

## ORIGINAL ARTICLE

# TURKISH HEALTHCARE PROVIDERS' LEVEL OF KNOWLEDGE, ATTITUDE AND PRACTICE TOWARD DIAGNOSIS RELATED GROUP SYSTEM - A CROSS SECTIONAL STUDY

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## ABSTRACT

*Diagnosis-related group (DRG) system is patient classification system designed to produce limited number of classes which are relatively similar in terms of resource consumption and clinical characteristics. The aim of this study was to assess the level of knowledge, attitude and practice (KAP) of Turkish health care providers toward DRG system implemented in Turkey. A total of 238 healthcare providers were randomly selected from two urban and one rural hospital in Turkey. A questionnaire was used for data collection; contacting 32 items (10 items about knowledge, 12 items about attitude and 10 items about the practice) and its validity and reliability were confirmed. Data analysis was performed using chi-square and multivariate logistic regression. In this study, only one third of healthcare providers showed good knowledge (35.7%) and good practice (37.4%) about DRG system, compared to 54.2% of them showed good attitude. There was significant difference between age, gender, occupation groups and whether the respondents have attended a workshop for DRG system in terms of KAP ( $p < 0.05$ ). These results indicated the need for further actions to implement DRG system in terms of creation of suitable environment and increasing awareness among healthcare providers, especially male, medical doctors, nurses, elderly, and those who have never attended a workshop, in addition to regular review to ensure the program would reach its targets.*

**Keywords:** Attitude, Diagnosis Related Groups, Knowledge, Practice, Turkey

## INTRODUCTION

Diagnosis-related group (DRG) system is patient classification system (PCS) designed to produce limited number of classes which are relatively similar in term of resource consumption and clinical characteristics. DRG has been ongoing since early formal development occurred in the late 1960's at Oxford University by Professor Martin Feldstein<sup>1</sup>. Currently the system experimented and used in many developed countries, countries in transitional economies as well as developing countries<sup>2</sup>. Despite different countries used different DRG models and methodologies<sup>3,4</sup>, they shared common objectives in shifting to DRGs based payment mechanism to enhance the transparency, increase the efficiency and to improve the quality of care<sup>5,6</sup>. However, the potential unintended consequences of DRG - based hospital payment systems led to more research to understand the international success and to avoid the controversy and criticism that may accompany the transformation process<sup>6</sup>.

Turkey has launched the Health Transformation Program (HTP) since 2003, first to address the highly complex and fragmented provision and

financing systems as well as inequalities in access to healthcare and second to meet the high expectation of Turkish people from healthcare providers<sup>7</sup>. During the last decade, several measures have been done<sup>8</sup>. The implementation of Universal Health Insurance (UHI) in 2008 was the most prominent sign which extended the health insurance coverage to more than 90% of entire population in 2011<sup>9</sup>. The Social Security Institution's (SSI) is the single UHI manager and public healthcare purchaser<sup>10</sup>. Moving from the cost-based reimbursement (fee-for-service payment) mechanism and the global budget model to DRG/Case-mix based system for the reimbursement of inpatient care was among the SSI's priorities in response to a more efficient and equitable health care system<sup>11,12</sup>.

In fact, DRG system was started in Turkey as a joint work of Ministry of Health, Ministry of Finance, Ministry of Labour and SSI with a research project executed by Hacettepe University (2005-2009)<sup>13</sup>. A pilot project on paying hospitals, based on DRGs, has been ongoing since 2006. Under this project, a branch called Diagnosis Related Groups Branch (TİG) was founded within the Ministry of

Health. The Australian DRG system has been adapted to Turkey and ICD-10 AM (International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification) has been translated to Turkish language. Software infrastructure was developed in order to transform the medical data into clinical codes and then to save them<sup>13</sup>.

Each hospital has its own unit and the connection with the servers of the Ministry of Health would be via internet. Required trainings were also provided to train the clinical coders. In addition to public hospitals, Ministry of Health provided technical support works for university hospitals and private hospitals to be covered as well<sup>12,13</sup>. Standardized clinical and hospital cost data have been collected and analyzed from almost 50 hospitals and base costs and relative weights have been developed. After the finalization of the project the SSI will purchase inpatient services from all providers (both public and private) based on DRG groups<sup>12</sup>. Thus, the important topic in the reform agenda is the completion of DRG studies and regulating the payments system depending on DRGs. Consequently, our study is very important and timely to assess the KAP levels of Turkish health care providers who will implement the DRG system.

