ACORN
AUSTRALIAN COLLEGE OF PERIOPERATIVE NURSES

JOURNAL OF PERIOPERATIVE NURSING

Gemma Siemensma
BA(LIS), MLIS, MBA, AALIA
Grampians Health

Health librarians as part of the perioperative care team

Many hospitals have access to a librarian but are they being used to the best advantage?

Okay, chances are you may never find a librarian in the operating suite, unless as a patient, but they do play a vital role in enabling the work of perioperative nurses. A perioperative nurse's role can encompass a variety of tasks at the pre-operative, operative and post-operative stage and includes the daily use of information resources to ensure evidence-based practice (EBP) occurs. EBP is 'the conscientious and judicious use of current best evidence in conjunction with clinical expertise and patient values to guide health care decisions'.[1]

Barriers to EBP exist at both an organisational level and a personal level. At the organisational level these barriers include workplace culture, heavy workloads, lack of human resources, lack of time, insufficient education programs, lack of organisational resources and infrastructure and lack of awareness. At a personal level barriers include lack of knowledge and skills (e.g. not understanding how to search, find, interpret and appraise information), and lack of belief, capacity, access or awareness.[2–5]

A librarian can help break through these barriers. But did you even know that health librarians exist? Or what they have to offer and how they can help? If the tasks you perform could be better based on evidence, or you are unsure how to access resources and the latest evidence, or just want to refresh your information-seeking skills, then partner with your health librarian to innovate and improve your workplace.

Resources

Librarians are collection specialists and can facilitate access to resources to help you perform your role. This may include subscribing to resources such as the ACORN Standards (*Standards for Perioperative Nursing in Australia*), clinical and surgical equipment user manuals, Australian Standards, medication resources (such as MIMS, Don't Rush to Crush, Australian Injectable Drugs Handbook), citation databases and full-text journals and e-books.

Part of a librarian's role is to make access to these resources seamless (no passwords needed onsite) so that you can access the latest information at the point of clinical need. Resources are generally accessible 24/7 so your needs can be met when required. Librarians also work with you as content experts to understand what resources should be included within organisational collections so that the collection reflects the current academic landscape.

Literature searches

Perioperative nurses often undertake work to update practices and processes, inquire about specific clinical cases, develop new policies, partake in research or project work, apply for grants and upskill via professional development or education initiatives. Much of this work requires a search of the literature to see what the latest evidence is on a topic. Anyone can google, but not everyone knows how to identify the most relevant, timely

and credible sources. As expert searchers, health librarians excel in this area and can work with you and undertake a search on your behalf or guide you through a self-directed search.

Databases can be complex and how subjects are described or indexed differs depending on which country you're in and what database you are searching. Multiple sources often need to be searched to find the required information specific to each situation. A health librarian understands these nuances and can tailor a search to your specific needs. This can be followed up with accessing the full text articles for you to peruse or they can obtain articles not readily available from other libraries within their networks.

Librarians may be able to help critically appraise and synthesise the evidence for particular situations and become part of wider project teams where their skills are highly valued. Librarians also act as knowledge brokers across the organisation. As librarians work with all clinical domains across a health service they are often aware of what other projects are happening and they can connect you with others undertaking similar tasks.

Education and training

Librarians are information literacy experts who possess curricular design and instruction skills and are able to teach the information skills associated with EBP. This can be in a formal or informal capacity. Health librarians teach EBP via one-on-one instruction, small group classes, workshops and online instruction.

A librarian can attend a staff meeting to give an overview of services, they can help staff download apps (such as MIMS), or they can teach information literacy skills such as how to search specific databases or how to use particular software (like EndNote).

Library spaces are often available to staff 24/7 and include access to librarians who can provide guidance on resources, technology and project or research activities on the spot. Library spaces often include training rooms, general access computers and study spaces so that work can be undertaken away from busy clinical areas and time can be allocated to complete tasks.

Consumer health and patient information

Understanding the needs and requirements of consumers is imperative for perioperative nurses. Librarians can aid in finding suitable information for consumers that complies with the NSQHS Standard for Health Literacy, ensuring information uses appropriate language and comes from a credible and reliable source. Librarians can also assist in helping find appropriate information in languages other than English. Many of the databases libraries subscribe to contain patient information and in some instances this can be tailored for local use.

Getting the right information into the right hands is critical to the success of surgery so why not have a conversation with your health librarian and be proactive about EBP in your workplace today.

