



Q fever—the superstition of avoiding the word “quiet” as a coping mechanism: randomised controlled non-inferiority trial

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ABSTRACT

OBJECTIVE

To determine the validity of the superstition that utterance of the word “quiet” in a clinical setting increases workload.

DESIGN

Prospective randomised controlled non-inferiority study.

SETTING

Microbiology department of a large teaching hospital in Lancashire, UK.

PARTICIPANTS

Two members of the medical microbiology team carried out the duty work on any given week day and an on-call team member on any weekend day. 29 days were assigned in which staff were to say “Today will be a quiet day” and 32 days were assigned in which staff were to refrain from saying the word “quiet” in any context.

INTERVENTIONS

Each day was randomly allocated to either saying “Today will be a quiet day” (intervention group) or refraining from saying the word “quiet” (control group) in any context.

MAIN OUTCOME MEASURES

The primary outcome was mean overall workload: a composite of number of clinically related telephone calls, clinically significant results, or validated results processed by the duty medical microbiology team during a 24 hour period referred to collectively as “clinical episodes.” A difference of 30 clinical episodes was considered as the margin of non-inferiority. Secondary outcomes included the individual components of the primary outcome.

RESULTS

Workload was measured each day over a 61 day period (1 May to 30 June 2019). A mean 139.0 clinical

episodes occurred on control days compared with 144.9 on days when the experimental intervention was uttered, a difference of 5.9 (95% confidence interval –12.9 to 24.7). The upper bound was less than the specified margin of 30, providing evidence for non-inferiority. No evidence of a difference in workload was found between interventions with any of the four components, whether considering unadjusted or adjusted analyses, or looking at the subgroups of week days or weekends.

CONCLUSIONS

The study findings refute the long held superstition that utterance of the word “quiet” impacts on clinical workload, and therefore it should not be avoided. In the era of considerable staff shortages and increased work related stress, doctors should look to other methods to increase resilience and protect their wellbeing and mental health.

TRIAL REGISTRATION

Lancashire Teaching Hospitals NHS Foundation Trust’s research department SE-259.

Introduction

*It’s oh so quiet
Shh shh
It’s oh so still
Shh shh
You’re all alone
Shh shh
And so peaceful until...¹*

someone wishes you a quiet shift, and then the whole thing is a disaster.

In the modern era of evidence based medicine, superstitions abound. One long held superstition is that utterance of the word “quiet” negatively affects a health professional’s shift because of increased workload and complexity of cases.² As mentioned in the book *This is going to hurt: Secret Diaries of a Junior Doctor*, “Say the Q word to a doctor and you’re all but performing an incantation, summoning the sickest patients in the world to your hospital.”³ Avoidance of the word quiet has therefore become common practice among healthcare professionals in the UK National Health Service and has also been mentioned in the United States⁴ and Japan.⁵

The evidence to support the harmful effect of the word quiet is mainly anecdotal, with only one other UK study concluding that the word impacted on on-call shifts in an orthopaedic department.⁶ We therefore conducted a randomised controlled non-inferiority trial to evaluate whether utterance of the word quiet increases clinical workload within a busy microbiology department of a teaching hospital in the north west of

WHAT IS ALREADY KNOWN ON THIS TOPIC

A long held superstition in healthcare is that uttering the word “quiet” adversely impacts on clinical workload

Previous studies have shown inconclusive results and therefore further evidence is required to better inform practice

WHAT THIS STUDY ADDS

In a busy hospital microbiology department, a mean 139.0 clinical episodes were encountered when the word staff refrained from uttering the word “quiet” compared with 144.9 on days when quiet was uttered

This difference of 5.9 (95% confidence interval –12.9 to 24.7) was within the study’s margin of non-inferiority

These findings suggest that uttering the word quiet does not significantly increase workload and that healthcare professionals should look to other, more evidence based, coping strategies

England. A secondary aim of the trial was to answer another mystery of the medical world—what medical microbiologists actually do.

Methods

Design

We conducted a randomised non-inferiority trial to evaluate the hypothesis that utterance of the word quiet increases clinical workload, as measured by the number of clinically related telephone calls, clinically significant results, and validated results processed daily by the duty medical microbiology team.

The null hypothesis for the study was that utterance of the word quiet increases clinical workload by no more than an average of 30 clinical episodes daily.

Because the trial participants were healthcare providers and not patients, we followed guidance from the International Committee of Medical Journal Editors, which states that trial registration is not required under these circumstances.⁷ The trial protocol was developed following SPIRIT (standard protocol items: recommendations for interventional trials) guidelines⁸ and finalised before study start.