## METHODS

### *Study design*

A cross-sectional study conducted in Turkey from 1<sup>st</sup> September to 30<sup>th</sup> November 2012<sup>14</sup>. The sample was calculated assuming that the knowledge is 50% among health care providers in Turkey using the formula:

$N = [Za^2 \times P \times Q / (M.E.)^2]$ . So,  $n = (1.96)^2 \times (0.50) \times (0.50) / (0.05)^2 = 384$ . Non-response correction = 5%. Thus, the total sample size with provision for drop-outs from the study =  $384 + 5\% \text{ of } 403(19.0) = 403$ . The total number of health care providers (medical doctors, nurses, coders and auxiliary staff) who answered the self-administered questionnaire was 238, making the response rate of the study 59%.

The study target population was selected randomly from two urban hospitals having great experience in research and training and one state hospital providing wide range of health services for rural population. Since 2011, these public hospitals have begun to implement the DRG system as classification and information tool but not for reimbursement of inpatient care. Each hospital has its own specific unit responsible for coding and further DRGs joining of cases using the 10<sup>th</sup> revision (ICD-10) for diagnosis code and 9<sup>th</sup> revision Clinical Modification (ICD-9 CM) for hospital procedure codes. Trained interviewers and data

collectors helped in providing a brief explanation of the study's objectives to all respondents. Confidentiality was assured and written consent was obtained from all respondents.

### *Measurement Instrument*

An expert team from the International Center for Case-mix and Clinical Coding (ITCC) in the Medical Center of the National University of Malaysia (UKMMC) developed the study questionnaire. The validity and reliability of the questionnaire in Turkish language has been proven to be satisfactory<sup>14</sup>. The questionnaire consists of 32 questions, ten questions related to each of knowledge and practice, while the remaining 12 questions are related to attitude. Responses were given on a five point Likert type scale ranging from (1) "strongly agree" to (5) "strongly disagree." Negatively worded questions were reverse scored (so that 1 = 5, 2 = 4, etc.). For the purposes of cross-tabulation and logistic regression analysis, and to assess the healthcare providers' KAP toward DRG system a summary score was constructed from each item given the categories (0) for the original categories (1, 2, and 3); and (1) for the original categories (4 and 5). Then we dichotomize the number of respondents into two contextual groups: high and low (good and poor KAP) on overall scale.

Decision was made to dichotomize the summary score based on a median split (cut-off point of more than 24 to be consider high knowledge and more than 31 for high attitude and more than 23 to be consider high practice) into (0) for low or poor KAP toward DRG system and (1) for high or good KAP toward DRG system as two dependent variables. The independent variables were the demographic information such as age, gender and occupation in addition to one question about whether the respondents have attended a workshop or training program for DRG system or not.

### *Ethical approval*

Our study protocol was approved by the Ministry of Health, Turkey, code number (B.10.0 SHG.0.20.00.00.-01099/19920), in 16/8/2012, and by respective authorities of the selected hospitals where data collection took place.

### *Data analysis*

Data was analyzed using the SPSS for Windows Statistical Package Version 16.0 (SPSS Inc, Chicago, IL, USA)<sup>15</sup>. For the descriptive analysis, frequency distributions were generated for all categorical variables. Means with standard deviations were determined for quantitative variables. Cross-tabulation (Chi-square test) was conducted to demonstrate any significant difference between dichotomized characteristics of respondents and healthcare providers' KAP (good or poor) toward

DRG system. Multiple logistic regressions were used to control for any potential confounders for good knowledge, attitude and practice about DRG system. Statistical significance was set at  $p < 0.05$ .

**RESULTS**

The average age of respondents was 38.63 years (SD 10.52) of which 124 (52.1%) were males and

114 (47.9%) were females. Nearly two-fifth were medical doctors (39.9%), one third (33.2%) were nurses, one sixth (16.4%) of them were auxiliary staff and the remaining 10.5% were coders. It was observed that only one third (33.6%) of respondents have attended a workshop or training program in Case-mix or DRG system (Table 1).

