

## Impact of weekends and public holidays on the in-hospitable death rate in Misan governorate.

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### ABSTRACT

**Background:** Medical care may become worse during holidays and weekends, probably, due to decrease in the number of physicians, other health staff, or medical resources, in addition to increase in the number of patients admitted at this period. This may explain the negative impacts on the outcome of patients admitted to the hospital at weekends and holidays.

**Aim of study:** It is to shed light on the impact of holidays and weekends on the death rates among admissions in the main hospital in the governorate of Misan governorate.

**Patients and methods:** In this cross-sectional stud, records of all patients admitted to the Al-Sadder teaching hospital in Misan, from the first January 2015 to end December 2015 were reviewed with particular concern of, site and day of admission to the hospital, day of death, and the number of dead individuals, among admissions during holidays and other week days.

**Results:** A total of 34983 patients admitted to the hospital during one year, (25.4%) of them were admitted on the weekends and public holidays. Among patients in the hospital wards other than labor room & ICU, there was a statistically significant increase in death rate among admissions on the weekends and holidays compared to that on other week days, (3.5% versus 1.9%, P value > 0.0001). All-cause death, in the hospital as a whole, was found to be significantly higher on weekends and holidays than that on the other weekdays. (4.3% versus 2.6% P value > 0.0001).

**Conclusion:** weekends and holidays have a negative impact on the outcome of hospital admissions as reflected by higher death rates compared to that on the other week days.

**Keywords:** Holidays, hospitable death, Misan

تأثير عطل نهاية الأسبوع والعطل الرسمية على نسبة الوفيات داخل المستشفى في محافظة ميسان  
 الخلفية: قد تكون الرعاية الطبية اقل خلال ايام عطل نهاية الاسبوع او العطل الرسمية الاخرى، ربما بسبب نقص عدد الاطباء، الكوادر الصحية الاخرى، او الموارد الطبية اضافة الى الزيادة في عدد المرضى الداخلين الى المستشفى خلال هذه الاوقات. وهذا قد يفسر التأثير السلبي على حال المرضى الراقدين خلال ايام نهاية الاسبوع والعطل الرسمية.  
 الهدف من الدراسة: القاء الضوء على تأثير ايام عطل نهاية الاسبوع والعطل الرسمية الاخرى على معدل الوفاة بين الراقدين في المستشفى التعليمي الرئيسي في محافظة ميسان.  
 الطرائق: في هذه الدراسة المقطعية تمت دراسة ملفات المرضى الراقدين في مستشفى الصدر التعليمي في ميسان للفترة من بداية شهر كانون الثاني الى نهاية شهر كانون الاول لعام ٢٠١٥ مع الاخذ بنظر الاعتبار بشكل خاص: مكان ويوم الرقود في المستشفى، يوم الوفاة، عدد حالات الوفاة بين المرضى الراقدين خلال ايام العطل وايام السبوع الاخرى.  
 النتائج: من بين ٣٤٩٨٣ مريض ادخلوا المستشفى، ٢٥.٤% كانوا قد ادخلوا المستشفى خلال ايام نهاية الاسبوع والعطل الرسمية الاخرى. من بين المرضى الراقدين في ردهات المستشفى، باستثناء صالات الولادة والعناية المركزة، كانت هناك زيادة ذات قيمة احصائية مهمة، في نسبة الوفيات خلال ايام نهاية الاسبوع والعطل الاخرى مقارنة بأيام الاسبوع الاخرى. (٣.٥% مقابل ١.٩%). كانت نسبة الوفيات في المستشفى بشكل عام ولجميع الاسباب خلال ايام العطل اكثر منها خلال ايام الاسبوع الاخرى ايضا. (٤.٣% مقابل ٢.٦%).  
 الاستنتاجات: الأيام عطل نهاية الاسبوع والعطل الرسمية الاخرى تأثير سلبي على ما يؤول اليه حال المرضى الراقدين من خلال ما تعكسه الزيادة في نسبة الوفيات مقارنة بأيام الاسبوع الاخرى.  
 الكلمات المفتاحية: العطل، الوفيات، ميسان

## INTRODUCTION

Severely ill patients who are admitted during the weekends may be at higher risk for adverse outcome as compared to patients admitted during weekdays.<sup>[1]</sup> Few studies suggest that hospitals function is less effective than the average on weekends than on weekdays.<sup>[2]</sup> Weekend hospital admission is associated with increased mortality, in addition to the fact that reduced weekend staffing and resources should affect all patients in hospital at weekends, not just those newly admitted.<sup>[3]</sup> Medical care may become worse during the holidays due to decrease in the number of physicians accompanied by increase in the number of patients admitted at this period, these may explain holiday spikes in deaths in the emergency department.<sup>[4]</sup> It is also found that, patients admitted to the ICU on the weekends and holidays, have a modestly more duration of stay in the ICU, than those admitted on other week days.<sup>[5]</sup> While overall mortality was similar for patients admitted to many hospitals, the holiday & weekend effect seems to be greater in main teaching hospitals.<sup>[6]</sup> Data from some clinical studies found that, frequently lower levels of diagnostic facilities at weekends may affect the hospital function negatively.<sup>[7]</sup> Many literatures show that some patients admitted during the weekend have worse outcomes than patients with similar health problem or disease when admitted during other days of the week.<sup>[8]</sup> High death risk for patients admitted on holidays and weekends, as shown by many clinicians, has stimulated many studies and efforts to bypass such problem and improve quality of health care.<sup>[9]</sup>

The aim of this study is to shed light on the impact of holidays and weekends on the death rates in the main hospital in the governorate of Misan, and so, to study the possible underlying causes and consider planning for its correction or management in order to improve health care and hospital performance.

