

Black clouds in the Emergency Room: myth or fact?

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Summary

INTRODUCTION: The reliability of anecdotes regarding the presence of unfortunate junior doctors in the Emergency Department (ED), so-called black clouds, is unknown. We tested this myth by identifying physicians who habitually present an outstandingly high workload.

METHODS: The workload of junior doctors over 1 year was retrospectively investigated by analysing quantitative (number of patients visited during a shift) and qualitative (corresponding workload according to the severity of the diseases) parameters. We also looked for potential associations between workload and the following factors: junior doctors' personal characteristics, self-evaluation of their degree of fortune and outside evaluation by senior physicians.

RESULTS: Junior doctors cared for 5.6 ± 3.2 (mean \pm standard deviation; range 1–19) patients per working shift in the ED. The average daily workload was 12.0 ± 6.4 (range 1–37). There was a significant physician effect on the average number of patients per shift ($p < 0.0001$), ranging from 2.7 to 7.7. The physician with an average of 7.7 was particularly unfortunate when compared with the third of the most fortunate (p -values from 0.0017 to 0.0496). Apart from the mention of a cat as favourite animal ($p = 0.0224$ and 0.0327, respectively), no factor seemed to be associated with the number of patients per shift or with the daily workload.

CONCLUSIONS: There is evidence that black clouds, i.e., junior doctors with an exceptionally high workload, really exist in the ED. The phenomenon is rather rare and difficult to recognise, as the self- and outside perception of black clouds seems to be misleading.

Key Words: black clouds, myth, high workload, emergency medicine, unfortunate physician

Introduction

As their name suggests, Emergency Departments (EDs) were created for taking charge of serious disorders, but, over time, the proportion of ED patients with non-life-

threatening conditions has continuously increased [1–3]. Patient flows are somewhat unpredictable, and ED crowding is a well-known logistical problem [4]. From a statistical point of view, one might assume that this irregularity combined with frequently changing working shifts should somewhat equalise the workloads of emergency physicians' at a defined ED. However, in all EDs we personally know there are tales about unfortunate junior doctors, who are sometimes referred to as having a "black cloud": unfortunate in the sense that they generally have a rather huge workload. Interestingly, there is even some consensus among caregivers that a given physician has a black cloud, and it is common to overhear true and proper rankings regarding the degree of unfortunateness.

These beliefs may eventually lead to odd and even somewhat superstitious procedures. For example, there are senior physicians in our institution who, prior to facing their night shift as attendants, consult the corresponding timetable to identify whether they have to supervise a supposed black cloud. If an unfavourable constellation shows up, they are prepared to never close their eyes during the night and they start to experience strange gut feelings. There are colleagues who convincingly assert that they having performed, on some occasions, unambiguous rituals such as crossing the fingers or making the sign of a cross.

Little is known as to whether black clouds really exist in the ED or whether we are actually dealing with an imaginary entity [5–7]. Thus, the objective of the present study was to identify unfortunate junior doctors by analysing their actual and perceived workloads in the ED and defining probable associations with their personal characteristics.