**Table 1 Frequency distribution of respondents' characteristics (n=238)**

No.	Respondents' Characteristics	Frequency	%	
1.	Age group	21-30 Years Old	60	25.2
		31-40 Years Old	80	33.6
		41-50 Years Old	56	23.5
		51 Years Old and above	42	17.6
2.	Gender	Male	124	52.1
		Female	114	47.9
3.	Occupation	Medical doctor	95	39.9
		Nurse	79	33.2
		Auxiliary staff	39	16.4
		Coders	25	10.5
4.	Training program	Attended	80	33.6
		Not attended	158	66.4

Table 2 shows that only 35.7 % of the respondents have good knowledge and 37.4% have good practice compared to 64.3 % who have poor knowledge and 62.6 % who have poor practice

respectively. However, 54.2 % of the respondents have good attitude towards DRG system compared to the remaining poor attitude respondents.

**Table 2 Frequency distribution of respondents by good and poor KAP (n=238)**

Scales	Good KAP		Poor KAP	
	Mean $\pm$ SD	Median	Freq.	%
Knowledge (10 items)	25.93 (12.22)	24	85	(35.7)
Attitude (12 items)	28.80 (13.66)	31	129	(54.2)
Practice (10 items)	24.63 (12.37)	23	89	(37.4)

A logistic regression was performed to ascertain the effects of age, gender, occupation and attendance a workshop or training program for DRG system on the likelihood that participants have good knowledge. The logistic regression model was statistically significant,  $X^2 (6) = 76.062$ ,  $p = < 0.001$ . The model explained 37.6% (Nagelkerke  $R^2$ ) of the variance in good knowledge and correctly classified 77.7% of cases. Females ( $p = 0.002$ , 95%CI 1.489 - 5.411) were 2.838 times more likely to exhibit good knowledge than males. Younger age group of less than 39 years old ( $p = < 0.001$ , 95%CI 2.350 - 9.529) was 4.732 times more likely to exhibit good knowledge than those of 39 years old and more. Participants who have attended a workshop or training program for DRG system ( $p = 0.002$ , 95%CI 1.519 - 6.027) were 3.026

times more likely to exhibit good knowledge than those who had no attendance of a workshop or training program for DRG system. Being coders ( $p = 0.027$ , 95%CI 1.155 - 10.457) were 3,476 times more likely to exhibit good knowledge than doctors, nurses and the auxiliary staff, Table 3.

Regarding the healthcare providers' attitude towards DRG system, a logistic regression was performed to ascertain the effects of age, gender, occupation and attendance a workshop or training program for DRG system on the likelihood that participants have good attitude. The logistic regression model was statistically significant,  $X^2 (6) = 41.070$ ,  $p = < 0.001$ . The model explained 21.2% (Nagelkerke  $R^2$ ) of the variance in good attitude and correctly classified 66.0% of cases.

**Table 3 Factors influencing good knowledge toward DRG system (n=238)**

Factors	B	S.E	Wald	P-value	Exp (B)	95% C.I.
<b>Age</b>						
≥ 39						
< 39	1.554	0.357	18.939	< 0.001	4.732	2.350 - 9.529
<b>Gender</b>						
Male						
Female	1.043	0.329	10.040	0.002	2.838	1.489 - 5.411
<b>Training</b>						
Not attended						
Attended	1.107	0.352	9.918	0.002	3.026	1.519 - 6.027
<b>Occupation</b>						
Medical doctor			11.861	0.008		
Nurses	-0.712	0.398	3.204	0.073	0.491	0.225 - 1.070
Auxiliaries	0.253	0.461	0.300	0.584	1.288	0.521 - 3.182
Coders	1.246	0.562	4.915	0.027	3.476	1.155 - 10.457
<b>Constant</b>	-2.431	.385	39.893	0.001	0.088	

*P value* < 0.05, *POR: Adjusted prevalence odds ratio.*

Females (p= 0.012, 95%CI 1.169 - 3.637) were 2.062 times more likely to exhibit good attitude than males. Younger age group of less than 39 years old (p= 0.013, 95%CI 1.174 - 3.773) was 2.104 times more likely to exhibit good attitude than those of 39 years old and more. Participants who have attended a workshop or training program for

DRG system(p= 0.014, 95%CI 1.185 - 4.379) were 2.278 times more likely to exhibit good attitude than those who had no attendance of a workshop or training program for DRG system. Being coders (p= 0.007, 95%CI 1.553 - 16.887) were 5.121 times more likely to exhibit good attitude than doctors, nurses and the auxiliary staff, Table 4.

