

Food for thought: skills of a Michelin starred restaurant potentially transferable to theatre

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Abstract

Background: The aims of this research were to identify key non-technical skills and team behaviours observed in a two-star Michelin restaurant kitchen (Sat Bains, Nottingham) and to evaluate the feasibility of transferring these skills and behaviours to the operating theatre context.

Methods: Key team skills and behaviours used by a team of professional kitchen staff were identified from a series of observations in the work setting and evaluated for potential application in the operating theatre environment. Sixty-one multi-professional operating theatre staff members were invited to complete a questionnaire specifically designed to gauge the relevance and feasibility of these skills and behaviours if implemented in the clinical setting in order to improve team performance and patient safety.

Results: Five team practices for potential use in the operating theatre were identified. These were use of a "stop moment"; implementing closed-loop communication; undertaking weekly prospective briefings about planned activity; displaying visual poster guides for each procedure; and using cameras to track the progress of operations. Fifty-five of the 61 theatre staff members approached completed the questionnaire. The "stop moment" was perceived to be the most feasible for implementation (76%, 42/55) and to offer the greatest potential for improvement in patient safety (85%, 47/55).

Conclusion: Certain team skills and behaviours observed in a professional kitchen may have value if adapted for the operating theatre. These team practices could improve teamwork and patient safety in the operating theatre, and would be welcomed by the majority of theatre staff. **Implications** Some team skills learnt from a Michelin starred kitchen are transferable to the operating theatre.

Keywords: Team working, human factors, operating theatre.

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Introduction

Surgical care has become more complex in the past 20 years, largely as a result of the introduction of new surgical techniques that involve increased reliance on technology and an increasing emphasis on efficiency and productivity within surgical services alongside patient safety and high-quality outcomes. Consequently, effective interaction between all members of the surgical team has become an essential ingredient for success [1]. Poor non-technical skills on the part of individual professionals and miscommunication within and between teams have been shown to be responsible for errors resulting in disability and mortality [2-4]. Non-technical skills have been described for several members of the operating theatre team, including surgeons [5], anaesthetists [6] and scrub practitioners [7]. These include various combinations of social and cognitive skills, including leadership, communication, situational awareness, and decision-making, which are complemented in the team context by additional attributes and practices that underpin high-quality team performance [8]. A Michelin starred restaurant has

a similar requirement to deliver high-quality service, albeit in a different context, in order to achieve high consistency and to uphold the reputation of the restaurant in a highly competitive market. We surmised that there would be similarities between a professional restaurant kitchen and an operating theatre in terms of applying the principles of leadership and effective teamwork to ensure delivery of a high-quality service under time-restricted conditions. Although the risks present in a professional kitchen are different from those in an operating theatre, the high-pressure environment may allow for interesting comparisons between the two settings. The aims of this empirical observational study were to identify specific team skills and behaviours practiced in a two-star Michelin restaurant kitchen, to explore their relevance to the operating theatre, and to canvass the potential appetite of operating theatre team members for implementation of any such practices within the clinical setting.

Methods

The first stage of this research was conducted at "Restaurant Sat Bains", a two-star Michelin restaurant located in South

Nottingham, and the second stage at the Department of Colorectal Surgery, Nottingham University Hospitals. The Nottingham University Hospital NHS Trust is a 1100-bed acute tertiary referral centre in central Nottingham

Information gathering

Team working in the kitchen at Restaurant Sat Bains was observed by a “theatre-naïve” medical undergraduate student (RN) and a senior clinician (CMA). After an initial orientation visit, specific team skills and behaviours were observed and documented using the Team Self-Review (TSR) tool [9] This instrument contains a predefined set of categories that describe team practices and has been used previously within the operating theatre context, but still provides sufficiently generic headings to allow a non-expert to record and code behaviours and practices observed in a kitchen context. These headings are shown in Table 1. A series of observation sessions was undertaken on five evenings during the course of one week. The observer was present from 8 am to 6 pm on weekdays and for the main serving periods (6–11 pm Thursday to Saturday; 7–11 pm Sunday to Wednesday), including the nightly team debriefing at the end of service. The data were collected as unobtrusively as possible to allow observation of normal staff behaviour in the kitchen.

