

Journal of Medical Safety

IARMM Official Journal (e-version)

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[Opinion]

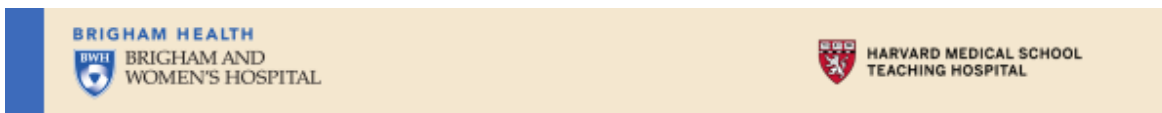
MULTIDISCIPLINARY TEAM APPROACH TO REDUCE LABORATORY ERRORS

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Clinical laboratory results are critically important for accurate and timely clinical decision making. By most estimates, they guide up to 70 % of patient care decisions, whether done for diagnostics purposes or for monitoring the progression of disease and therapeutic success. It is therefore

imperative to develop and deploy a continuous quality assurance (CQA) and quality improvement (CQI) systems including a Safety Reporting System covering the entire spectrum of laboratory testing (Figure 1).



Safety Event Reporting Process

Types of Safety Events:

- Pre-analytical
 - Incorrect selection of tests by the ordering clinician
 - Specimen collection
 - Patient misidentification
 - Wrong number, type of specimen
 - Mislabeled / unlabeled specimen tubes
 - Transportation / lost specimens
 - Log-in errors
 - Processing and routing errors
 - Specimen sent to the wrong lab
 - Delays in sending out to reference laboratories
- Intra-analytical
 - Technical (QC, instrument failure)
 - Suboptimal quality or quantity of specimen
 - Specimen mix ups before or during analysis
 - Product recalls (reagent, instrument)
- Post-analytical
 - Incorrect interpretation or results
 - Result entry errors
 - Delayed reporting or results

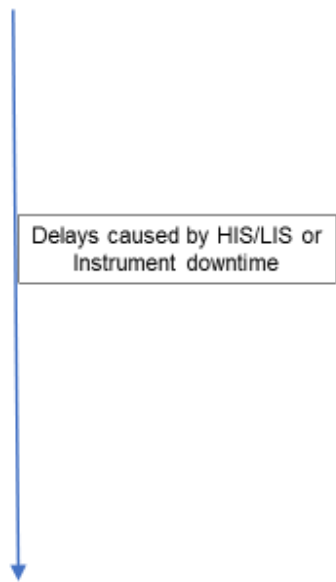
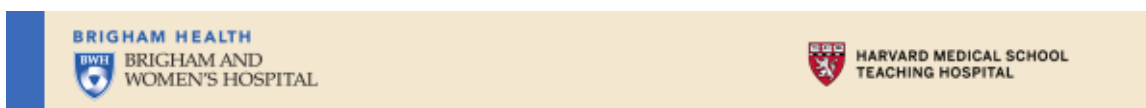


Figure 1

As shown in the Figure, potential sources of pre-analytical errors include incorrect selection of tests by the ordering clinician, patient misidentification, wrong number, type or mislabeled / unlabeled specimen tubes occurring during specimen collection, specimens lost during transport to the central laboratory and errors made during the specimen log-in and pre-analytical processing. Next, intra-analytical errors may originate from technical problems during specimen analysis (unacceptable quality control, instrumentation failure) or problems related to suboptimal quality or

quantity of the specimen. Finally, post-analytical sources of errors include mis-entered test result, incorrect interpretation or delayed reporting of results to the ordering provider.

We implemented a Pathology-wide system for reporting errors with the goal of identifying their root causes and providing corrective and preventative action. We initially categorized the errors by severity to ensure rapid deployment of precious resources toward identification and problem resolution. (Figure 2).



Categories of Severity

- *"No harm"*
 - Low potential for patient harm
 - Identified before reporting of results to the ordering clinicians
- *"Non-lab event"*
 - Pre-analytical errors caused by clinical / nursing staff
 - Test incorrectly ordered by the provider
 - Mis-timing of specimen collection
 - Incorrect understanding about scheduled phlebotomy rounds
- *"Near harm / near miss"*
 - Potential to cause harm or injury
 - Identified before major harm occurred
- *"Harm"*
 - Direct patient impact resulting in serious injury or death

Figure 2

As shown in Figure3, we found out that most of the errors identified in our department were categorized as "no harm" with rare "near harm". Next, we created separate error identification and

communication pathways for internally and externally reported errors to facilitate timely and efficient communication, discovery of root cause and implementation of corrective action (Figure 4).

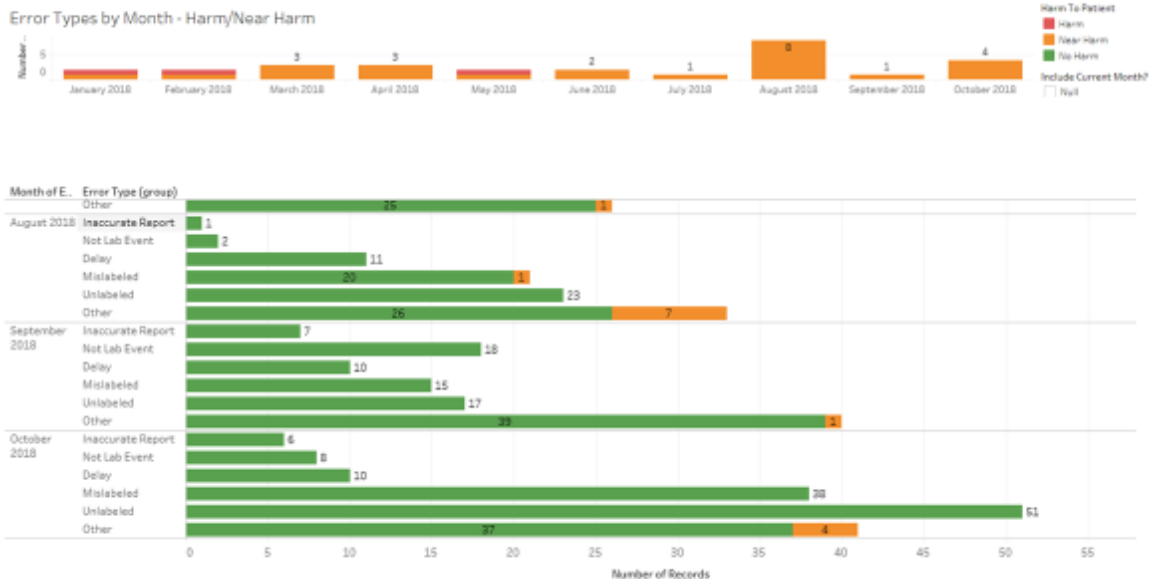


Figure 3

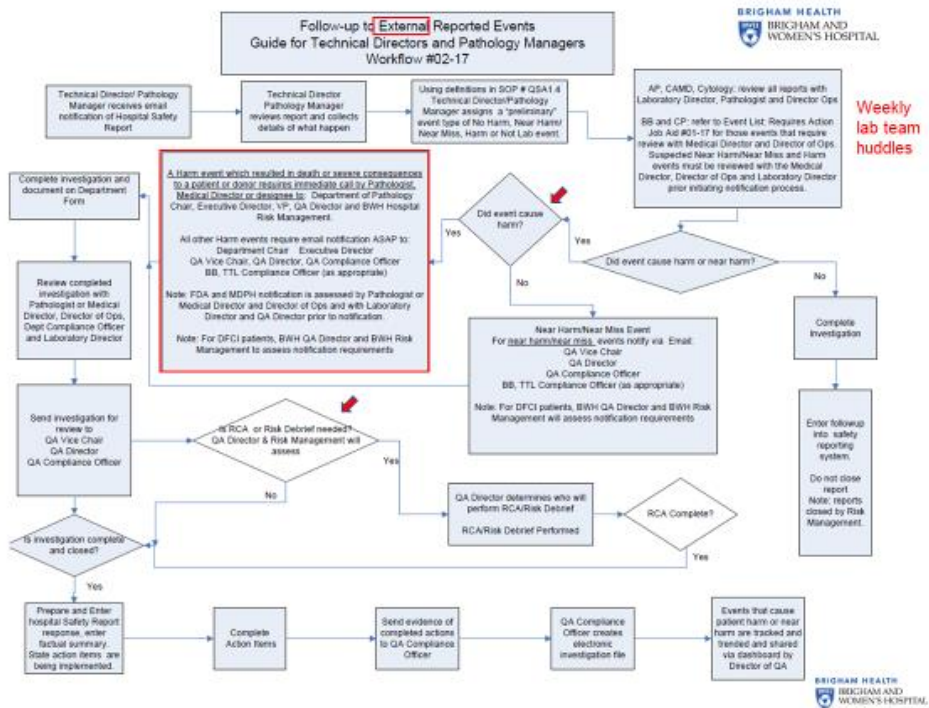


Figure 4

Whereas internal reports are generated by laboratory staff, external reports originate from nursing staff or ordering clinicians. The reports are captured and transmitted daily by the Hospital Safety Reporting System to laboratory technical or managerial staff who are responsible for investigation and follow-up. Daily notifications of

events are also received by the laboratory compliance officers and the Hospital Regulatory Compliance and Risk Management departments. Intensive training of laboratory staff was necessary to ensure full compliance with the safety reporting system (Table 1).

Staff Training

'Healthstream' training modules In-person (1.5 hr, case scenarios)

Trainees:

- Pathologists
- Directors of Operations
- Technical Directors
- Managers
- Compliance Officers
- Compliance Sr. Techs
- Supervisors

Content:

1. Roles and Responsibilities
2. Event notification and discovery
3. When and How to enter a report
4. Event Types
 - No Harm
 - Near Harm/Near Miss and Harm
 - Not Lab Event
6. Investigation
7. Leadership notification
8. QA Review
9. How to enter follow-up in Hospital Safety Reporting System
10. Quiz



Table 1

Our multidisciplinary team including the Laboratory Director, Operating and Technical leaders of Chemistry, Hematology, Microbiology, Tissue Typing, Immunology and Ambulatory services laboratory as well as nursing representatives meets on a weekly basis to review various errors and to monitor process improvement activities. We plan to extend these weekly huddles to anatomic

pathology including molecular diagnostics and cytogenetics in the near future.

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[Opinion]**TECHNOLOGIES FOR IMPLEMENTING COMPETENCY-BASED APPROACH TO POSTGRADUATE NURSING EDUCATION****Bakhtina I.S., Garderobova L.V.**

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Key Words: competency-based continuing medical education, educational programs; simulation learning; development of competencies

The main directions in development of modern medical education system are determined by the Bologna Declaration and focused on recognition of professional qualifications; development of academic mobility; introduction of credit-modular system; implementation of quality management system in education. In the transition period, it is necessary to ensure the adaptation of the principles of the Bologna Process to the conditions for the development of the health care system in Russia, priority is being given to the introduction of a new admission system of novice specialists and health practitioners to professional activity through accreditation and the development of continuing medical education system. The development of competencies is important, and the system of medical education should possess effective technologies for the development and evaluation of professional competencies. The international trend in the use of competency-based training principles in medical education is actively supported by the professional community.

Our educational organization has 30 years of experience in the field of postgraduate nursing education. Educational programs are practice-oriented and built on a modular basis, with the inclusion of training modules in all aspects of practical activities. The main educational aim is to improve already existing and develop new professional competencies. We currently apply considerable resources in ensuring the quality of medical personnel training through the implementation of simulation and case study technologies.

Simulation-based education involves the formation of behavioral model that is applicable in clinical situations. This model should include a set of professional competencies. At the initial stage of training in medical technology, a specific competency and a particular occupational skill is formed (vascular access provision, hand hygiene, etc.). When carrying out case tasks, a student learns the algorithm of working operations that ensure an integrated follow-up to the necessary manipulations; several professional competencies are being evaluated. For example, in basic cardiopulmonary resuscitation training, not only the correctness of compressions and ventilation is being monitored, but also ensuring safety, performing a primary examination, team work. Assessment of professional competencies is carried out in the form of objective structured clinical exam. As a result of our research, this approach to training made it possible to reduce level of mistakes: communicative in 2 times; in providing infectious safety in 3 times.

We plan to actively develop a competency-oriented approach in further vocational education and training of medical personnel, turning to the best domestic and foreign experience on the terms of mutually beneficial network partnership with universities and medical organizations, providing integration into the international educational space.

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[Opinion]**THE THIRD CIRCLE OF VICTIMS, FOLLOWING A SENTINEL
EVENT-THE RIPPLE EFFECT****Alona Sigler-Harcavi****Abstract**

As an attorney with extensive experience in risk management, patient safety and quality assurance, I also represent, for the State of Israel, medical staff ("second victims") before inquiry boards, following sentinel events. Thanks to attorney-client privilege and the anxiety regarding the inquiry, staff members are very open with me, often baring their emotions, pains and fears to me with respect to the mood and tone existing in their ward, even weeks and months after the sentinel event. Consequently, I witness the ongoing injury caused by sentinel events, not only to the patient and to the second victims, but also to the entire staff of the ward (sometimes of the entire institution). These are the members of the third circle of victims ("third victims"). When management doesn't take care of the second victims, the third victims also get hurt, dreading the possibility of being involved in a similar event and not getting the care they need from their employers. These apprehensions harmfully affect the solidarity of the ward and the whole institute's corporate culture, resulting in an "every man for himself" mentality. Therefore, taking care of the second victims should be an integral part of risk management, not only for the benefit of the second victims, but for a far larger and wider interest: preserving morale, motivation, role perception, teamwork, etc. of the third circle. It has been my experience that post-sentinel-event risk management that does not include second victim care, is like a half-built bridge: going nowhere, very low ROI.

Key Words: Risk management, sentinel event, second victim, inquiry, transparency, learning organization.

First example –A mix up in the IVF unit:

I want to tell you the story, of a sentinel event, that took place, not so long ago, in an IVF unit, at one of the general hospitals, in Israel:

- The embryos of patient A were accidentally implanted in the uterus of another patient, patient B.
- This was the result of an accumulation of mistakes, made by doctors, nurses, lab technicians, and a Secretary – just like in the Swiss cheese model.
- Fortunately, a few minutes later, a lab technician discovered the mistake – by sheer luck.
- The incident was reported immediately, and the senior staff talked with both patients: the owner of the embryos and the patient who received them, by mistake.
- The patient who received the embryos agreed to pregnancy prevention procedures and the embryos were lost.

The consequences of the incident:

- Both patients did not receive their embryos that day;
- One patient lost precious embryos;
- The other patient suffered a critical loss of trust, in medical staff – and refrained from having any more fertility treatments;
- A malpractice lawsuit was filed against the hospital;
- The incident was widely reported in Israel, through national media and social networks.

Risk management actions:

- Following the incident, the hospital performed some risk management activities: a debriefing was conducted, and protocols were refreshed and renewed;
- The Israeli Health Ministry conducted an inquiry of its own.

Meanwhile, new problems emerged:

- The incident impacted harshly on staff morale and motivation, their ability to work as a team, the ability to rely on each other, their perception of their roles, and more;
- Allegations were exchanged between staff members of different disciplines and between the management and the staff;
- Staff members who reported and revealed systemic problems, as the cause of the incident, were perceived as troublemakers.
- One staff member decided to leave the unit, blaming a hostile work environment as the

cause for leaving. Later she was asked to come back – and so she did – but the problems remained;

- The incident impacted badly on staff performance and the overall mood of the unit for some time.

Representing medical staff:

- As an attorney with extensive experience in risk management, patient safety and quality assurance, I also represent, for the State of Israel, medical staff that were involved in sentinel events (sometimes known as "second victims") before inquiry boards.
- Thanks to attorney-client privilege and the anxiety regarding the inquiry, staff members are very open with me, often baring their emotions, pains and fears, with respect to the mood and tone existing in their unit, even weeks and months after the sentinel event.
- Consequently, I witness the ongoing injury caused by sentinel events, not only to the patient and to the second victims, but also to the entire staff of the unit, members of the management and sometimes the staff of the entire institution, which I shall refer to as the "third circle of victims".

Multiple points of view:

- I can tell you the story of the sentinel event in the IVF unit –
 - From the patients' point of view;
 - From the point of view of the second victims;
 - Or from the point of view of the management;
 - But this article will focus on the Third Circle's point of view: their needs and feelings, their resolutions, decisions and more.

The Second Victims:

Because we are dealing with a ripple effect, in order to fully understand the implications on the third circle, a few observations regarding the second victims are necessary:

- Often, as a result of being involved in a sentinel event, the staff members experience trauma. Many staff members define such an event – and the time period following such an event – as the most difficult period of their career or even their lives.
- Those staff members feel guilty for failing the patient and doubting their aptitude for their position or profession.

- Some of the second victims take all the responsibility upon themselves – and ignore the system's role in the event.
- While others: Blame everybody else for the event, in order to feel better about themselves – which, in its turn, generates a sequence of new problems in the unit, especially regarding teamwork and trust.
- Left to their own devices, the length of the second victims recovery period and the outcome of this recovery is totally based on the individual's strength and resources

What do Second Victims need?

- To know they are not alone, when facing their conscience, the patient, their colleagues, the media, the Ministry of Health etc. (Some of the Second Victims even have to face backlash from inside their own home).
- They need to know they still have a professional future.
- Second victims feel relieved when the patient or the patients' family is being looked after and that their pain is being alleviated.
- Second victims feel better when actions take place in order to prevent similar events from occurring again in the future, since this means:
 1. There is a smaller chance for a similar event to happen to them again in the future;
 2. Something good came out of the event – therefore the pain was not entirely in vain.

The Second Victims – What is the reality I see in Israel?

- The Israeli Ministry of Health repeatedly declares that it expects the institutions to support the second victims.
- However, there are big differences between the medical institutions as to how to handle this issue.
- The second victim is sometimes lost between the cracks, resulting in negative consequences such as: A decline in the motivation to take responsibility and the motivation to advance, or even leaving the healthcare system entirely, which means that years of training and experience go down the drain.
- Of course, a culture of blame and shame does not go hand in hand with supporting the second victims. A culture of learning and forward-facing risk management depends on supporting the second victims.

The Third Circle of Potential Victims

- Many of those Staff members think to themselves: "something similar could have happened to me too, and what will become of me if it does"?
- Other staff members may think it will be better for them to keep their distance from the second victims, since they prefer to be identified with the group of staff members so called: "those who never make mistakes".
- When management does not take care of the second victims, and does not send a clear appropriate message across the institution, the third circle also gets hurt: They fear the danger of being involved in a similar event, and they assume that if so, they too won't get the support they will need, neither from their employers, nor their colleagues. These apprehensions harmfully affect the solidarity of the unit and the whole institute's corporate culture, going as far as an "every man for himself" mentality.

The main Take home message:

- Following the occurrence of a sentinel event, caring for the second and third circle of victims is an integral part of forward-facing risk management.
- Not only for the benefit of the second victims, but for a far larger and wider interest: preserving morale, motivation, role perception, teamwork, etc. of the entire third circle.
- It has been my experience that post sentinel-event risk management that does not include second victims care, is like a half-built bridge: going nowhere, very low ROI.

Second Example – Suicide in an oncology ward

- A patient with suicidal tendencies, well known to the staff, was hospitalized in an oncology ward. He committed suicide there, by jumping out the window.
- The incident happened when the nurse, who was in charge of the suicide watch, stepped out of the room briefly, to bring the patient his medication, which he urgently needed.
- The ward's staff had no previous experience in dealing with mental or suicidal patients.
- The event was traumatic for the entire staff, including the arrival of the police at the scene.
- In this case, the hospital's chief nurse and her deputy immediately arrived at the scene.

- The chief nurse supported the staff, helped with handling the patient's family and the authorities.
- In the weeks to follow, a lot of resources were invested in drawing conclusions, making the required changes and supporting the staff.
- The main messages to the entire staff were:
 - The nurse involved was not the only one responsible for the event;
 - Systemic lessons must be learned;
 - The most important issue is to prevent future events;
 - Work must go on, while giving support to those who need it.
- Despite all the difficulties, the ward managed to keep a positive and functional atmosphere, good teamwork and to give mutual support.
- The health ministry inquiry board, which took place months later, was very impressed with the work that was done by the chief nurse and the entire hospital.

