

BMJ Open Effects of Iranian healthcare transformation plan on discharge against medical advice rate and related factors in 2012 and 2016

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ABSTRACT

Objective Discharge against medical advice (DAMA) is a critical problem in hospitals and has several consequences for healthcare systems. The aim of this study was to determine and compare the rate of DAMA and its related factors before and after executing the healthcare transformation plan (HTP) in Iran.

Methods In a two-phase, cross-sectional study, the DAMA information of 200 patients in 2016 (after HTP) and the patients of a previous study in 2012 (before HTP) was compared. Samples were randomly selected from the main referral centre in the north-west of Iran. Data were collected using a validated and reliable questionnaire and analysed using the SPSS V.16 software.

Results In the post-HTP plan period, the rate of DAMA was 3.9%, while this rate was 5.49% in 2012 ($p=0.029$). A total of 15% (108 out of 721) of patients in the postreform group and 13.5% (101 out of 747) in the prereform group were rehospitalised ($p=0.411$). The three main categories of reasons for DAMA in 2012 and 2016 were as follows: patient-related factors, 27% vs 45%; staff-related factors, 33% vs 30%; and hospital-related factors (basic amenities), 40% vs 25%. In both periods, the average scores of patient satisfaction were almost the same; however, satisfaction regarding environmental and human factors in hospitals had changed significantly after HTP ($p<0.05$).

Conclusions There was a decrease in the rate of DAMA after HTP in Iran. Considering DAMA as a multifactorial phenomenon, this might be due to the higher relative satisfaction after HTP, indicating an increase in public confidence in general hospitals.

INTRODUCTION

For more than half a century, the issue regarding patients leaving hospitals against medical advice has been discussed in the medical literature.¹ Discharge against medical advice (DAMA) comes up when a patient (or his/her caregiver) decides to discharge contrary to the opinion of the physician providing medical services.² DAMA is a common problem of hospitals in all countries of the world because it can lead to additional

Strengths and limitations of this study

- This is the first study designed to determine and compare the rate of discharge against medical advice (DAMA) and its related factors before and after the healthcare transformation plan.
- The limitations of the current study include the low sample size of the population and the absence of matching in the study groups.
- Another limitation is the use of only two time points and one centre as the source of the included patients, which seems insufficient for such a conclusion.
- Another limitation is that because of the general condition of the current hospital containing all specialty and subspecialty departments, the rate of DAMA due to transfer to higher specialty hospital will be lower; therefore, there is a low possibility of transfer of patients from discharge pathway to another more specialised hospital with personal consent.

and unnecessary therapeutic interventions and cost increases of up to 56%,^{3,4} morbidity,⁵ rehospitalisation of up to 40%, and even death more than the routine discharge of patients.⁶ It can be considered a service indicator and patient dissatisfaction alarm.⁷

Different studies in the world have indicated a large number of DAMA. For example, DAMA accounted for 1% of total discharges in Canada, 0.8%–2.2% in the USA,^{5,7} 6.2% in Australia,⁸ 6% in Italy,⁹ 3.3% in India,¹⁰ 4.01% in Saudi Arabia,¹¹ 0.32% in Oman,¹² 6%–8% in Iran¹³ and 0.72% in Nigeria.¹⁴ Moreover, the rate of DAMA in developing countries is two times higher than in developed countries.^{15,16} In Iranian hospitals, the rate of DAMA is higher compared with similar countries.^{3,4}

Various reasons for DAMA have been mentioned in different studies, including dissatisfaction with hospital services, personal reasons such as addiction or drug abuse, inability to afford payment of hospital bills/

costs, psychological problems, family affairs such as taking care of other children at home, lack of significant recovery or feeling of significant recovery after some days of hospitalisation, long-term stay in hospital, and living location (urban or rural).^{17 18} As a result of the similarity of the reasons for DAMA in various studies, these reasons can be divided into three different categories: (1) factors related to patients, (2) hospital circumstances (basic amenities) and (3) medical staff.^{6 7}

Studies conducted in Iran have shown the affinity between the reasons for DAMA and healthcare system problems. Therefore, following several reforms in the last decades, such as a strong PHC network and starting family physician programmes with huge achievements,^{19 20} the hospital-oriented transformation plan was launched in May 2014 in response to varied needs and challenges.^{21 22} The main objectives of the plan consist of reducing health expenditure for patients, improving the healthcare services, and increasing coverage as well as access to inpatient care.²³

