)	91 (55.8)	192 (58.0)	
Recommendation of acquaintances	26 (5.3)	6 (3.7)	20 (6.0)	
Close distance and convenient transportation	85 (17.2)	29 (17.8)	56 (16.9)	
Patients' satisfaction with hospital services	21 (4.3)	7 (4.3)	14 (4.2)	
The size of hospitals and high-tech facilities	60 (12.1)	25 (15.3)	35 (10.6)	
Other	2 (0.4)	2 (1.2)	0 (0.0)	
Cancer				
Reasonable price	19 (3.8)	5 (3.1)	14 (4.2)	0.045
Hospitals received good rates for cancer or cancer treatment from the HIRA	345 (69.8)	114 (69.9)	231 (69.8)	
Recommendation of acquaintances	35 (7.1)	12 (7.4)	23 (6.9)	
Close distance and convenient transportation	16 (3.2)	2 (1.2)	14 (4.2)	
Patients' satisfaction with hospital services	19 (3.8)	2 (1.2)	17 (5.1)	
The size of hospitals and high-tech facilities	58 (11.7)	27 (16.6)	31 (9.4)	
Other	2 (0.4)	1 (0.6)	1 (0.3)	

Discussion

The results of the study highlighted that public reporting may mislead the choice of hospital for patients with AMI to select a hospital with a good rating than the nearest hospital. Before providing clinical information and public reporting of AMI to the respondents, most respondents answered that they would go to the nearest hospital after the onset of AMI symptoms. Despite the fact that most respondents had little knowledge about AMI, majority of the respondents chose the nearest hospital as their choice. This is crucial, as appropriate timing of treatment for AMI is essential to have better outcomes. However, after providing the information about the HIRA's public reporting and clinical information of AMI, the number of respondents who chose hospitals with good rating significantly increased. Although HIRA publicly discloses both the hospital ratings and information on the available hospitals for AMI care [22], we found these information did not affect the respondent's choice of hospital because they were not aware of it. This is consistent with previous studies [4, 23, 24].

Unlike chronic diseases such as cancer, it is of importance to visit the nearest hospital where the appropriate treatment is available as soon as the onset of AMI symptom occurs, since early treatment is critical for the prognosis of AMI [26]. According to the report, the time taken to arrive at tertiary hospitals after the onset of AMI is an average of 30 minutes later than the time taken to arrive at general hospitals in Korea [21].

Prehospital delays for AMI treatment increase the risk of mortality. Patients with AMI, who tend to choose hospitals based on the hospital ratings, are often at risk of missing the 'golden time' for proper treatment while looking for hospitals with a good rating. In addition, outside the metropolitan area in Korea, 80% of patients with AMI die because of missing the 'golden time' for treatment while being transferred to the emergency room after the onset of AMI symptoms [27].

The fact that hospital ratings are considered more when selecting hospitals for cancer treatment than AMI treatment indicates that there are differences in the factors to consider when choosing a hospital for acute (AMI) and chronic disease (cancer). In ranking the hospitals, it is necessary to interpret the data appropriately, but the public reporting offer no guidance as to the relative benefit of specific measures. For example, for choosing hospital for medical care for patient with pneumonia, the guidance in different factors including appropriate timing for antibiotics (i.e., within four hours) or what the correct antibiotics should be given, is more important [28]. Although there are few studies evaluating the effect of severity of illness or insurance type on hospital choice [29, 30], the evidence for hospital choice according to disease type remains limited.

Despite a small proportion of respondents (9.9%) who considered hospital ratings as the most useful information for AMI treatment, more than half (57.3%) of respondents selected 'Good rates' as the most important factor for their future hospital choice for AMI treatment. This can be interpreted in the respondents' belief that the hospital with a good rating for AMI care quality is the best hospital with great doctors' expertise.

Another interesting finding is the association between education level and the choice of hospital. In our study, additional information about the clinical characteristics of the disease or hospital rating had no effect on the respondents' choice of hospital by education level (Supplementary Table 1). In Tayyari's study [31], however, there was a significant relationship between education level and the choice of highly specialized hospital. Thus, additional study is needed to investigate various factors that may influence the choice of hospitals.

The strength of this study is that we used mobile devices and social media platforms to collect the data for our survey. This way of collecting data is cost-effective, enables access to large and diverse individuals quickly, and takes less time than traditional methods to obtain data for analysis. In addition, this research is easily replicable using the standardization of data collection process.

Limitations

The limitation of this study is that the results are not generalizable to the entire Korean population as the snowball sampling method was used to select the study population. Most respondents were young ages less than 40s as the mobile and social media platform is more popular in this age group [32, 33], and were concentrated in the metropolitan area.

When providing clinical information and public reporting of AMI in the survey to observe change in hospital choice for AMI treatment before and after information acquisition, we did not indicate that when someone has onset of AMI symptom, he or she should go to the nearest hospital as soon as possible because this might lead respondents to choose the 'close hospitals' for the question of hospital choice. In addition, the definition of 'good rate' was not specifically presented in the survey questions, but we assumed that the respondents considered the first and second grades out of five as good.

Conclusions

Our study showed that publicly available hospital quality ratings influence people's choice of hospital, increasing the risk of selecting a hospital with a good rating than the nearest hospital, which is recommended for AMI patients. Policy-makers need to stress the importance of choosing the nearest hospital when AMI symptoms occur, in addition to hospital ratings, in the public reporting.

Abbreviations

GPs: General Physicians; OECD: Organization for Economic Co-operation and Development; AMI: Acute myocardial infarction; HIRA: Health Insurance Review and Assessment Service; Favorite: Usual hospitals; Close: Nearby hospitals; Famous: Famous hospitals recommended by acquaintances; Good rate: Hospitals that received Good Rates from the HIRA;

Declarations

Ethics approval and consent to participate

Ethics approval for this study was obtained from the Institutional Review Board Catholic University of Korea (MC18ZESI0044). Consent to participate is not applicable. Completion of the survey was voluntary. Before completing the survey, participants were given a brief introduction to the purpose and aims of the survey. If they were willing to proceed, they could start survey. We have not collected or recorded personally identifiable information pursuant to the Personal Information Protection Act.

Consent for publication

Not applicable.

Availability of data and material

The data that support the findings of this study are available from [the Department of Preventive Medicine, College of Medicine, The Catholic University of Korea] but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of [the Department of Preventive Medicine, College of Medicine, The Catholic University of Korea].

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

KC conceptualized the study and wrote the initial draft of the paper with MK and SK. KC, MK, CYJ and SK participated in the study design and conception of this work. KC and CYJ carried out data analysis. MK, HQ, and SL critically reviewed and edited the manuscript. All authors have read and approved the final manuscript.

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