Feasibility analysis

Following each visit, the observed team attribute sand practices were reviewed and categorised as specific skills and behaviours under the TSR headings. After review by the research team, a questionnaire was designed to evaluate the perceived relevance and feasibility of introduction of the key principles identified in kitchen team practices into the operating theatre setting. The questionnaire was distributed to a multi-professional group of operating theatre practitioners, support workers, surgeons, and anaesthetists. Respondents were asked to indicate on a 5-point Like scale their level of agreement or disagreement with five statements for each identified team skill, behaviour, or practice as follows

- This is a workable initiative.
- This initiative would improve patient safety
- This initiative would improve productivity.
- The increased workload due to this initiative would have a detrimental effect.
- This is a valuable initiative.

Information on the demographics and job descriptions of the respondents was collected in order to ensure a representative multi-professional sample of operating theatre staff.

Results

Structure of the kitchen team:

In contrast with the shared responsibilities often seen in the operating theatre, there is a clear hierarchical structure in the professional kitchen. Sat Bains, the chef patron at Restaurant Sat Bains, has ultimate authority in his kitchen. He works closely with the head chef, followed by the sous chef, chefs de partie, and commis. Sat Bains described proceedings in the kitchen as needing to be like a “military operation” in order to maintain the high performance of the kitchen team and the high quality of the food and level of service provided by the restaurant. The senior chefs comprise the chef patron, head chef, and sous chef, each of whom supervises the work of the other kitchen staff. They provide direction on timings and supervise plating-up, ensuring that the food served is of an acceptable standard. The chef on the “pass” (the long, flat surface where dishes are plated and picked up by waiting staff) leads the rest of the kitchen and remains there for the duration of service to maintain consistency, and gives clear directions to the rest of the team. When errors are made or the team is behind on timings, this is announced by one of the senior chefs who then push for more focused and rapid performance so that targets are met.

Observed skills and behaviours

At the end of the last service on Sunday, prospective briefings are held with the entire team to ensure that all the necessary ingredients and equipment are available for the following week. A similar prospective briefing could be held in theatre at the end of each week to confirm that all equipment needed for the following week’s operations is available or can be ordered if necessary. This could help to reduce delays whilst waiting for specific equipment and may reduce the costs of sourcing particular items at short notice. Such briefings would also help to ensure that the most appropriate equipment is always used.

Tracking of real-time activity

Time management was observed to play a crucial role in the kitchen. Cameras are used to monitor diners as they progress through their courses. To ensure that each course is cooked and served at the appropriate time the camera footage is displayed on a screen in the kitchen, assisting the chefs to anticipate the speed at which they need to prepare and serve meals. This concept could be adapted and transferred to theatre by installing cameras in each operating room so that footage can be viewed by the theatre coordinator. This would enable the coordinator to monitor precisely the stages of each operation, complement the information already provided by the computer-based Operating Room Management Information System, and assist in the timing of theatre lists. This could increase productivity by reducing the time wasted when patients are taken to theatre too soon or too late.

Table 1. Team health areas and dimensions.

Team health areas	Team health dimensions		
Team management	Planning and organisation	Leadership and direction	Inter-team working
Team thinking	Shared situational understanding	Thinking ahead	Decision-making
Team behaviour	Information passed	Communication style	Monitoring and support
Team climate	Recognition and respect	Managing disagreements	Stress and flashpoints
Team safety	Safe practice	Equipment use	Low energy and fatigue

Situational awareness

The use of check boards ensures that all members of the kitchen team maintain situational awareness. The menus are on the check boards at each section, and the chef on the pass calls out when plates have gone out, which helps to coordinate the team. Applying this principle to the operating theatre could result in a “guide” for each procedure, perhaps in the form of a printed chart. As each stage of the procedure is completed, this would be called out and checked off on the chart. This would heighten the situational awareness of the whole theatre team, so that any necessary equipment could be made available, staff breaks could be coordinated, and other tasks, such as transport of specimens to the laboratory, could be performed in a timely manner. This strategy could also be used as a signal to staff that a particularly complex part of a procedure is approaching.