By executing the healthcare transformation plan (HTP), there was a decline in direct payments of patients in state hospitals from 37% to 3% for rural residents and 6% for urban ones; all patients were covered by insurance, the incomes of personnel and doctors were noticeably increased, the quality of hospital hotelling services was improved,^{13 24} and the number of full-time physicians in public hospitals was increased.¹³ Based on reports, there has been a significant improvement in bed occupancy and turnover,²⁵ caesarean delivery,²⁶ insurance coverage,²² public satisfaction,¹³ hotelling circumstances,²⁷ hospital functional parameters,²⁸ patient admission²⁹ and direct payments of patients²³ after HTP.

Therefore, evaluating the result of the present HTP in Iran is an important necessity for the design of better healthcare reforms in the future. Therefore, the current study was designed to determine and compare the rate of DAMA and its related factors before and after HTP.

MATERIALS AND METHODS

Study design and settings

A before-and-after evaluation survey was conducted in the main general educational-medical centre of Tabriz University of Medical Sciences (Tabriz, Iran) in two time periods: before (2012) and after (2016) HTP. This centre is currently the main referral centre in the north-west of Iran, with about 800 inpatient hospital beds, full-service medical specialty and subspecialty, and an average bed occupancy rate of 92.7%.

Study tools and data gathering

All DAMA patients were considered as the study population, but due to patients' condition (end of life, old age, critical condition, low educational level and other reasons for participation in the study) 200 patients (31% turnout) were included after exclusion of uncompleted and irrelevant forms in 2012 and 2016 separately. Convenience

sampling was applied in the present study and patients who were willing to participate in the study were selected.

The study inclusion criteria were as follows: filling in a written consent form to participate in the study and hospitalisation period between 1 and 30 days at the different departments of the hospital. The study exclusion criteria included hospitalisation for more than a month or less than a day, admission to the emergency medicine department, hospitalisation in the last 1 month, end-stage diseases, missing document components and history of DAMA.

The data collection tool was a questionnaire used by two similar previous studies,^{30 31} which contained 29 main factors leading to DAMA, with content validity checked and modified by three specialists.^{30 31} As far as some questions were modified, a decision was made to ascertain the validity and reliability of questionnaires one more time. The judgement of 10 experts in specialised fields was used to measure content validity. The correlation between items contained in the questionnaire was evaluated through Cronbach's alpha in order to measure the internal consistency of the questionnaire. The questionnaire's reliability was measured by the test-retest method as well as by the participation of 30 people ($\alpha=0.85$). The reasons for DAMA were classified into three main categories: personnel-related, hospital-related and patient-related causes. The questionnaires were distributed to patients who were discharged by DAMA and were gathered by two trained researchers.

The study variables consisted of the demographic characteristics of patients, including age, sex, living area, educational level, length of hospital stay (inpatient day), frequency of hospitalisation and type of insurance, as well as parts related to the following:

- ▶ Patients' reasons for DAMA, consisting of seven parts: financial problems, dependency of the patient to the family, transfer to other hospital or medical centre, fear of continuing therapy, implicit doctor advice, feeling of recovery, and lack of patient attendant.
- ▶ Factors related to personnel, consisting of four parts: proper care of personnel, proper relationships and personnel responsiveness to patients and their attendants, on-time attendance of doctor, and lack of skill and expertise of medical staff.
- ▶ Factors related to the hospital (basic amenities), consisting of four parts: accessibility to facilities, crowding, environmental health and hygiene, and nutrition status.
- ▶ Total evaluation by patients, consisting of four parts: scoring hospital from 0 to 20, tendency for rehospitalisation in the same hospital in case of need, advising families and relatives to hospitalise in the same hospital in case of need, and direct and indirect costs paid to the hospital.

Statistical analysis

Data obtained from the study were analysed using descriptive statistics (frequency, percentage, mean and SD). Also,

Table 1 Comparing individual characteristics of DAMA patients before and after HTP

Characteristics	Time period		P value
	Before	After	
Gender			
Male	120 (60)	130 (65)	0.052
Female	80 (40)	70 (35)	
Living location			
Urban	110 (55)	140 (70)	0.038
Rural	90 (45)	60 (30)	
Age (years)	51.82±23.81	55.16±21.86	0.172
Education			
Illiterate	102 (51)	92 (46)	0.004
Under diploma	58 (29)	5 (2.5)	
Diploma	23 (11.5)	52 (26)	
University degree	17 (8.5)	51 (25.5)	
Length of stay (days)	6.15±10.57	6.04±5.14	0.132
Frequency of hospitalisation	1.28±0.70	1.32±1.4	0.001
Type of insurance			
Public insurance	116 (58)	156 (78)	0.001
Private insurance	66 (33)	19 (9.5)	
No insurance	18 (9)	25 (12.5)	

Data are shown as frequency (percentage) and mean±SD. Time period was defined as before and after HTP. DAMA, discharge against medical advice; HTP, healthcare transformation plan.

