

The Tao of Bao: A Randomised Controlled Trial Examining the Effect of Steamed Bun Consumption on Night-Call Inpatient Course and Mortality

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Abstract

Background: Medical superstitions remain prevalent in today's stressful and technology driven healthcare environment. These irrational beliefs commonly involve night calls, which are periods of volatile workload. In Singapore and Hong Kong, it is commonly held that consumption of steamed buns ("bao") by on-call physicians is associated with increased patient admissions and mortality, due to a homonymous interpretation of the word "bao" in dialect. **Materials and Methods:** A prospective unblinded randomised controlled trial with a permuted block randomisation design was performed on weekdays over 6 weeks. Steamed buns or control food were offered to the internal medicine night-call team of a tertiary-care hospital on a nightly basis. Information on admissions and mortality was collected from the hospital electronic database. Data on sleep patterns and shift duration were obtained by interview. **Results:** There were no significant differences in the median number of hours slept on days on "bao" administration versus "control" intervention ($2 \pm$ median absolute variation of 1.5 h vs 2 ± 1.5 h, $P = 0.30$) or in the number of hours spent in the hospital (30.8 ± 1.9 h vs 30.5 ± 2.2 h, $P = 0.09$). There were no significant differences in the median number of general ward admissions per night ($n = 73 \pm 6$ versus 71 ± 7 admissions, $P = 0.35$), monitored care unit admissions (4 ± 1.5 vs 4 ± 1.5 admissions, $P = 0.65$) or inpatient mortality (2 ± 1.5 vs 2 ± 1.5 deaths per night, $P = 0.47$). **Conclusion:** The consumption of steamed buns ("bao") has no effect on inpatient admissions, mortality, or sleep duration on call. Regardless, our results indicate that the night call in Singapore remains a challenge in terms of workload and shift duration.

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Key words: Medical superstition, Night duty, Occupational medicine, Sleep deprivation

Introduction

The modern world remains full of superstition. Often, despite their better judgement, intelligent rational people adopt rituals and strategies to cope with anxiety and uncertainty. The medical profession is not exempt.

Several studies have investigated the prevalence and nature of such beliefs in the medical community. Doctors and nurses in the Western world own to beliefs that the full moon affects workload, trauma and emergency room admissions.¹⁻⁴ A majority of staff surveyed in some studies report that certain individuals are associated with "black clouds", attracting an excess of work.⁵ The belief that stating that a night call was quiet ("the Q word") would result in a supply of additional work is also common, though no difference has been demonstrated in a randomised controlled study in the United States.⁶

In Singapore and Hong Kong, the best known superstition in the healthcare community is the admonition against consumption of steamed buns ("bao") during a night call, lest the night-call staff be occupied with morbidity and mortality. Such a belief has been commonly accounted for by the homonymous interpretations of the term "bao", which may be interpreted as "to have the lion's share" of admissions or as a "shroud" for corpses. A recent survey of healthcare personnel in Singapore indicated that 46% of responders actively avoided these steamed buns during night calls.⁷

This study was undertaken to determine the effect of steamed bun ("bao") consumption by night-call staff on patient admissions and mortality, as well as total sleep duration each night.

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Materials and Methods

A prospective randomised controlled unblinded trial was conducted in the internal medicine service of a 1600-bed tertiary care hospital. The study extended over a period of 30 weekdays (excluding Saturdays and Sundays) extending over 6 weeks from February to April 2007. There was no public holiday during this period. Sample size calculations were based on a power of 0.8, $\alpha = 0.05$, and a projected absolute difference of 20 admissions and sigma of 20, with double-sided testing and continuity correction. Permuted block randomisation with a 1:1 ratio, using the day of the week, was used to assign each day randomly to consumption of steamed buns (A calls) or control food (B calls), to ensure group and periodic balance due to the expected variation of admission load over different weekdays. Primary end points were night-call inpatient admissions, monitored unit (ICU/high dependency) admissions and overall inpatient mortality. In view of the multiracial and multi-religious nature of the night-call staff, who hail from countries as diverse as Malaysia, Myanmar, India, Philippines, China, Pakistan, and the United Kingdom, the choice of filling for the steamed bun was minced vegetables, and therefore suitably *halal* and vegetarian. Water was supplied.