Study setting

The microbiology department of Lancashire Teaching Hospitals NHS Foundation Trust is based at Royal Preston Hospital and in addition serves Chorley and South Ribble Hospital. The department provides district general hospital services to 370 000 people in Preston and Chorley and specialist care to 1.5 million people

across Lancashire and South Cumbria, including the specialties of oncology, major trauma, disablement services, neurology and neurosurgery, renal, and vascular. The laboratory team comprises more than 60 whole time equivalent laboratory and support staff and 5.8 whole time equivalent microbiology consultants and trainees. For the financial year 2018/19 the service received more than 530 000 specimens. Additionally, the department runs a home and clinic based Outpatient Parenteral Antimicrobial Therapy service, which in 2018 treated more than 300 patients.

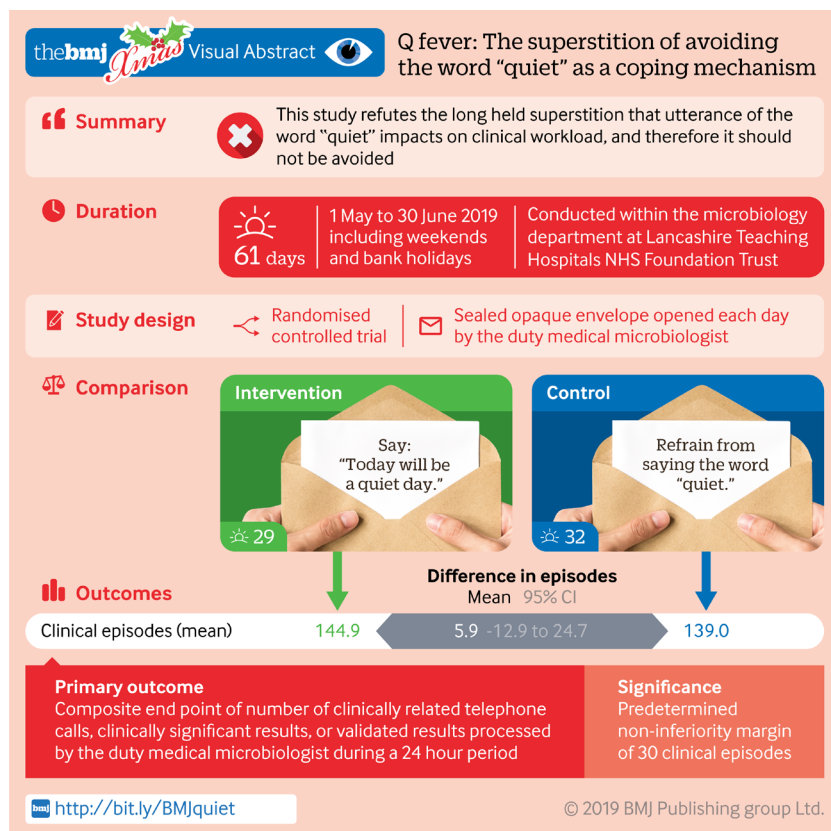
Interventions and randomisation

In this study two members of the medical microbiology team carried out the duty work on any given week day, and an on-call team member after 5 pm, and on weekends and bank holidays. Within our department this is assigned to individuals according to consultant and registrar availability and is not standardised.

During the study period a member of the duty clinical team for that day carried out the intervention within the offices of the microbiology department between 8 am and 9 am. The intervention was witnessed by the other team member, if applicable, or he or she was informed by telephone if working in a different location. The interventions were either saying "Today will be a quiet day" (intervention group) or refraining from saying the word "quiet" in any context (control group). The tone, enthusiasm, and audibility with which the intervention was uttered was at the discretion of the duty member. To minimise confounding we did not disseminate the intervention to colleagues who worked in other departments, such as infection control or biomedical scientists. Each day over a period of 61 days was randomly allocated to the intervention or control using a list prepared before the study start by the trial statistician (PPJP) using the big stick procedure⁹ to minimise imbalance between trial arms. Randomisation was not stratified and was implemented using sequentially numbered opaque envelopes containing that day's allocation. The duty team was not blinded to the intervention since the outcomes are objective and not likely to be affected by knowledge of the intervention.

