

## The Association between Birthdays and Medical Emergencies

### Abstract

**Background:** Not many studies have examined the risk of emergency medical attendance during stressful life events or special days such as birthdays. This study looked at whether patients had a higher than normal chance of attending the emergency departments around their birthdays compared to the rest of the year. **Methods:** Patient attendance data were collected from our accident and emergency department from April 2013 to March 2014. The birthday of individual patients was matched with their date of attendance to find out the number of patients attending emergency department on and around their birthdays. Chi-square test and binominal distribution test were used to compare birthday attendances with those occurring at other times of the year. **Results:** A total of 1028 patients attended within the 7 days starting from their birthday (expected number 49,  $211/52 = 946$ ). This was found to be statistically significant ( $P = 0.0071$ ). Road traffic accidents were more frequent on both the birthday week and the week after birthday. Medical emergencies, injury in a public place, 19–35 years age group and male patients showed similarly significant association but for the week after birthday only. **Conclusions:** People are more likely to present to emergency departments in the week starting from their birthday than any other week of the year. There is scope for public health initiatives such as sending health education information in the form of a birthday card to raise awareness of this risk.

**Keywords:** Attendance, birthday, emergencies

### Introduction

Not many studies have examined the risk of emergency medical attendance during stressful life events or special days. A literature search found no such studies looking at association of birthdays and emergency department attendances. Birthdays have been implicated in vascular events,<sup>[1]</sup> associated with higher suicide rates,<sup>[2]</sup> and general practice attendances.<sup>[3]</sup> Alcohol-related injuries have been shown to be more common around birthdays and special events.<sup>[4]</sup> It is also well documented that men are more likely to seek emergency medical attention than women.<sup>[5]</sup>

The present study looked at whether patients had a higher than normal chance of attending emergency department for any cause around their birthdays compared to the rest of the year.

### Methods

#### Study design and data collection

Patient attendance data were collected from our district general hospital's accident and

emergency department for a full calendar year from April 1, 2013, to March 31, 2014. The birthday of individual patients was matched with their date of attendance to find out the number of patients attending emergency department on and around their birthdays. This was done by our information support team using hospital attendance data, and this was separated into different subsets to see if individual coding categories (such as place of injury, mode of injury, age, and sex) had any similar correlation. Patient's mode of injury/presentation included road traffic accidents (RTAs), sports injuries, medical problems, psychiatric problems, assault, and self-inflicted injuries. Place of injuries included public place, leisure amusement parks, workplace among others including home. They were divided into <18 years, 19–35 years, 36–65 years, and >66 years to look at the effect of age on attendance patterns.

Attendance data were tabulated in three different subsets, one based on whether patients attended on their birthday itself, second whether they attended in their birthday week ( $\pm 3$  days of their birthday, 3 days before and after including the birthday, giving a total of 7 days/1 week),

**How to cite this article:** Kurup H, Uzoigwe CE. The association between birthdays and medical emergencies. *Int J Prev Med* 2017;8:21.

### Harish Kurup, Chika Edward Uzoigwe

Department of Orthopaedics, Pilgrim Hospital, United Lincolnshire Hospitals NHS Trust, Boston, PE21 9QS, United Kingdom

**Address for correspondence:** Mr. Harish Kurup, Pilgrim Hospital, United Lincolnshire Hospitals NHS Trust, Boston, PE21 9QS, United Kingdom. E-mail: [harish.kurup@bostonfoot.co.uk](mailto:harish.kurup@bostonfoot.co.uk)

#### Access this article online

**Website:** [www.ijpvmjournal.net/www.ijpm.ir](http://www.ijpvmjournal.net/www.ijpm.ir)

**DOI:** 10.4103/ijpvm.IJPVM\_6\_16

#### Quick Response Code:



This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: [reprints@medknow.com](mailto:reprints@medknow.com)

and third whether they attended in the week after their birthday (within 7 days/1 week starting from their birthday).

### Statistics

Statistical evaluation was done using MedCalc statistics software, Version 16.8.4 (Medcalc, Belgium). The univariate Chi-square test was used to compare birthday attendances with those occurring at other times of the year, and a  $P < 0.05$  was considered to be significant for this study. When the expected number of events was five or less, binominal distribution test was used instead. It was assumed that on any given day of the year chance of a person attending the emergency department was the same. Hence, number of patients presenting to hospital on their birthday should be yearly attendance number/364 (2014 was not a leap year). Similarly, an average weekly attendance rate (yearly attendance number/52) should correspond to the number presenting on their birthday week or the week after their birthday.