**Table 4 Factors influencing good attitude toward DRG system (n=238)**

Factors	B	S.E	Wald	P-value	Exp (B)	95% C.I.
<b>Age</b>						
≥ 39						
< 39	0.744	0.298	6.235	0.013	2.104	1.174 - 3.773
<b>Gender</b>						
Male						
Female	0.724	0.290	6.248	0.012	2.062	1.169 - 3.637
<b>Training</b>						
Not attended						
Attended	0.823	0.334	6.092	0.014	2.278	1.185 - 4.379
<b>Occupation</b>						
Medical doctor			7.847	0.049		
Nurses	0.164	0.330	0.246	0.620	1.178	0.617 - 2.248
Auxiliaries	0.478	0.418	1.308	0.253	1.613	0.711 - 3.658
Coders	1.633	0.609	7.197	0.007	5.121	1.553 - 16.887
<b>Constant</b>	-1.083	0.295	13.435	0.001	0.339	

*P value* < 0.05, *POR: Adjusted prevalence odds ratio.*

As for healthcare providers' practice towards DRG system, a logistic regression was performed to ascertain the effects of age, gender, occupation and attendance a workshop or training program for DRG system on the likelihood that participants have good practice. The logistic regression model was statistically significant,  $X^2(6) = 79.477$ ,  $p <$

0.001. The model explained 38.7% (Nagelkerke  $R^2$ ) of the variance in good practice and correctly classified 74.4% of cases. Females (p= < 0.001, 95%CI 1.878 - 6.827) were 3.580 times more likely to exhibit good practice than males. Younger age group of less than 39 years old (p= < 0.001, 95%CI 1.726 - 6.638) was 3.385 times more

likely to exhibit good attitude than those of 39 years old and more. Participants who have attended a workshop or training program for DRG system ( $p = < 0.001$ , 95%CI 1.876 - 7.538) were 3.760 times more likely to exhibit good practice than those who had no attendance of a workshop or training program for DRG system. The coders

( $p = 0.003$ , 95%CI 1.811 -17.179) were 5.578 times more likely to exhibit good practice than doctors, nurses and the auxiliary staff, while the auxiliary staffs ( $p = 0.006$ , 95%CI 1.427 - 8.860) were 3.556 times more likely to exhibit good practice than doctors and nurses, Table 5.

**Table 5 Factors influencing good practice toward DRG system (n=238)**

Factors	B	S.E	Wald	P-value	Exp (B)	95% C.I.
<b>Age</b>						
≥ 39						
< 39	1.219	0.344	12.586	< 0.001	3.385	1.726 - 6.638
<b>Gender</b>						
Male						
Female	1.275	0.329	15.000	< 0.001	3.580	1.878 - 6.827
<b>Training</b>						
Not attended						
Attended	1.325	0.355	13.936	< 0.001	3.760	1.876 - 7.538
<b>Occupation</b>						
Medical doctor			14.379	0.002		
Nurses	0.261	0.390	.447	0.504	1.298	0.604 - 2.789
Auxiliaries	1.269	0.466	7.418	0.006	3.556	1.427 - 8.860
Coders	1.719	0.574	8.969	0.003	5.578	1.811 -17.179
<b>Constant</b>	-2.874	0.412	48.675	0.001	0.056	

*P value < 0.05, POR: Adjusted prevalence odds ratio.*

Upon controlling for confounders, respondents aged less than 39 years old, females, coders, auxiliary staff and those who have attended a workshop or training program for DRG system were significantly associated with good knowledge, attitude and practice toward DRG system.

**DISCUSSION**

One of the most important topics in recent Turkish health reform agenda is the completion of DRG studies and regulating the payment systems depending on DRGs. This was very important and timely pilot study in the sense that the results of the study give health policy-makers and planners a better understanding of the levels of knowledge, attitude and practice of Turkish health care providers toward DRG system, their needs, and further actions to enhance the system. The application of DRG system needs an extensive health and treatment output classification system and the system needs to be updated systematically corresponding to any changes in medical practices. Therefore, this complicated DRG system can only be implemented with an efficient, organized automated system and well informed health care staff<sup>16</sup>.