χ^2 and independent-sample t-tests were used to compare the qualitative and quantitative variables between groups, respectively. Statistical analyses were performed using the SPSS V.16.0 software package for Windows. In this study, a p value of less than 5% was regarded as statistically significant.

Patient and public involvement

Patients were not involved because this study included no human participants.

RESULTS

In this before–after study or quasi-experimental study, 747 (3.9%) out of 37 987 patients were discharged by DAMA in the first half of 2016, while 721 (5.49%) out of 27 468 patients were discharged by DAMA in the first half of 2012 ($p=0.29$). Also, the rehospitalisation rates of DAMA patients were 15% (108 out of 721) and 13.5% (101 out of 747) after and before HTP, respectively ($p=0.411$). **Table 1** presents a summary of the demographic characteristics of the included patients in both time periods.

Among hospitalisation wards, gastroenterology, surgery, neurology and thoracic departments were recorded to have the most number of cases of DAMA in both time periods, without any statistical significance ($p>0.05$). **Table 1** shows

Table 2 Patient-related causes for DAMA before and after HTP

Items	Time period		P value
	Before	After	
feeling of recovery	30 (15)	44 (22)	0.03
Financial problems	32 (16)	23 (11.5)	0.04
Emotional dependence on family	34 (17)	36 (18)	0.79
Afraid of resuming treatment	22 (11)	27 (13.5)	0.44
Transfer to another hospital	22 (11)	16 (8)	0.3
Sense of ineffective stay at the hospital	38 (19)	36 (18)	0.79
Consulting with prior physician	22 (11)	18 (9)	0.5

Data are shown as frequency (percentage). Time period was defined as before and after HTP. DAMA, discharge against medical advice; HTP, healthcare transformation plan.

that there is a significant difference when comparing the educational level ($p=0.004$), frequency of hospitalisation ($p=0.001$) and coverage of insurance ($p=0.001$) between time periods, but with respect to gender, residency area, age and length of stay the difference is not significant ($p>0.05$).

According to the reasons mentioned for DAMA, three main categories were elaborated in 2012, namely 27% of patient-related factors, 33% of staff-related factors and 40% of hospital-related factors, while the frequency of these factors was changed to 45%, 30% and 25% in 2016, respectively. Patient-related, staff-related and hospital-related reasons for DAMA are shown in **tables 2, 3 and 4**, respectively.

By comparing factors in patient-related issues (**table 2**), it was found that the differences in feeling of recovery and financial problems were statistically significant between the two time periods ($p=0.03$ and $p=0.04$, respectively). Moreover, in both time periods, the main factor leading to DAMA was the idea that continuing stay in the hospital would be ineffective, and there was no significant difference between the groups ($p>0.05$).

Of the staff-related factors leading to DAMA (**table 3**), important changes include a threefold increase in the proper care of patients by personnel (23% vs 66.5%, $p<0.001$) and a fourfold increase in doctors' on-time attendance ($p<0.001$). Furthermore, the difference between parts which evaluated proper relationship with patients and expertise of medical staff was statistically significant ($p=0.04$ and $p=0.002$, respectively).

By comparing the results between the two time periods, with regard to hospital-related factors (**table 4**), there was a fourfold improvement in patients' nutrition status ($p=0.031$), but the improvement in hospital sanity was not statistically significant ($p=0.076$). Conversely, lack of facilities and crowding had increased significantly ($p=0.005$ and $p=0.03$, respectively).