Closed-loop communication

Each communication in the kitchen is confirmed by the recipient saying “yes, chef” to ensure that the message has been received. All information passed is concise and devoid of unnecessary words, for example, “two beef”. This economy of words allows communication at the speed necessary in a fast-moving kitchen and is a version of the check back used in surgery to confirm that a communication has been received, so it is not always known whether a message has been heard and/or interpreted correctly. A standardised communication procedure is considered to be important in emergency situations [10]. Introducing a similar procedure into theatre could help to improve safe communication, and could be as simple as saying “yes, doctor” or “yes, nurse” in response to each instruction or question passing between one team member and another. This would be particularly useful during the “sign in”, “time out”, and “sign out” phases of the WHO Surgical Safety Checklist, and the ideal would be full closed-loop communication, a three step process involving call-out, check back, and closing the loop [10]. However, this may not be feasible for every communication that takes place during an operation.

Call-out and a “sterile cockpit”

One of the practices identified in the kitchen was the change in behaviour during the plating-up process. This was identified to be similar to the “sterile cockpit” concept in aviation [11] where by crew members are prohibited from undertaking any non-essential tasks that might be a distraction during the critical periods of take-off and landing. Once the plates are on the pass, there is a period during which chefs involved in plating-up concentrate solely on that task with minimal distraction from other team members. Another behaviour noted was that an announcement is made to the entire kitchen in the event of an error or if the kitchen is running behind on timings, so that all staff is aware. This means that the whole team can focus on correcting the error or getting back on track with timings. These announcements are usually made by a senior chef, and are a good example of leadership and communication skills. In surgery, an error is often dealt with by the staff immediately involved without alerting the rest of the team. Practices observed in the kitchen could be applied in the operating theatre, in that

if a member of staff identifies an error or problem, they can alert the rest of the theatre team very simply saying “Stop: surgical/anaesthetic/nursing problem”. This would be a “call-out” signalling the first identification of an unexpected event in theatre.¹⁰ At that point, anyone undertaking a non-critical activity would pause and await further information. The whole theatre team would then focus on solving the problem before any other tasks are resumed.

Other behaviours

The senior chefs praise good work, but errors and poor work are criticised proactively so that junior staff have the opportunity to learn from their more experienced counterparts. Sat Bains believes that chefs work better if treated well and shown respect, but at the same time has a hard attitude towards errors so as not to be seen as being too lenient or settling for substandard work. The food and service need to be “on-point” at all times to maintain the reputation of the restaurant and meet customers’ expectations. The hierarchical system of the kitchen means that disagreements are resolved by the chef patron and head chef, and their opinion is accepted as being correct. This practice would be inappropriate in the surgical environment, given the multi-professional skill set that comes into play in an operating theatre and the absence of a hierarchical structure.

Feasibility

Five principal team skills, behaviours, and practices identified in the professional kitchen were selected for review by multi-professional members of the operating theatre team to gauge their relevance and feasibility for use in the clinical workplace. The questionnaire was distributed to 70 theatre team members, from whom 51 fully completed and 10 partially completed responses were received. The 61 respondents (37 women, 21 men, 3 of unknown gender) included 9 surgeons, 5 anaesthetists, 17 nurses, 22 operating department practitioners, 7 theatre support workers, and 1 medical student.

Prospective briefing

There was no clear preference on the part of the respondents with regard to prospective briefing being incorporated as a new team practice in theatre. Fifty per cent of respondents agreed that this would be workable in theatre, 58.8 % agreed that it would improve patient safety, and 54.8% believed that it would improve productivity; however, 22% considered that it might have a detrimental effect on staff workload. Just over half (52%) of the respondents agreed that prospective briefing would be valuable and almost one quarter (24%) disagreed (Table 2).

Tracking of activity in real time

The suggestion of tracking activity in the operating theatre in real time using cameras met with a negative response 66.7% of respondents did not agree that it would be workable in theatre while 23.5% agreed that it would be workable. Just over one quarter agreed that it would improve patient safety, and 60% disagreed. Sixty-four present did not agree and 18% did agree that use of cameras would improve productivity (Table 3).

Situational awareness

The respondents had no clear preference with regard to use of

Table 2. Responses of team members (n=55) to the suggestion of prospective weekly briefing.