Fourteen night-call staff were on call each night with responsibility for inpatient care, inclusive of the medical intensive care unit: 5 house officers, 7 night call medical officers, and 2 registrars responsible for inpatient wards. Informed consent was obtained from each subject. Food was administered by individual delivery to the subject concerned in the afternoon preceding the call. Data on ward admissions and mortality between 4 pm and 8 am of the following day were collected from the hospital electronic medical record database. Data from each physician about compliance and on-call sleep duration were also collected the day following the call. All data were analysed in R version 2.2.1. Values in brackets represent the median absolute deviation. Non-parametric testing was performed in all situations (Wilcoxon's test). A *P* value of <0.05 was regarded as significant. Missing observations were excluded from the analysis.

The study was approved by the hospital institutional review board (IRB).

Results

The admission load over the period of the study is presented in Figure 1. Variation between the admissions by day of the week was observed ($P = 0.04$ by one-way analysis of variance), with heaviest patient loads seen on Mondays (Fig. 2). As mentioned, permuted block randomisation design was used to account for this anticipated variation.

Consent was sought from a total number of 144 physicians, and 137 provided informed consent. Of the 7 physicians who declined participation, 5 cited concerns about a potentially heavier on-call workload, 1 claimed food allergy, and the last physician cited an unspecified religious injunction against participation. Median compliance recorded on a daily basis was good and noted to be equivalent in both arms of the study ($86 \pm 10\%$ and $86\% \pm 2\%$ on both A and B calls, $P = 0.7$).

There was no statistical difference between the median number of total admissions on A calls ($n = 73 \pm 6$) and B calls ($n = 71 \pm 7$) ($P = 0.35$). Similarly, no difference was observed between the number of admissions to the monitored units on A and B calls (4 ± 1.5 versus 4 ± 1.5 admissions respectively, $P = 0.55$). No difference in the number of deaths was observed, with a median of 2 ± 1.5 deaths (A calls) and 2 ± 1.5 deaths (B calls) ($P = 0.54$).

The distribution of the number of hours slept per call, as well as the call shift duration is presented in Table 1. There is no significant difference observed between A and B calls. All subset analyses were pre-planned.

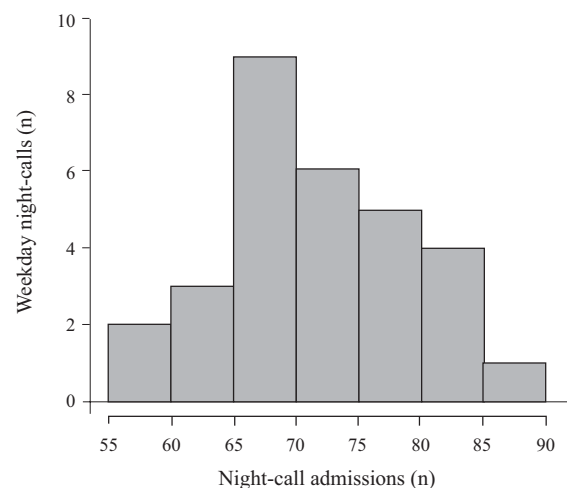


Fig. 1. Histogram of weekday night-calls by admission number.

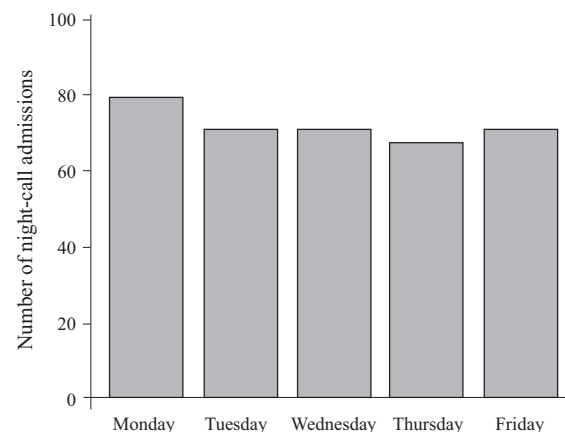


Fig. 2. Mean number of night-call admissions by day of the week.

Table 1. The distribution of the Number of Hours Slept Per Call and the Call Shift Duration

		A calls	B calls	P value
Median number of hours slept (h)	All doctors	2 ± 1.5	2 ± 1.5	0.30
	Registrars	3.0 ± 2.2	3.0 ± 2.9	0.69
	Medical Officers	2.5 ± 1.1	2.5 ± 1.5	0.71
	House Officers	1.5 ± 1.5	1.5 ± 1.1	0.62
Median call shift duration (h)	All doctors	30.8 ± 1.9	30.5 ± 2.2	0.09
	Registrars	33.8 ± 1.7	34 ± 2.2	0.60
	Medical Officers	30.5 ± 1.6	29.9 ± 1.4	0.053
	House Officers	30.7 ± 1.6	30.5 ± 1.5	0.79

Variation is represented with the median absolute deviation.