The study was conducted with approval from the Hospital's Clinical Governance Department.

### Results

A total of 49,211 patients attended our emergency department between April 1, 2013, and March 31, 2014 [Table 1]. Of these, 50.8% were male. We divided them into four age categories: <18 years (19.4%), 19–35 years (20.8%), 36–65 years (29.5%), and >66 years (30.3%). Out of these, 146 patients attended on their birthday itself which was

higher than normal (expected number  $49,211/364 = 135$ ). However, this was found not to be statistically significant (146 vs. 135;  $P = 0.34$ ). Nine hundred and fifty-one patients attended within the week ( $\pm 3$  days) around their birthday (expected number  $49,211/52 = 946$ ). This was found not to be statistically significant (951 vs. 946;  $P = 0.8$ ). A total of 1028 patients attended within the 7 days starting from their birthday (expected number  $49,211/52 = 946$ ). This was found to be statistically significant (1028 vs. 946;  $P = 0.0071$ ).

Out of 997 patients who attended for RTA, thirty patients attended in the week around their birthday (expected number  $997/52 = 19.17$ ). This was found to be statistically significant (30 vs. 19.17;  $P = 0.013$ ). Twenty-eight patients attended in the week after their birthday (expected number  $997/52 = 19.17$ ). This was found to be statistically significant as well (28 vs. 19.17;  $P = 0.042$ ). No association with birthday was found for assault-related injuries, psychiatric emergencies, or self-inflicted injuries in this study. Out of 19,130 patients whose attendances were for a medical condition (other than injury/surgical), 59 patients attended on their birthday (expected number  $19130/364 = 52.5$ ). This was found not to be statistically significant (59 vs. 52.5;  $P = 0.40$ ). Three hundred and eighty-three patients attended in the week around their birthday (expected number  $19130/52 = 367.9$ ). This was found not to be statistically significant (383 vs. 367.9;  $P = 0.42$ ). Four hundred and twenty-one patients presented in the week following their birthday. This was found to be statistically significant (421 vs. 367.9;  $P = 0.0052$ ).

**Table 1: Emergency department attendance figures and association with birthday**

	Total number	Attendance on birthday (day 0)			Attendance on birthday week (0±3 days)			Attendance on week after birthday (0+6 days)		
		Actual number	Expected number	P (Chi-square test)	Actual number	Expected number	P (Chi-square test)	Actual number	Expected number	P (Chi-square test)
All patients	49,211	146	135	0.34*	951	946	0.8	1028	946	0.0071
Mode of injury										
Road traffic accident	997	6	2.73	0.12*	30	19.17	0.013	28	19.17	0.042
Assault	656	3	1.8	0.54*	14	12.6	0.69	11	12.6	0.65
Psychiatric	470	4	1.29	0.083*	11	9.04	0.51	11	9.04	0.51
Self-inflicted	509	3	1.39	0.33*	12	9.8	0.48	13	9.8	0.3
Medical	19,130	59	52.5	0.40	383	367.9	0.42	421	367.9	0.0052
Place of injury										
Public place	5810	22	15.9	0.13	127	111.7	0.13	144	111.7	0.0020
Age group (years)										
<18	9532	29	26.18	0.64	184	183.3	0.96	200	183.3	0.21
19-35	10,268	32	28.21	0.52	202	197.5	0.75	229	197.5	0.024
36-65	14,516	40	39.9	0.97	264	279.2	0.36	280	279.2	0.96
>66	14,895	45	40.92	0.56	301	286.4	0.38	319	286.4	0.052
Sex										
Males	24,994	73	68.66	0.62	506	480.65	0.24	540	480.65	0.0063
Females	24,217	73	66.53	0.45	445	465.71	0.33	488	465.71	0.30

\*Binomial distribution test

Totally, 5810 patients had an injury at public place, 22 patients attended on their birthday (expected number  $5810/364 = 15.9$ ). This was found not to be statistically significant (22 vs. 15.9;  $P = 0.13$ ). One hundred and twenty-seven patients attended in the week around their birthday (expected number  $5810/52 = 111.7$ ). This was not statistically significant (127 vs. 111.7;  $P = 0.13$ ). One hundred and forty-four attended in the week following their birthday (expected number  $5810/52 = 111.7$ ). These were found to be statistically significant (144 vs. 111.7;  $P = 0.002$ ).