Table 3 Staff-related factors affecting DAMA before and after HTP

Items	Time period	Answers					P value
		Absolutely agree	Agree	Neutral	Disagree	Absolutely disagree	
Proper care of personnel	Before	25 (12.5)	29 (14.5)	60 (30)	64 (32)	22 (11)	<0.001
	After	24 (12)	109 (54.5)	12 (6)	41 (20.5)	14 (7)	
Lack of proper relationship and contact with patient	Before	21 (10.5)	30 (15)	68 (34)	60 (30)	21 (10.5)	0.04
	After	12 (6)	42 (21)	31 (15.5)	92 (46)	23 (11.5)	
On-time presence of doctor	Before	8 (4)	28 (14)	68 (34)	70 (35)	26 (13)	<0.001
	After	17 (8.5)	130 (65)	18 (9)	35 (17.5)	0 (0)	
Lack of skill and expertise of medical staff	Before	5 (2.5)	20 (10)	80 (40)	73 (36.5)	22 (11)	0.002
	After	1 (0.5)	24 (12)	36 (18)	105 (52.5)	34 (17)	

Data are shown as frequency (percentage).

Time period was defined as before and after HTP.

DAMA, discharge against medical advice; HTP, healthcare transformation plan.

In 2016, patients' reports on hospital performance were categorised into weak (9.5%), average (13.5%), good (37%) and excellent (40%). The mean total score of patients who evaluated the hospital before and after HTP was 13.82 ± 4.64 and 13.43 ± 4.07 , respectively ($p=0.37$).

In the postreform period 138 patients (69%) and in the prereform period only 28 patients (14%) stated that they would select this hospital again in case of readmission ($p<0.001$). Finally, in the postreform period, 68.5% stated that, in case of a similar problem with their relatives, they would recommend this centre; however, the rate was 54% for the prereform period.

DISCUSSION

In this before–after study, the rate of DAMA, the mean length of stay in hospital and the frequency of hospitalisation decreased post-HTP. However, rehospitalisation after hospital discharge increased compared with the prereform period.

According to related studies from 2012 to 2014, the rate of DAMA in different hospital wards (except psychology and emergency wards) in Iran was about 6%–8%.^{7 32} Furthermore, a study of 17 hospitals in Tabriz, Iran resulted in a DAMA rate of 5.7%.⁵ All these results showed a high rate of DAMA before HTP. However, in a study performed after HTP, this rate was 3.27%,³³ which was similar to the results of our study. This improvement could be an indicator of the positive impact of HTP because of the presence of resident physicians at all hours in the hospital, thereby decreasing costs and improving responsiveness.^{21 22}

Among the demographic determinants, patients' gender did not show a statistically significant difference in the two time periods. The results of studies conducted by Hwang *et al*,³⁴ Moyse and Osman³⁵ Vahdat *et al*³⁶ were similar to the results of the present study. In these studies, most patients were 60 years old or over, and the mean age of those who were hospitalised was not statistically significant.

Table 4 Hospital-related factors affecting DAMA before and after HTP

Items	Time period	Answers					P value
		Absolutely agree	Agree	Neutral	Disagree	Absolutely disagree	
Hospital hygiene	Before	2 (1)	24 (12)	61 (30.5)	80 (40)	33 (16.5)	0.076
	After	5 (2.5)	126 (63)	13 (6.5)	54 (27)	2 (1)	
Lack of facilities	Before	4 (2)	11 (5.5)	75 (37.5)	80 (40)	30 (15)	0.005
	After	5 (2.5)	36 (18)	20 (10)	137 (68.5)	2 (1)	
Proper nutrition	Before	3 (1.5)	26 (13)	70 (35)	74 (37)	27 (13.5)	0.031
	After	2 (1)	111 (55.5)	17 (8.5)	68 (34)	2 (1)	
Lack of satisfaction due to crowding	Before	7 (3.5)	16 (8)	64 (32)	82 (41)	31 (15.5)	0.03
	After	2 (2)	48 (24)	7 (3.5)	139 (69.5)	4 (2)	

Data are shown as frequency (percentage).

Time period was defined as before and after HTP.

DAMA, discharge against medical advice; HTP, healthcare transformation plan.

After the transformation plan, insurance coverage increased by 93% and included 10 million people without using any prior insurance services.²⁴ This phenomenon has changed the public tendency towards hospitals and DAMA, as the study of Baptist *et al*¹⁷ showed that both insurance status and household income were associated with an increased risk of DAMA. In addition, the study of Ibrahim *et al*¹⁸ showed that having insurance was a predictive factor in DAMA.