Discussion

This study conclusively demonstrates that steamed buns (“bao”) do not have an effect on inpatient admissions or mortality, contrary to medical and nursing superstition in Singapore and Hong Kong. The sadly rational result of this study is consistent with the conclusions of most studies designed to examine the basis of irrational beliefs within and without the medical and nursing community.

The weaknesses of this study are unlikely to overtly compromise the results. The study was designed with intervention based on days rather than individuals, resulting in a reduced granularity in analysis. A short response duration limited to several hours could not be excluded, given the study design. The choice of spiced vegetable filling rather than the more typical barbecued pork does mean that a more inimical effect of the latter cannot be excluded.

The results of this study need not be limited to an interpretation of medical superstition. Indeed, what may potentially be more important is the insight provided into the current state of physician welfare in Singapore. Whether medical staff may continue to function optimally and care for patients after a potentially uninterrupted 30 hours of work is a difficult question for doctors, healthcare administrators and patients. There are data suggesting an increase in errors, percutaneous needle injuries, adverse events and even driving accidents among sleep-deprived junior doctors.⁸⁻¹² A questionnaire-based study in 2004 surveying sleep patterns of house officers in Singapore has raised similar concerns as we do here.¹³

The compromise between training, clinical service, manpower and error rates is a very real issue that should be examined in a rational fashion driven by data. While continuous on-call shifts in the Western world in excess of 24 hours and even 36 hours remain common and are justified by many senior physicians on the grounds of training, there is a growing voice that the likely resulting error rates are unacceptable to society at large.

Interestingly, it was noted that the highest ranked physicians with the heaviest responsibilities both on- and off-call, the registrars, spent the longest total duration per call in the hospital, extending to a mean of 33 hours. The underlying reason is multifactorial, but presumably related primarily to service demands and training requirements.

Conclusions

This study demonstrates that steamed buns (“bao”) have no effect on night-call admissions or mortality, contrary to medical superstition in Singapore and Hong Kong. At the same time, this study points to the need to address the issue of workload and sleep deprivation among physicians.

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Conflict of Interest Statement:

No financial interests in any food or beverage companies by the authors are declared. Though eagerly sought, no pharmaceutical sponsorship was forthcoming.

REFERENCES

- Mathew VM, Lindsay J, Shanmuganathan N, Eapen V. Attempted suicide and the lunar cycle. *Psychol Rep* 1991;68(3 Pt 1):927-30.
- Nunez S, Perez Mendez L, Aguirre-Jaime A. Moon cycles and violent behaviours: myth or fact? *Eur J Emerg Med* 2002;9:127-30.
- Stair T. Lunar cycles and emergency-room visits. *N Engl J Med* 1978;298:1318-9.
- Allen JL. Emergency admissions and lunar cycles. *J Emerg Nurs* 1986;12:85-8.
- Tanz RR, Charrow J. Black clouds. Work load, sleep, and resident reputation. *Am J Dis Child* 1993;147:579-84.
- Ahn A, Nallamotheu BK, Saint S. “We’re jinxed” – are residents’ fears of being jinxed during an on-call day founded? *Am J Med* 2002;112:504.
- Lim EC, VM Oh, Quek AM, Seet RC. Take a bao if you are not superstitious. *Ann Acad Med Singapore* 2007;36:217-20.
- Barger LK, Ayas NT, Cade BE, Cronin JW, Rosner B, Speizer FE, et al. Impact of extended-duration shifts on medical errors, adverse events, and attentional failures. *PLoS Med* 2006;3:e487.
- Lockley SW, Landrigan CP, Barger LK, Czeisler CA. When policy meets physiology: the challenge of reducing resident work hours. *Clin Orthop Relat Res* 2006;449:116-27.
- Ayas NT, Barger LK, Cade BE, Hashimoto DM, Rosner B, Cronin JW, et al. Extended work duration and the risk of self-reported percutaneous injuries in interns. *JAMA* 2006;296:1055-62.
- Chow KM, Szeto CC, Chan MH, Lui SF. Near-miss errors in laboratory blood test requests by interns. *QJM* 2005;98:753-6.
- Barger LK, Cade BE, Ayas NT, Cronin JW, Rosner B, Speizer FE, et al. Extended work shifts and the risk of motor vehicle crashes among interns. *N Engl J Med* 2005;352:125-34.
- Puvanendran K, Venkatramani J, Jain A, Farid M. Sleep deprivation in junior doctors – house officers in Singapore. *Ind Health* 2005;43:129-32.