So what to do? – My Model (in a nutshell)

1. Principles and Values:
 - 1.1. The third circle's state of mind, motivation and values are what make or break the team work. Without team work we cannot do anything, especially to prevent sentinel events and learn from them, when they do happen.
 - 1.2. We should raise the awareness of mid and upper-level management to the reality that any response or lack of it, following a sentinel event has an immense, lasting impact on the entire staff of the unit and their overall disposition.
 - 1.3. Management of all levels must commit to a consistent and pre-established policy, regarding sentinel events, reports of events and near misses, supporting the staff, adopting a systemic approach and so on.
 - 1.4. A fixed set of rights: as others I also suggest predetermining a fixed set of rights for second victims – this way everything is known in advance.
 - 1.5. Dealing with a sentinel event, one must always remember that not all such events are the result of negligence or preventable.
 - 1.6. Avoid the misconception that punishment, by itself, is sufficient to prevent future mistakes. Punishment does not inspire motivation, quite the opposite.
2. After the event
 - 2.1. Regarding The Second Victims
 - 2.1.1. The first question management should ask themselves - regarding each and

every staff member, who was involved in a sentinel event - is:

Do we want to retain them?

Usually, management intuitively knows the answer to this question, especially when the event was caused by an inadvertent mistake, contributed by a systemic or an infrastructure deficit.

- 2.1.2. Credibility and Transparency are other significant considerations, for retaining the staff member, since this is exactly the kind of behavior we want to encourage.

- 2.1.3. Clear Messages and Consistent Actions: When management decides to keep the staff member, management's actions need to be consistent in this matter, such as: making sure that the staff member gets emotional support when needed, and has legal counsel – generally this is already covered by insurance. Telling the staff member explicitly: according to what we know today and as far as this is up to us, we want you with us going forward. We understand that a systemic problem or an infrastructure challenge also contributed to the mistake, and we will do everything in our power to improve them, in order to reduce the chance of a similar event occurring in the future.

And last but not least: Don't forget to give positive feedback, such as - we appreciate the way you acted after the event – when such feedback is due.

- 2.2. Regarding The third circle - Clear messages to the entire unit and institution These messages need to be explicitly spread to the entire staff of the unit, in order to prevent negative atmosphere and trust issues.

3. On a day-to-day Basis – Regarding the Entire Staff of the Institution

- 3.1. Since sentinel events and mistakes, are an inseparable part of any system, every training and every protocol should include references as to how to cope with them when they do happen, sooner or later, including: everybody needs to be transparent, cooperative, and do whatever they can to lessen the damage while supporting each other. This will help us to learn how to prevent similar mistakes in the future.

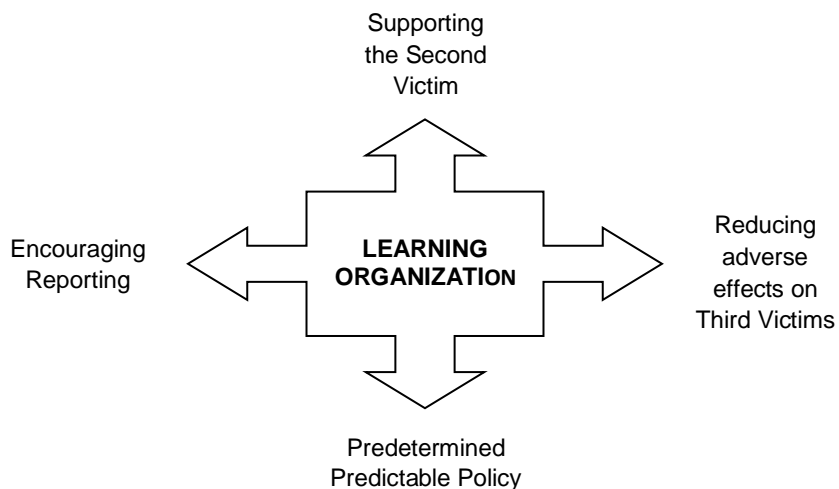
- 3.2. Each and every member of the organization needs to ask themselves every day

- What can I do today?
- With what I have in hand now
- From my position;

- In order to:
 - Prevent sentinel events
 - Improve team work, morale, motivation, etc.
 - To benefit:
 - Myself, and other staff members, patients and the entire organization.
- 3.3 In my experience, each and every one of us, can contribute to these goals, even an independent legal counsel, such as myself.

In conclusion:

In order to be a learning organization, which we all want to be, we should remember the ripple effect that sentinel events have throughout the medical institution. Therefore we must make sure that our culture includes supporting the Second and third circle of victims. Risk management that does not include second victims care, is like a half-built bridge: going nowhere, very low ROI.



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[Original]

RETROSPECTIVE DATA ANALYSIS OF NEGATIVE APPENDICECTOMY RATE IN A LARGE DISTRICT GENERAL HOSPITAL IN NORTH-WEST LONDON, RE - AUDIT

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Mr. Noman Zafar - Consultant, Mr. Kamran Qurashi- Consultant**
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Abstract

Introduction: Appendicitis is one of the most common causes of abdominal pain in emergency departments. However, its diagnosis remains challenging. An acceptable negative appendectomy rate (NAR) is the portion of pathologically normal appendices. It estimates the improvement in NAR as result of changes in practice of diagnosing appendicitis with increased use of imaging and better clinical assessment and decision making in comparison to the previous available study. We aim to define our local practices and results.

Method: Retrospective analysis of data for 251 appendicectomies performed over a period of 36 weeks.

Results: 251 patients were identified over 8 months period and split into two groups. Group Positive (201) defined as those patients who had histopathological evidence of appendicitis and Group Negative (50) defined as the patients who had no histopathological evidence of appendicitis giving a NAR of 19.9% , whereas previous study conducted in same hospital in 2014 gave NAR of 43%.Pre-operative images (Ultrasound Scan and/or Computed Tomography) were used in 57,4% of patients in 2018 while in 2014 they were used in 25,9% of the patients with a significant difference between the two periods (p-value < .000).

Discussion: Our present NAR of 19.9% when compared with the previous NAR of 43% in same institution shows a significant drop. This drop in NAR is attributable to the change in practice in our center implemented in 2014 that led to increased use of Pre-operative imaging i.e. Ultrasound scan/CT scan/MRI scan.

Key Words: Negative Appendicectomy Rate(NAR), Pre-operative Imaging, Computed Tomography, Magnetic Resonance Imaging, Ultrasound scan, histopathology.

1. Introduction

Appendicitis is one of the most common causes of abdominal pain in emergency departments. However, its diagnosis remains challenging. Historically, an acceptable negative appendectomy rate (NAR) is defined as the portion of pathologically normal appendices removed surgically in patients suspected of having acute appendicitis which has been between 15% and 25%.¹ Negative appendectomy can also be defined as the absence of inflammation or pathology in the appendix³. In the UK, diagnosis of appendicitis is incorrect in one in five patients. The NAR in UK is higher than expected in a developed healthcare system. The practice of selective rather than universal pre-operative imaging may contribute to higher rate in UK⁵. Accurate diagnosis and appendectomy remain the cornerstones of therapy for acute appendicitis⁶. It has been established through various studies performed in other developed healthcare systems, that imaging techniques such as ultrasound, computed tomography (CT) and magnetic resonance imaging (MRI) are correlated with a reduced negative Appendectomy rate. The aim of this study was to evaluate the relationship of CT/USS use with the rate of Negative Appendectomy, define our local practices and results, compare current NAR with previous one and establish the change in diagnosing with the use of imaging.

2. Methods

All emergency appendectomies over a period of one year were retrospectively identified by the

hospital electronic theatre logbook. Demographic data and histopathology reports of these patients' resected appendices were electronically retrieved and analyzed. WBC, CRP, patient details (gender, Age) were retrieved through ICE system. The use of pre-operative imaging in this cohort was determined by interrogating a Picture Archiving and Communication System.

Source of Data: Online case details (ICE, EPRO, Theatre list), retrospective.

Sampling Method: Random, all patients with appendectomy in 8 months time.

3. Results

Two hundred and fifty-one patients underwent urgent, non-incidental laparoscopic appendectomy between April 2018 to November 2018. The overall rate of Negative appendectomy was 20.7%. The age group of patients ranging from 5 years to 86 years with a mean age of 30.2 years. Out of which 40.3% were Females and 59.7% were Males. One hundred and ninety-nine removed appendices were histopathologically proven appendicitis, and fifty – two histopathologically normal appendix were removed. No statistically significant difference with regard to gender (p-value 0.074) or age (p-value 0.09) was found.

In the study performed, under Group Positive 66% patients underwent CT scan and 53% had USS. And, in Group Negative 11% had CT scan and 20% had USS (Table1). The use of pre-operative CT was found to be significantly different between the two groups.

PRE-OPERATIVE:	CT SCAN	US SCAN
GROUP POSITIVE	66	53
GROUP NEGATIVE	11	20
P-VALUE	0.049	0.069

Table 1

This study was then compared to the study performed in the same hospital in 2014 and it was seen that CT scan use increased from 10.7% (2014) to 31.5% (2018) and US scan use increased

from 16.2 (2014) to 29% (2018) and 3 patients had both CT scan and US scan (Table2).

PRE-OPERATIVE	CT SCAN	US SCAN	CT SCAN and US SCAN
2018	31.5 %	29 %	3 %
2014	10.7 %	16.2 %	0 %

Table 2: Difference in use of preoperative imaging in 2014 & 2018

Pre-operative images (Ultrasound Scan and/or Computed Tomography) were used in **57.4 %** of patients in 2018 while in 2014 they were used in **25.9 %** of the patients with a significant difference between the two periods (**p-value <0.000**). In 4 years the Negative Appendectomy Rate in our institution has significantly reduced from 44 % to 20.7 %. Therefore, we can say that increase in pre-operative imaging is directly related to the decrease in NAR.

4. Discussion

This study postulates the decrease in negative appendectomy rate by increasing the use of pre-operative imaging in all patients suspected of having appendicitis. The data collected over 8 months was compared with the study done in 2014 in the same hospital. The study demonstrates an NAR of 44% in 2014 which was reduced to 20.7% because of the increased use of pre-operative imaging from 26.9% (2014) to 60.5% (2018).

Is this NAR acceptable? The Negative Appendectomy rate in UK is between 15-25% as seen in a recent study. Our NAR comes in the average range of current UK NAR. But, why UK's NAR is so high as compared to other developed Health care systems who have already achieved an NAR of 3-5%. In Netherland, the current NAR is 3.3% as proved in a recent study. Their NAR in 2010 study was 15% which led them to implementing mandatory guidelines of pre-operative imaging in suspected Appendicitis, which led them to achieve an NAR of 3.3% in 2014. According to the study in Netherland, it was stated that "...appendectomy **should not** be carried out without prior imaging. Ultrasonography is the recommended imaging technique in patients with suspected appendicitis. After negative or inconclusive ultrasonography, a CT scan can be carried out." Similar studies were done in USA, and they demonstrated the achievement of NAR 5.4% in 2012 with the help of routine imaging in patients with suspected appendicitis. According to the study

in USA, it stated "Routine imaging in the evaluation of patients suspected to have appendicitis can safely reduce unnecessary operations²."

Now, the question that arises is why UK's Negative Appendectomy rate is so high? The reason for this can be attributed to the fact that the cost and perceived risk of radiation exposure due to CT scan is a barrier to its routine use. The Limitation of our study is that we were unable to identify patients with diagnostic laparoscopy and the grade of surgeon performing the surgery as majority diagnostic laparoscopy/ appendectomy is done by surgical trainees without the consultant present, due to inability to differentiate between normal and inflamed appendix or due to oblivious approach, "if appendix is removed then appendicitis cannot happen".

A prospective well designed study could identify true diagnostic laparoscopies from intended appendectomies and then perhaps our NAR may not be that high. We feel that all the suspected patients should be scanned by a well-trained radiographer/radiologist, who have high specificity (>90%) .In the UK, USS is mostly reported by relatively junior staff, we think there is a room to improve the USS yield.

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[Original]

RISK MANAGER MINDSET OF NEW CHIEF NURSES WORKING AT HOSPITALS IN JAPAN

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Abstract

Objectives: To compare the risk manager (RM) mindset of four new chief nurses serving as RMs through interviews using a questionnaire upon their initial appointment and 1 year later.

Methods: The questionnaire (33 items, answered on a four-point scale) scores were individually totaled and the interview responses were categorized according to what the respondents valued in working on medical safety.

Results: Collectively, the mean questionnaire scores rose after 1 year, with scores increasing for the items of “working hard with ambition” and “a trustworthy person.” In the first interview, the respondents gave answers including, [lack of problem-solving skills], [measures do not become established], and [local rules exist], while in the second interview, respondents gave answers including, [RMs are the last bastion], [having high goals], [understanding information based on evidence-based medicine is important], and [good interdisciplinary relationships are important].

Conclusion: New chief nurses grew professionally starting at the stage of “feeling confusion and difficulty with their role and skills,” after which they encountered serious incidents, going through a stage of “anxiety and a sense of accomplishment from unpredictable circumstances,” and finally reached a stage of “wanting to become trustworthy” New chief nurses also said that, “RMs are the last bastion to protect both patients and staff” and changed their RM mindset by believing that “safety is everything.” The interviews led the new chief nurses to develop self-insight. In the future, we will continue to conduct research in this area to support new chief nurses in developing a RM mindset.

Key Words: new chief nurse, risk manager mindset, interview, safety management, duty performance

1. Introduction

Japan has developed into a super-aged society with a birthrate declining at a globally unprecedented rate. Moreover, medical technology has advanced and become more complex and patients' and families' value consciousness has heightened. Nurses' workloads have increased

due to these facts as well as the shortening of hospital stays. Chief nurses have traditionally played a central role in achieving organizational goals related to medical safety and quality assurance. However, departmental safety management has become the most crucial role of

chief nurses since the patient misidentification incident in 1999.

Imaoka et al¹⁾ wrote that, “new chief nurses experience difficulty in performing their job and are saddled with confusion and conflict upon their initial appointment.” The researcher in this study has similarly found that assuming risk manager (RM) duties for the first time was the most difficult job for chief nurses.

This study involved interviews with chief nurses upon their initial appointment using a questionnaire, with a focus on RM job performance. The objective was to clarify what new chief nurses value as RMs in working on safety management by surveying the chief nurses again 1 year later.

2. Methods

2.1. Definitions of terms

- 1) New chief nurse: A chief nurse appointed on April 1, 2017.
- 2) Risk manager: An individual central to the clinical department who is responsible for preventing medical accidents, such as by circulating and enforcing a medical safety management manual and by providing education and guidance, and for countermeasures around the time of a medical accident, including providing support to the injured party.
- 3) RM mindset: Kai²⁾ wrote that “safety awareness is consciously endeavoring (having the mindset) to prioritize safety in medical settings above all else and ensure safety by predicting and avoiding risks to patients and medical staff to protect safety.” Accordingly, a RM mindset was defined as “consciously endeavoring to prioritize safety in medical settings and ensure safety to protect safety.”
- 4) Incident: An incident was defined as “all incidents including near-misses, medical accidents, and medical errors.”

2.2. Investigative method

- 1) Participants
Four new chief nurses (subjects A, B, C and D)
- 2) Study design: A qualitative study analyzing the results of semi-structured interviews on the basis of a questionnaire.
- 3) Investigative period
First interview: June 2017 (3 months after appointment)
Second interview: March 2018 (1 year after appointment)

2.3. Analytical methods

- 1) The questionnaire^{3,4)} (33 items, three factors) was scored from one to four points (from “I

completely disagree” to “I agree,” respectively) and the scores were tallied.

Factor 1: Positive attitude toward problem-solving (14 items)

Factor 2: Flexibility in coping strategy (10 items)

Factor 3: Clear achievement motivation (9 items)

2) With the consent of the participants, the interviews were recorded and transcripts were created. Next, the transcripts were checked by the participants and were then processed and anonymized. Any examples of “what participants value in working on medical safety as RMs” were summarized and categorized. An instructor also provided supervision throughout the entire study. Interview guide

- (1) What participants felt when answering the questionnaire
- (2) What actions participants took
 - (a) Situations where outcomes improved
 - (b) Situations where objectives could not be achieved and situations where improvement is difficult
- (3) What participants valued and what measures participants devised as RMs
- (4) In what areas participants felt they had grown or improved their skills

2.4. Ethical considerations

The director of nursing at the target hospital gave consent to participate after receiving an explanation of the study. The participants were informed that cooperation in the study was voluntary, that they would be free to withdraw from the study at any time, and that their personal information would be protected. The interviews with the participants were conducted in a quiet, private room at a time specified by the participants themselves. The study was approved by the ethics committee of the researcher’s institution (study number: C-0017).

3. Results

All four participants were women aged in their 40s. The participants had been working as nurses for an average of 24.75 ± 3.11 years, had an average of 10.25 ± 2.04 years of experience as deputy chief nurses, and an average of 5.75 ± 3.41 years of experience in working at the department where they were appointed as chief nurses.

All the participants had completed the second level of the Certified Nurse Administrator Education Program and had been promoted to chief nurse with the encouragement of their superiors. Two of the participants had completed medical safety manager training.

3.1. Comparison of questionnaire answers

1) Changes in scores for Factor 1 “Positive attitude toward problem-solving”.

After 1 year, the mean scores of three of the participants (subjects A, B and C) had increased, while the mean score of one participant remained unchanged. The mean score of the four participants therefore rose by 0.14 points after 1 year.

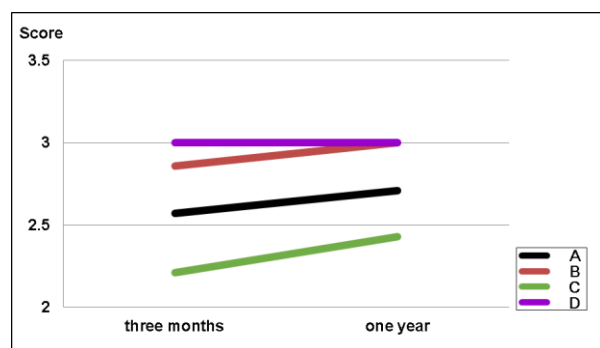


Figure 1 Factor1: positive attitude toward problem solving (14 items)

2) Changes in scores for Factor 2 “Flexibility in coping strategy”.

After 1 year, the mean scores of two participants (subjects A and D) had decreased, but had increased for the other two participants. The mean score of the four participants therefore remained unchanged after 1 year.

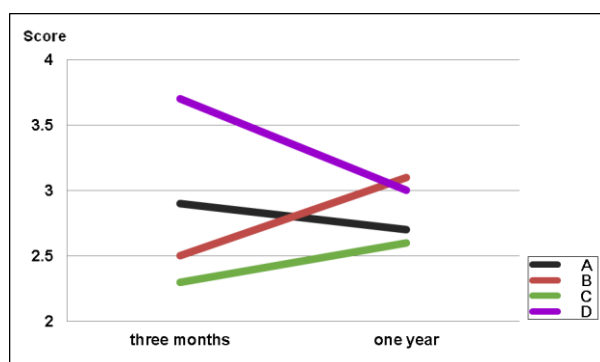


Figure 2 Factor 2: flexibility in coping strategy (10 items)

3) Changes in scores for Factor 3 “Clear achievement motivation”.

The score decreased for one participant (subject A), increased for two participants, and remained unchanged for one participant. The mean score of the four participants therefore rose by 0.23 points after 1 year.