References

1. Titler M. The evidence for evidence-based practice implementation. In: Hughes RG, editor. Patient safety and quality: An evidence-based handbook for nurses [Internet]. Rockville MD: Agency for Healthcare Research and Quality; 2008 [cited 2022 December 19]. Available from: www.ncbi.nlm.nih.gov/books/NBK2659/
2. Khammarnia M, Haj Mohammadi M, Amani Z, Rezaeian S, Setoodehzadeh F. Barriers to implementation of evidence based practice in Zahedan teaching hospitals, Iran, 2014 [Internet]. Nurs Res Pract. 2015[cited 2022 December 19];2015[cited 2022 December 19]:357140. DOI: 10.1155/2015/357140
3. Yoo JY, Kim JH, Kim JS, Kim HL, Ki JS. Clinical nurses' beliefs, knowledge, organizational readiness and level of implementation of evidence-based practice: The first step to creating an evidence-based practice culture [Internet]. PloS One. 2019[cited 2022 December 19];14(12):e0226742. DOI: 10.1371/journal.pone.0226742
4. Smith JR, Donze A. Assessing environmental readiness: First steps in developing an evidence-based practice implementation culture [Internet]. J Perinat Neonatal Nurs. 2010[cited 2022 December 19];24(1):61-71. DOI: 10.1097/JPN.0b013e3181ce1357
5. Daei A, Soleymani MR, Ashrafi-rizi H, Kelishadi R, ZarghamBoroujeni A. Personal, technical and organisational factors affect whether physicians seek answers to clinical questions during patient care: A literature review [Internt]. Health Info Libr J. 2021[cited 2022 December 19];38(2):81-96. DOI: 10.1111/hir.12323

Peer-reviewed article

Authors

Mohammed Bahran Shegafi
King's College London

Mary Leamy
King's College London

Geraldine A Lee
King's College London

Corresponding author

Mohammed Bahran Shegafi
King's College London

What do extended cardiac surgical team members in the Kingdom of Saudi Arabia think about their jobs, and what would improve them? A qualitative study

Abstract

Despite the long history of integrating non-medical practitioners into the extended cardiac surgical team, concerns about job design that reduce job satisfaction persist in the literature. In the Kingdom of Saudi Arabia (KSA), previous research has found that these non-medical practitioners known as cardiac surgical assistants (SAs) express significant dissatisfaction with multiple aspects of their role. Improving job satisfaction can positively impact on the recruitment and retention of this valuable workforce who increase surgical capacity within cardiac units. This qualitative study was therefore conducted to gain an in-depth understanding of cardiac SAs' perspectives of their role and to explore how it could be redesigned to improve their job satisfaction. Through thematic analysis of 14 individual interviews, six themes were identified: the importance of the role, low level of autonomy, lack of recognition, inconsistency of training, poor appraisal and feedback, and feeling unappreciated and undervalued. The data allowed a number of specific recommendations to be formulated that could be implemented at service, organisational and professional levels to enhance SA job satisfaction. It is important that the working conditions of surgical assistants should be further improved to address the issues which cause lower levels of motivation and a greater intention to leave their role.

Keywords: surgical care practice, job design, organisation, cardiothoracic surgery

Introduction

As the prevalence of coronary artery disease (CAD) increases, the number of patients requiring coronary artery bypass graft (CABG) surgery increases.[1] However, there is a chronic global shortage of cardiac surgeons, and so the Kingdom of Saudi Arabia (KSA), like many other countries worldwide, has been employing non-medical practitioners to extend surgical care capacity since the 1990s.[2,3] Despite having similar roles, these practitioners are known by different names internationally. For example, they are referred to as 'physician assistants' (PAs) in the United States of America (USA),[4] as 'surgical care practitioners' (SCPs) in the United Kingdom (UK)[5] and as 'surgical assistants' (SAs) in the KSA. Surgical assistants work primarily to perform surgical interventions, such as saphenous vein and/or radial artery harvest, and pre-operative and post-operative care under the direction and supervision of a consultant surgeon.[4]

Literature review

The wider literature on non-medical surgical assistants has found that they practised safely, contributed to shortening waiting lists and were considered as valuable members of the extended surgical team.[6–8] However, there is a dearth of literature on the non-medical workforce in cardiac surgery, with most accounts being anecdotal, and little empirical evidence on the clinical outcomes associated with the role.[9]

As is the case with SCPs in the UK, cardiac SAs who are allied health professionals have expanded their roles as nurses and operating department practitioners. However, SAs in the KSA, unlike their counterparts in the US and UK, receive only in-house hospital-based training with no formal university curriculum. In addition, in the KSA, cardiac SAs can work in hospitals run by the Ministry of Health, the Ministry of Education and the Ministry of Defence or hospitals that are run privately.[10] This diverse range of employing organisations results in disparities in how the cardiac SA job requirements, roles and responsibilities have been defined and operationalised in practice.