Outcome measures

The primary outcome was a composite of number of clinically related telephone calls, clinically significant results, or validated results processed by the duty medical microbiology team, including on call, weekends, and bank holidays, daily from 9 am to 8 59 am the next day. These markers represent clinically relevant objective measurements of workload within the department. Secondary outcomes include the individual components of the composite primary outcome, with telephone calls being further divided into two periods: 9 am to 5 pm and 5 pm to 9 am on week days. Laboratory computer systems gathered the data retrospectively, except for telephone consultations and clinically significant results received out of hours, which were the team recorded prospectively. No



patient or healthcare worker identifiable information was recorded.

Sample size

Using data collected over a period of 30 consecutive days in January 2019, we expected a mean of 156 clinical episodes (standard deviation 41) for the composite primary outcome.

The margin of non-inferiority of 30 clinical episodes was prespecified before completion of the protocol and study start based on the authors' experience of what would be considered a clinically significant increase in workload. Based on the data from January, 30 clinical episodes would proportionally represent an additional three clinically related telephone calls, two clinically significant results, and 10 validated results for each duty team member during a 24 hour period. In the absence of a precedent and in discussion with colleagues we believed this to be a sufficient to feel noticeably busier and to justify avoidance of the word quiet. Using a one sided 2.5% level of significance and assuming no difference in the mean primary outcome measure between arms, we calculated that a total sample size of 60 days would be required to show non-inferiority with 80% power.

As sample size calculations were based on data taken in winter and the study took place at a traditionally quieter period (May and June) we planned to undertake a blinded sample size re-estimation at the halfway point. This involved calculation of the aggregate standard deviation (pooled across arms). The sample size re-estimation was undertaken in line with the study protocol. The calculated standard deviation was slightly less than anticipated, indicating slightly higher power than expected. We therefore completed the trial

without the sample size amended. As the analysis was blinded to treatment allocation (pooled across arms), there was no impact on overall type I error or bias in treatment effect estimates.

Statistical analysis

Day was considered as the unit of analysis; all consecutive days were included in the analysis. We calculated the difference in mean of the primary outcome measure between the intervention and control groups along with 95% confidence interval. If the upper bound of this 95% confidence interval was less than the margin of non-inferiority of 30, then we considered non-inferiority to be shown. We also calculated the mean difference and 95% confidence intervals for each component of the composite outcome. These analyses were repeated after adjustment for day of week and bed occupancy as potentially important predictors of workload. Total and components of workload were analysed in the subgroups of weekdays and of weekends to determine whether the treatment effect differs between the two subgroups. We also included bank holidays as weekends.

In post hoc analyses, we also evaluated whether workload increased on days with a full moon, solstices or equinoxes, or a Friday on the 13th day of the month, as each of these might be considered inauspicious days that could confound the effect of the intervention.

Patient and public involvement

No patients were involved in setting the research question or the outcome measures, nor were they involved in developing plans for design or implementation of the study. No patients were asked to advise on interpretation or writing up of results. No patients

