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How Important is Intravenous Fluid Administration to Patients Presenting to the Emergency Department and to Their Families?

Ozgur Tatli[1], Perihan Simsek[2], Ayla Gursoy[2], Murat Topbas[3], Vildan Ozer[1], Abdulkadir Gunduz[1]
[1]Department of Emergency Medicine, Karadeniz Technical University School of Medicine, Trabzon, Turkey
[2]Department of Nursing, Karadeniz Technical University School of Medicine, Trabzon, Turkey
[3]Department of Public Health, Karadeniz Technical University School of Medicine, Trabzon, Turkey

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Abstract

Aim: Intravenous fluid administration is a frequently applied form of therapeutic service in emergency departments. This study aimed to determine the effect of intravenous fluid administration on patients' and their relatives' preference for emergency departments.

Materials and Methods: The study was conducted involving 430 individuals consisting of patients (259) presenting to a university hospital and their relatives (171). Data were collected using a questionnaire developed by the authors.

Results: Overall, 82.3% of the patients and relatives included in the study stated that the administration of intravenous fluid in emergency departments affected their preference for these units for health services. While the patients are treated with IV fluid in the emergency department, cessation or interruption of the IV fluid was perceived by the patients and relatives as a lack of interest in the patient (40.5%) or as discontinuation of treatment (32.6%).

Conclusion: Patients and relatives prefer emergency departments for access to intravenous fluid administration and believe that administering drugs together with intravenous fluid is the most effective therapeutic method. In addition, patients and relatives believe that sufficient attention is not paid to the patient and that the treatment has been discontinued if intravenous fluid administration in the emergency department is stopped.

Keywords: Emergency department use, intravenous fluid therapy, health service, perception

Introduction

The demand for emergency department (ED) services is increasing worldwide (1). An approximately 4.6% annual increase in ED presentations was determined in Western Australia in 2007-2013 (2). An approximately 11% increase in ED presentations was recorded in England between 2008-2009 and 2012–2013 (3). This increased demand for ED services is a result of the interaction of features associated with countries' health systems, sociodemographic structures, and health needs (4, 5).

Various factors are known to influence ED presentations. Individuals experiencing health problems requiring emergency medical care and perceptions of urgency are particularly significant (6). Sociodemographic characteristics, such as income level, education level, and presence of social support systems also affect the demand for ED services (5).

Some studies have shown that special diagnostic methods for patients' health problems and a belief that these problems require medical treatment are involved in the use of EDs (7-9). One therapeutic method widely used in EDs is intravenous (IV) fluid administration. It is used to maintain homeostasis and to dilute various drugs for the safety of medical treatments in conditions when enteral intake is insufficient or due to excess fluid loss from the body (10). Our clinical observations suggest that patients presenting to EDs in Turkey have a strong desire to receive iv fluid therapy. The purpose of the study was to determine the opinions of patients presenting to EDs and their relatives concerning iv fluid administration and the effect of those ideas on their preference for EDs.

Materials and Methods

This study was planned as a descriptive research and was conducted following the receipt of ethical approval from the Regional Clinical

Corresponding Author: Ozgur Tatli e-mail: dr.ozgurtatli@gmail.com
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Table 1. The Effect of Administration of Intravenous Fluid Therapy in the Emergency Department on Demand for Emergency Departments According to Sociodemographic Features (No=430)

		The effect of administration of IV fluid therapy on the choice of emergency department				
Feature		**Effective**		**Ineffective**		**p**
		n	**%**	**n**	**%**	
Sex	Female	193	80.1	48	19.9	0.169
	Male	161	85.2	28	14.8	
Marital status	Married	166	81.8	37	18.2	0.777
	Unmarried	188	82.8	39	17.2	
Education level	Below primary	26	78.8	7	21.2	0.003
	Primary	44	84.6	8	15.4	
	Secondary	223	86.8	34	13.2	
	Undergraduate or above	61	69.3	27	30.7	
Age, years	<34	220	82.7	46	17.3	0.792
	≥34	134	81.7	30	18.3	
Total	354	82.3	76	17.7		

Table 2. Patient and Relative Opinions Regarding the Effects of Intravenous Fluid Administration (without any Medications) for Various Health Problems (No=430)

	Therapeutic Effect of Intravenous Fluids					
	Yes		**I am undecided**		**No**	
Health problem	**n**	**%**	**n**	**%**	**n**	**%**
Lethargy	285	66.3	36	8.4	109	25.3
Diarrhea	272	63.3	44	10.2	114	26.5
Fever	260	60.5	47	10.9	123	28.6
Nausea	258	60.0	52	12.1	120	27.9
Pain	241	56.0	41	9.5	148	34.4
Dizziness	178	41.4	66	15.3	186	43.3
Headache	149	34.7	50	11.6	231	53.7
Sore throat	110	25.6	63	14.7	257	59.8
Cough	79	18.4	71	16.5	280	65.1

Research Ethical Committee Office. It was performed in the ED of a university hospital receiving on an average 250 presentations a day. The study population consisted of patients meeting the inclusion criteria and of relatives accompanying these patients. Patients presenting to the ED and accompanying relatives aged over 17 were enrolled. Participants provided written informed consent.