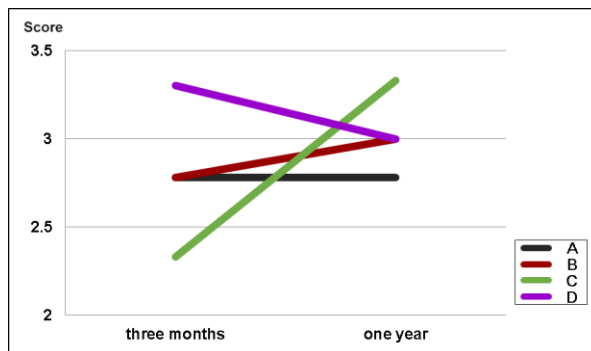


Figure 3 Factor 3: clear achievement motivation (9 items)

3.2. Interview results

Below, categories are indicated by [square brackets], sub-categories are indicated by <angular brackets>, and codes are indicated by “double quotation marks”.

In this paper, the interview results are described in the order of (1) What participants felt when answering the questionnaire, (2) What actions participants took, (3) What participants valued and what measures participants devised as RMs, and (4) In what areas participants felt they had grown or improved their skills.

(1) What participants felt when answering the questionnaire

Nineteen codes were extracted from the results of the first interview and were summarized into three categories (in descending order): [lack of skill], [role and skills], and [doubt].

Forty-two codes were extracted from the second interview and were summarized into two categories: [lack of skill] and [role and skills].

(2) What actions participants took

Forty-six codes were extracted from the results of the first interview and were summarized into six categories: [existence of local rules], [changes in disease structure and widespread rule violations], [changing the blood sampling orientation of new hires], [repetition of the same incidents], [incidents typical to novice nurses], and [lack of cooperation by physicians and chief nurses].

Thirty-two codes were extracted from the results of the second interview and were summarized into seven categories: [serious incidents decrease and minor incidents increase as a result of risk prediction training], [6R (right patient, right drug, right purpose, right dose, right route, and right time) check for drugs: raising awareness of the purpose

of the 6R], [job improvement and enforcement of the 6R check], [good communication between medical staff], [improvement in the orientation of novice nurses], [making use of veteran nurses in novice nurse education], and [environmental improvements].

(3) What participants valued and what measures participants devised as RMs

Thirty-one codes were extracted from the results of the first interview and were summarized into eight categories: [monitoring staff with respect], [patient participation-type nursing], [guidance based on evidence-based medicine (EBM)], [building countermeasures against repeated incidents], [information sharing], [educational support for the entire nursing department], [cooperation with leaders], and [following rules].

Twenty-two codes were extracted from the results of the second interview and were summarized into six categories: [raising the awareness of all staff to the same extent], [respecting the autonomy of staff and continuously observing new rules], [learning from incidents], [preventing the fading of rules], [information sharing], and [being aware that medical care is for the patients].

(4) In what areas participants felt they had grown or improved their skills

Thirty codes were extracted from the results of the first interview and were summarized in four categories: [being aware of the RM role despite a lack of self-awareness], [I awoke to my leadership role], [effective training to ensure quality became clear], and [I learned post-incident visualization and countermeasures].

Thirty codes were extracted from the results of the second interview and were summarized into four categories: [As a RM, I am a trustworthy person and the last bastion], [I have made understanding events based on EBM a habit], [I learned how to interact with the families of patients], and [I have no solid sense, but I have become capable of viewing situations objectively as a RM].

4. Discussion

The data obtained from the interviews using a questionnaire were used to depict the 1-year journey of new chief nurses as RMs as a red line on a graph where the y-axis represents the growth process and the x-axis represents time, as shown in Figure 4.

New chief nurses as RMs (in this study)	Full-time RMs (Yamauchi et al)
Stage 1 Feeling confusion and difficulty with the RM role and skills	Stage I Feeling puzzlement and confusion
Stage 2 Anxiety and a small sense of accomplishment under unpredictable circumstances	Stage II Struggling with must-do tasks
Stage 3 Wanting to become a trustworthy RM	Stage III Confronting the gap between the workplace and their own thoughts
	Stage IV Entrusting jobs to the workplace with the thought 'workplace takes precedence!'

Figure 4 The growth process

New chief nurses initially experienced the occurrence of serious incidents, repeated incidents, and widespread local rules, and felt “confusion and difficulty with the RM role and skills.” Thereafter, new chief nurses recognized and utilized resources for executing their RM role while repeatedly experiencing anxiety and setbacks under unpredictable circumstances. After 1 year, the new chief nurses had come to think that, “I want to become a trustworthy RM” and their RM mindset had accordingly changed and grown, as indicated by the statement, “RMs are the last bastion of the department.”

The 1-year journey of the new chief nurses is discussed as follows in the order of Stage 1 “Feeling confusion and difficulty with the RM role and skills,” Stage 2 “Anxiety and a small sense of accomplishment under unpredictable circumstances,” and Stage 3 “Wanting to become a trustworthy RM.”

1. Stage 1 “Feeling confusion and difficulty with the RM role and skills”

The first year as a RM did not progress smoothly; new chief nurses experienced a lack of interdisciplinary cooperation and skills for RM role. Moriyama⁵⁾ stated, “The role conflict of new chief nurses is characterized by recognizing limitations, such as confusion and worry over timely decisions, actions, and choices and an inability to produce results despite hard work, while simultaneously bearing the same weight of responsibility as veteran nurses; consequently, new chief nurses face a dilemma due to the large gap between reality and everyone’s expectations.” This study similarly showed that upon their initial appointment, new chief nurses sensed their lack of skill due to their inability to make swift decisions regarding unexpected events, which they had never before

experienced during their tenure as deputy chief nurses, and faced role conflict arising from not knowing how to execute the actions they wanted to perform. Confusion and a sense of difficulty consequently took precedence and new chief nurses grew very slowly.

However, as evidenced by “I awoke to my leadership role as a manager,” by 3 months after their appointment, new chief nurses understood the RM role and their self-awareness of attempts to perform their duties had begun to develop. Furthermore, new chief nurses mentioned, <I became aware of my lack of skill after seeing the items in the questionnaire>, which suggested that self-evaluation using a questionnaire became an indicator for new chief nurses in the performance of their RM duties for the first time.

2. Stage 2 “Anxiety and a small sense of accomplishment under unpredictable circumstances”

Yamauchi et al.⁶⁾ wrote, “The steps of RM growth were characterized by overlaps and progress by moving back and forth.” This study also showed that upon their initial appointment, new chief nurses disregarded the problems they perceived with department-specific rules and were unable to take any concrete measures. The RM mindset temporarily declined when the nurses were easily swayed by situations including serious incidents and repeated incidents. However, the new chief nurses were disposed to setting high safety goals when, through their struggling with must-do tasks, increasingly their efforts gradually led to results. Accordingly, the new chief nurses were unable to take a journey as a RM where they climbed one step at a time.

Furthermore, the new chief nurse grew on a spiral-like trajectory that moved back and forth while they felt a small sense of accomplishment from working on departmental safety management while experiencing anxiety under unpredictable circumstances and repeated failures and setbacks each time they came to a standstill upon encountering a serious incident.

In 1 year, the new chief nurses each experienced serious incidents multiple times. In the interviews, the new chief nurses said, “dealing with patients, families, and staff is difficult, but coping while borrowing the strength of other departments is important.” In accordance with Imaoka’s¹⁾ statement that, “in the organization, senior chief nurses modified old behavior by learning desirable behavior, attitudes, and knowledge through active

incorporation of the empirical knowledge of senior chief nurses,” this study also demonstrated that the new chief nurses collected empirical knowledge through serious incidents and changed their consciousness to the belief that it is acceptable to borrow the strength of the medical safety management department, superiors, and senior chief nurses as resources to solve problems that cannot be solved alone. Behavioral changes also emerged whereby the new chief nurses worked as part of a team through coordinating interdisciplinary cooperation to solve problems.

As a factor behind middle managers’ thoughts about retirement, the Kyoto Nursing Association found in a survey⁷⁾ that “almost 60% of respondents face multiple challenges and sense limitations to their abilities.” Furthermore, in regard to the growth of new chief nurses, Moriyama⁵⁾ noted that, “the support of a mentor is important for new chief nurses at the stage of adapting to organizational socialization who are in the process of cultivating management skills to overcome the barrier of role conflict and growing without retiring.” The participants in this study similarly said in the interviews that, “I acquire empirical knowledge and borrow the strength of the medical safety management department, superiors, and senior chief nurses,” “good interdisciplinary relationships,” “I participate in medical safety training and competency workshops,” and “I was able to perform self-reflection through this questionnaire and interviews.” Accordingly, the importance of support from the medical safety management department, superiors, and senior chief nurses was highlighted as a factor that enhances the RM mindset of new chief nurses.

3. Stage 3 “Wanting to become a trustworthy RM”

The categories of [RMs are trustworthy people], [RMs are the last bastion of the department], [it is important to have high goals], [I have made understanding events based on EBM a habit], [raising the awareness of all staff to the same extent], [good interdisciplinary relationships are important], and [it is acceptable to borrow the strength of veteran nurses] reveal that new chief nurses grow by learning many lessons as they perform their RM duties. Meanwhile, the new chief nurses’ statements including, “RMs are the last bastion to protect both patients and staff” and “I have come to understand the RM role and take responsibility for the nursing department’s organizational remarks” represent the strong newly developing desire of new chief nurses to become

trustworthy RMs. Sumo⁸⁾ stated that, “consciously incorporating ‘feedback’ for staff who have shown the strongest impact on safety awareness into the risk management role of chief nurses can serve as a factor to enhance the safety culture of the ward.” In this study, the category [raising the awareness of all staff to the same extent] was similarly thought to be the result of new chief nurses’ understanding the RM role and actively engaging in the role. Sumo⁸⁾ also wrote that, “chief nurses’ enhancement of their own risk sensitivity leads to enhancement of risk management ability, such as the careful selection of feedback periods and safety education content.”

Measures to continue efforts to raise the awareness of all staff to the same extent therefore, lead to enhancement of the RM mindset of chief nurses from the standpoint of demonstrating the direction for staff to move in to avoid risks. Furthermore, Shimamori⁹⁾ stated that, “one of the first things that front-line nursing administrators should do to ensure safety is constantly habituate on-site staff to performing duties in accordance with a standardized safety process.” Like the findings of these studies, the results of this study suggested that new chief nurses recognized education to ensure that staff can follow new rules by developing risk sensitivity while simultaneously respecting staff autonomy as an important task of RMs, and that new chief nurses were already working on this task.

In the “open-ended answer” section of the second interview, the following six categories were identified: [Making improvements through interdisciplinary investigation of causes and sharing of information is an important attitude for medical staff], [Consistent education based on the building of good relationships between nurses and educators is important], [Good interdisciplinary human relationships lead to safety management], [I borrow empirical knowledge and veteran nurses’ strength for use in safety management], [I was able to form good interdisciplinary relationships], and [I have people whom I can count on when I am struggling, which gives me a sense of security]. These six categories suggested the need for interdisciplinary cooperation and the fact that new chief nurses borrow empirical knowledge and veteran nurses’ strength for use in safety management. In interdisciplinary relationships, the new chief nurses learned that, [Making improvements through interdisciplinary investigation of causes and sharing of information is important]. Kawashiro¹⁰⁾ found that,

“professionals of various disciplines need to deepen their autonomous expertise in their respective fields and eliminate differences in commitment between disciplines while sharing goals to jointly protect the safety of patients.” In addition, Miyoshi et al.¹¹⁾ stated that, “most individuals chose ‘open communication’ as a factor for becoming a safer organization.

Safety education to facilitate interdisciplinary cooperation and communication therefore needs to be examined.” The participants in this study also said that, “I think about how professionals of various disciplines should act as a professional group” and “I give serious consideration to improvements instead of blaming professionals of other disciplines,” which demonstrated that new chief nurses experienced incidents involving professionals of various disciplines and made efforts to build good interdisciplinary relationships. These findings show that new chief nurses learned through experience the need to continue staff education to also continue good interdisciplinary relationships.

4. Growth of new chief nurses

During their first year as a RM, the new chief nurses grew professionally starting at Stage 1, “feeling confusion and difficulty with the RM role and skills,” after which they encountered serious incidents and passed through Stage 2, “anxiety and a small sense of accomplishment under unpredictable circumstances,” before reaching Stage 3, “wanting to become a trustworthy RM,” while following a spiral-like trajectory.

Immediately after being promoted to chief nurse following their experience as a deputy chief nurse, the new chief nurses promptly faced a variety of problems in the workplace without any role models. Accordingly, after passing through the stage of “feeling confusion and difficulty with the RM role and skills,” the new chief nurses began to understand their own position and role while still being swayed by situations, after which they progressed to Stage 2, “anxiety and a small sense of accomplishment under unpredictable circumstances,” while responding to situations in the workplace. All four of the new chief nurses also reached Stage 3, “wanting to become a trustworthy RM,” only after experiencing Stage 2, “anxiety and a small sense of accomplishment under unpredictable circumstances.”

5. Comparison of new chief nurses who are full-time RMs and new chief nurses who are departmental RMs

The growth process of full-time RMs at medical institutions surveyed by Yamauchi et al.⁶⁾ was compared with that of the new chief nurses in this study.

Yamauchi et al.⁶⁾ described the process by which full-time RMs at medical institutions grow in four stages: “I: feeling puzzlement and confusion,” “II: struggling with must-do tasks,” “III: confronting the gap between the workplace and their own thoughts,” and “IV: entrusting jobs to the workplace with the thought ‘workplace takes precedence!’.” They describe this process as being characterized by overlaps and progression by moving back and forth through these stages.

Stage 1 in this study, at which new chief nurses felt confusion and difficulty, was similar to Stage I for full-time RMs. In many organizations, only one full-time RM is appointed within a hospital by the hospital director and director of nursing, and consequently the RMs have a high level of awareness of their role of “protecting the safety of the entire organization.” Accordingly, the full-time RMs transitioned to Stage II of “struggling with must-do tasks.” Meanwhile, the new chief nurses in this study began to understand their own position

and role while experiencing setbacks from being swayed by situations, and progressed to Stage 2 of “anxiety and a small sense of accomplishment under unpredictable circumstances,” as they responded to situations in the workplace. Stage 2 for the new chief nurses did not exist in the growth process of full-time RMs. “Anxiety and a small sense of accomplishment under unpredictable circumstances” was therefore revealed to be the only stage newly discovered in this study.

Like full-time RMs, the new chief nurses in this study experienced three stages of growth in just 1 year. The process of growth differed from those of full-time RMs, but changes were nonetheless seen in the RM mindset, as evinced after 1 year by the statement, “I want to become a trustworthy RM.” Furthermore, like full-time RMs, the new chief nurses learned through personal experience that it is acceptable to accomplish duties by borrowing the strength of surrounding people as a resource instead of struggling alone.

Through these processes, the new chief nurses were expected to grow by “confronting the gap between the workplace and their own thought” and “entrusting jobs to the workplace with the thought ‘workplace takes precedence’,” in a similar manner to full-time RMs.

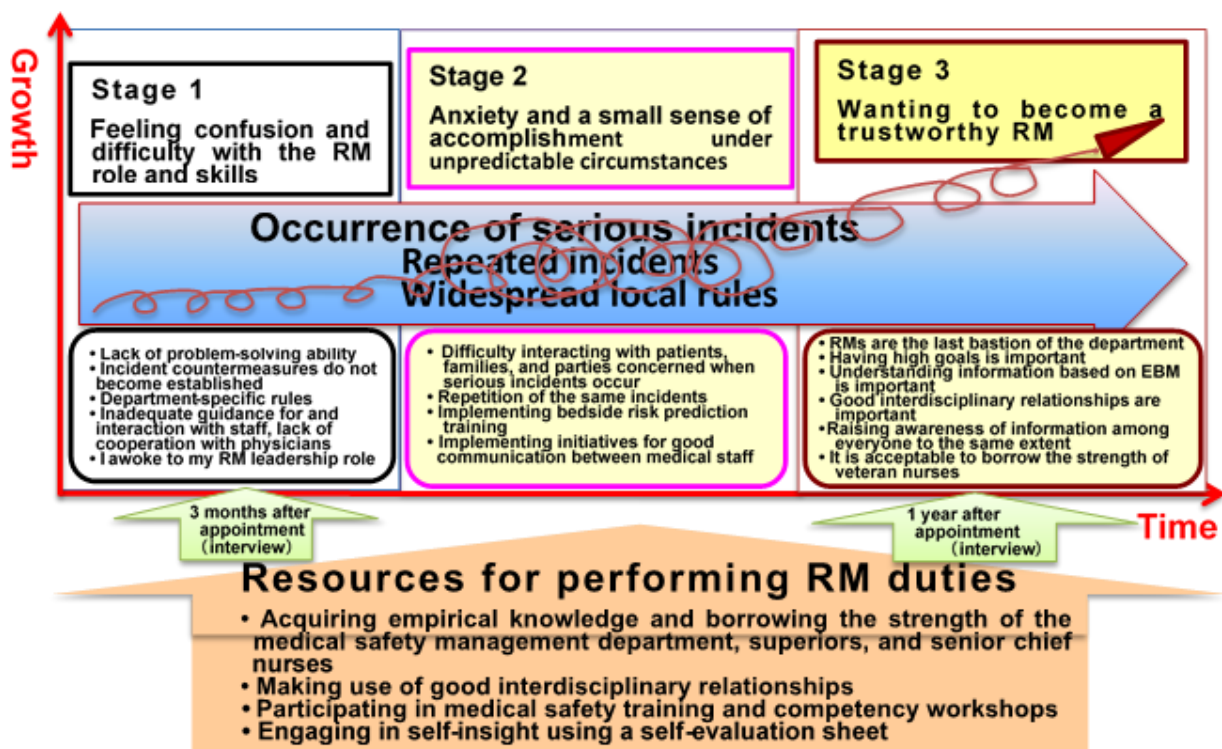


Figure 5 One-year journey of new chief nurses as RMs

6. Effects of this study

This study involved a first round of interviews with new chief nurses using a questionnaire 3 months after their appointment as chief nurse when they had become accustomed to their duties, followed by a second round of interviews approximately 1 year after the appointment when they had experienced various duties.

In regard to the two rounds of questionnaire-based self-evaluations and interviews, the new chief nurses said, <I was able to look back as a form of reflection by participating in this research,> <I performed self-reflection by answering the questionnaire,> and <I sensed my lack of countermeasure as a safety manager when incidents occur.> Sakurai¹²⁾ stated that, “after reflection, chief nurses exhibited self-insight and assigned meaning and value to actions, which is the purpose of reflection, as exemplified by statements such as, ‘I objectively reflected on myself and made realizations,’ ‘I was happy to be able to appreciate myself,’ and ‘I was able to assign meaning to and organize my own behavior, way of thinking, and other actions,’ but also demonstrated expanded knowledge of nursing management and an inquisitive mind, as represented by statements such as, ‘I was able to identify future measures’ and ‘I developed the desire to develop further.’” In this study, the participants spoke of worrying about unresolved problems, but also talked about having accomplished tasks by working on solving the problems of staff and the department. For new chief nurses, the questionnaire-based self-evaluations and interviews in this study may offer an opportunity to deepen self-insight by talking about one’s thoughts, which may have allowed the new chief nurses to cultivate their RM mindset.

5. Conclusion

1. The growth process of new chief nurses during their first year as a RM passed through three stages and differed from that of full-time RMs.
2. As RMs, the new chief nurses grew while following a spiral-like trajectory where they came to a standstill upon encountering serious incidents and felt a small sense of accomplishment despite experiencing anxiety.
3. The new chief nurses spoke of how “RMs are the last bastion to protect both patients and staff,” realized that “safety is everything,” and developed the strong desire to “become a

trustworthy RM,” which demonstrated change of their RM mindset.

4. The questionnaires and interviews provided the new chief nurses with an opportunity to deepen their self-insight, which was considered an effective means of educating and supporting them in executing their RM role.

6. Conclusion

This study was conducted on four new chief nurses and there are limitations in generalizing the results of new chief nurses to RM mindsets in all situations. A future challenge will be developing this research as a means of offering self-evaluation and self-insight into the RM role. We also intend to continue working on this research to support new chief nurses in developing a RM mindset.