## PATIENTS AND METHODS

In this retrospective cross-sectional study, we reviewed records of all patients admitted to the Al-Sadder teaching hospital in Misan, from the first January 2015 to end December 2015. The

patients studied were divided in two categories, the first group included patients in the general medical wards (excluding labour room and intensive care unit) and the other one included patients in the intensive care unit (ICU). Parameters taken in concern were; total number of patients admitted to the hospital, divided into number of admissions to the ICU and number of those admitted to the other medical wards, day of admission, day of death, number of dead individuals during holidays and other week days among admissions of the two categories mentioned above. The percentage of death out of the total number of patients admitted during the weekends and holidays & weekdays was taken into consideration as an index of death rate in this study. Holidays, in our study, include weekend (Friday and Saturday) in addition to other official public holidays. Patients admitted to the labor room were excluded. All-cause death is considered in this study. Results are presented in numbers and percentages. Results were analyzed statistically according to the SPSS version 18. Chi-square test was used to assess the significance of association, and P value which is equal to or less than (0.05) is considered significant for statistical purposes.

## RESULTS

Out of the total 34983 patients admitted to the hospital during the year 2015, 25.4% of them were admitted on the weekends and public holidays. (Table-1).

**Table 1. Admitted patients according to the day of admission to the hospital.**

Day of admission	Admitted Patients	
	No.	%
Week days	26080	74.6
Weekends & holidays	8903	25.4
<b>Total</b>	34983	100.0

Out of the total admissions to the hospital, patients with severe illness who were admitted to the intensive care unit (ICU) on weekends and public holidays were more than those

admitted to the same unit on other weekdays. (8.5% versus 6.4%, P value < 0.0001). (Table-2).

**Table 2. Admitted patients to the hospital according to the place and day of admission.**

Ward	Weekdays		Weekends & Holidays		Total		P value
	No.	%	No.	%	No.	%	
General wards	24404	93.6	8146	91.5	32550	93.0	0.0001
Intensive care unit	1676	6.4	757	8.5	2433	7.0	
<b>Total</b>	26080	100.0	8903	100.0	34983	100.0	

Regarding death rates among patients admitted to the ICU, no significant difference was detected on weekdays and weekends and public

holidays. (12.2% versus 12.5% P value = 0.79). (Table-3).

**Table 3. Death rate of ICU admissions at week days versus weekends & public holidays.**

Variable		Weekdays		Weekends & holidays		Total		P value
		No.	%	No.	%	No.	%	
Admitted patients	Discharged alive	1472	87.8	662	87.5	2134	87.7	0.79
	Dead	204	12.2	95	12.5	299	12.3	
	<b>Total</b>	1676	100.0	757	100.0	2433	100.0	

Death rate among patients in the other hospital wards, (excluding ICU and obstetric ward) showed statistically significant increased death

during the weekends and holidays compared to that on other weekdays. (3.5% versus 1.9%, P value < 0.0001). (Table-4)

**Table 4. Death rate of admissions to the other medical wards on week days versus weekends and public holidays**

Variable		Weekdays		Weekends & holidays		Total		P value
		No.	%	No.	%	No.	%	
Admitted patients	Discharged alive	23936	98.1	7860	96.5	31796	97.7	0.0001
	Dead	468	1.9	286	3.5	754	2.3	
	<b>Total</b>	24404	100.0	8146	100.0	32550	100.0	

All-cause death, through our study, was found to be significantly higher on weekends and holidays than that on the other weekdays in the

hospital as a whole. (4.3% versus 2.6% P value < 0.0001). (Table-5).