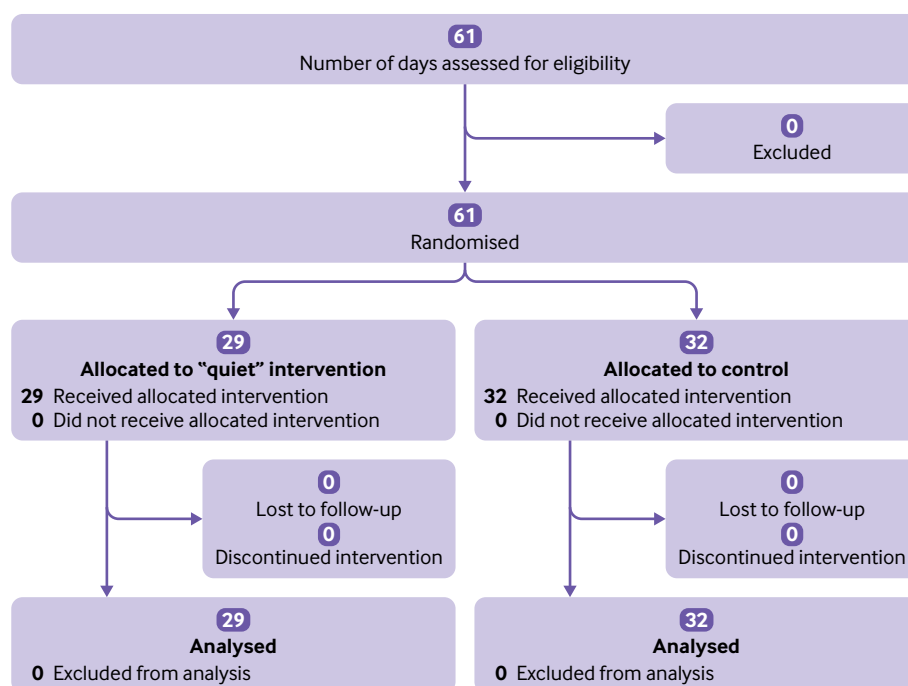


Fig 1 | Flow of days through study

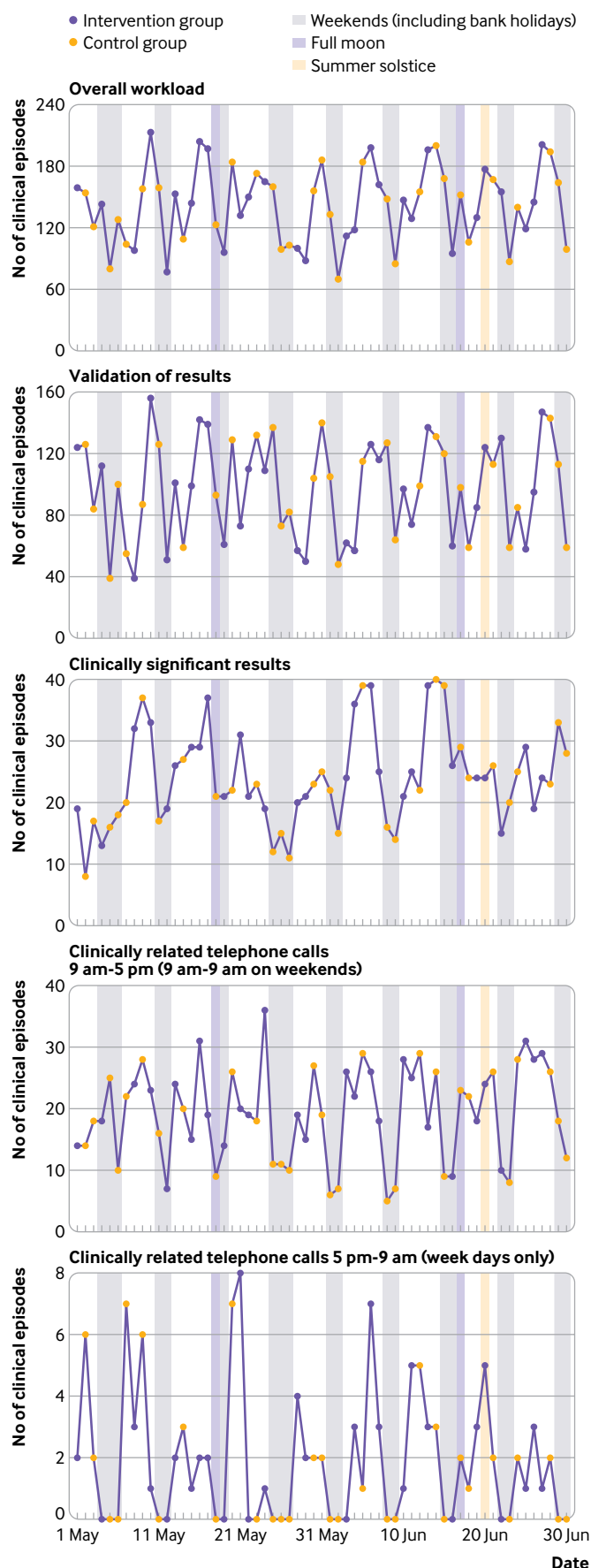


Fig 2 | Workload during study period

were recruited to the study. There are no plans to disseminate the results of the research to the patient community.

Results

The trial was conducted over a period of 61 days, from 1 May to 30 June 2019 (fig 1), which included 41 week days, two days during a full moon (18 May and 17 June), one day of the summer solstice (20 June), and no Friday's on the 13th day of the month (fig 2, table 1). The mean number of clinical episodes was 139.0 on control days ($n=32$) compared with 144.9 on intervention days ($n=29$), a difference of 5.9 clinical episodes (95% confidence interval -12.9 to 24.7) (fig 3). The upper bound of the 95% confidence interval was less than the prespecified margin of 30 for non-inferiority, thereby providing evidence for non-inferiority. Although the workload was greater on week days than at weekends (a mean increase of 34.6 episodes), the differences between interventions were consistent in the subgroups of week days or weekends with no evidence for an interaction between treatment and type of day ($P=0.870$). The mean difference between arms was slightly smaller after adjustment for type of day (weekend or week day) and daily bed occupancy (0.4 , -15.1 to 15.9); although the upper bound of the confidence interval was still less than 30, supporting non-inferiority. The greatest contribution to workload was validation of results, with a mean 97.0 on control days and 96.2 on intervention days (see supplementary file). No evidence of a difference in workload was found between the intervention and control groups for any of the four components, whether in unadjusted or adjusted analyses or when subgroups analysed by week days or weekends (see supplementary file).