Team work	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
This is a workable initiative (n=52)	6 (11.5%)	10 (19.2%)	10 (19.2%)	19 (36.5%)	7 (13.5%)
This initiative would improve patient safety (n=51)	3 (5.9%)	9 (17.6%)	9 (17.6%)	20 (39.2%)	10 (19.6%)
This initiative would improve productivity (n=51)	4 (7.8%)	9 (17.6%)	10 (19.6%)	19 (37.2%)	9 (17.6%)
The increased workload due to this initiative would have a detrimental effect (n=50)	8 (16.0%)	13 (26.0%)	18 (36.0%)	7 (14.0%)	4 (8.0%)
This is a valuable initiative (n=50)	3 (6.0%)	9 (18.0%)	12 (24.0%)	21 (42.0%)	5 (10.0%)

Table 3. Responses of team members (n=53) to the suggestion of using cameras in theatre.

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
This is a workable initiative (n=51)	16 (31.4%)	18 (35.3%)	5 (9.8%)	9 (17.6%)	3 (5.9%)
This initiative would improve patient safety (n=50)	16 (32.0%)	14 (28.0%)	7 (14.0%)	9 (18.0%)	4 (8.0%)
This initiative would improve productivity (n=50)	14 (28.0%)	18 (36.0%)	4 (8.0%)	10 (20.0%)	4 (8.0%)
The increased workload due to this initiative would have a detrimental effect (n=50)	10 (20.0%)	13 (26.0%)	12 (24.0%)	10 (20.0%)	5 (10.0%)
This is a valuable initiative (n=50)	16 (32.0%)	11 (22.0%)	14 (28.0%)	6 (12.0%)	3 (6.0%)

posters to improve situational awareness in the operating theatre. However, less than half of the respondents agreed that it would be workable or valuable or that it would improve productivity or patient safety (Table 4). Closed loop communication Again, there was no clear preference with regard to closed loop communication. While 58.8% of respondents did not believe that this team practice would increase the workload to a detrimental level positive responses to all other statements did not exceed 50% (Table 5).

Call-out and a “sterile cockpit”

In total, 76.7% of respondents either agreed or strongly agreed that call-out would be workable in theatre 17.9 % either disagreed or strongly disagreed. The majority of respondents (85.4%) agreed that this had the potential to improve patient safety and only a small proportion (9.1%) disagreed (Table 6).

Discussion

The study of non-technical skills outside the clinical environment is not a new phenomenon. There is a history of drawing parallels from similar organisational research and professional development strategies within civil and military aviation, the nuclear and oil industries, and even Formula 1 pit crews [12]. This study explored the potential for operating theatre staff to improve their team skills and behaviours by studying the team attributes and practices already present in a Michelin starred restaurant kitchen. Three of five team behaviours observed in the kitchen were considered by our respondents to be worthwhile adapting for use in the operating theatre.

Direct observation revealed behaviours in a professional kitchen that were either not present in the operating theatre or practised better in the kitchen than in the theatre. An example of the latter is the “stop moment”, which was considered by the respondents to be already in place in the operating theatre but mainly used for problems of a serious nature. The kitchen environment relies heavily on its hierarchical structure, particularly with regard to decision-making and handling

of disagreements. Although this structure is effective in the kitchen, it is important in the operating theatre that all team members feel that they have a voice [13] to ensure optimal patient safety. However, the majority of respondents (85%) in our survey believed that a “stop moment” would improve patient safety. Closed-loop communication has been studied previously in simulated trauma scenarios, and includes the sender transmitting the message (call-out), the receiver acknowledging the message by checking back, and then the sender verifying that the message was interpreted correctly [10]. In the present study, only 32.7% of respondents agreed that closed loop communication was a valuable intervention, and although the respondents felt that some form of confirmation would be useful, the use of titles such as “doctor” and “nurse” was inappropriate, and may lead to development of a hierarchical structure in the operating theatre. Authority gradients have been shown to have a detrimental effect on teamwork and patient care [13] so reinforcing this may be counterproductive. In the kitchen, everyone is referred to as “chef”, but there is no equivalent in the operating theatre. Kitchen teams often produce the same dishes every evening, whereas a wide variety of procedures is performed in an operating theatre and each patient is anatomically unique. Furthermore, whereas the kitchen team is usually consistent from one day to the next, the staff in an operating theatre can change from day to day according to shifts and theatre allocations. This may account for the negative response to the suggestion of prospective briefings in our survey, given that the lists for the following week often change and cannot be anticipated at all in emergency theatres. However, individual surgeons often have a list of the equipment they require for each type of operation, and this list is usually discussed in advance at scheduling meetings. Less than half of the respondents agreed that poster guides would be workable or improves patient safety, but may be useful for staff training and educational purposes. There were concerns that stopping to tick a poster may be a distraction, particularly for surgeons

Table 4. Responses of team members (n=51) to the suggestion of a poster guide for each procedure.