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[Original]

THE EDUCATION PROGRAM OF RAPID RESPONSE SYSTEM FOR MEDICAL STUDENTS IN JAPAN

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Abstract

Rapid Response system (RRS) is an important mechanism for prevention of sudden change in the hospital and safety of the patient's outcome.

In the Japanese medical care system, number of hospitalists is not so adequate, therefore, each specialist should take care of their patient. Then, the judgment on the condition of the patient is depending on the specialist's opinion, and there is a risk that the RRS does not work smoothly.

We conducted a retrospective review of one hospital's RRS 5-years data.

All of calling are 226, Outpatient before examination:28%, Outpatient under examination31%, Hospitalizedpatient:41%. Outpatient before examination who isn't decided in which clinical department to receive medical care. we should be noted here, "No treatment". its reason is cancellation by a specialist.

In Japan, the RRS education has become available to Nurse, but It isn't clear for doctor and in graduate student's education curriculum.

We built RRS educational program for medical students in Japan. This program needs to about 3hours.of lectures and simulation. And we hope to use the KIDUKI course, which is content for healthcare professionals unique to Japan, to find the sudden change to patient condition deterioration, and use the content of the triage education to determine urgency.

In addition, education on physicians mainly focuses on the education of response, but education as a finder to physicians is necessary to prevent sudden changes in order to protect the safety of hospitalized patients' lives.

Key Words: Rapid Response System, Afferent limb, Hospitalist, KIDUKI

1. Introduction

Rapid Response System (RRS) is an important mechanism for finding of sudden change to patient condition deterioration in the hospital and improved safety of Patient's outcome¹⁾. In the Japanese

medical care system ,number of hospitalist isn't so adequate, because in many hospital system in Japan, The same doctors often provide outpatient and inpatient management. Therefore, each specialist should take care of their patient.

Since around 2000, the number of hospitals that have started RRS has increased in Japan. but mainly Code Blue System that is responding to cardiac arrest, the number of systems for preventing sudden changes to patient condition deterioration is increasing little by little in recent years.

Then the judgment on the condition of the patient is depending on the specialist's opinion, and there is a risk that the Rapid Response System does not work smoothly.

Although the importance of RRS is understood. We examined why it is difficult to spread in Japan and what kind of ingenuities necessary in the Japanese Medical System.

2. Methods

The study was conducted a retrospective review of one hospital's Rapid Response system 5-years data. This hospital is an educational hospital with 1000beds.It have started RRS from 2004, and its system is a mixed system with the Code Blue system. It analyzed the trends and examined what was lacking in medical education.

3. Results

1. Classification (see Figure1)

This system can be called anytime, by anyone, at any time. All of calling are 226, Outpatient before examination: 28%, Outpatient under examination 31%, Hospitalized patient: 41%. Outpatient before examination who isn't decided in which clinical department to receive medical care.

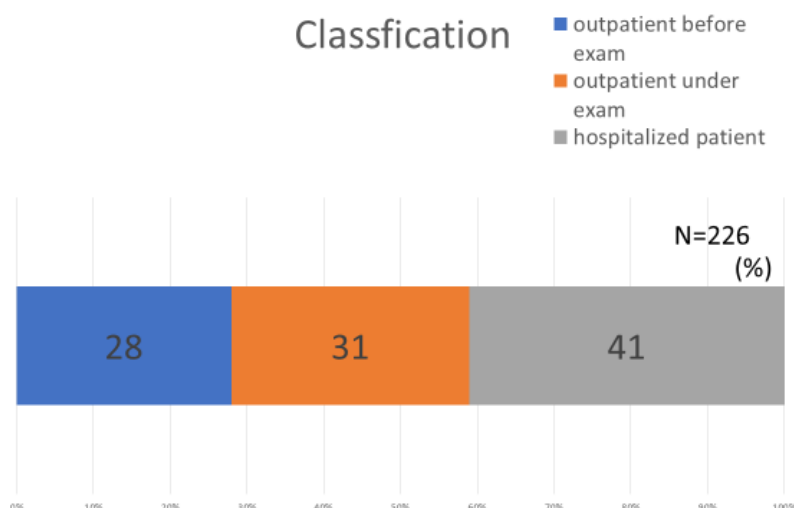


Figure 1

2. A Kind of reason for the call (see Figure2)

The call reason was classified into 18 classifications. Most of reason is conscious level down, next is Cardio-pulmonary-arrest, Dyspnea and others. Others is included any reasons. For example, Nurses couldn't find the charge doctor, and they are wondering who to call because they and the charge doctor had different opinion. Then next shock. crump, and feel-bad.

Most of Outpatient before examination is sudden fall down, who are conscious level down, fall, crump and feeling bad.

Most of Outpatient under examination is dyspnea included Cardio-Pulmonary-arrest.

Most of hospitalized patient is Dyspnea as same Outpatient under examination.

3. Intervention (see Figure 3)

The intervention was classified into 8 classifications. Most of intervention is treatment what are medication, hemostasis, injection etc. On the other hand, we should be noted here," No treatment". its reason is cancellation by a specialist. Because the doctor thought patient as DNAR but that was not clearly ordered and shared.

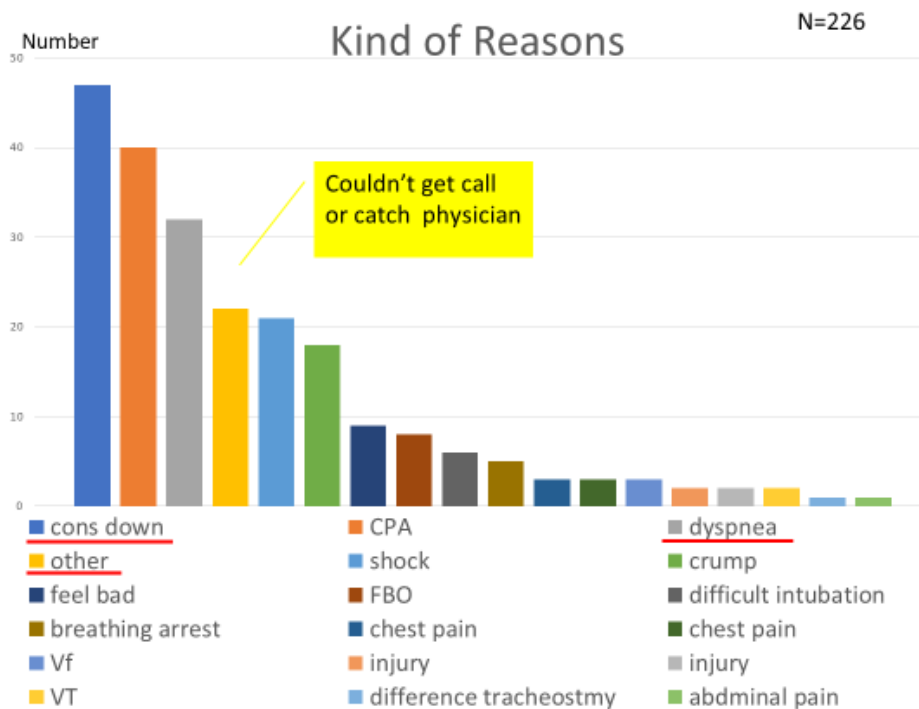


Figure 2

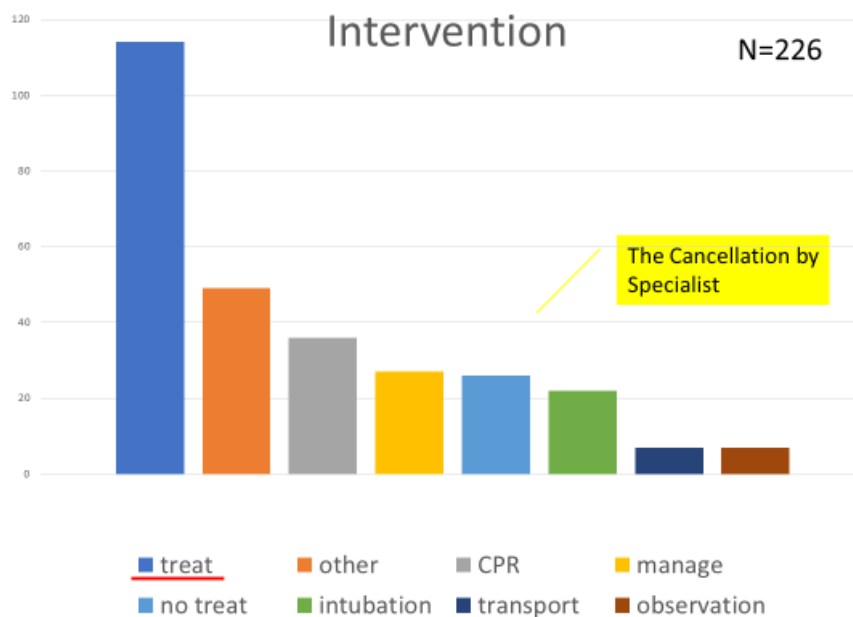


Figure 3

4. Discussion

These results are RRS and Code Blue mixed data. But it might many number of hospitals are probably same in Japan.

The fact that there were many outpatients in the classification is thought to be the result of being used as a system to cope with troubles, not as Code Blue but as “Thank you for Calling”.

However, many outpatients under examination need to help that medical emergency attention or procedures. Although, it is important to realize that

patient conditions have deteriorated due to ABC changes and nurse concerns.

So, in Japan, the RRS education has become available to Nurse, but It isn't clear for doctor and in graduate student's education curriculum.

Then in Japan, Medical education core curriculums²⁾ has 37 symptoms to be learned before graduation. Some symptoms became the reasons to RRS. But it has not sudden change prediction. (see Table1)

37 symptoms to be learned before graduation

- | | |
|---|---|
| 1.Fever | 18.Consciousness disorder and faint |
| 2.Bloody phlegm and hemoptysis | 19.Stomachache |
| 3.Lymphadenopathy | 20.Headache |
| 4.The whole body weariness | 21.Twitch |
| 5.Dyspnea | 22.Rascality and vomit |
| 6.Abnormality of the urine volume and urination | 23.Motor paralysis and muscle strength decline |
| 7.Appetite (desire) slump | 24.Dizziness |
| 8.Pain in chest | 25.Vomiting of blood and bloody bowel |
| 9.Bloody urine and albuminuria | 26.discharge |
| 10.Weight reduction and weight gain | 27.Lower back back pain |
| 11.Heartbeat | 28.Dehydration |
| 11.Menstruation disorder | 29.Constipation and the loose bowels |
| 12.Shock | 30.Arthritis and arthrophyema |
| 13.Pleural fluid | 31.Edema |
| 14.Anxiety and depression | 32.Jaundice |
| 15.Cardiac standstill | 33.Injury and heat injury |
| 16.Swallowing difficulty and obstacle | 34.Rash |
| 17.Thing forgetting | 35.Abdominal distension (Abdominal dropsy is included.) tumor |
| | 36.Cough and phlegm |
| | 37.Anemia |

Table 1

RRS has 4 aspects. Afferent limb, which is the first aspect, is important to prevent sudden change to patient condition deterioration.

Especially, there are many education and outcomes to detect abnormalities to nurses in charge of patient observation³⁾.

However, there are reports on education for Rapid Response Team and doctors, but there is no report on RRS education in pre-graduate medical education⁴⁾.

Also, in the Japanese medical system, not only nurses but also doctors who are not emergency physicians need to learn observations to prevent the deterioration of patient conditions.

Recently, most of the hospitalized patient who has sudden change condition and critical ill had been getting Septic shock and require early intervention⁵⁾.

Therefore, it's important to learn the relationship between RRS and Sepsis in Pre-graduate medical education. Otherwise, it might be difficult to ask a general doctor to understand RRS.

In addition, Trigger Program education that what is RRS was able to increase attention to patient. And this program creates a minimum standard of communication between medical staffs around vital signs indicating patient instability⁶⁾.

Thus, we devised a program to introduce RRS into pre-medical education. (see Table2)

content	session
What is the RRS	Literature review
How to find	KIDUKI(Japanese original session)
What indicator to use	Early Warning Score, Quick SOFA Japan Triage and Acuity Scale
What method to use	Problem based learning and Situation based team training
What and How to Evaluate	Knowledge,skill, self-perceived and confidence, Team performance

Table 2

This program needs about 3 hours of lectures and simulations. And we hope to use the KIDUKI course, which is content for healthcare professionals unique to Japan, to find the sudden change to patient condition deterioration, and use the content of the triage education to determine urgency.

5. Limitation

This data is one hospital, and it can't always be generalized. However, the cause of not spread of RRS in Japan might be the same.

6. Conclusion

We conducted a retrospective review of one hospital's Rapid Response System data. This system was a mix of RRS and Code Blue systems. We consider that in order to quickly detect sudden changes to patient condition deterioration, it's necessary to educate the doctor in charge. In addition to the early detection by the conventional RRS co-medical staff. To that end, a program to learn about sepsis, which is not included in the current core curriculum in Pre-graduate medical education. But is an indicator for early detection and the cause of sudden changes in many hospitalized patients, is required.

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[Original]

SAFETY MANAGEMENT OF HEAT STROKE FOR THE 2020 TOKYO SUMMER OLYMPICS

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Abstract

Objectives: The Summer Olympic Games are generally held in mid-summer. Considering the temperature rise, heat stroke-related disease may be the greatest risk in the 2020 Tokyo Olympics. Hence, in the past Summer Olympic Games, the risk of heat stroke was examined with reference to measures against heat in the 1996 Atlanta Olympics where our research group participated in medical treatment. Herein, we will investigate on measures against heat and use the findings as a reference for the 2020 Tokyo Olympics plan.

Methods: Using the 1996 Atlanta Olympics reference, we calculated the necessary number of medical staff for the 2020 Tokyo Olympics participants, paying attention to the following: “Ratio of diseases,” “Breakdown of top complaints and diseases of participants in a first-aid station,” and “Frequency of the heat stroke-related disease by a job type.” On the basis of the results, we will present the best medical measures for the upcoming grand sports event.

Results: The environment of Tokyo is similar to that of Atlanta; thus, the medical data in 1996 Atlanta Olympics are tremendously useful for the 2020 Tokyo Olympics. Most of the participants complained of an “Injury” in a first-aid station, and the most common injury type was heat stroke-related disease. Chief complaints and diseases of patients did not demonstrate the specific tendency. Furthermore, participants will need 2,319 medical staff members.

Conclusion: All participants need to be educated on heat stroke prevention. In addition, the medical staff for the 2020 Tokyo Olympics should be competent enough to treat patients with various diseases.

Key Words: Heat Stroke, Heat Stroke-related Disease, Mass Gathering, Medical Safety Management, 2020 Tokyo Olympic, Summer Olympic Games.

1. Background

In large-scale events, management of heat stroke-related disease is important to ensure the safety of participants^{1,2,3,4,5,6}. For instance, the Summer Olympic Games are generally held during mid-summer, and the 2020 Tokyo Olympics (2020 Tokyo) is scheduled from July 24 to August 9. Considering the temperature rise and the urban heat island phenomenon^{7,8,9,10,11}, we believe that heat stroke-related disease is the greatest risk in this event. Japanese ministries are taking measures against global warming and heat stroke, but the number of patients with heat stroke-related illnesses is increasing as the temperature rises¹². Therefore, managing heat stroke-related diseases during the 2020 Tokyo is indispensable for participants, including the athletes. In the past Summer Olympic Games, the risk of heat stroke was examined with reference to measures against heat in the 1996 Atlanta Olympics (1996 Atlanta), wherein our research group actually participated in medical treatment. In the present research, we will set qualification requirements by job type on the basis of the 1996 Atlanta, take measures against heat, and use the findings as a reference for the 2020 Tokyo plan.

2. Methods

Method 1.

The data acquired from the 1996 Atlanta, where our research group participated, could be used as reference data for the 2020 Tokyo. We compared Tokyo and Atlanta, according to geographical relationship, climate classification, mean temperature of the month, and the time of the event.

As observed, Tokyo is not similar to any of the seven meetings held since the 1996 Atlanta. According to the weather data published by the Japan Meteorological Association, we referred to the average temperature and average maximum temperature in Tokyo in 1996 and the latest in 2018.

Method 2.

Based on the 1996 Atlanta data^{1,6}, which are similar to the abovementioned results, we calculated the number of medical staff needed by the participants of the 2020 Tokyo and of the 1996 Atlanta. Furthermore, using the reference of the 1996 Atlanta, we examined the following: "Ratio of diseases," "Breakdown of top 7 complaints and diseases of participants in a first-aid station," and "Frequency of heat stroke-related disease by a job type." On the basis of these results, we examined the best medical measures required for the 2020 Tokyo.

3. Results

Result 1.

The latitude of Tokyo is 35° 41' N, whereas that of Atlanta is 33° 45' N. Their individual latitude is almost the same as those of Sydney, Athens, Beijing, London and Rio de Janeiro.

Both cities exhibit a humid subtropical climate (Cfa), according to the Köppen-Geiger climate classification (Table 1). The mean temperature in Atlanta in 1996 was almost the same as that in Tokyo during the same period. Furthermore, the period demonstrated almost the same time. Therefore, we consider Atlanta as a city with a similar climate to Tokyo (Table 2).

		Jul.	Aug.
1996 Atlanta: mean temperature		28.6°C	26.3°C
1996 Tokyo	mean temperature	26.2°C	26.2°C
	highest temperature	30.0°C	30.0°C
2018 Tokyo	mean temperature	28.3°C	28.1°C
	highest temperature	32.7°C	32.5°C

Table 1 Temperature at the time of holding between Tokyo and Atlanta

Year	City	Country	Latitude	Climate classification	Jul.	Aug.	Period
1996	Atlanta	USA	33°45' N	Humid subtropical (Cfa)	26.8°C	26.3°C	1996.07.19~08.04
2000	Sydney	Australia	33°52' S	Humid subtropical (Cfa)	20.0°C (Sep)	22.1°C (Oct)	2000.09.15~10.01
2004	Athens	Greece	37°58' N	Steppe (BSh)	33.5°C	33.2°C	2004.08.13~08.29
2008	Beijing	China	39°54' N	Steppe (BSh)	31.4°C	30.3°C	2008.08.08~08.24
2012	London	UK	51°30' N	West Coast Marine (Cfb)	23.5°C	23.2°C	2012.07.27~08.12
2016	Rio de Janeiro	Brazil	22°54' S	Savanna (Aw)	26°C	26°C	2016.08.05~08.21
2020	Tokyo	Japan	35°41' N	Humid subtropical (Cfa)	29°C	31°C	2020.07.24~08.09

Table 2 Geographical relations and climate environment between Tokyo and 7 countries held

Result 2.

1) Estimated number of medical staff required and medical qualification for the 2020 Tokyo

In the 1996 Atlanta, 10,318 athletes, 5,200,000 spectators and others, and 1,542 medical staff were recorded. According to the Tokyo Olympic and Paralympic Games Organizing Committee, the number of participants in Tokyo in 2020 is estimated to be 11,090 for athletes and 7,825,800 for spectators and others. Assuming that the medical staff would provide the same medical treatment as that in the 1996 Atlanta, 2,319 medical staff would be needed for the 2020 Tokyo (Table 3). The qualification requirements for

medical staff participation were determined by the International Olympic Committee (IOC); hence, only qualified staff could participate.