The mean overall workload was 150.7 on the three days with a full moon or summer solstice compared with 141.4 on days without a full moon or summer solstice, a mean difference of -9.3 (-53.7 to 35.1).

Discussion

Our study found that utterance of the word "quiet" has no impact on the clinical workload of medical microbiologists, and this result holds during week days and weekends. Secondary analyses also found that no individual element of the combined workload was impacted by the intervention. Use of the word "quiet" should not be avoided and should perhaps even be encouraged, especially as the sentiment in wishing a colleague a quiet shift remains true.

Comparison with other studies

A previous study conducted within an orthopaedic department in a UK hospital found that saying the word quiet impacted on on-call workload and suggested that a Q word specialist manager should be appointed as well as nationwide public initiatives considered to reduce use of the word.⁶ That study, conducted in a different setting to ours, only included referrals during night shifts; did not include a description of sample

Table 1 | Description of study days by allocated arm. Values are numbers (percentages) unless otherwise stated

Study days	Control group (n=32)	Intervention group (n=29)	Total
Week days	17 (41)	24 (58)	41
Saturday, Sunday, or bank holiday	15 (75)	5 (25)	20
Full moons	2 (100)	0 (0)	2
Solstices and equinoxes	0 (0)	1 (100)	1
Friday 13th	0	0	0
Median (interquartile range) bed occupancy (%)	98.1 (95.3-100)	98.7 (96.0-100)	98.4 (95.3-100)

size justification, suggesting the convenience sample might have introduced bias in the results; and was not reported following CONSORT guidelines, making it difficult to judge whether other important sources of bias existed. In contrast, in our study we followed a prespecified protocol following SPIRIT guidelines, reported results in line with CONSORT guidelines, conducted the study over 61 days, and looked at several different components of workload. As whole days were randomised in our study we also included both day time and out of hours on-call work. A second similar study was performed in an emergency department in Japan.⁵ The authors also found no detrimental effect on workload of using the word quiet. Some of the primary and secondary outcome measures were, however, subjective, although attempts were made to control for subjectivity. Our findings add further weight to these conclusions given the robust statistical power of the study, combined with the measurement of objective data.

Limitations of this study

Our study has several limitations. Firstly, we could not control for the use of the word quiet within the other hospital departments by either staff, patients, or visitors. Secondly, we did not incorporate microbiology ward rounds in our data collection as these are non-standardised and difficult to measure but they could have impacted on the number of clinical inquiries on any given day. Thirdly, we did not control for other confounding factors such as seasonal variation, number of microbiological samples received, or presence of black cats, cracked mirrors, or lone magpies. Fourthly, while our margin of non-inferiority was prespecified before the study began and was

based on the clinical judgment of the authors and colleagues, it was not derived from a formal consensus building approach, as is sometimes recommended. Fifthly, a chance imbalance in treatment allocation occurred between weekdays and weekends (see table 1). Randomisation was not stratified and therefore chance imbalances are possible. We have presented adjusted analyses that showed slightly smaller differences between arms, and subgroup analyses with no evidence of interactions. Our study was not powered to detect treatment-covariate interactions, but we nevertheless consider that the totality of the evidence overwhelmingly supports our conclusion of non-inferiority. Day of week and bed occupancy are likely predictors of workload and we would recommend restricted randomisation to balance one or both factors for future randomised clinical trials in this area. Finally, this trial was conducted in a single study centre over a two month period, which might limit generalisability to other populations.