Patients and relatives who were physically, psychologically, and cognitively incapable of understanding and answering questions provided to them; under the influence of alcohol or any substance during presentation; or transferred to any other health institution from the ED in which the study was performed were excluded. In the event that a patient had more than one accompanying relative, the degree of proximity was considered as an inclusion criterion. A sample size of 384 was calculated for the research, and the study was conducted with 430 patients.

The study was performed between 09.00 AM and 5.00 PM, and the first patient to be included in the study on each study day was randomly selected from the first five patients presented. Every fifth subsequent patient and the relative of each patient (if applicable) was enrolled until the specified sample size was reached.

The term 'intravenous (IV) fluid therapy' mentioned in the study refers to all IV fluid therapies in any quantities. Intravenous fluid therapies can be administered with various drugs or without any medication (10). This study examined opinions regarding both forms of IV fluid therapy (Table 1). Data for fluid therapies administered without any drugs (Tables 2 and 3) are presented in the relevant sections. In addition, data about opinions of partipicants regarding the efficacy of administration of drugs with IV fluid therapy is presented in Table 4.

A qustionnaire based on observations of the authors in ED were used as data collection tools. The questionnaire consisted of three parts. The first part was specifically used for sociodemographic features, such as age and sex, and the second section included questions concerning opinions regarding the effects of IV fluid administration. The third section consisted of questions aimed at evaluating the relation between a desire for IV fluid administration and the preference for EDs. The content validity of the questionnaire was determined by five emergency physicians and five emergency nurses. In order to determine the intelligibility of the questions, the questionnaire was administered to 20 individuals twice, five days apart. Any requisite amendments were made according to results of this administration. The questionnaire was administered after requisite information had been given to patients and relatives by the authors on a voluntary basis using the face-to-face interview method. The questionnaire

Table 3. Opinions of Patients and Relatives Regarding the Efficacy of Intravenous Fluid Therapy without any Medications (More than one option was selected) (No=430)

	Patient				Relative				
	Agree		Disagree		Agree		Disagree		
Effects	n	%	n	%	n	%	n	%	p
It strengthens the body	139	53.7	120	46.3	83	48.5	88	51.5	0.268
It replaces substances that are lacking in the body	117	45.2	142	54.8	78	45.6	93	54.4	0.928
It strengthens the immune system	105	40.5	154	59.5	59	34.5	112	65.5	0.207
It has a therapeutic effect	93	35.9	166	64.1	66	38.6	105	61.4	0.572
It provides psychological improvement	121	46.7	138	53.3	74	43.3	97	56.7	0.483
It kills germs	59	22.8	200	77.2	42	24.6	129	75.4	0.670
It prevents worsening of the disease	86	33.2	173	66.8	53	31.0	118	69.0	0.631

Table 4. Opinions of Patients and Relatives Regarding the Efficacy of Intravenous Fluid Therapy without any Medications (More than one option was selected) (No=430)

	Patient				Relative				
	Agree		Disagree		Agree		Disagree		
Effects	n	%	n	%	n	%	n	%	p
Drug administration with IV fluid is the most effective treatment method	186	71.8	73	28.2	118	69.0	53	31.0	0.531
Drug administration with IV fluid produces earlier healing than other treatment methods	121	46.7	138	53.3	79	46.2	92	53.8	0.916
Effects of the drugs increase if they are administered with IV fluid	115	44.4	144	55.6	70	40.9	101	59.1	0.477
Healing delays if IV fluid therapy is not received (with suitable medicine)	61	23.6	198	76.4	26	15.2	145	84.8	0.035
If drugs are added to IV fluid drug effects last longer	44	17.0	215	83.0	24	14.0	147	86.0	0.411
I can not recover unless I receive IV fluid therapy (with suitable medicine)	38	14.7	221	85.3	10	5.8	161	94.2	0.007

was administered to patients at the end of treatment and to relatives as they were accompanying their patients.