Methods

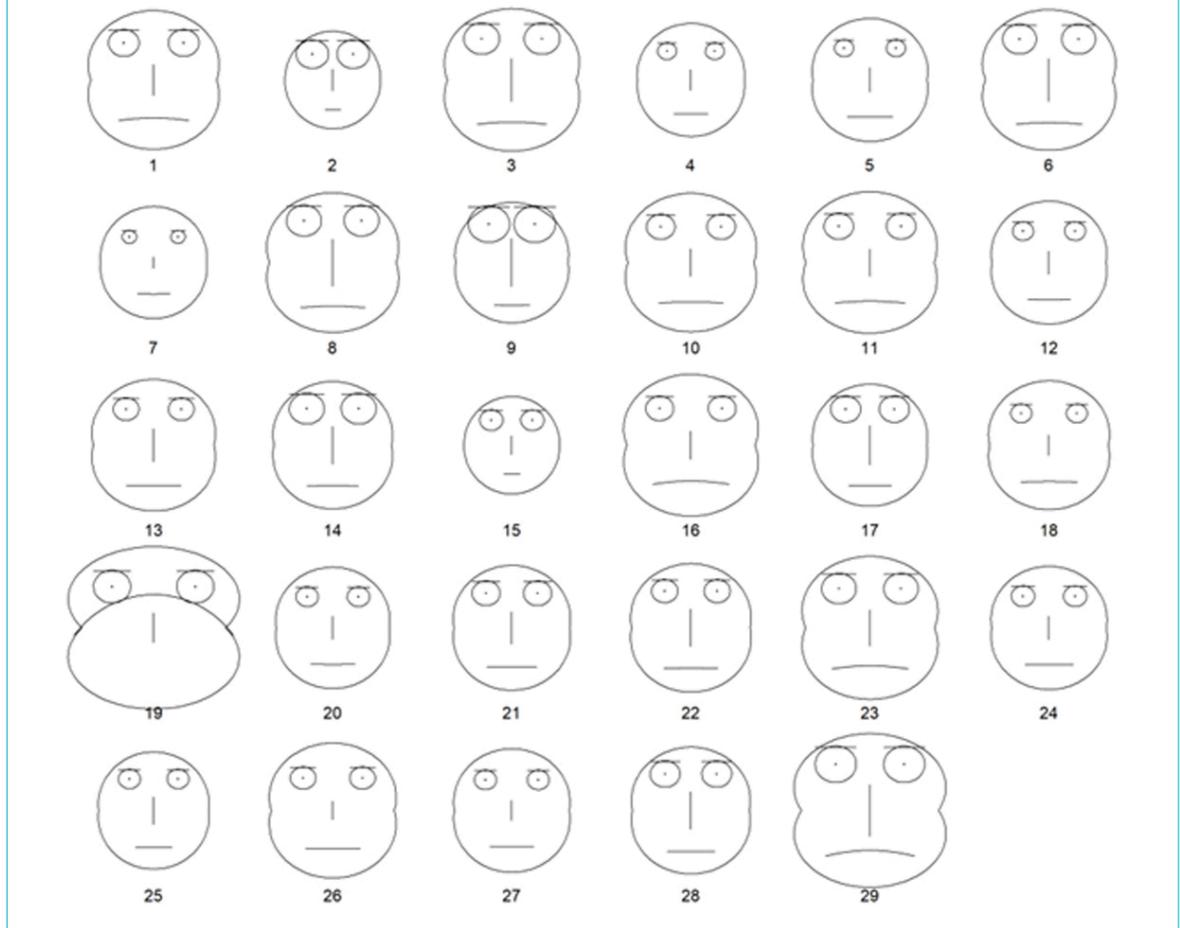
Site and subjects

This was a retrospective observational study investigating the workload of junior doctors of the Departments of General Internal Medicine and General Surgery from a regional teaching hospital in Southern Switzerland. We focused

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Figure 1: Chernoff faces representing the number of patients per working shift visited by the single junior doctors and their daily workload (revised SETS), respectively. The number of patients is represented by the curvature and size of the mouth, and its variability by the size of the nose. The workload is displayed by both the height and the width of the face, as its standard deviation by the size of the eyes.



on their work in the ED from 1 October 2015 to 30 September 2016.

Data sources and collection methods

Upon admission to our ED, specifically trained nurses using the revised Swiss Emergency Triage Scale (SETS, an emergency scale ranging from 1 [acute critical situation] to 4 [non-urgent situation]) triaged each patient [8]. The analysis included all relevant patients eventually handled by the junior doctors; bagatelle cases were excluded. Quantitative (number of patients visited per day) and qualitative (severity of disease/injury) data regarding the amount of work were extracted from our electronic medical record. For each degree of severity a corresponding quantified workload was defined: SETS 1 = 4 points, 2 = 3 points; 3 = 2 points and 4 = 1 point; daily workload was thus the sum of all workloads during one working shift. Data were obtained by simple computerized cross-checks with no direct access to the patients' clinical database. Thus, no patient was directly involved in the design and implementation of the study.

In parallel, all junior doctors were asked to fill out a questionnaire regarding some personal characteristics (see [table 1](#)). They were also interviewed about their perception of having had a black cloud during ED shifts over the last 12-month period; a Likert scale ranging from 1 (black cloud; very unfortunate) to 6 (white cloud; very fortunate) was used. The same Likert scale served for hetero-evalua-

tion by three corresponding senior physicians, classifying each resident by analogy.

As this study did not use direct patient data, no approval from by the regional ethics committee was required. All participants (junior doctors) provided written informed consent.