2) Ratio of diseases in patients who visited the first-aid station in the 13 categories of Atlanta Olympic Games (AOG) classification, the most frequent disease was Injury (42.5%), followed by Respiratory (12.3%). The number of Injury was approximately 3.4 times that of Respiratory (Fig. 1). Among the Injury cases, the most frequent diseases were sprain and strain (27.3%), followed by heat stroke-related diseases, such as heat cramps and dehydration, heat stroke, and heat syncope (25.8%) (Fig. 2)

	Nation	Athlete (person)	Spectator and others (person)	Medical staff (person)
1996 Atlanta	197	10,318	5,200,000	1542
2016 Rio de Janeiro	207	11,238	1,170,000	
2020 Tokyo	206	11,090	7,825,800	2319 (estimation)

Table 3 Number of participants in the Summer Olympic Games

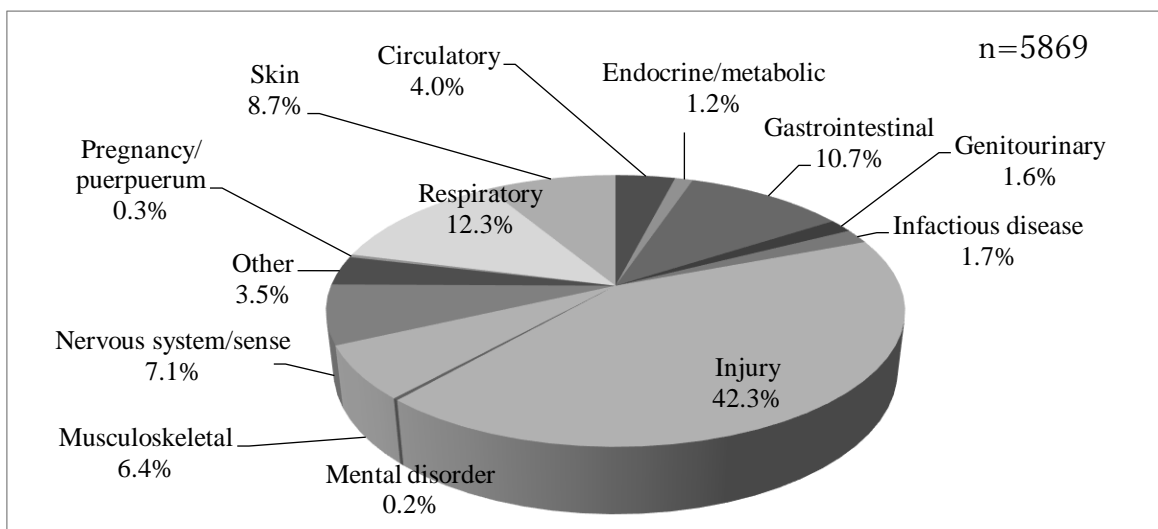


Figure 1 Ratio of the AOG classification in the 1996 Atlanta

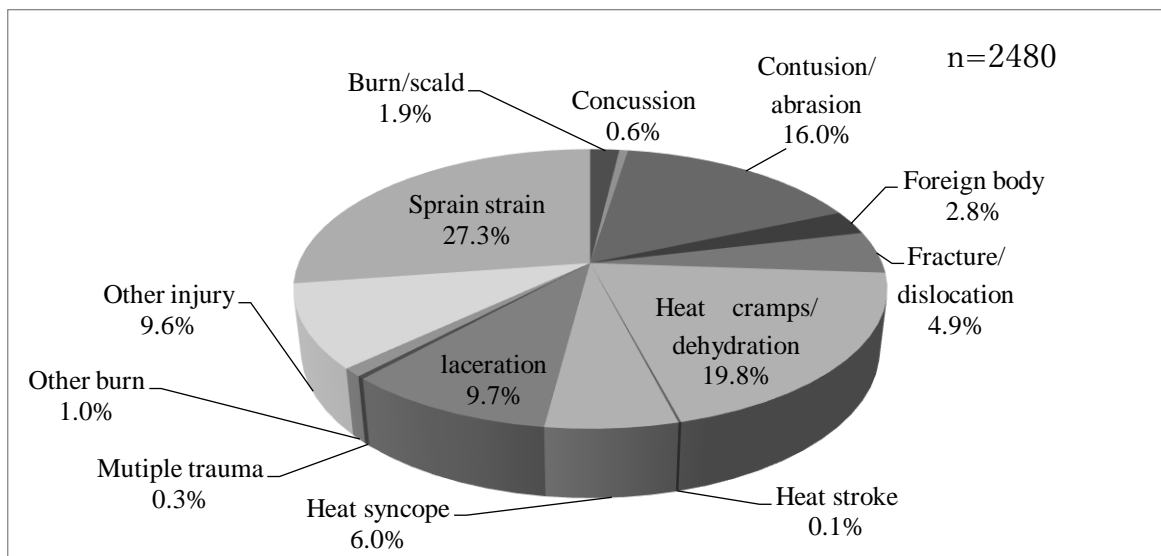


Figure 2 Ratio of heat stroke-related diseases in the Injury category in Atlanta

3) Breakdown of the top 7 complaints and diseases of participants in a first-aid station (Table 4). The top daily complaints and diseases were sprain and strain, heat cramps and dehydration, acute upper respiratory infection, and contusion and abrasion. Furthermore, a single-day visit for an eye disorder and skin infection was recorded. Meanwhile, chief complaints and diseases in almost every day were other injuries, other conditions, and other skin disorders that could not be identified. These complaints or diseases did not show a specific tendency.

4) Frequency of the heat stroke-related disease by a job type (Table 5)

The ratio of heat stroke-related diseases by a job type was highest in spectators and others (76.2%). In each heat stroke-related disease, the proportion by occupation was higher in spectators and others. In particular, most of the job types of heat stroke were spectators and others.

	19/Jul	20/Jul	21/Jul	22/Jul	23/Jul	24/Jul	25/Jul	26/Jul	27/Jul	28/Jul	29/Jul	30/Jul	31/Jul	1/Aug.	2/Aug.
1	Heat Cramp/ dehydration	Heat Cramp/ dehydration	Sprain/ Strain	Heat Cramp/ dehydration	Sprain/ Strain	Heat Cramp/ dehydration	Acute upper resp.inf	Sprain/ Strain	Sprain/ Strain	Contusion/ abrasion	Acute upper resp.inf	Sprain/ Strain	Sprain/ Strain	Sprain/ Strain	Sprain/ Strain
2	Sprain/ Strain	Sprain/ Strain	Heat Cramp/ dehydration	Sprain/ Strain	Heat Cramp/ dehydration	Sprain/ Strain	Sprain/ Strain	Contusion/ abrasion	Acute upper resp.inf	Nausea/ Vomiting	Sprain/ Strain	Heat Cramp/ dehydration	Acute upper resp.inf	Heat Cramp/ dehydration	Heat Cramp/ dehydration
3	Contusion/ abrasion	Laceration	Acute upper resp.inf	Contusion/ abrasion	Acute upper resp.inf	Acute upper resp.inf	Contusion/ abrasion	Acute upper resp.inf	Contusion/ abrasion	Sprain/ Strain	Heat Cramp/ dehydration	Contusion/ abrasion	Heat Cramp/ dehydration	Other Injury	Contusion/ abrasion
4	other injury	Contusion/ abrasion	Contusion/ abrasion	Acute upper resp.inf	Contusion/ abrasion	Contusion/ abrasion	Other injury	Heat Cramp/ dehydration	Other condition	Acute upper resp.inf	Contusion/ abrasion	Acute upper resp.inf	Nausea/ Vomiting	Acute upper resp.inf	Rash
5	Acute upper resp.inf	Acute upper resp.inf	other injury	Laceration	Other skin disorders	Other skin disorders	abdominal pain	Nausea/ Vomiting	abdominal pain	Laceration	Nausea/ Vomiting	Nausea/ Vomiting	Contusion/ abrasion	Contusion/ abrasion	Acute upper resp.inf
6	Heat syncope	Heat syncope	Laceration	other injury	Heat syncope	Nausea/ Vomiting	Other condition	Other condition	Nausea/ Vomiting	Rash	Laceration	Heat syncope	Skin infection	Nausea/ Vomiting	Laceration
7	Laceration	abdominal pain	Rash	Rash	Laceration	Lower extremity	Disorder of the eye	Lower extremity	other respiratory	Heat Cramp/ dehydration	Other injury	Lower extremity	Other codition	Other codition	Nausea/ Vomiting

Table 1 Breakdown of the top 7 complaints and diseases of participants in a first-aid station in the 1996 Atlanta

	Heat cramps/ dehydration	Heat stroke	Heat syncope	Total
ACOG*	82 (12.9%)	0 (0.0%)	23 (3.6%)	105 (16.5%)
Olympic family	3 (0.5%)	0 (0.0%)	0 (0.0%)	3 (0.5%)
Officials	3 (0.5%)	0 (0.0%)	0 (0.0%)	3 (0.5%)
Media	4 (0.6%)	0 (0.0%)	1 (0.2%)	5 (0.8%)
Athlete	35 (5.5%)	0 (0.0%)	1 (0.2%)	36 (5.6%)
Spectator and Others	362 (56.7%)	2 (0.3%)	122 (19.1%)	486 (76.2%)
All	489 (76.6%)	2 (0.3%)	147 (23.0%)	638 (100%)

*Atlanta Committee for the Olympic Games

Table 2 Ratio of consultation of heat stroke-related diseases in Atlanta

4. Discussion

1. Validity of the 1996 Atlanta medical data
 To discuss the medical system as a mass gathering, we need to use medical data that have been conducted in the same plan in the past^{1,2,3,6}. No reference data other than the Olympics data can be used for the Olympics of a huge-scale and less frequent event. Therefore, as a result of examining the past Olympic host cities with an environment similar to that of Tokyo, Atlanta was nominated for the reasons that the latitude is near to Atlanta and that it has the same climate classification. The medical data in the 1996 Atlanta are extremely useful for the 2020 Tokyo. The limitation of these data is that predicting the

number of patients with heat stroke-related diseases is difficult because the mean high temperature in the 2020 Tokyo has been predicted to rise from that in the 1996 Atlanta, due to the effects of global warming and the city functional differences between Tokyo and Atlanta.

2. 2020 Tokyo patient characteristics predicted from high temperatures
 Considering the effects of global warming, the temperature is rising not only in Japan but across the world⁸. Moreover, Tokyo, which is a mega city, demonstrates a temperature rise due to the urban heat island phenomenon. In Japan, a Wet Bulb Globe Temperature (WBGT) index is used as a heat index for heat stroke prevention. As a result of

examining the WBGT index from July 24 to August 9 in 2020 Tokyo on the same day in 2019, the result was 4 days for Severe Warning and 13 days for Danger. From this result, the WBGT index during the 2020 Tokyo period is predicted to be at or above the level of “Severe Warning.” In the National Weather Service Heat Index, which demonstrates a similar heat index, the level of “caution” for heat is reached when the temperature is beyond 26°C, regardless of humidity. Considering the possible mean highest temperature of 32°C or more in 2020 Tokyo and the level of “extreme caution” in the NWS heat index, we predicted that heat stroke-related patients in 2020 Tokyo will increase than those in 1996 Atlanta⁹. Heat stroke-related disease is a direct disease associated with a temperature rise^{6,7,9,11}, which corresponds to Injury in the category of the AOG classification. Based on the 1996 Atlanta data^{1,6}, heat stroke-related diseases accounted for a higher proportion of spectators and others than that of other occupations, and the forecast for audience in the 2020 Tokyo was 7,825,800, which is expected to be 1.5 times that of the 1996 Atlanta. Moreover, the number of patients with heat stroke-related diseases will be 1.5 times that of the 1996 Atlanta. Indirect diseases due to temperature rise may also increase in any of the 11 categories other than Injury from the AOG classification.

3. Medical staff for the 2020 Tokyo

On the basis of the 1996 Atlanta data^{1,6}, the total number of medical staff needed in 2020 Tokyo was calculated to be 2,319. This number is the number of people who participated in the weather conditions at the time of the 1996 Atlanta; thus, the required number may increase in 2020 Tokyo, where temperature rise is predicted. In 1996 Atlanta, the IOC classified medical positions as doctors, nurses, and paramedics and required ACLS qualifications as a requirement for participation. The registration of medical staff dealing with similar conditions in 2020 Tokyo is relatively limited; hence, securing the expected total number of medical staff remains a concern. From the 1996 Atlanta data, chief complaints and illnesses of patients who visited a first-aid station did not demonstrate the specific tendency, so the corresponding medical staff for the 2020 Tokyo needs wide-ranging medical knowledge and skills^{3,4,13}.

4. Medical measures action for the 2020 Tokyo

A total of 24 scientific organizations formed consortium for the emergency disaster medical

care system during 2020 Tokyo^{14,15}. This consortium will demonstrate the emergency care system around the meeting place for the disaster outbreak of terrorism and the majority of diseases and injuries^{14,15,16}. Considering that a temperature rise is predicted during 2020 Tokyo^{7,9,10}, “heat stroke guidelines” were made as measures for heat stroke-related diseases¹⁷. In addition, ministries and government offices in Tokyo are working on the urban heat island effect¹². They are certain that 2020 Tokyo will be held under high temperatures^{7,9,10}. Hence, knowledge on heat stroke-related diseases is indispensable for the medical staff⁵. Under the leadership of the IOC¹³, each organization should cooperate, and the medical staff and volunteers should be educated enough on various diseases before the 2020 Tokyo commences.

5. Conclusion

All participants need to be informed on heat stroke prevention, considering that the mean highest temperature will be 32°C and over during 2020 Tokyo. The medical staff must also be competent enough to treat patients with various diseases.

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[Short Communication]

ENDEAVOR AND CHALLENGES FOR MEDICAL SAFETY PROMOTERS TO REDUCE FALL ACCIDENT PREVENTION OF IN-PATIENTS

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Abstract

Objectives: Fall accidents of in-patients can result in severe injuries and death; preventing them is a great challenge. This study is to clarify how medical administrators should propel the fall accident prevention and the challenges they currently have.

Methods: We conducted a questionnaire in 5 facilities from February to March of 2018 including the fall accident occurring rate in 2017 and their preventing measures. Also, we investigated how each administrator of the medical accident prevention should be promoting preventive activities and what kind of challenges they have.

Results: The annual fall accident rates in 5 facilities were; max. 16.88‰ and min. 0.39‰. The common preventions measures among 5 were utilization of assessment sheet, bed fence 4 points fence utilization, and physical restraint. The measures taken by administrators were; educational guidance regarding the assessment sheet utilization, checking and instructing of prevention equipment, coping with the environment by ward patrol and instructing the staff. Also, they were concerned about the lack of information sharing among staff and educational guidance against insufficient accident preventions.

Discussion: The administrators should facilitate and promote in-patients safety measures by receiving all the accident reports so that they can take effective measures. Not only personalized “measures” depending on the individual patients’ characteristics, some measures can be tackled as the whole hospital. We should discuss the educational support to the whole hospital after grasping the characteristics of the fall accident occurrence factors by the hospital and the situation of the staff communication.

Key Words: Patient safety, Fall prevention, Patient safety administrator, Medical staff communicate.

1. Introduction

Some of the main factors of in-patient fall accidents include patient side factors, environmental factors such as facilities and caretakers' factors. According to the 2015 Medical Accident Information by Japan Medical Function Evaluation Organization, 3,374 cases of medical accident injuries were reported from 275 medical institutions. Analyzing the fall accident factors among them, "caretakers' factors" were reported to be the second factor to the "patient side factors" in numbers²⁾. It is considered that approaching to the caretakers, namely medical workers who assist patients tend to trip and fall should be the fall accident prevention countermeasure. In Japan, since 2002, patient safety administrators have been placed in each hospital, who are in charge of promoting patient safety of the corresponding hospital. We believe the work done by the patient safety administrators will be the key of the promotion of fall accident prevention, judging by the literature on the relationship between patient safety administrators and patient safety³⁾⁴⁾. From the above, the objective of this study is to clarify how patient safety administrators should propel the fall accident prevention and the challenges they currently have.

2. Methods

We conducted a paper questionnaire in 5 facilities upon receiving approval by the corresponding hospitals. We sent out the questionnaires by mail, and had the participants answer the questions and filled them in. The subjects were patient safety administrators at the hospitals. The duration of the questionnaire was from February to March of 2018. The content of the questionnaire was the fall accident occurring rate in 2017 (from January to December) and their preventing measures practiced in the hospitals. The presence of accident prevention measures was to be "present" if used once or more during the corresponding period. We calculated the falling rate by dividing the fall reports per year by the total number of hospitalizations and multiplying it by 1,000. Also, we made the field as free description where the patient safety administrator in each hospital answered what actions they have been taking to promote falling accident prevention, and what kind of challenges they have.

3. Results

All the patient safety administrators who are the patient safety promoters of the participating institution were head nurses. The annual fall accident rates in 5 facilities were; max. 16.88‰ and min. 0.39‰ (Table 1).

Table 1 Summary of Hospital

Hospital	A	B	C	D	E
Annual falling accident rate* (‰)	4.65	0.59	0.39	1.62	16.88
# of Wards #	6	5	3	4	4
# of Beds	267	226	149	180	180
# of Departments	9	6	4	3	6
# of Doctors	20	12	5	19	9
# of Nurses	217	143	118	108	126
# of Nurse aids	7	8	6	19	3
# of Caregivers	5	16	6	0	14
# of Pharmacists	4	4	3	4	3
# of Clinical Laboratory Technicians	4	4	2	4	3
# of Nutritionists	3	3	3	2	3
# of Radiography Technicians	4	3	2	4	1
# of Physiotherapists	9	12	5	1	5
# of Occupational Therapists	6	6	5	5	2
# of Language Auditors	4	5	2	0	0
# of Clinical Engineers	1	3	1	1	1

*Note: Fall accident rate (‰) = number of reported fall cases/cumulative total number of in-patients x 1,000‰: Per-mil

Table 2 Fall accident prevent measures practiced in every hospital

Fall accident prevention measures practiced	A	B	C	D	E
Fall accident prevention assessment sheet utilization	1	1	1	1	1
Bed fence 4 points fence utilization	1	1	1	1	1
Physical restraint	1	1	1	1	1
Children's bed with fence utilization	1	1	1		1
Installment of "out of floor" alarm sensor on the floor	1	1		1	1
Instruction of shoe selection	1	1		1	1
Utilization of low beds		1	1	1	1
Creation of fall accident prevention manual		1	1	1	1
Installment of "out of bed" alarm sensor on the bed	1	1			
Installment of "out of bed" alarm sensor on the patient's hospital gown, etc.		1		1	
Installment of an alarm sensor at the patient room door	1	1			
Installment of an alarm sensor at the wheelchair and chair	1	1			
Installment of a camera in the patient room		1			1
Utilization of fall prevention brochure	1				1
Use of portable toilet		1		1	
Full fixation of an over-bed table		1			1
Use of 5-wheel IV stand	1				1
Installation of an alarm sensor at the toilet					
Displaying a poster for calling attention for fall accident prevention					
Utilization of patient information sharing pictogram, etc.					
Total number of measures	11	15	6	9	12

Table 3 3 Actions of patient safety administrator

Hospital	Actions of patient safety administrator	Concerns of Patient Safety Administrators
A	<ul style="list-style-type: none"> • Schedule a ward patrol for fall accident prevention • Consider the utilization of fall accident prevention assessment sheet • Creation of utilization of a flowchart for fall accident prevention items (goods) and actions for making it a practice 	<ul style="list-style-type: none"> • Concerned and struggling for fall accident prevention measures for patients unable to push the call button • In trouble being unable to conduct assessment for fall prevention • Have not succeeded in fully sharing the fall accident prevention
B	<ul style="list-style-type: none"> • Review the selection criteria of safety goods/equipment • Review the fall accident prevention assessment sheet and standard nursing care plan • Adjust the environment as needed after reflecting the fall accident cases 	<ul style="list-style-type: none"> • About prevention measures and usage of safety goods/equipment for patients with cognition disorder • Timely understanding patient's conditions and sharing them • Investigation of fall accident prevention measures • Methods of how to have the manual well known to staff and have them comply with it
C	<ul style="list-style-type: none"> • Majority of in-patients are bed-ridden, and nurses check the environment around the beds • Conduct a ward patrol for fall accident prevention • Check the use of bed fences and wheelchair use conditions 	<ul style="list-style-type: none"> • Increase the training participation rate • Making the checking actions a practice • Have them thoroughly adhere to the pointing and calling • Comply the rules and the manual
D	<ul style="list-style-type: none"> • Conduct a safety patrol and check the ward safety condition • Conduct a daily ward patrol and environment check 	None
E	<ul style="list-style-type: none"> • Instruct to ensure to perform fall accident prevention assessment and information sharing in the department • Conduct reviewing of nursing care plan, give feedback and perform a tracking investigation • Conduct a ward patrol at the time of accident occurrence 	<ul style="list-style-type: none"> • In trouble due to being unable to make an assessment for fall accident prevention • Not conducted "confirmation/checking" necessary by the medical staff • Unable to take necessary actions foreseeing risks by grasping

4. Discussion

The study this time did not show correlation between falling rate and fall accident prevention measures. In addition, no significant differences were observed in the actions of patient safety administrators. Patient safety administrators as medical safety promoters are responsible for continuously practicing activities in order to effectively deal with in-hospital medical safety. They play a role of a member of the organization, receiving all the accident reports promoting in-hospital safety measures should facilitate and promote in-house safety measures by receiving all the accident reports so that they can take effective measures. Fall accident prevention measures include those which the whole hospital can work on, in addition to measures individually catered to each patient. One of the initiatives throughout the hospital is planning the staff trainings. The occurrence factors by each hospital have characteristics. We believe that one of them is thought to be their communication style. Thus, it is required to consider the educational guidance to the whole hospital upon grasping the current situations of communication in each hospital. In addition, it is believed that utilization of some devices should be necessary, such as information sharing tools for fall accident prevention which suit the particular hospital. We have study results of how medical staff communicate among them and awareness and actions for fall prevention by different professions⁵⁾. Patient safety administrators are in the position where they should approach each and every one of the medical staff. Thus, it is considered necessary to grasp the characteristics of each profession of each hospital on their awareness and actions for fall accident prevention, so that the findings can be utilized in the activities for this purpose.