Statistical analysis

The data obtained were analyzed using the IBM Statistical Package for the Social Science (IBM SPSS; Armonk, NY, USA) for Windows v23.0software. Descriptive data were expressed as number and percentage and measurement data as mean+/-standard deviation and minimum-maximum values. The chi square test was used to compare descriptive data. A p value of <0.05 was regarded as statistically significant.

Results

Of the individuals enrolled in the study, 60.2% (n=259) were patients and 39.8% (n=171) were accompanying relatives. In total, 44% of the participants were males and 56% females. The mean age of the participants was 33.6±15.3 years (min: 18, max: 78). Additionally, 59.8% of the subjects enrolled in the study were educated up to secondary school level.

Of the subjects in the study, 82.3% (n=354) stated that administration of intravenous fluid therapy in an ED affected their selection of such departments for health services.

When the effect of IV fluid therapy on the ED preference in different education levels was examined, an increase was observed in preferences for EDs providing intravenous fluid therapy parallel to increasing education levels among participant groups except undergraduate or higher degree group, but this increase was not statistically significant (p=0.455). Participants without undergraduate level of education (85.7%) more commonly described the application of IV fluid therapy as a factor influencing ED preference compared to subjects with undergraduate level of education or higher (69.3%). This difference was statistically significant (p=0.001). Additionally, the administration of IV fluid was more commonly reported as a factor affecting the preference for ED among subjects with a secondary level of education compared to others. This difference also was statistically significant (p<0.05) (Table 1).

Ninety point five percent (n=389) of the participants stated that they had previously been given IV fluid therapy at least once. The majority of subjects (89.1%) stated that the previous fluid therapy they had received was effective. The preference for EDs due to IV fluid administration was significantly higher among subjects who reported that the previous IV fluid therapy they received was effective compared to those who found it ineffective (2.1%) (p=0.007).

A total of 81.2% of the patients and relatives in the study thought that "there was no need for IV fluid administration" if this was not considered necessary after examination. However, 15.3% of participants insisted that the physician should provide IV fluid administration and 2.1% stated they consider attending a different ED for IV fluid administration. If participants were aware that the recommended treatment would exhibit the same effect whether administered orally or through IV fluid, 54.4% of subjects stated they would still prefer to receive treatment through IV fluid.

Intravenous fluids were reported as being effective in the treatment of lethargy by 66.3% of subjects, in the treatment of diarrhea by 63.3%, and in reducing fever by 60.5%.

In the scope of this research, 34.9% of patients and relatives believed that even when no medication was added, IV fluids still contained water-vitamins and drugs; 16% believed that it contained water and drugs; and 14.4% believed that it contained water and various substances. Additionally, 59.3% of subjects reported believing that IV fluids would have no effect unless some substances were added (Table 2).

In terms of perceived benefits, 51.6% of subjects stated that IV fluid administration with no added medication would strengthen the body. In addition, patients and relatives thought that IV fluid administration would replace substances lacking in the body and it would be of psychological benefit (45.3%; Table 3).

In addition, 25.8% of the patients and relatives in this study thought that IV fluids being dripped slowly into the body would enhance the effect of IV fluid administration, 25.3% thought that a higher quantity of fluid being administered would do so, and 16.3% thought that a faster flow of IV fluid would enhance its effectiveness. Finally, 40.5% of subjects interpreted IV fluid administration being stopped or the flow being interrupted as indicative of insufficient interest provided to the patient by the medical staff, while 32.6% of participants considered this indicative that treatment was not complete, and 11.6% thought that the patient's condition might worsen.

We found that 23.6% of the patients and 5.2% of relatives thought that recovery might be delayed if IV fluid was not administered (p=0.035). In addition, significantly more patients (14.7%) than relatives (5.8%) stated that they cannot recover without IV fluid administration (p=0.007). A total of 70.7% of subjects reported thinking that the administration of drugs together with IV fluid is the most effective therapeutic method (Table 4). Moreover, 57% of patients and relatives reported acquiring knowledge of therapeutic methods from their experience and 55.3% from health workers.

Discussion

Global research shows that patients' beliefs that they require special diagnostic and therapeutic techniques influence their decision to present to EDs (11, 12). Callen et al. (9) determined that thinking that an X-ray and ultrasound might be required in case of suspected fracture encouraged patients to present to the ED. Gentile et al. (13) determined that medical treatment being provided in addition to imaging techniques in EDs affected presentations to these units.