Statistical analysis

Differences between physicians regarding either the number of visited patients per shift or the daily workload were investigated with an analysis of variance (ANOVA) model, followed by Dunnett's tests. Potential links between the number of patients seen per shift, the daily workload of these patients, and the junior doctors' personal characteristics (including the evaluation by senior physicians) were investigated with linear mixed effect models, taking the factor junior physician as a random effect. Correlation between the two scales of fortune (auto-evaluation and hetero-evaluation by the senior physicians) was also computed. All analyses were carried out with R version 3.2.2, R Foundation for Statistical Computing, Vienna, Austria, running Windows 7 Service Pack 1.

Results

Twenty-nine out of 35 junior doctors were enrolled for thorough analysis. They participated in a total of 9864 consultations in the ED, over 1789 work shifts. Among them,

7927 (80.4%) were ambulatory examinations and for 1937 (19.6%) the patient was eventually hospitalised.

On average, the junior doctors cared for 5.6 ± 3.2 (mean \pm standard deviation) patients per working shift (range 1–19); for almost all physicians the percentage of ambulatory patients was between 65 and 85%. The average daily workload was 12.0 ± 6.4 points (range 1–37). There was a significant physician effect regarding the average number of patients per shift ($p < 0.0001$), ranging from 2.7 to 7.7. The physician with an average of 7.7 was particularly unfortunate when compared with the third of the most fortunate (p -values from 0.0017 to 0.0496). [Figure 1](#) illustrates the overall situation of quantitative and qualitative workload by means of Chernoff faces [9]; it allows the immediate detection of a black cloud (Resident 19) and of some white clouds (Residents 2, 4 and 15).

No factor (personal characteristics, self-evaluation, evaluation by the senior physician) was associated with the number of patients per shift, apart from the choice of the cat as the favourite animal ($p = 0.0224$; [table 1](#)). The same was observed for the daily workload ($p < 0.0001$): apart from the favourite animal, no factor was associated with the average daily workload ($p = 0.0327$; [table 1](#)).

One physician (3%) considered himself unfortunate (2 points on the 1–6 Likert scale), five (17%) rather unfortunate (3 points), 13 (45%) rather fortunate (4 points), and 10 (35%) fortunate (5 points). No one chose the two extremities of the scale (1 or 6). The correlation between the self-evaluation of fortune and the evaluation by senior physicians was 0.4949 ($p = 0.0063$).

Discussion

This work shows evidence of the existence of black clouds in the ED. On average, black clouds clearly handle a greater number of patients per working shift and also face a higher workload in terms of more severely ill patients.

Our data are dissimilar to previous research, since the former studies: (1) were based on small physician samples, namely six to 19 junior doctors [5–7]; and (2) applied a different methodology insofar as that the reputation of the junior doctors was related to their actual workload [5–7]. Accordingly, perceived black clouds had similar workloads to perceived white clouds. We have also seen that junior doctors who perceive themselves as having a black cloud do not face a huge workload. Conversely, our study focused on authentic black clouds.

The external assessment by senior doctors also seems to be inadequate and, therefore, we may question their occasional superstitious rituals. Fortunately, recent research has shown that superstitious procedures may be beneficial anyway and might thus be reasonably promoted [10]. Specifically, superstitious thoughts and practices in daily routine may increase performance by boosting the individual's confidence in mastering upcoming tasks, through increased task persistence as well as by changes in perceived self-efficacy [10].

Having a black cloud is a rather rare phenomenon; just 3% of the residents in the ED seem to fulfil the necessary quantitative and qualitative criteria. However, these unfortunate junior doctors are difficult to characterise and, accordingly, to identify. In fact, no personal feature was significantly

associated with a high workload apart from the favourite animal, a cat.

This study has some limitations. Firstly, it was a single centre study dealing with 29 junior doctors only. Although our data support the existence of black clouds in the ED and help to describe the phenomenon, they may be not generalised to all junior doctors whatever their discipline and wherever they work. Nonetheless, we examined a 12-month period with a significant number of working shifts and consultations for each resident. Secondly, our research focused on junior doctors only, and hierarchically more advanced doctors (and other professionals) were not considered. Thus, we may not know whether this phenomenon disappears over time and whether it is limited to our profession only. Finally, as our junior doctors do not clock their working shifts we were unable to put our results in context with each resident's skill and efficiency. The presence of black and white clouds might, however, question the general assumption that junior doctors have comparable experiences throughout their training [11].