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[Short Communication]**A NEW APPROACH FOR MEDICAL EDUCATIONAL METHOD OF
NON-TECHNICAL SKILLS, DEPLOYING KIT-GAME****Tatsuya Kitano**Seijoh University, Health Care Management Course, Faculty of Business Administration
Graduate School of Health Care Studies, Patients Safety & Quality Management, Aichi, Japan**Abstract**

According to the report “Medical accident data gathering operation” (authored by Kitano and others, 2014), the second most factor is lack of communications. Our proposal is based on the concept that health care services should be patient oriented, safe, secure and comfortable for them, and the services should be provided with high quality. This time, we confirmed the educational effect of introducing KIT-Game (Kaleidoscope Insight Training Game, authored by Kitano) as a new method to strengthen Non-Technical Skills (NTS) such as communication, teamwork and leadership. I checked “educational effect 1.” by introducing “KIT-Game B”. We think this is the challenge to be solved by the organization. It is important to draw “Empowerment (authored by Kitano)” of medical staff, build consensus among them who constitute organization, and guide them to change their actions. For the purpose of solving these issues, 2-day seminar of medical safety measures has been held continuously since 2014. In 2018, the seminar was held, having 24 people in total whose occupations are doctor, nurse, physical therapist, clinical engineer, and medical school student. At the seminar, we introduced methodology of building organization where patient’s right is regarded as the most important, and creating organization by utilizing KIT-Game including coaching, facilitation, improvisation and card game as a tool to emphasize NTS, and checked the effect by taking questionnaire right after the seminar. After the seminar in 2018, having 24 people in total, whose occupations are doctor, nurse, physical therapist, clinical engineer, and medical school student, we got data from the questionnaire as follows. 1.The ability of conversation has been emphasized (96%), 2.The ability of “listening to patient” has been emphasized (100%), 3.Acquired altruistic intention (100%), 4.Understood the meaning of “learning improvisation” and utilize it for quality improvement of medical practice and safety management (100%), 5.Learned that facilitation skill at a conference can be utilized for quality improvement of medical practice and safety management (96%), 6.Got confidence of solving issues for quality of medical practice and safety management (79%).

What we can see from this result is that, it is important to grasp current situation and issues reside in medical accident data collection project and its investigation system, analyze the background factors

for issues, and then, extract the fact and understand the organizational factors systematically at first. Furthermore, there is an imminent need here for each medical institution to practice “KIT – Game”, which is a new solution to build up medical safety management system based on the experience and principle. Moreover, we think providing education for “corporation among multiple occupations” in medical departments of universities and/or medical school will be the key to the re-establishment of medical quality and safety management system in each country.

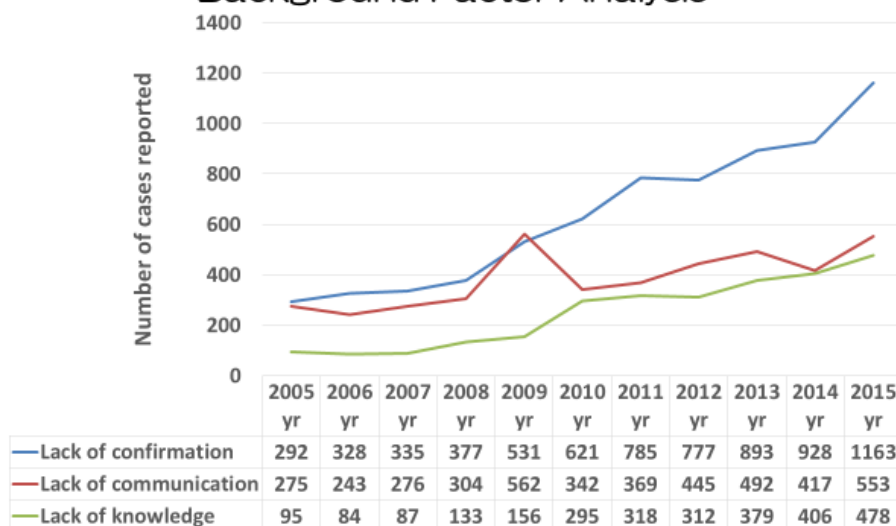
Key Words: KIT-Game, Non-technical skills, medical education, behavioral change, Empowerment, professionalism, Improvisation, team building, patient’s safety.

1. Background

In Japan, under the hospital function certificate program of The Japan Council for Quality Health Care, which is foundation assessing quality, safety and function of hospital, there are 2,169 certified facilities (as of 1, November 2019) and they account only 26.1% of all 8,300 facilities in the country (as of 30, September, 2019), and it is hard to say that securing sustainable quality to provide healthcare system has been established yet. On the other hand, according to reports by prevention of medical accident division of The Japan Council for Quality Health Care (JQ), the number of medical accidents, in the last 14years and 9months accounts for 41,088 (274 medical facilities obligated to report, and 806 of facilities with sign up application filed, as of Jun, 2019)¹).Based on the

reports stated above, we have conducted background factor analysis. According to the report “Medical accident data gathering operation” (authored by Kitano and others, 2014) (Fig.1), the second most factor is lack of communications. Now assignment of dedicated health care safety manager has been mandated as a prerequisite to estimate for addition of healthcare safety measure. However, 53.5% (Kitano and other, 2010) of workload by healthcare safety managers have been currently consumed for gathering and analysis of incident and/or information for accidents., hence, it is hard to secure time for primary work such as patrol inside hospital, education of all employees, re-enforcement of cooperation between occupations, etc. And it is not yet reach to establish matured safety culture.

Medical facility mandated to report and number of cases
Background Factor Analysis



(From: Japan Council for Quality Health Care ,Public Interest Incorporated Foundation,2005,Jan-2015,Dec Medical accident data aggregation report , by Kitano,2015)

Figure.1

2. Importance of Communication Skill

As an importance of communication skill, 1. "Communication errors which cause medical accident" occupies top in the list. 2. Communication between occupations is getting more difficult because operation between occupations are vertically organized, medical expertise and departments are segmented, and operation is integrated into two or more municipal hospitals, etc. 3. Communication among medical staff promotes cooperation among multi-disciplinary. Furthermore, communication between patients and medical staff could bring up information gathering skills necessary for diagnosis and therapy evaluation, and also could give patients "healing" effect to relieve uneasiness and worries of a disease. However, in most Japanese medical school, there is no department of "healthcare communication" installed in medical education program. This is one of the reasons why it is hard at clinical site to partner and communicate well among practitioners because of medical staff's communication skill is low. In future, we should combine and leverage three factors, one, education of medical staff training school, two, education at clinical site and three, lifelong education by professional association, to enhance communication skill.

3. Methods

For the purpose of solving these issues, 2-day seminar of medical safety measures has been held continuously since 2014. In 2018, the seminar was held, having 24 people in total whose occupations are doctor, nurse, physical therapist, clinical engineer, and medical school student. At the seminar, we introduced methodology of building organization where patient's right is regarded as the most important, and creating organization by utilizing KIT-Game(Kaleidoscope Insight Training Game, authored by Kitano) including coaching, facilitation, improvisation and card game as a tool to emphasize "Non-Technical Skills" and checked the effect by taking questionnaire right after the seminar.

3.1 About Kaleidoscope Insight Training, 2009

To resolve these issues, it is necessary for medical staff to learn about medical communication skill, partner with patients and enhance information gathering skill necessary for clinical examination. This time, I would like to show you a new way of effective medical communication method that I designed. I would like to introduce **[Kaleidoscope Insight Training by T. Kitano, 2009]** as a method of

enhancement Non-Technical Skills. This method is constructed by following four steps.

Step.1: KIT-Workshop (workshop for resolving problems) is a tool that helps to share objective and target, provide a chance to reach an agreement, and change one's behavior. With this, a person will consequently be able to plan and concretize his/her action plan.

Step.2: KIT-The Patients Safety & Quality Management Feedback Support System, 2012) This one is what I explained in this academic conference last year. The system predicts possible medical accidents by coding accumulated data for medical accident case in the past.

Step.3: KIT-Game A (Kaleidoscope Insight Training Card Game) 2010 kitano is a card simulation for the purpose to enhance ability of observations and prediction capability. I will explain more in detail later.

This time, I would like to explain in detail about Step.4: KIT-Game B (Healthcare Educational Innovation Game). This method is based on 『Yes, and』 (respective interaction method). We can use this tool to practice in the first one through five minutes at briefing or lecture every time. What good about this tool is, 1. A person can improve communication skill, 2. More intuitive with the five senses exercised, 3. think more flexibly, 4. Have rich sensitivity and become expressive. 5. Have self-confidence and trust others, 6. become stronger to ad-lib and make prompt decision, 7. Bring up sensibility to enjoy this moment. As a result of these effects, a person can discover one's own personality and also understand others better. In addition, a person can enhance listening skills, observation capability, communication skill, look around carefully and pay attention to others. Consequently, I believe this is an effective tool to strengthen overall capability of an organization.

As prerequisite training for introducing Step.4: KIT-Game B (Healthcare Educational Innovation Game), we instruct how to utilize 『Yes, and』 (carefully listening, respective dialogue), Coaching skill (to listen carefully, to acknowledge, to ask questions) and Facilitation (to prompt dialogue). These are is useful for meeting management (Fig.2).

How to nurture medical staff in future?

Importance of learning medical ethics and understanding definition of professional
Zoom Out what's on the background!? ⇒ Context Based Medicine

Is it possible to cope with change such as Manual (clearly described documents to ensure smooth handoff), CRM, Team STEPPS, etc.? ⇒ Effective medical communication method

【Kaleidoscope Insight Training by T.Kitano, 2009】

Step.1:KIT-Workshop (Workshop for problem resolution) ⇒ Sharing objective and goal, place to reach an agreement

Step.2:KIT-The Patients Safety & Quality Management Feedback Support System, 2012

Step.3:KIT-Game A (Kaleidoscope Insight Training Card Game) 2010

⇒ card simulation to enhance an ability of observations and prediction capability

Step.4:KIT-Game B (Healthcare Educational Innovation Game)

『Yes, and』 based on respective interaction,

- ① Improve communication skill
- ② More intuitive with right brain exercised
- ③ Think more flexibly and positively
- ④ Have rich sensitivity and become expressively
- ⑤ Have self-confidence and trust others
- ⑥ Become stronger to ad-lib and make prompt decision
- ⑦ Bring up sensibility to enjoy this moment

→ As a result, a person can discover one's own personality and understand others better!!

A person can enhance listening skills, observation capability, improvement of communication skill, looking around carefully and paying attention to others

⇒ strengthen overall capability of an organization!

T.Kitano, "Medical education" medical education management program, textbook

Figure 2

3.2 About KIT-Workshop (Workshop for problem resolution) to sharing objective and goal, place to reach an agreement

It is not one-way knowledge and technique sharing, but is two-way learning and creation activity, where participants actively join, experience and learn through interaction in a group.

【Expected effect by introduction of workshop】

1. Providing space to learn and experience with interaction, not one-way.
2. Drawing independence through activities.
3. Building team by working together.
4. Securing diversity by introducing rules.
5. Making argument visible.

【Basic rules of this workshop】

Listen carefully till someone finishes talking, do not criticize, join an opinion you are interested in, everyone should give opinion, participate positively, enjoy the workshop.

【Preparation for making workshop efficient】

- ① Make group of 5 or 6 people without deviation by division and occupation.
- ② Prepare name holder and write one's nickname you want to be called.

★ Make no friction by position, age, authority gradient and generations, and generate atmosphere to speak up easily.

③ Hand out papers (B size) for the amount of theme to each work group.

★ Use it for substitute of whiteboard to make the contents verbalized and visualized.

④ Hand out necessary amount of sticky notes (10×10cm) with three colors (red, yellow, blue) to each group.

★ Use sticky notes to make shy members easy to give opinions.

Write down simple keywords or short sentences to a paper (B size).

⑤ Marker (thin, bold) uni PROCKEY Marker® (5 to 7 colors), felt-tip pen, stapler, cellophane tape, paper (A4, A3 size.)

The most important thing is to concretize the action plan. Sharing and recognize objective. Visualization and/or verbalization make it easy to understand things that is hard to express or convey. This is the place where interaction happens between occupations and intergeneration, leading to enhance further cooperation. The role of facilitator is important. Hence, development of facilitators is the urgent need.

3.3 KIT-Game A (Kaleidoscope Insight Training Card Game) 2010

Now, I would like to explain briefly about Step.3: KIT-Game A (Kaleidoscope Insight Training Card Game) 2010 that I designed. Kaleidoscope In-service Training Game® (By T. Kitano, 2012) is a training game performed by teams, for the purpose to enhance prediction skill. The procedures of the game are followings,

- ① About 20 to 30 cards are prepared beforehand. In these cards, consultation date and time, date of hospitalization, information of patient, age, record of medical history, underlying disease, etc. are described.
- ② Dividing participants into groups, having 5 or 6 members in each group. Then a facilitator deals

cards randomly, to put them under unexpected situation.

- ③ Under emergency situation, participants can train responsiveness, practical skills, coordination skills and prediction capability.

Utilizing Step.3: KIT-Game A (Kaleidoscope Insight Training Card Game) 2010 (By T. Kitano) (Fig.3), we aim to provide operations including ward and foreign in the hospital where we focus on raising awareness of risk prediction, co-activity of mutual monitoring among staff, management capability improvement of staff in view of reduction of medical accidents, quality improvement and patient's safety in health care.

A New Approach for Educational Method of Communication as CRM Training (By T. Kitano, 2010) Step.3: KIT-Game A (Kaleidoscope Insight Training Card Game) 2010

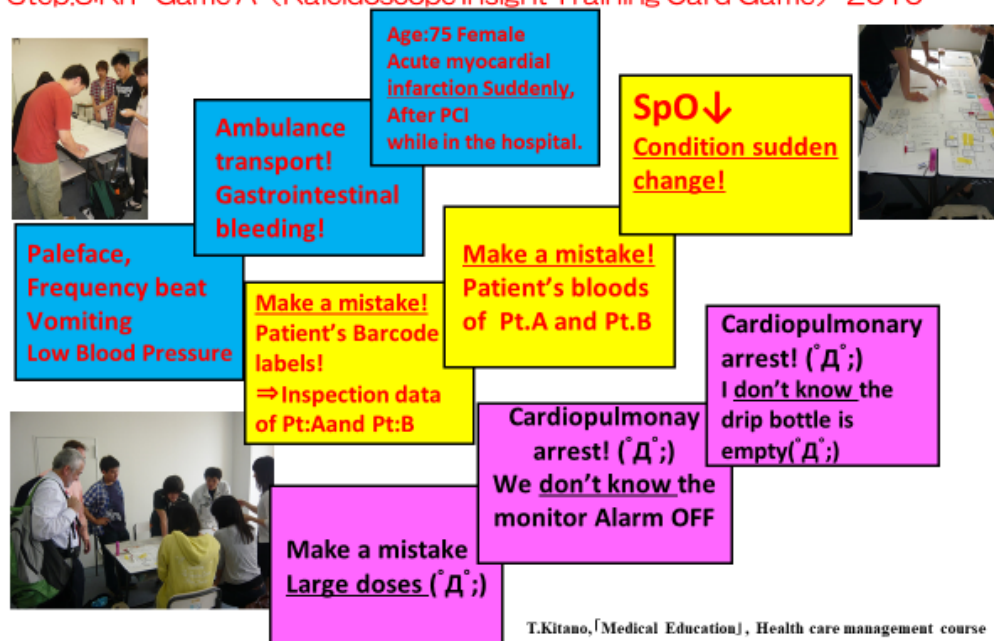


Figure.3

3.4 KIT-Game B (Healthcare Educational Innovation Game) 2016

I would like to explain Step.4: KIT-Game B (Healthcare Educational Innovation Game) that I designed.

- ① Training the five senses (control perception and sensitivity through five senses of taste, smell, tactile, auditory, vision) leads to improve intuition.
- ② It helps to have ability of positive thinking and become flexible.

- ③ It leads to enhance sensitivity and expressiveness.

④ As a result, it also leads to earn self-confidence and have profound trust to others.

- ⑤ It helps to be stronger to ad-lib, and to bring up a sense of prompt decision making.

As I explained above, this method is useful to enhance communication skill and establish organization, leading to change an individual and/or organization.

With this method, it is possible to combine several games we can pick up among those games or we could even create some games. Now I will explain ④ "what are you doing ? " game, and ⑰ "Digest" game you can perform in just 1 to 5 minutes. This is an explanation of ④ "what are you doing ?" game. First, the boy asks the girl "what are you doing?", and then, she responds "I'm running" (however, she is doing gesture of brushing her teeth). Next, the girl asks the boy "what are you doing?", and he responds, "I'm swimming" (however, he is doing gesture of running as the girl said previously). After that, he asks "what are you doing?", and she responds, "I'm riding bicycle" (however, she is doing gesture of swimming). In the similar way, let them keep on performing this for 3 to 5 minutes repeatedly. By experiencing this game continuously, we can train ability to work each brain independently by performing different gesture from one's remark. It leads to enhance ability to improvise and make prompt decision, and as a result, we can train the five senses and bring up intuition (Fig.4).

Next, I will explain about ⑰ "Digest" game. First, facilitator who prompt dialogue, assigns a theme,

for example, "summer holiday" to each group with 5 to 7 members. Next, each group member improvises with one's own scenario, along with the theme "summer holiday" (such as swimming in the sea, fireworks, camping, climbing). After the improvisation finished, next member of the group improvises one's own, and it goes as the same way until every member of the group finish improvisation. With that, the story "summer holiday" is completed as a team. Concerning time for improvisation, we gradually decrease like 5 minutes, 3 minutes, 1 minutes and then, 30 seconds. Each group member observes act of the first member, followed by improvisation of other team members randomly without meeting beforehand to create a story along with the theme "summer holiday". By performing this training continuously, we can bring up ability of observation, creativity, improvisation skill, prompt decision making skill, having association skill between organization, stimulate the five senses, and have ability to summarize things clearly and briefly! (Fig.4,5)

Let's enhance communication skill using "Yes, and", coaching, facilitation, improvisation!

『Yes,and』 is based on "Respective conversation"!