As described above, the form of treatment administered in EDs makes these units attractive for patients. However, the inappropriate use of EDs interrupts the provision of emergency services for those who genuinely need them (14). Additionally, inappropriate use of emergency services adds to health personnel workloads (15). Improper use is also a concern with an adverse impact on health service costs (16). The factors affecting patients' preference for EDs therefore require investigation. A high majority of participants in our study stated that the administration of IV fluid in EDs influenced their preference for these units. One previous study analyzed the reasons for repeated presentations to EDs from the health worker perspective. According to the study, health workers cited the desire for IV fluid therapy as one of the causes of repeat emergency service presentations (17). Another study investigated ED health workers' opinions regarding the inappropriate use of such units. In the study, 90.3% of health workers stated that the perceived need for IV fluid therapy or injections led to the inappropriate use of EDs (18). The data from those studies are parallel to the findings of the present study.

In this study, approximately one participant in four thought that IV fluid therapy without any medication would have no therapeutic effect. The same proportion of participants reported that the administration of drugs in IV fluids was the most effective therapeutic method. On the other hand, the majority of participants explained that the application of IV fluid therapy in EDs affected their preference for these departments. This may be interpreted as believing that receiving drugs together with IV fluids is a more effective and rapid treatment method influences the ED preference.

Age, sex and marital status had no effect on the preference for EDs to get IV fluid therapy, but education level affects this choice. The preference for EDs to get IV fluid therapy was more prevalent among individuals educated to secondary school level or below. These findings may be related to increasing level of consciousness and awareness with education. However, further studies are needed in order to be able to explain this situation with scientific data.

Majority of the patients and their rleatives enrolled in this study thought that IV fluid administration had analgesic effects. In a study of advanced-stage cancer patients and their relatives, Cohen et al. (19) determined that participants thought that IV fluid therapy reduced pain and enhanced the efficacy of analgesics.

Approximately one-half the participants in this study stated that IV fluid administration replaced deficient substances and provided psychological benefits. The study by Cohen et al. (19) reported that participants thought that IV fluid administration reduced fatigue by

raising energy levels and was thus promising in terms of increasing quality of life and maintaining human dignity. Similar to our study, Cohen et al. reported that subjects believed that IV fluid administration permitted intake of substances and electrolytes needed by the body. Patients and relatives also thought that IV hydration improved mental health and nourished and restored the body, mind, and soul (19). In a study by Malia et al. (20), of the 20 final-stage cancer patients, 30% of participants stated that IV hydration was a good alternative method of nutrition and that similar to oxygen, they needed IV hydration to survive. Morita et al. (21) investigated 62 final-stage cancer patients living in care homes and the relatives of those patients. They reported that 76% of patients and 85% of family members thought they would not receive the nutrients they required without IV hydration (21). By contrast, in a study by Chiu et al. (22) of final-stage cancer patients, subjects thought that fluid therapy can only meet fluid requirements.

The preference for EDs due to IV fluid administration was significantly high in this study among individuals who had previously received IV fluid in these departments and subsequently had experienced an improvement. In the study by Musgrave et al. (23) of final-stage cancer patients and their relatives, relatives stated that previous experience of the effectiveness of IV fluid administration influenced their desire for IV fluid. Fitzsimmons et al. (24) investigated 32 coaches from the American Football League and assessed IV fluid administration among football players before matches. The study reported that hyperhydration was administered before matches in 75% of the teams mainly due to the players' desire to receive it. Two coaches taking part in the study stated that some players wanted to receive IV fluid before every game and therefore believed that IV fluid administration is addictive. These findings may show that IV fluid therapy can have a placebo effect.

Study limitations

The main limitation of this study is that it was conducted in a single center. The fact that the study was conducted with patients presenting to the ED may also be regarded as a limitation. In order to overcome this, the questionnaires were applied after patients were discharged. Additionally, the questionnaire might be applied with different groups other than patients presenting to the ED.

Conclusion

The data obtained from this preliminary study show that the wide availability of IV fluid administration in EDs is significant to patients from various perspectives. The participants reported thinking that therapy administered by the IV route made them feel better, relieved pain and provided necessary nutrients and is of benefit in numerous diseases. In addition, they thought that interruption of IV therapy in the emergency department meant that insufficient attention is paid to them and that the treatment is interrupted. The high value attached by patients to this method of treatment causes them to prefer certain EDs. This is the first study to elicit information concerning how and why individuals choose to attend EDs for IV fluid administration in Turkey. We think that further investigation of the subject of the admission to EDs for IV fluid administration through multi-center studies with wider patient series will provide valuable knowledge in several important areas, including inappropriate use of EDs, overcrowding, patient satisfaction and personnel workloads.

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