**Table 5. Overall death rates in the hospital during weekdays and weekends and holidays.**

Variable		Weekdays		Weekends & holidays		Total		P value
		No.	%	No.	%	No.	%	
Admitted patients	Discharged alive	25408	97.4	8522	95.7	33930	97	0.0001
	Dead	672	2.6	381	4.3	1053	3	
	Total	26080	100.0	8903	100.0	34983	100.0	

## DISCUSSION

In this study we try to shed light on the impact of weekends & public holidays on the in-hospital death rate in Misan governorate. Out of the 34983 patients admitted to the Al-Sadder teaching hospital in Misan, 8903 patients (25.4%) were admitted at the weekends and public holidays. A study showed that weekend admissions to hospitals comprised (24.8%) of all admissions.<sup>[10]</sup> Substantial medical and public attention was paid to the effect of weekends and holidays on the outcome of hospitalized patients. Evidence about the relationship between weekend admission to the hospital and quality of care was conflictin according to many studies.<sup>[3]</sup> In our study, severely ill patients admitted to the ICU constitute 6.4% of the total admissions to the hospital at the week days, compared to 8.5% of the total admissions at weekends and holidays. Also, out of the total 2433 patients admitted to the ICU, 757 (31.1%) was admitted at the weekends and holidays, this seems to be a bit more than that in other hospitals as shown by one study in which it was found that ICU admission at weekend comprised 27.9% of all ICU admissions.<sup>[11]</sup> Such apparently high number of ICU admissions at weekends and holidays, in our study, may be due to the fact that the ICU in Al-Sadder teaching hospital in Misan is the only intensive care unit in the governorate, to which, severely ill patients from

all regions of the governorate are usually referred, or there is lower threshold for admission to this ICU. In our study, there is no statistically significant differences in death rates among admitted patients to the ICU at weekends or holidays and other weekdays (12.5 versus 12.2, P value 0.79). Among 160,220 admissions to the ICU, for acute myocardial infarction, there was no significant difference in mortality on a weekend or a weekday according to other study.<sup>[12]</sup> Other studies showed different results regarding the effect of weekends on the ICU death rate as in a study which showed that, admitted patients to the ICU at the weekend and holidays, have 8% more death risk than those admitted during other weekdays with particularly higher death risk for some of the risky medical conditions, such as aortic aneurysm, and pulmonary embolism, when admitted at weekend or holidays.<sup>[13]</sup> Data from 150,000 patients admitted to ICUs at 28 hospitals was analyzed and revealed a 9% higher risk of in-hospital mortality among admission to the ICU during the weekend,<sup>[14]</sup> other study found that death rate in ICU admission was 26% at weekends compared to 16% of admissions at other week days.<sup>[15]</sup> According to another study, the Brazilian ICU admissions showed that the mortality among admissions on weekends and holidays was 24% and for those admitted on weekdays was 13%.

<sup>[16]</sup> Such different death rates in different studies or hospitals may be related to; the nature and severity of the disease, different guide lines regarding indication of admission to the ICU, or may be due to different levels of .medical care and resources. The relation of the death rate to the severity of the disease was shown by many studies as in one which showed that admission to the emergency room was associated with a mortality rate of 23.4% compared to 12.5% for other week days admission.<sup>[17]</sup> Other study showed that patients with surgical problems had higher mortality rate when admitted to the ICU at holidays or weekends than weekday. <sup>[18]</sup> However, death rate, as detected through our study, was significantly higher (P-value < 0.0001) among individuals brought to other medical wards in the hospital (excluding ICU and labor room) at holidays and weekends than other week days admissions, (3.5% versus 1.9%). Also we found that, all-cause, death rate in the hospital as a whole, is significantly higher on the weekends and public holidays than on the other weekdays (4.3% versus 2.6%, P value < 0.0001), this finding is, to some extent, comparable to results of another study which showed that the in-hospital death rate was 5.8% of admission on a public holiday compared with 3.7% of admission on other days of the week. <sup>[19]</sup> A study done in England hospitals, showed that , there was 15% more risk of death for those admitted on weekends as compared to those admitted on other weekdays.<sup>[9]</sup> We hope through this study to have our own baseline data about the performance of our hospital during the holidays and weekends as reflected by the nature of the impact of weekends or holidays on the in-hospital death rate. Although, it seems that we are not so different from many other hospitals elsewhere with respect to difference in the death rates among admissions at holidays or weekdays, we should have our plans and studies to find out any defect in health care that may affect the hospital performance negatively, and

to try our best to correct it, so that to improve the health care patient outcome.

## CONCLUSIONS

1. Considerable number of all patients admitted to the hospital in the year of the study, were managed in the intensive care unit due to severe clinical problems. This may explain, to good extent higher death rate in ICU admission on different days of the week.
2. Comparable death rates among ICU patients at weekends and other weekdays, as found in our study, may be due to the similarity of medical care and resources in the ICU during different days of the week, (holidays, and other weekdays) or may be due to comparably severe clinical conditions of ICU patients.
3. The statistically significant higher death rate among patients in the other medical wards of the hospital, (excluding labour room and ICU) at weekends and holidays as compared to other week days, should be considered carefully to highlight its underlying causes and plan for its correction or management.
4. As it is the first study in Misan governorate, it may present baseline data about such important issue, also it may be of benefit for planning to improve health care in the hospitals particularly during holidays, also, it may be of importance for future, probably more informative, studies.
5. To improve the outcome of admissions to the hospital at weekends and holidays, it is recommended.

## RECOMMENDATION

That the medical care and resources should be enough and similar to that available at other days of the week or should be arranged in appropriate way to meet the requirement of medical care according to the nature and severity of clinical problems admitted to the hospital at holidays on the weekends and holidays.

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