You are able to,

- ① Enhance communication skill.
 - ② Train five senses and enhance intuition.
 - ③ Think positively and flexibly.
 - ④ Sensitive and expressive.
 - ⑤ Be confident and trust others.
 - ⑥ Improve improvisation and immediate decision making.
 - ⑦ Bring up sense of enjoying this moment.
- As a result, you can discover your uniqueness!!
Leading to understand others!!

Listening, insight, improving communication skill,
looking carefully and attentiveness ⇒

As a result, organizational performance will be improved!



T.Kitano, "Medical education", Medical management course.

Figure.4

【KIT-Game B : Healthcare Educational Innovation Game By T.Kitano,2016】

- ① Rhythm word game for ice breaking
- ② Associated rhythm word game for ice breaking
- ③ Knife and fork
- ④ **What are you doing?**
- ⑤ Picture
- ⑥ YES, AND ! Yeah !
- ⑦ Resolution CEO
- ⑧ Re-union party
- ⑨ Emotional Change
- ⑩ I am a tree
- ⑪ Gibberish
- ⑫ 1 to 66
- ⑬ Open your mouth
- ⑭ Papers
- ⑮ Freeze Tag
- ⑯ Sing About It
- ⑰ **Digest**
- ⑱ Gesture rounding
- ⑲ Tetsuko's lounge
- ⑳ One Word
- ㉑ One Voice
- ㉒ Me, your instructoretc.

Positive Feed Back
Based on "Yes, and" !
And ... Explore with joy !

We can train ability to work right and left brain independently by performing different gesture from one's remark. It leads to enhance ability to improvise and make quick decision, and as a result, we can train right brain and bring up intuition!



keep doing the similar dialogue for 3 to 5 minutes, repeatedly



T.Kitano,「Medical Education」, Health care management course

Figure.5

4. Results

After the seminar in 2018, having 24 people in total, whose occupations are doctor, nurse, physical therapist, clinical engineer, and medical school student, we got data from the questionnaire as follows. 1. The ability of conversation has been emphasized (96%). 2. The ability of "listening to patient" has been emphasized (100%), 3. Acquired altruistic intention (100%), 4. Understood the meaning of "learning improvisation" and utilize it for quality improvement of medical practice and safety management (100%), 5. Learned that facilitation skill at a conference can be utilized for quality improvement of medical practice and safety

management (96%), 6. Got confidence of solving issues for quality of medical practice and safety management (79%) (Fig.6,7). What we can see from this result is that, it is important to grasp current situation and issues reside in medical accident data collection project and its investigation system, analyze the background factors for issues, and then, extract the fact and understand the organizational factors systematically at first. Furthermore, there is an imminent need here for each medical institution to practice "KIT - Game", which is a new solution to build up medical safety management system based on the experience and principle.

Organized by Medical safety study group: Medical safety seminar 2018 – 「Let's enhance Non-Technical Skills!」
Survey result I Participants: 24, Target: Dr, Ns, PT, Medical school students, etc.)

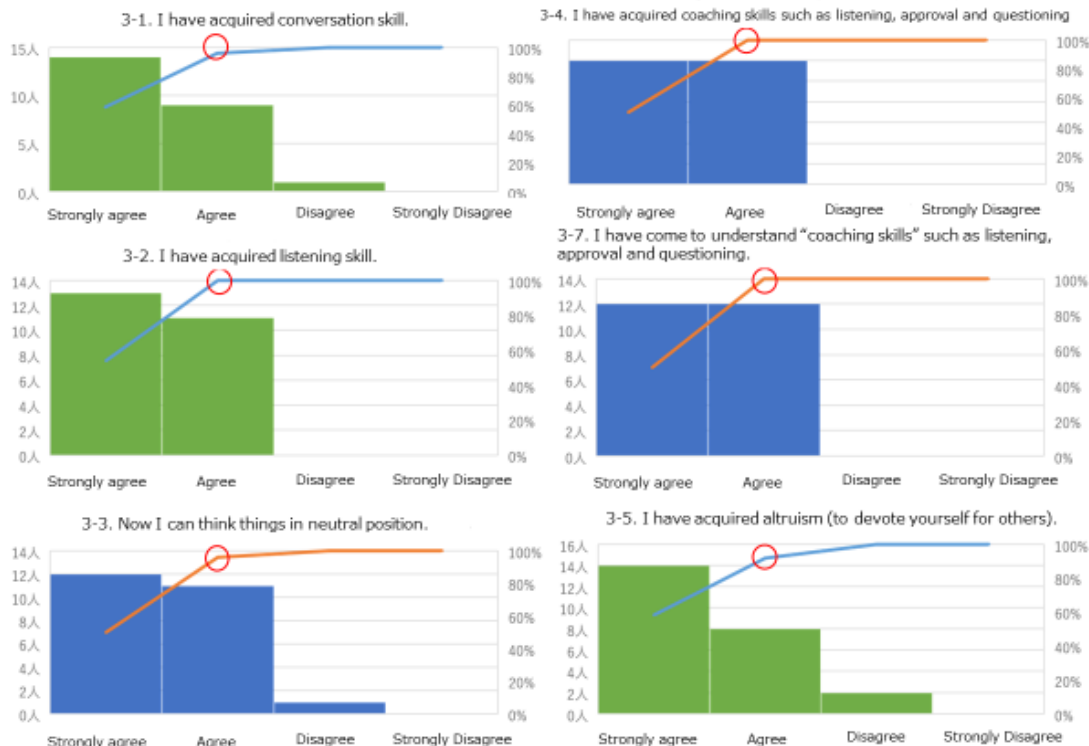


Figure.6

Organized by Medical safety study group: Medical safety seminar 2018 – 「Let's enhance Non-Technical Skills!」
Survey result II Participants: 24, Target: Dr, Ns, PT, Medical school students, etc.)

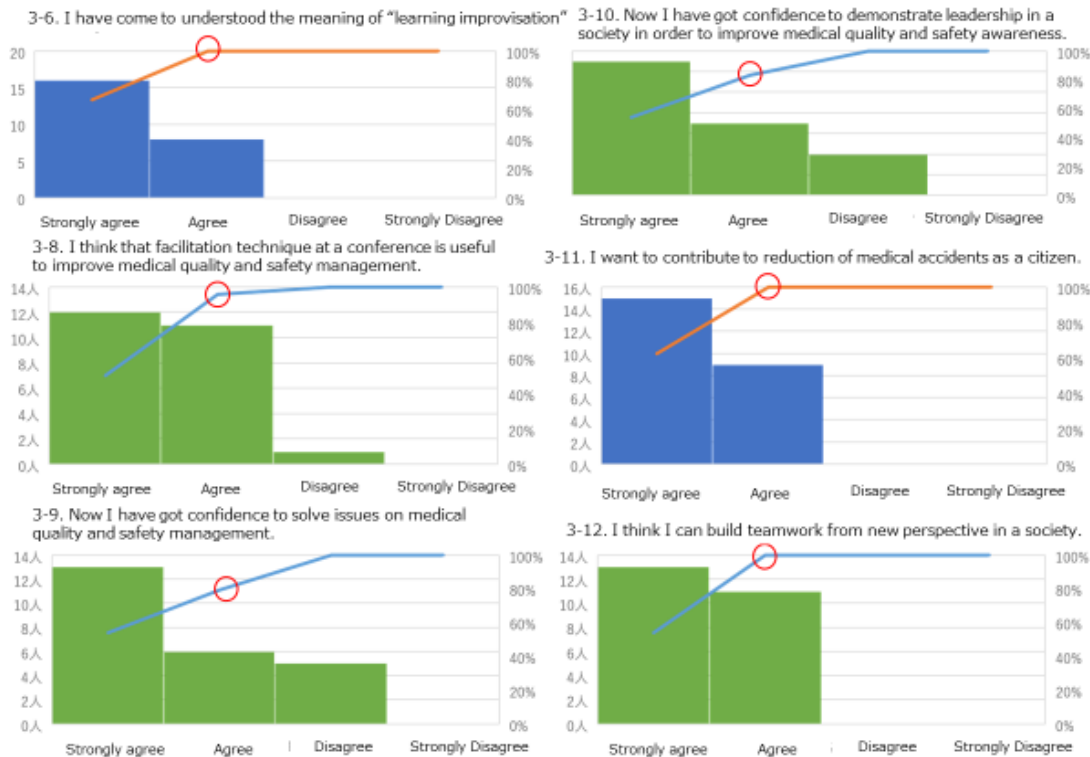


Figure.7

Questionnaire sheet for medical safety seminar 2018 - Acquire coaching skills by improvisation - "Person and organization start to move on! Acquire active communication skills".

Q1. Please answer your residential area, age, gender (M/F) and occupation.

Residential area, region, Age, Gender, Occupation (Example: Nurse, General citizen, etc.)

Q2. Please circle the days all you participated.

27th, Oct. (Sat) / 28th, Oct. (Sun)

Q3. Please answer those questions with regard to this seminar below. (Circle the number correspond with.)

Q3-1 I have acquired conversation skill.

- ① Strongly agree ② Agree
③ Disagree ④ Strongly disagree

Q3-2 I have acquired listening skill.

- ① Strongly agree ② Agree
③ Disagree ④ Strongly disagree

Q3-3 Now I can think things in neutral position.

- ① Strongly agree ② Agree
③ Disagree ④ Strongly disagree

Q3-4 I have acquired coaching skills such as listening, approval and questioning.

- ① Strongly agree ② Agree
③ Disagree ④ Strongly disagree

Q3-5 I have acquired altruism (to devote yourself for others).

- ① Strongly agree ② Agree
③ Disagree ④ Strongly disagree

Q3-6 I have come to understand the meaning of "learning improvisation".

- ① Strongly agree ② Agree
③ Disagree ④ Strongly disagree

Q3-7 I have come to understand "coaching skills" such as listening, approval and questioning.

- ① Strongly agree ② Agree
③ Disagree ④ Strongly disagree

Q3-8 I think that facilitation technique at a conference is useful to improve medical quality and safety management.

- ① Strongly agree ② Agree
③ Disagree ④ Strongly disagree

Q3-9 Now I have got confidence to solve issues on medical quality and safety management.

- ① Strongly agree ② Agree
③ Disagree ④ Strongly disagree

Q3-10 Now I have got confidence to demonstrate leadership in a society in order to improve medical quality and safety awareness.

- ① Strongly agree ② Agree
③ Disagree ④ Strongly disagree

Q3-11 I want to contribute to reduction of medical accidents as a citizen.

- ① Strongly agree ② Agree
③ Disagree ④ Strongly disagree

Q3-12 I think I can build teamwork from new perspective in a society.

- ① Strongly agree ② Agree
③ Disagree ④ Strongly disagree

Q3-13 What kind of support you want to provide in order to improve medical practice?

(Free writing) for example. holding training program of improvisation in a hospital, rebuild medical quality and safety management system, holding a seminar for local health care constantly, volunteering in a hospital.

Q3-14 What kind of activity and/or regional activity you want to do for promoting medical quality and safety management system and providing safe, relaxed and comfortable medical practice?

(Free writing) for example: holding training for all the staff in a hospital, providing education for the next generation, providing education of regional and/or general health care.

Q4. Please tell us your proposal for "support of building medical quality and safety management system" which can be realized immediately.

Q5. Please tell us your impression of this seminar "Person and organization start to move on! Acquire active communication skills".

Thank you for your cooperation.

*** We use this data collected by this questionnaire only for the purpose of promotion of "seminar for medical safety management and measurement" in the future. In terms of protection of personal information, we organize this information as project report in the way that person who wrote cannot be identified. We will pay special attention concerning treatment of personal information and store those data under highly secured environment.**

5. Conclusion

Our proposal is based on the concept that health care services should be patient oriented, safe, secure and comfortable for them, and the services should be provided with high quality. In order to practice methodology of establishing an organization who can provide high quality of medical care under safety management organization, where patient's right is regarded as the most important, we should recognize current issues reside in the organization. When we deal with issues, it is important to draw Empowerment (authored by Kitano) of medical staff, build consensus among team members, leading to behavioral change in its context. This time, we confirmed the educational effect of introducing KIT-Game (Kaleidoscope Insight Training Game by T. Kitano) as a new method to strengthen Non-Technical Skills such as communication, teamwork and leadership. In order to practice methodology of building an organization with high quality of medical care is provided under safety management, where patient's right is regarded as the most important, we should recognize issues to be solved by organization. Hence, it is important to draw "Empowerment (authored by Kitano)" of medical staff, build consensus among them who are the members of an organization, and guide them to change their actions. This time, we confirmed the educational effect of introducing KIT-Game (Kaleidoscope Insight Training Game by T. Kitano) as a new method to strengthen Non-Technical Skills such as communication, teamwork and leadership. Having systematically understood the current situation and issues reside in medical accident data collection project and its investigation system, we propose introduction of 1. 『YES, AND』, 2. Coaching, 3. Facilitation, and 4. KIT-Game (Kaleidoscope Insight Training Game produced by Kitano) to create safe environment as the way to solve issues and build up medical safety management organization, based on experience and methodology. We hope our proposal such as KIT-Game will be introduced into medical education, and also implemented by each medical organization.

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[Short Communication]**ANALYSIS OF THE MEDICAL ACCIDENTS IN DENTISTRY IN JAPAN****Uno Imaizumi**Department of Critical Care Medicine and Dentistry, Division of Anesthesiology,
Graduate School of Dentistry, Kanagawa Dental University**Abstract**

The cases of dental treatment accidents (excluding those of dental implants) were collected, and the causes of these accidents were analyzed using the P-m SHELL model, which is usually used to analyze medical accidents. The keywords “dentistry,” “dental treatment,” “accident,” and “death” were used to search for data, with accident content and causes analyzed from those cases associated with medical accidents in dental treatment from 1948 to October 2019.

Of the total 19 cases, the plaintiffs’ claims were rejected in 4 cases. The remaining 15 cases were classified into 6 wound cases, 4 drug-related cases, 3 airway obstruction cases, 1 emotional distress case, and 1 case of disseminated intravascular coagulation syndrome. There were 6 cases of death reported.

All cases involved liveware factors, and common factors were linked to human errors, such as manuals and education and training methods. Making improvements in the staff education and in-hospital manuals, along with diligent study aimed at improving dentists’ own medical techniques and knowledge, could lead to a decrease in the number of medical accidents in dentistry.

Key Words: dental treatment, P-m SHELL model, human error

1. Introduction

To the best of our knowledge, there is no document providing a cause-by-cause analysis of medical accident cases reported in Japanese dentistry. Therefore, in this study, cases of dental treatment accidents (excluding those of dental implants) were collected, and the causes of these accidents were analyzed using the P-m SHELL model¹⁾, which is usually used to analyze medical accidents.

2. Methods

Online database and digital library data were used to run an information analysis of the medical accidents pertaining to dental treatment. Information was collected using Hanrei Hisho

INTERNET²⁾ (LIC Co., Ltd., Tokyo) with a record of important cases, digital library data (major legal journals: Hanrei Taimuzu³⁾, Hanrei Jiho⁴⁾, etc.), and a court case search site⁵⁾. The keywords “dentistry,” “dental treatment,” “accident,” and “death” were used to search for data, with accident content and causes analyzed from those cases associated with medical accidents in dental treatment from 1948 to October 2019. Court cases where the plaintiffs’ (patients) claims were rejected were excluded, while the causes of the remaining cases were analyzed by categorizing them into the different factors of the P-m SHELL model (Figure 1), which is a model used for analyzing medical accidents.

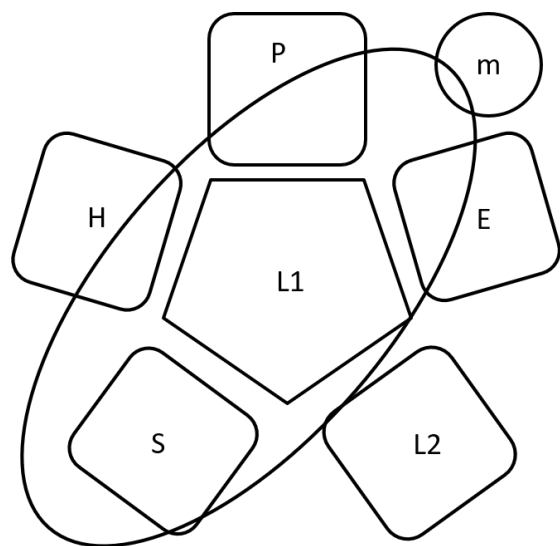


Figure 1

P-m SHELL model (Cited from Reference 9)

3. Results

Of the total 19 cases, the plaintiffs' claims were rejected in 4 cases. The remaining 15 cases were classified into 6 wound cases, 4 drug-related cases, 3 airway obstruction cases, 1 emotional distress case, and 1 case of disseminated intravascular coagulation syndrome. There were 6 cases of death reported. Table 1 shows the specific accident details and causes, results of the court cases, and results of the analyses based on the P-m SHELL model.

Causes were categorized as patient, management, software, hardware, environment, or healthcare professional-related human factors.

No.	Judgment date	Classification	Content	Cause	Results of the cases	Classification by P-m SHELL model	Case publication journals
1	1972.5.2	Airway obstruction	Death of a 5-year-old female patient after returning home following extraction performed under general anesthesia	Allowed to return without full arousal from anesthesia; complaints of abnormalities after returning home also went unaddressed	Manslaughter from professional negligence	m, S, H, L1	Keiji Saibansho Geppo 4(5):963.
2	1982.12.17	Emotional distress	Emotional distress involving mandibular pain, discomfort, and malocclusion due to surgery performed to extract the lower wisdom teeth	Patient's complaints following tooth extraction went unaddressed	Claim for damages from emotional distress upheld	L1	Hanrei Taimuzu 495:153.
3	1983.11.10	Drug-related	Worsening myasthenia gravis due to use of xylocaine and nitrous oxide	Xylocaine and nitrous oxide used despite patient's explanation of prior history	Claim for damages from negligence upheld	S, L1	Hanrei Jiho 1134:109.
4	1989.3.24		Steroid drug administration and tooth extraction measures taken by a doctor on a patient with systemic lupus erythematosus		No fault; claim rejected		Hanrei Taimuzu 707:216.
5	1989.4.26		Mandibular fracture due to tooth extraction		No causal relationship; claim rejected		Hanrei Taimuzu 714:207.
6	1990.9.25	Airway obstruction	Death of a pediatric patient caused by airway obstruction due to the extracted tooth dropped during extraction	Incorrect treatment in a seated position from a horizontal position during a fall, the back being hit while standing	Claim for damages as compensation for death upheld	m, S, L1, L2	Hanrei Taimuzu 738:151., Hanrei Jiho 1373:103.
7	1994.12.26	Drug	Death by suffocation from aspirin-induced asthma attack by loxonin, an analgesic and anti-inflammatory drug, administered by the dentist	Treated without knowing that administration of loxonin is contraindicated in patients with aspirin-induced asthma	Violation of duty of study to acquire knowledge pertaining to drugs, and violation of duty of care in administering drugs	S, H, L1	Hanrei Taimuzu 890:214., Hanrei Jiho 1552:99.
8	1995.11.28		Impaired visual function after surgery to remove maxillary cysts and remove impacted maxillary wisdom teeth		No breach of duty; claim rejected		Hanrei Taimuzu 918:205.