Out of the 10,268 patients in the age group 19–35 years, 32 attended on their birthday (expected number  $10268/364 = 28.21$ ). This was not statistically significant (32 vs. 28.21;  $P = 0.52$ ). Two hundred and two patients attended in the birthday week (expected number 197.5;  $P = 0.75$  not significant). However, 229 patients attended in the week after their birthday which was statistically significant (expected number 197.5;  $P = 0.024$ ). Similarly, there was no increased attendance rates in age groups < 18 years, 36–65 years, over 65 years or in females as a group [Table 1]. Out of the 24,994 males who attended emergency department, 73 attended on their birthday (73 vs. 68.66;  $P = 0.62$  not significant), 506 attended on birthday week (506 vs. 480.65;  $P = 0.33$   $P = 0.62$  not significant). However, there was significantly higher number in the week after birthday with 540 men attending for emergencies (540 vs. 480.65;  $P = 0.0063$ ).

## Discussion

Oxford dictionary<sup>[6]</sup> defines birthday as “The anniversary of the day on which a person was born, typically treated as an occasion for celebration.” Wikipedia<sup>[7]</sup> quotes “A birthday is an occasion when a person or institution celebrates the anniversary of their birth.” It also explains how different cultures connect it to a person’s development such as reaching adulthood, becoming eligible to vote/marry/legally purchase alcohol or tobacco products, obtain a driving license, and so on. Even though birthday is an occasion of celebration for most, it also reminds individuals of the aging process and can also be a stressful event for some with significant psychological effects. Studies<sup>[8]</sup> have shown an increased incidence of alcohol-related adverse events in young adults around their birthdays. Our finding of increased attendance rates in patients aged over 18 years (19–35 years group) can be explained by the legal age for purchasing/drinking alcohol in the United Kingdom which is set at 18.

The main finding of this study is that people are more likely to present to hospital in the 7 days starting from their birthday ( $P < 0.0071$ ). They are not more likely to attend on their birthdays itself although ( $P = 0.34$ ) or on the week around this ( $P = 0.8$ ). This may be because most people work full time and may defer their birthday celebrations to

a more convenient time which is usually the weekend after their birthday. The 7 days starting on the birthday covers the first weekend after the birthday. This should explain the observed higher emergency department attendance rate in this particular period.

The myth of birthday blues is well known, but there is conflicting evidence on whether suicides are higher around birthdays or not. A German study<sup>[9]</sup> looking at 11,378 deaths from suicide found no evidence to suggest their association with birthdays. However, the UK study<sup>[10]</sup> observed that in men aged 35 and above, receiving mental health care, there was an increased risk for suicide around their birthday compared to the general population. Our study did not look at suicide rates or attempts but looked at emergency attendances for psychiatric consultations only. A study from Hungary<sup>[11]</sup> showed high suicide rates in men of all age groups on their birthday but only found this to be true in women over the age of 60 years. We failed to find any statistically significant higher attendance rates for patients on their birthdays for psychiatric problems.

A Canadian study<sup>[1]</sup> looking at more than 70,000 emergency admissions with acute stroke, transient ischemic attacks, and acute myocardial infarction observed that these events showed a statistically significant higher incidence on the patients’ birthday. They did not find any increase in incidence for control conditions such as asthma, appendicitis, or head trauma. They concluded that in patients with predisposing conditions the birthday stress may trigger vascular events. They have noted that similar increases in vascular events have been recorded around significant events such as earthquakes, terrorist attacks, and even football matches. Based on the above observations, they recommended avoidance of risk factors such as exposure to cold temperatures, excess physical exertion, salt and alcohol consumption in individuals with known risk factors around their birthday. They also suggested that reminder strategies may help improve the adherence to medications during birthdays. Our study did not look specifically at vascular events. However, we did find a statistically significant increase in attendance rates for a medical condition in the week after birthday which does cover some of these emergencies.

We found that a significantly higher number of male patients presented to emergency department in the week after their birthday. Risk-seeking behavior in men leading to medical emergencies has been well documented in literature as well.<sup>[5]</sup>

We found a higher incidence of RTAs around birthdays, both on the birthday itself and in the week after. However, we did not investigate into the cause of these accidents and whether or not any alcohol consumption was alleged or proved in any of these. However, it is well known that

consumption of alcohol even within legal limits increases the risk of RTAs.<sup>[12]</sup> Studies have looked at birthday cards<sup>[8]</sup> warning on the consequences of excessive drinking around 21<sup>st</sup> birthdays and found positive results. The mere knowledge that birthdays are associated with higher rates of emergencies may help in designing appropriate preventive strategies. This may be public health initiatives at a social level or at a more personal level based on enhanced public awareness. A birthday card from the local health authority with some health advice may not be the ultimate answer to this but may go a long way as a starting point.