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
This is a workable initiative (n=51)	5 (9.4%)	13 (24.5%)	10 (18.9%)	20 (37.7%)	5 (9.4%)
This initiative would improve patient safety (n=51)	3 (5.9%)	12 (23.5%)	15 (29.4%)	15 (29.4%)	6 (11.8%)
This initiative would improve productivity (n=51)	3 (5.9%)	11 (21.6%)	20 (39.2%)	13 (25.4%)	4 (7.8%)
The increased workload due to this initiative would have a detrimental effect (n=51)	4 (7.8%)	14 (27.5%)	20 (39.2%)	11 (21.6%)	2 (3.9%)
This is a valuable initiative (n=51)	4 (7.8%)	12 (23.5%)	16 (31.4%)	16 (31.4%)	3 (5.9%)

Table 5. Responses of team members (n=54) to the suggestion of confirmation of communication.

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
This is a workable initiative (n=54)	4 (7.4%)	12 (22.2%)	14 (25.9%)	20 (37.0%)	4 (7.4%)
This initiative would improve patient safety (n=51)	5 (9.8%)	11 (21.6%)	13 (25.5%)	19 (37.3%)	3 (5.9%)
This initiative would improve productivity (n=51)	5 (9.8%)	13 (25.5%)	18 (35.3%)	13 (25.5%)	2 (3.9%)
The increased workload due to this initiative would have a detrimental effect (n=51)	8 (15.7%)	22 (43.1%)	14 (27.5%)	4 (7.8%)	3 (5.9%)
This is a valuable initiative (n=52)	5 (9.6%)	10 (19.2%)	20 (38.5%)	15 (28.8%)	2 (3.8%)

Table 6. Responses of team members (n=56) to the suggestion of a "stop moment".

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
This is a workable initiative (n=56)	3 (5.4%)	7 (12.5%)	3 (5.4%)	32 (57.1%)	11 (19.6%)
This initiative would improve patient safety (n=55)	2 (3.6%)	3 (5.5%)	3 (5.5%)	31 (56.4%)	16 (29.0%)
This initiative would improve productivity (n=54)	3 (5.6%)	7 (13.0%)	17 (31.5%)	19 (35.2%)	8 (14.8%)
The increased workload due to this initiative would have a detrimental effect (n=55)	9 (16.7%)	27 (49.1%)	10 (18.2%)	4 (7.3%)	5 (9.1%)
This is a valuable initiative (n=55)	2 (3.6%)	1 (1.8%)	10 (18.2%)	29 (52.7%)	13 (23.6%)

and scrub practitioners. However, it should be noted that when the WHO Surgical Safety Checklist was originally implemented, there were concerns that it would interrupt workflow, leading to delays in patient care, particularly in urgent cases [14]. Staff also felt that they were generally aware of what stage an operation was at, although in our experience it is not uncommon for anaesthetists to have to enquire as to how an operation is progressing. The suggested practice of real-time activity tracking using cameras was not well received, with only a small minority of respondents (18%) agreeing that it was valuable and over 50% disagreeing. Concerns were raised concerning the dignity and confidentiality of patients relating to access to the footage. Guests at the restaurant are not necessarily aware that they are being filmed; however, in theatre, consent would be required from patients to make an audio-visual recording of their procedure [15]. Staff also felt that they may be "spied on" and that use of camera would be reminiscent of "Big Brother". Concern was also raised that it may be difficult for theatre coordinators to recognise the stage of an operation and that they would be too busy to study footage from up to 18 theatres anyway. Further research may be required to assess the genuine need for such monitoring, but with such opposition from staff, introducing this organisational practice would not currently be feasible.

Conclusion

A two-star Michelin restaurant uses a set of team behaviours and skills that improve productivity, enhance team working, and maintain high standards of service delivery. Similar practices are already in use in the operating theatre, but introduction of novel approaches already in place in a professional kitchen could enhance safety and productivity in the operating theatre. The responses to the questionnaire used in this study indicate that a number of these practices would be viewed positively by theatre staff. Future work should focus on assessment of these behaviours and skills in the clinical environment.

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