No.	Judgment date	Classification	Content	Cause	Results of the cases	Classification by P-m SHELL model	Case publication journals
9	2002.9.18	Maxillary sinus perforation	Failure to check for palatal root after formation of the palatal root. Although there was no palatal root, the maxilla was mistaken for a palatal root; the maxilla was drilled resulting in maxillary sinus perforation as well as incorrect introduction of the impression agent	Failure to check for palatal root in radiographs, failure to palpate the palatal root with the deep needle, and mistaken inspection of palatal root in visual examination	Claim for damages upheld due to failure to check, and negligence of duty to report and explain the event to the patient	S, L1, L2	Hanrei Taimuzu 1129:235.
10	2003.3.17	Drug	Arsenous acid preparation was stuck to a tooth where its use was not appropriate, resulting in leakage and provoking osteomyelitis	Lack of knowledge or awareness of the potential of arsenous acid preparations leaking out from the root area, and failure to perform examination of the shape of the root before sticking the drug onto a tooth with an unfinished root, where its use is contraindicated	Violation of duty of care in that the root area needs to be fully inspected, checked etc. in order to prevent complications, such as drug leakage	S, L1	Hanrei Taimuzu 1156:215., Hanrei Jiho 1837:78.
11	2003.4.24	Wound	Mishandling of the turbine causing injury to the outside of the lower right lip	The finger used to immobilize and prevent turbine from shaking slipped and released the compression on the mucosa	Claim for damages upheld due to medical malpractice	H, L1, L2	LLI/DB Hanrei Hisho listing
12	2003.10.16		Anaphylactic shock developed due to xylocaine administration resulting in death		No breach of first-aid obligation; claim rejected		LLI/DB Hanrei Hisho listing
13	2005.11.2	Wound	The syringe needle broke during administration of local anesthesia for tooth extraction and was mistakenly introduced into the patient's right maxillary tissue	Despite tissue hardness, a fine needle (14 mm long, 0.26 mm thick) was used, causing the syringe needle to break when the needle was pulled out after insertion, with the remaining needle migrating into the right maxillary tissue	Claim for damages due to tort found to be negligent upheld	S, H, L1, L2	Hanrei Jiho 1923:77., LLI/DB Hanrei Hisho listing
14	2007.1.19	Wound	Mandibular fracture during extraction of the impacted mandibular wisdom teeth	Despite difficulty of tooth extraction, the tooth was not split. Instead, unreasonable external force was applied to extract the tooth, resulting in mandibular fracture	Liability for damages based on tort found to involve negligence	S, L1, L2	Hanrei Taimuzu 1247:304., Hanrei Jiho 1986:118.
15	2007.12.6	Wound	Tooth extraction caused osteomyelitis of the mandible with lingering after-effects, such as paralysis of the mental nerve	Extraction in the presence of acute inflammation should be avoided because it may lead to expanded or worsened inflammation, impaired healing of the extraction socket, as well as osteomyelitis	Claim for damages from defendants partially upheld, with reasonable causal relationship found between negligence of duty to avoid tooth extraction and the onset of mandibular osteomyelitis and presence of mental nerve paralysis	S, L1, L2	LLI/DB Hanrei Hisho listing
16	2010.12.16	Drug	Death of a 4-year-old patient caused by anaphylactic shock following local anesthetic administration	Vital signs should be checked when an abnormality is noticed	Causal relationship with death ruled out, despite observing negligent violation of duty of care to observe the vital signs after local anesthetic administered by the dentist	S, L1, L2	LLI/DB Hanrei Hisho listing

No.	Judgment date	Classification	Content	Cause	Results of the cases	Classification by P-m SHELL model	Case publication journals
17	2013.9.17	DIC	The patient experienced a sudden change during radicular cyst fenestration, and thereafter died	Dental anesthesiologist not contacted in the early stages	Violation of duty of care because whole-body management of a patient should be entrusted early on to a dental anesthesiologist	S, L1, L2	LLI/DB Hanrei Hisho listing
18	2014.10.10	Airway obstruction	While treating the deciduous central incisor of a 2-year-old female patient, a cotton roll placed between the upper lip and gums fell into the patient's oral cavity and was aspirated, leading to suffocation and death	Treatment was continued with no measures taken to prevent a cotton roll from dropping into the oral cavity	Negligence was noted because it is fully possible to predict that a cotton roll could potentially fall down into the oral cavity during treatment and obstruct the airway. There is a professional obligation to prevent such falling in order to avoid danger; thus, it would have been possible to avoid this	m, S, L1, L2	LLI/DB Hanrei Hisho listing
19	2015.7.9	Wound	After injury to the patient due to contact with an instrument, the dentist treated sutured the injury, which narrowed the patient's submandibular duct	Mishandling of the turbine resulted in it touching the floor of the mouth; following which, errors in suturing the injury affected the left submandibular duct	Claim for damages from negligence upheld	H, L1, L2	Hanrei Taimuzu 1422: 308.

Table 1

4. Discussion

Analysis in this study was performed using the P-m SHELL model. "Patient" was added because of the uniqueness of medical care to the m-SHELL model^{6,7)}, which is an explanatory model for human factor engineering. In this model, human error is explained as being caused by a mismatch between the properties of "L" (themselves) and the surrounding environment (machines, operation manuals, team medical care, equipment, etc.) in medical practice¹⁾.

The P-m SHELL model has 7 factors: P (Patient), m (management), S (Software), H (Hardware), E (Environment), L1 (Liveware), and L2 (other Liveware), with "L1" (healthcare professionals themselves) being the center of the P-m SHELL model. Surrounding "L1" are hardware (H), software (S), other liveware (L2), environment (E), patients (P), and management (m), governing the whole. Specifically, "L" is human error (lack of attention, misjudgment, confirmation errors, insufficient knowledge and skill, or medication errors), where "L1" represents the concerned parties and "L2" represents the related parties. "H" includes hardware-related elements, such as medical equipment, instruments, equipment, and facility structures, while "S" includes manuals,

education and training methods, etc. "E" is the environment as it affects work and behavior, and "m" is organizational, administrative, and system-related issues. "L1" is the center of the system and the most important, having the most flexibility as compared to the other elements¹⁾.

The 15 cases were analyzed, excluding those where the plaintiffs' claims were rejected.

Most cases pertained to wounds, representing 6 cases (cases 9, 11, 13, 14, 15, and 19). Cases 11, 13, and 19 were accidents from mechanical operations, such as turbine contact or accidental syringe needle insertion, and all were considered to be caused by "H" and "L." Case 13 also involved "S," due to manual inadequacies pertaining to selection of the syringe needle. Case 9 was an accidental perforation of the maxillary sinus due to maxillary bone-cutting involving failure to check for the palatal root, categorized as "S" because of medical record or manual inadequacies regarding writing of checks. Negligent failure in the duty to report and explain the accident to the patient was also noted, thus including "L" as a factor along with inadequate checks. Cases 14 and 15 both included accidents during tooth extraction and were caused by incorrect timing of the extraction and poor procedure judgment, involving "S" and "L" as

factors with respect to the manual and negligent judgment, respectively.

Next, the most common were the drug-related cases (3, 7, 10, and 16), of which cases 7 and 16 were deaths. Cases 3 and 7 were attributed to “S” and “L1,” due to lack of confirmation of medical history. Case 10 was attributed to “S” and “L1,” because of manual-related inadequacies pertaining to the use of an arsenous acid preparation, as well as failure to examine and check. Case 16 was a case of anaphylactic shock caused by administration of a local anesthetic. Violation of the duty to monitor vital signs was also indicated, and “S” and “L” factors were included with respect to manual-related inadequacies and lack of attention by the dentist and staff.

Next, the airway obstruction cases 1, 6, and 18 were analyzed. Case 1 involved inadequate management following general anesthesia. The female patient who died had a thymic lymphatic constitution, and it put her at risk of death from the shock due to anesthesia. Therefore, “P” factors were attributed, but it was also stated that had necessary first aid been performed, it would have been fully possible to resuscitate even the idiosyncratic individual, thus ruling out “P” factors. Therefore, inadequate measures taken by the dentist corresponded to “L1” factor, and manual inadequacies in performing general anesthesia were attributed to the “S” factor. The question also remains whether there were facilities permitting performance of general anesthesia, which is an “H” factor. Certain “m” factors were also present, including a lack of management and safety education for general anesthesia performed at a dental clinic.

Cases 6 and 18 were both cases of death by airway obstruction due to a foreign object choking during the treatment of a child. “L1” factors were involved in case 6 with respect to the incorrect action of being seated when the extracted tooth fell into the airway, and in case 18, wherein there was failure to take precautionary measures against dropping of cotton rolls. Additionally, “S” and “m” factors were attributed due to the inadequacies of staff education and manuals for pediatric dental treatment. In both cases, the patient had rejected treatment and was shaking the head. It was noted that it would be difficult to expect complete suppression of body movement, and sudden body movement by a pediatric patient would be within the scope of what a dentist should anticipate when dealing with children; hence, “P” was not the relevant factor.

Case 2 involved emotional distress. “L1” is a pertinent factor, as complaints such as post-extraction pain and discomfort were left unaddressed.

In case 17, the patient’s condition changed suddenly during minor surgery, followed by death. This was attributed to the fact that a dental anesthesiologist was not entrusted with whole-body management in the early stages. Inadequacy of manuals for sudden changes indicates “S,” while the delay in calling the dental anesthesiologist indicates “L.” It was also stated in the court case that there was no reliable evidence indicating that the cause was inadequate initial emergency lifesaving treatment systems at the hospital; hence, “m” was not a relevant factor.

All cases were classified under “L,” involving contribution by healthcare professionals, and no cases were classified under “P.”

Similarly, in medical accidents involving dental implants⁸), there were no “P” factors, and all were classified under “m,” “S,” “H,” “E,” “L1,” and “L2.” This result is in contrast to the fact that the “P” causes were most common in general anesthesia-related medical accident cases from 1971 to 2016⁹). This is because of the intensified effects of patients’ constitutions, such as pulmonary embolism and malignant hyperthermia, but the last 3 years have seen a decrease in “P” factors in anesthesia-related accidents¹⁰). Advances in medical techniques are thought to have reduced “P” factors in recent years.

Limitations of the present study were that not all accidents pertaining to dental treatments were necessarily covered. With most accidents in dentistry being handled by monetary settlements, as also stated by Hagiwara et al.¹¹), fewer events have led to trials than have actually happened.

5. Conclusion

There were 19 cases of dental treatment-related accidents in a span of 72 years, including 7 cases of death.

All cases involved “L” factors, and common factors were linked to human errors, such as manuals and education and training methods. Making improvements in the staff education and in-hospital manuals, along with diligent study aimed at improving dentists’ own medical techniques and knowledge, could lead to a decrease in the number of medical accidents in dentistry.

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[Short Communication]

THE CHARACTERISTICS OF INCIDENTS ASSOCIATED WITH BIRTH ASSISTANCE DURING MIDWIFERY TRAINING

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Abstract

Background: Birth assistance is a midwifery skill used to safely assist the mother and newborn through the entire labor process. Giving birth sometimes put the mother's and newborn's life at risk, causing extremely high levels of stress among midwifery students. It is therefore necessary to carefully select the contents of safety management education, improve the methods of teaching, and re-establish the support system for midwifery training.

Objective: To identify the characteristics of incidents experienced by midwifery students during birth assistance training.

Methods: Involving 11 midwifery students from 2 colleges, incident cases they encountered during the training were investigated according to birth assistance stages (early stage: 1st-2nd cases, mid stage: 5th-6th cases, late stage: 9th-10th cases), and free-form text responses were qualitatively analyzed. This study was conducted with the approval of the ethics committee.

Results: The ages of the subjects ranged between 21 and 23 years, and they were 4th year students. A total of 17 incident cases were reported (early stage: 5 cases, mid stage: 4 cases, late stage: 8 cases). Their characteristics were divided into: "late judgement", "immature skills", "difficulty responding to sudden changes", "lack of insight", and "thoughtless behavior caused by the stress", and they were uniformly observed in all stages.

Conclusion: The characteristics of incidents associated with birth assistance that students encountered during midwifery training were: "late judgement", "immature skills", "difficulty responding to sudden changes", "lack of insight", and "thoughtless behavior caused by the stress".

Key Words: incidents, midwifery training, birth assistance, characteristics, qualitative analysis

1. Introduction

In Japan, concerns over rapid aging and a declining birth rate began to increase around 1994, and the total fertility rate was 1.42 in 2018. An increasing number of never-married people, late marriage, and a decreasing number of deliveries among married females are thought to be associated with the declining birth rate. Places to give birth are also being centralized, resulting in a shortage of facilities providing birth assistance training for midwifery students. The midwifery regulations of Japan specify that it is mandatory for students to perform birth assistance in at least 10 cases, in order to take the national midwifery certification examination.

Birth assistance is a midwifery procedure to be performed while giving priority to maternal and newborn safety. Many midwifery students become nervous when performing birth assistance, as the labor process may put the mother and child at risk in some cases. Previous studies on incidents involving nursing students frequently reported <falls>, <accidental tube removal>, and <reporting-related problems> mainly due to <wrong impressions>, <insufficient confirmation>, <a lack of attention>, or <insufficient communication/reporting>^{1,2)}. However, they rarely reported incidents involving midwifery students. The number of studies on safety management performed by clinical midwives has also been limited to date.

The investigation of incidents experienced by midwifery students during birth assistance training may be useful to select appropriate contents of safety management education, improve conventional teaching methods, and re-establish support systems for midwifery training. To identify the characteristics of incidents experienced by midwifery students during birth assistance training.

1.1 Operational definitions

Incidents: Events in which inappropriate action during birth assistance affects the patient but does not cause symptoms or injury. An incident is also called a near-miss. Incidents include experiences in which an inappropriate action did not affect the patient but caused a “fright” (brief moment of tense feeling due to fear that the one might have taken a wrong action, for example) or “surprise” (sobering experience in the similar situation as “fright”).

2. Methods

2.1 Participants and data collection

Data were collected from June to November 2016. The study objective and methods were explained to midwifery students at 2 universities to obtain their consent, and a questionnaire survey was conducted to investigate incidents experienced by them during clinical training based on the birth assistance stage (early: Cases 1-2, mid: 5-6, and late: 9-10) and reported in a free-description style. The faculty member of each university in charge of midwifery training was asked to present each student with copies of the questionnaire for the 3 birth assistance stages (early, mid, and late), telling the student again when to respond to it. Responses were sealed, dropped into an exclusive box, and sent back to the researcher by the faculty member when all students finished responding.

2.2 Data analysis

The obtained data were classified into similar contents for qualitative analysis.

2.3 Ethical considerations

This study was approved by the Institutional Review Board of Kanazawa Medical University (Kanazawa City, Japan; approval no.: 204).

3. Results

There was a total of 11 midwifery students, 7 from University-A and 4 from B. Their ages ranged from 21 to 23. All of them were in their fourth year at university. None had clinical experience. All had completed midwifery management programs. There were no accidents in their free descriptions. A total of 17 incident cases were reported (early stage: 5 cases, mid stage: 4 cases, late stage: 8 cases). Their characteristics were divided into: “late judgement”, “immature skills”, “difficulty responding to sudden changes”, “lack of insight”, and “thoughtless behavior caused by stress”, and they were uniformly observed in all stages (Table 1). (Table 2) lists the characteristics and examples of the incidents.

Table 1 Characteristics and stages of Incidents

period	Characteristics	n	Examples (incident cases no.)
First stage of labor	late judgement	1	Deceleration (no.1)
	immature skills	2	Preparation of birth assistance (no.2) (no.11)
	difficulty responding to sudden changes	1	Related to labor progress (no.10)
Second stage of labor	late judgement	2	Related to labor progress (no.6), Related to Vacuum extraction (no.15)
	immature skills	3	Birth assistance (no.8) (no.9), Related to labor progress (no.12)
	difficulty responding to sudden changes	3	Birth assistance (no.3), Related to labor progress (no.14) (no.17)
Third stage of labor	lack of insight	3	Umbilical cord cutting (no.5) (no.7) (no.16)
Fourth stage of labor	thoughtless behavior caused by stress	2	Fall of mother (no.4) (no.13)

Table 2 Characteristics and Examples of Incidents

Characteristics	Examples
Late judgement	Case 10: Vacuum extraction was required. During vacuum extraction, the student, lacking knowledge of midwifery approaches for this procedure, disturbed the doctor's movements. She was also unable to appropriately communicate with the parturient female.
Immature skills	Case 6: There was a loop of the umbilical cord around the child's neck, and the umbilical cord was also short. The child's posterior shoulder was pulled out, but the progress of labor stopped. In that instant, the student unintentionally detached her hand from the child. Although the child did not come out, he might have fallen.
Difficulty responding to sudden changes	Case 12: The parturient female had previously experienced 3 deliveries. It was the early stage of labor. When the uterus opening was 6 cm, the supervising midwife (A) needed to step outside for a moment, leaving the female in the care of another midwife (B) in her first year of clinical practice and the student. As the female said that she wanted to go to the toilet, they accompanied her. However, as labor pain intensified in the toilet, they transferred her directly to the delivery room. Pelvic examination immediately after arrival revealed a full uterus opening. On reflection, Midwife A pointed out: "Letting the female go to the toilet under such a condition may have increased risks".
Lack of insight	Case 9: The puerperant female was transferred from a bed to wheelchair at 2 hours after delivery. Although she stated, "I am physically OK", she was slightly staggering. She did not fall, but she might have required assistance, such as supporting her back, as her bleeding level was relatively high during labor.
Thoughtless behavior caused by stress	Case 2: When cutting the umbilical cord after birth, the student could not adopt an appropriate posture to perform the cutting procedure. As the child moved his hands and legs, and the waters made him slippery, it was difficult for the student to smoothly cut his umbilical cord. So, she performed the procedure in a hurry, remaining in an inappropriate posture. As a midwife supported the child to make it easier for her to cut his umbilical cord, she could safely do it, but she nearly hurt his hands and legs.

4. Discussion

The characteristics of incidents associated with birth assistance that students encountered during midwifery training were: “late judgement”, “immature skills”, “difficulty responding to sudden changes”, “lack of insight”, and “thoughtless behavior caused by stress”. Among these characteristics, “late judgement” and “immature skills” were generally similar to those of incidents experienced by nursing students¹⁾.

In Japan’s midwifery education system, clinical training tends to be provided after in-school preclinical training sessions and skill tests on birth assistance. Students’ psychological status should also be considered, as their anxiety and tension increase during training. Especially, when performing birth assistance, which directly addresses life, they experience a high level of tension. As recounted by <thoughtless behavior caused by stress>, such a mental state may lead to the adoption of unusual behaviors. To allow students to make the most of their abilities and skills, people around them, thus, faculty members and supervisors are expected to create environments for students to feel secure and supported, and then convey the joy of learning to them, and help them acquire various experiences, while enhancing their self-confidence based on each experience.

However, importantly, the results of the present study revealed no differences in the characteristics of incidents among different birth assistance stages. As midwifery students do not simply grow into professional midwives with the advancement of the birth assistance stage, but they face new challenges, and need to acquire advanced assessment skills, as they encounter more birth assistance cases. Thus, in addition to such a complex of knowledge, they may also acquire a detailed knowledge, address specific challenges, and experience frustration and distress through each practice. Although interest in the birth assistance procedure and persons involved in it can be developed at an early stage, case-by-case deliveries may lead to confusion and disappointment.

In Japan, a high midwife turnover rate resulting from novice midwives’ difficulty in adapting to their workplaces is raising concerns. Reality shock due to a gap between midwifery education and clinical settings is thought to be one of the causes³⁾, and

the current midwifery education system to enhance students’ midwifery competencies within a short period is being blamed for the gap. <Difficulty responding to sudden changes>, which was shown to be a characteristic of incidents in the present study²⁾, clearly explains this.

5. Conclusion

The characteristics of incidents associated with birth assistance that students encountered during midwifery training were: “late judgement”, “immature skills”, “difficulty responding to sudden changes”, “lack of insight”, and “thoughtless behavior caused by the stress”. The usefulness of making environmental arrangements for students to make the most of their skills and adopting simulation during training was also suggested.

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- ② Books and other monographs
Detels R, McEwen J, Beaglehole R, Tanaka H. *Oxford Textbook of Public Health. The Scope of Public Health. Fourth Edition.* Oxford: Oxford University Press, 2002.
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Detels R, Breslow. Current scope and concerns in public health. In: Detels R, McEwen J, Beaglehole R, Tanaka H. *Oxford Textbook of Public Health. The Scope of Public Health. Fourth Edition.* Oxford: Oxford University Press, 2002: 3-20.

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