### Limitations

Are birthdays evenly distributed during the year? As per the US statistics<sup>[13]</sup> from 1973 to 1999, February 29<sup>th</sup> has the least common birthday as expected (due to once in 4 years occurrence in leap years only), followed by December 25<sup>th</sup> and January 1<sup>st</sup>. These were followed by December 24<sup>th</sup>, January 2<sup>nd</sup>, and then July 4<sup>th</sup>. The most common birthday was September 16<sup>th</sup>. These may be explained by seasonal variations in conception and also the preferences of parents and doctors at times of induction of labor/cesarean section as up to 50% children may be born this way.<sup>[14]</sup> This has been the focus of many mathematicians' debates,<sup>[15]</sup> and the consensus appears to be that for all mathematical calculations, it is safer to assume that there is equal chance of birthdays along any day of the year.

Sub-subset analysis including many possible combinations of mode of injury and place on injury may have been possible using the same data but was not explored due to the complexity of work involved. Analyzing Friday to Sunday period immediately following the birthday to support the theory of weekend celebration was also not explored due to similar reasons.

This study was conducted in the UK district general hospital. The study population in other countries with a different cultural background may be different, and hence, our findings may not be reproducible elsewhere.

### Conclusions

People are more likely to present to emergency departments in the 7 days starting from their birthday and more so for RTAs or any medical problem. Higher attendance rates were also seen in the 19–35 years age group and males. There is scope for public health initiatives such as sending health education information in the form of a birthday card to raise awareness of this risk.

### Acknowledgments

We wish to thank Joan Padley and Honor Green, Information Analysts at our Hospital for their contribution to the study by collecting the required data.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

**Received:** 06 Jan 16 **Accepted:** 13 Jan 17

**Published:** 06 Apr 17

### References

1. Saposnik G, Baibergenova A, Dang J, Hachinski V. Does a birthday predispose to vascular events? *Neurology* 2006;67:300-4.
2. Alter M. Patient page. Birthday blues. *Neurology* 2006;67:E3-4.
3. Handysides S. Characteristics of patients who consult their GP on their birthdays. *Br J Gen Pract* 2011;61:575-6.
4. Lewis MA, Lindgren KP, Fossos N, Neighbors C, Oster-Aaland L. Examining the relationship between typical drinking behavior and 21<sup>st</sup> birthday drinking behavior among college students: Implications for event-specific prevention. *Addiction* 2009;104:760-7.
5. Lendrem BA, Lendrem DW, Gray A, Isaacs JD. The Darwin awards: Sex differences in idiotic behaviour. *BMJ* 2014;349:g7094.
6. Oxford University Press. Available from: <http://www.oxforddictionaries.com/definition/english/birthday>. [Last accessed on 2015 Oct 03].
7. Wikipedia. Available from: <https://www.en.wikipedia.org/wiki/Birthday>. [Last accessed on 2015 Oct 03].
8. Labrie JW, Migliuri S, Cail J. A night to remember: A harm-reduction birthday card intervention reduces high-risk drinking during 21<sup>st</sup> birthday celebrations. *J Am Coll Health* 2009;57:659-63.
9. Reulbach U, Biermann T, Markovic K, Kornhuber J, Bleich S. The myth of the birthday blues: A population-based study about the association between birthday and suicide. *Compr Psychiatry* 2007;48:554-7.
10. Williams A, While D, Windfuhr K, Bickley H, Hunt IM, Shaw J, *et al*. Birthday blues: Examining the association between birthday and suicide in a national sample. *Crisis* 2011;32:134-42.
11. Bozsonyi K, Veres E, Zonda T, Kmetty Z. The effect of birthday in the fluctuation of suicides in Hungary (1970-2002). *Psychiatr Hung* 2010;25:74-9.
12. Leporati M, Salvo RA, Pirro V, Salomone A. Driving under the influence of alcohol. A 5-year overview in Piedmont, Italy. *J Forensic Leg Med* 2015;34:104-8.
13. Chandra A. For New York Times; 2006. Available from: [http://www.nytimes.com/2006/12/19/business/20leonhardt-table.html?\\_r=2](http://www.nytimes.com/2006/12/19/business/20leonhardt-table.html?_r=2) &. [Last accessed on 2015 Oct 03].
14. Todman D. A history of caesarean section: From ancient world to the modern era. *Aust N Z J Obstet Gynaecol* 2007;47:357-61.
15. Wikipedia. Available from: [https://www.en.wikipedia.org/wiki/Birthday\\_problem](https://www.en.wikipedia.org/wiki/Birthday_problem). [Last accessed on 2015 Oct 03].