Analysis of the questionnaire employed in this study reveal that the level of knowledge about the DRG system was poor among the study group; only one third of the healthcare staff had correct information about the system. Multiple logistic regression and chi-square test results describe that the knowledge levels of female respondents, young personnel (less than 39 years old), coders, auxiliary staff and those who have attended a workshop or training program for DRG system were significantly higher than their counterparts. The results emphasize the need for education about the DRG system, especially for males, physicians and nurses in the older age groups. The results found in this study are similar to works undertaken previously in this area. Based on a study in Pahang, Malaysia, a generally low level of understanding of DRG (Casemix) by clinicians and care providers is revealed<sup>17</sup>.

In a survey by Bridges et al. to develop a better DRG knowledge in New South Wales, knowledge was found to be better amongst hospital managers and coders than doctors and nurses<sup>18</sup>. The results of a survey of nursing managers in seven hospitals in Sydney indicated that “many nurse managers did not demonstrate a comprehensive knowledge of the casemix system and DRGs in particular”<sup>19</sup>. In another study, knowledge of DRG system in



Tehran, Iran was found to be poor among medical doctors and high-level staff surveyed<sup>20</sup>.

Lack of knowledge and misunderstanding of the DRG system among healthcare staff and coders in hospitals would lead the system to failure. Based on the findings of a survey on hospital staff knowledge in Australia, Gleeson established that this limited knowledge may also bring about negative attitudes to the current system<sup>21</sup>. Only around 54.2% of our sample had positive attitudes toward the DRG system. Further, younger respondents (aged less than 39 years old), females, coders, auxiliary staff and those who have attended a workshop or training program for DRG system were more likely to have positive attitudes than older age group (aged 39 years old and more), males, medical doctors, nurses and those who have not attended a workshop or training program for DRG system, respectively. This misinterpretation of the system would result in poor practices of the system and a resistance to change. Results of a survey among Dutch mental health care professionals indicated that perceived absence of benefits of DRG results in health care professionals being quiet resistant towards the DRG system<sup>22</sup>. Hence, an education attempt may include all uses of the DRG system, which not only contains cost control, but also advances in utilization, quality, or efficiency. It is confirmed by Ghaffari et al. (2008) that even a short educational workshop did affect the level of knowledge and attitudes of medical care staff toward the funding system in Iran<sup>20</sup>.

Good practice of the DRG system in Turkey requires a high level of knowledge, positive attitudes, and strong cooperation by all healthcare staff. In our study, only 37.4% of the medical care respondents had good practice toward the DRG system. Similar to knowledge results, being female, coders, auxiliary staff, having an age of less than 39 and have attended a workshop or training program for DRG system were significantly associated with good practice scores. Medical doctors may do worse than coders in practice and in survey scores, since they are not trained as coding professionals and many of them assert that concentrating on coding take them away from actual patient care. Moreover, as stated by Baker, nurses or medical doctors may not support the DRG system and may have poor practices if they have the incorrect opinion in that the system would create negative effects on their patient care<sup>23</sup>. However, Blay and Donoghue, (2003) indicated that most of the surveyed "nurse manager were keen to improve their knowledge of casemix and data analysis with the majority demonstrating an interest in attending workshops"<sup>19</sup>. The data was collected from only three hospitals in Turkey, thus, the study findings may not be easily

generalized. Further follow up of the level of knowledge of, attitude toward and practice on DRG system among Turkish healthcare providers including the public and private hospitals is recommended.

## CONCLUSION

Consequently, this study confirms that knowledge, attitude, and practice toward the DRG system in Turkey were poor among healthcare staff surveyed. Gender, age, occupation and whether the respondents have attended a workshop or training program for DRG system were associated; i.e. young, female, coders, auxiliary staff and those who have attended a workshop or training program for DRG system were more likely to have good scores. These results indicate the need for further actions to create a suitable environment and to create awareness of the DRG system among all medical care providers to ensure the program would reach its targets. The need for follow-up education joined with a committed expert on casemix to motivate staff, supply up-to-date information about casemix and generally maintain the interest and enthusiasm of staff in using casemix information is recommended.

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