Implications of this study

As found by this study, medical microbiologists have a huge number of clinical encounters each day from discussions of clinical cases to the validation of reports and communication of clinically significant results. Appreciably among this number the case mix can vary hugely across all specialties and age groups—each call for advice presents a unique challenge. However, the components of the primary outcome forms only a part of the role of medical microbiologists. The challenges within infection management are ever increasing, with healthcare associated infections; emerging and re-emerging infections such as Middle East respiratory syndrome, monkey pox, and measles; and, arguably most concerning, increasing antimicrobial resistance.^{10 11} Point prevalence data from 2011-12 highlighted that about 30% of patients in UK hospitals received an antimicrobial agent,¹² indicating the scale of the role of medical microbiologists. Antibiotic stewardship,¹³ guideline development, and infection control also form key parts of the medical microbiology discipline. Microbiology is a small specialty with 682 consultant medical microbiologists in the UK and 233 medical microbiology or combined microbiology and infectious diseases trainees. Overall, 35 clinical

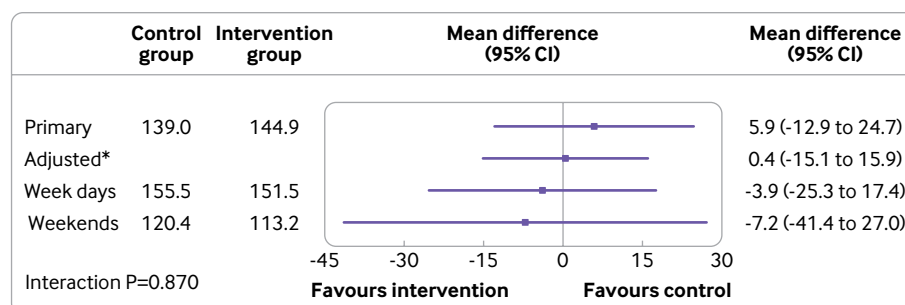


Fig 3 | Overall workload during study period by treatment group. *Adjusted for type of day (weekend or week) and daily bed occupancy

scientists hold a fellowship of the Royal College of Pathologists (FRCPath) and practice medical microbiology.¹⁴

Clearly this study is somewhat tongue-in-cheek, but it highlights an important problem. The 2018 report from the joint Health Foundation and Kings Fund on the healthcare workforce in England highlighted that “There are significant staff shortages across the NHS. There are over 100,000 vacancies across NHS trusts (1 in 11 posts). In addition, the staff that are in post are under increasing stress: the latest NHS staff survey showed that 38% of staff had felt unwell during the previous 12 months due to work-related stress.”¹⁵ A Royal College of Physicians report in 2016 notes that the NHS is underfunded, under-doctored, and overstretched, resulting in falling morale, productivity, and patient experience.¹⁶ In the face of such immovable obstacles is it any wonder that staff hope that luck falls on their side?

Our study confirms what is probably already known—that superstitions such as not uttering the quiet word will not ease the heavy workload faced by healthcare professionals. As our study shows, in one shift a single microbiologist can expect to encounter 140 clinical episodes; this number exceeded 190 on eight days during the two month study period. Healthcare professionals need to be resilient and mindful to care for their own wellbeing as well as those around them.

Conclusion

Uttering the word “quiet” does not impact on clinical workload and therefore its use should not be avoided. Medical microbiologists belong to a small specialty that faces large challenges, not least trying to slow the increase of antimicrobial resistance. They are there to support other healthcare professionals with all aspects of infection management from individual complex cases and travel associated infections to stewardship or advice on infection control.

Areas for further research include whether horse shoes placed outside patient isolation rooms can prevent the transmission of resistant organisms, whether a rabbit's foot in theatre can reduce surgical site infections, and whether being touched by a royal can cure tuberculosis.

National support resources available for struggling doctors include the BMA Wellbeing Support Services Peer Support Counselling (www.bma.org.uk/advice/work-life-support/your-wellbeing/counselling-and-peer-support); DocHealth, a confidential psychotherapeutic consultation service for doctors (www.dochealth.org.uk/); and the NHS Practitioner Health Programme (www.php.nhs.uk). More general resources include the mental health charity MIND (www.mind.org.uk/) as well as the Samaritans, which can be contacted at all times (telephone 116 123).

We thank the team of medical microbiologists, healthcare scientists, and pathology IT team at Lancashire Teaching Hospitals NHS Foundation Trust for their contributions.

Contributors: CB and RS devised the study, supervised the distribution of the pre-sealed allocation envelopes, and collected the data. PP contributed to the study design, provided randomisation and power calculations, and conducted statistical analysis. All three authors contributed to the literature review and writing the protocol and manuscript. CB is the guarantor. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

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Competing interests: All authors have completed the ICMJE uniform disclosure form at www.icmje.org/doi_disclosure.pdf and declare: no support from any organisation for the submitted work no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work.

Ethical approval: Not required. The study was registered with Lancashire Teaching Hospitals NHS Foundation Trust's research department as service improvement since data collected will be used to enhance the trust's clinical service.

Data sharing: Data will be available on request from the corresponding author for 12 months after publication.

The lead author and guarantor (CB) affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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