The educational level in both periods of studies showed that DAMA is mostly usual among patients with lower educational level. Moreover, in the study of Vahdat *et al*,³⁶ 55.6% of DAMA people were illiterate or had under high school education. Furthermore, education level of patients discharged with personal consent was significantly higher in the post-HTP period. In this time the educational level of high school graduates and upper levels had increased from 5.4% to 55% ($p=0.004$). In a way, this difference showed the tendency of educated people of the society to refer to state hospitals or to rate their dissatisfaction in comparison with low-educated people. This could be due to their higher expectations, leading to hospital discharge. This indicates the higher rate of attendance of people in public hospitals after HTP, which is in accordance with the higher admission rate after HTP and increased number of provided services found in the current study.

This indicates increased demand in public hospitals after HTP, which is in compliance with other studies.

After the reform plan, 70% of DAMA patients were Tabriz Metropolis residents compared with 55% of patients before HTP, and this leads to two hypotheses. The first hypothesis is that due to the execution of HTP and the residence of specialist physicians for 24 hours in district hospitals, referral or sending patients to this centre has reduced compared with the pre-HTP period. The second hypothesis is that due to the execution of HTP and various economic-social issues, educated urban people have found a positive attitude towards the hospitals.

Before HTP, hospital-related factors were the most commonly mentioned reasons for DAMA, but after HTP this trend changed such that patient-related factors were the main reasons for DAMA in this study. This was similar to other studies, which indicated a change in hospital-related and patient-related factors.

Personal determinants of DAMA such as economic status, dependence on family, fear of continuing therapy and lack of patient attendant did not show a significant difference; however, the percentage of leaving the hospital due to being emotional was higher in the postreform period (increased from 15.3% to 22%). Among human factors, the part of 'proper care of personnel' showed higher percentage in the post-HTP period, which indicated an increase in patients' satisfaction with the transformation plan.^{32 37}

Proper relationships and responsiveness of personnel to patients fail to serve expected quality, probably due to the large number of patients and time constraints, but this issue has not undergone a significant change before and after HTP.

Based on reports of the Ministry of Health and some studies, increased attendance rates of patients at public hospitals after HTP were due to decreased inpatient total payment to hospitals, presence of specialist physicians at all hours and improved facilities, so patients who could not attend hospitals can do now. Patients who visited private hospitals before are now more eager to attend public hospitals.

On-time attendance of doctors at the patient's bedside and the attitude of patients about the proper care of medical staff showed a significant increase post-HTP compared with pre-HTP.

Comparing the environmental factors involved in discharge in the two periods of the study showed satisfaction with environmental hygiene and nutrition status of the hospital, while dissatisfaction with crowding and noise in the hospital environment showed a significant change in comparison with pretransformation study. In the study of Rangraze Jedi and Rabiee,⁶ the reasons for leaving the hospital included issues related to the patient, hospital staff and hospital status. Previous studies conducted in Iran considered lack of facilities as the most important factor for patients' dissatisfaction, and concluded that a considerable percentage of patients were dissatisfied with access to nurse-doctors, as well as their service qualities.^{6 7}

The total evaluation of patients using a 0–20 range to rate their subjective satisfaction with hospitals did not show a significant change in the two studies. However, in the post-HTP period, more patients had stated that they would choose this hospital again in case of need. Therefore, after the health reform plan, people showed higher tendency to introduce this hospital to their relatives in case of problems, and in total this might reflect an improvement in service quality.

In previous studies, most of the reasons for DAMA were dissatisfaction with the doctor, advice and referral of doctors to the private sector and lack of hospital facilities, and prolongation of hospitalisation period was the least reason for discharge with personal consent.^{7 38 39}

Accordingly, it is expected that by increasing the financial support provided by HTP, patients are less eager to leave public hospitals compared with private hospitals. Further studies regarding staff recommendation for patients to go to private hospitals are needed.

CONCLUSION

There was a decrease in the rate of DAMA after the implementation of HTP in Iran. Based on our findings, considering DAMA as a multifactorial phenomenon, the current decrease might be due to the improved financial and logistic support provided by HTP, as well as the subsequent enhanced recovery sensation. Although HTP has decreased the rate of DAMA, some unfavourable indices regarding healthcare satisfaction still exist. The results of the current study demonstrated that the authorities could modify HTP and maximise its effects on DAMA as well as other different aspects of healthcare. Therefore, the

suggested research themes are continuous surveillance of frequency and factors related to DAMA and analysis of the results in order to modify treatment headquarters of medical universities and specialty hospitals.

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