In conclusion, junior doctors having a black cloud actually exist in the ED. Still, this phenomenon is rather rare and difficult to recognise, as the self- and outside perceptions of black clouds seem to be misleading.

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Table 1: Characteristics of the junior doctors depending on their daily workload.

Characteristics	Patients (n)	p-value	Daily workload (points)	p-value
Civil status				
Married	5.5 ± 3.2	0.8762	11.9 ± 6.3	0.9134
Single	5.5 ± 3.1		12.0 ± 6.4	
Hair colour				
Blonde	6.0 ± 3.3	0.4439	12.6 ± 6.6	0.7636
Brown	5.3 ± 3.0		11.6 ± 6.2	
Black	5.7 ± 3.1		12.1 ± 6.4	
Bold	5.4 ± 3.1		11.8 ± 5.9	
Grey	4.7 ± 2.4		10.7 ± 5.5	
Eye colour				
Blue	5.4 ± 3.2	0.9895	11.4 ± 6.2	0.6802
Brown	5.6 ± 3.1		12.1 ± 6.4	
Green	5.3 ± 3.1		11.9 ± 6.2	
Zodiac sign				
Air	5.6 ± 3.0	0.6197	12.0 ± 6.4	0.4489
Water	5.9 ± 3.6		13.0 ± 6.9	
Fire	5.2 ± 2.8		11.3 ± 6.1	
Earth	5.4 ± 3.0		11.6 ± 6.0	
Day of birth				
Monday	5.6 ± 3.2	0.5941	12.3 ± 6.3	0.7328
Tuesday	5.3 ± 3.3		11.4 ± 6.6	
Wednesday	5.6 ± 3.3		12.2 ± 6.4	
Thursday	5.7 ± 3.2		11.9 ± 6.7	
Friday	6.4 ± 3.2		13.4 ± 6.7	
Saturday	5.5 ± 3.0		11.6 ± 6.2	
Sunday	5.2 ± 2.8		11.6 ± 5.9	
Moon cycle at birth				
First	5.4 ± 3.0	0.2558	11.6 ± 6.2	0.1485
Full	4.3 ± 3.0		9.8 ± 5.8	
Last	5.6 ± 3.2		12.3 ± 6.4	
New	5.6 ± 3.5		11.4 ± 6.2	
Birth leap year				
Yes	5.1 ± 2.9	0.1484	10.9 ± 5.9	0.0669
No	5.7 ± 3.2		12.3 ± 6.4	
Car				
BMW group	5.7 ± 3.0	0.4556	12.4 ± 6.2	0.5492
Fiat-Chrysler	5.0 ± 3.3		11.0 ± 6.5	
Ford	4.8 ± 2.7		10.3 ± 5.8	
General Motors Group	5.7 ± 3.2		12.1 ± 6.6	
Volkswagen - Audi	5.0 ± 2.9		11.1 ± 5.7	
Renault - Nissan	5.3 ± 3.3		11.6 ± 6.5	
Other	5.7 ± 3.2		12.5 ± 6.4	
No car	5.8 ± 3.0		12.1 ± 6.4	
Favourite animal				
Dog	5.8 ± 3.3	0.0224	12.4 ± 6.6	0.0327
Cat	6.1 ± 3.1		12.8 ± 6.5	
Horse donkey	5.6 ± 3.2		12.5 ± 6.5	
Other	5.0 ± 2.9		10.9 ± 5.9	
Years of experience				
Increase for one additional year of experience	+0.0008 ± 0.022	0.9513	+0.0311 ± 0.0427	0.4411
Foot size				
Increase of one size	0.0272 ± 0.055	0.6299	+0.0097 ± 0.1090	0.9504
Self-evaluation of luck				
Increase by one degree on the 1 to 6 Likert scale	0.1984 ± 0.1917	0.2845	+0.5658 ± 0.3738	0.1230
Evaluation of luck by senior physicians				
Increase by one degree on the 1 to 6 Likert scale	0.1566 ± 0.1628	0.3295	+0.3561 ± 0.3227	0.2621

Data are expressed as mean number per shift ± standard deviation.