Internationally, there are concerns related to the job design of cardiac surgical assistants; including concerns about the degree of role autonomy, uncertainty surrounding the delegation of tasks and the relatively variable scope of practice structures.[11,12,13] Indeed, a survey by Krishnamoorthy and Britton[14] reported that the vast majority (99%) of non-medical practitioners in cardiac surgery felt undervalued and unable to develop in their current advanced roles. Krishnamoorthy[13, p.1] suggests that if nothing is done to amend or alter these factors, then the workforce will 'soon cease to exist'. Supporting this assertion, a recent national cross-sectional survey of 35 cardiac SAs in the KSA also found that 83 per cent were unsatisfied with aspects of their role, such as autonomy, and 62 per cent were dissatisfied with job complexity.[15] Therefore, it is clear that there is a need for empirical research to better understand how the SA role is enacted in cardiac care in order to improve job satisfaction, recruitment, career progression and retention.[14]

Research questions

This qualitative study was driven by the following research questions:

- What factors do cardiac SAs working in the KSA perceive influence their job satisfaction and their ability to perform their role satisfactorily?
- What job design recommendations can be drawn from SAs' suggestions on how they would like to enhance their role?

Method

This exploratory, qualitative study is part of a larger mixed method study which featured an explanatory sequential design to explore cardiac SAs' perspectives on their role in the KSA and what factors affect their job satisfaction and performance. The quantitative part of this study which was completed first has already been published.[15]

This paper details the qualitative element of the study which was used in the subsequent interpretation and clarification of results from the quantitative survey.

Theoretical framework

Hackman and Oldham's[16] Job Characteristics Model (JCM) formed the basis for the quantitative element of the research and also informed the qualitative study described in this paper. The JCM proposes five key job attributes which influence an individual's personal and work outcomes, such as job satisfaction, absenteeism, work performance and motivation.[16] These attributes are:

1. task variety – the degree to which the individual is required to use a range of skills
2. task identity – whether an individual feels responsible for completing an entire task
3. task significance – how the worker experiences the meaningfulness of their work
4. worker autonomy – feeling of independence leading to the worker experiencing responsibility for the work outcomes
5. feedback – the information the worker receives about the outcomes of their work.

This framework informed the development of the qualitative semi-structured interview schedule together with relevant literature from a previous review.[3,12,13,15] The JCM model was also used as a sensitising concept when conducting the analysis. Sensitising concepts are analytical constructs that 'give the user a general sense of reference'[17] and which can guide attention to particular events or behaviours.[18]

Setting

This study was undertaken in seven cardiac centres around KSA that employ cardiac SAs. Two are in the central region, one in the south, two in the western region, and two in the eastern region.

Recruitment and sampling

Participants for the interview study were chosen by random purposive

sampling from a pool of 53 SAs who had previously been identified by the research team to take part in a survey on job satisfaction. Names were obtained by approaching hospitals for information on their employment of SAs. This pool of participants represented SAs working in hospitals run by ministries of health, education and defence across the entire KSA. In random purposive sampling, the researcher randomly selects instances from a sampling frame containing a purposely chosen sample.[19]

Participants were sent an email directly from the lead researcher with an information sheet and a consent form to return. Participation was entirely voluntary, and to avoid any coercion no members of the participants' organisations played a role in issuing study invitations. There were no inducements offered for participation. Equally only the research team was aware of the identities of the participants in this study. This was also affirmed throughout the interviews. The researcher interviewed consenting participants and continued to recruit from this pool until the team were confident that data saturation was met. This occurred after the fourteenth participant was interviewed. This approach was selected primarily to avoid recruiting more participants than would be needed to complete the research.

The interview guide was developed by members of the research team to elicit participants' attitudes on a range of topics pertaining to the characteristics of their job as an SA. Prompts and probes were used in conjunction with these guiding questions to encourage participants to elaborate on their responses. The interview guide was piloted on two surgical care practitioners in the UK by the lead researcher (MBS), but no changes were required. (See Table S1 in supplementary material for interview guide.)

Data collection

Between November 2020 and March 2021, data collection was conducted by the lead researcher (MBS). Due to the pandemic caused by SARS-CoV-2 (COVID-19), all participants were interviewed virtually using Zoom or Microsoft Teams. Fourteen interviews were completed, the audio recordings from the interviews were professionally transcribed and then imported into the qualitative data analysis software NVivo 12. The interviews lasted between 60 and 90 minutes and were conducted by the lead researcher (MBS). Ethical permission was provided by both Kings College London (MRSP-19/20-17546) in the UK and King Abdullah Medical City (20-705) in the KSA. The methods used were in accordance with both the hospital's and the university's research data management policy.

Data analysis

The data were analysed thematically in six stages, as recommended by Braun and Clarke.[20] While thematic analysis is a flexible approach it is still necessary to select a theoretical basis for analysis; this can either be deductive or 'top-down' (driven or framed by a specific research question) or inductive or 'bottom-up' (driven purely by data). Braun and Clarke[20] propose a hybrid approach, which was used in this study. Thus, some themes clearly emerged from the interview questions based on the research framework (e.g. elements of autonomy from the JCM) and others emerged only after a full examination of the data (e.g. poor appraisal processes). The data in this study were also analysed to produce an overall understanding using semantic themes (explicit, surface meaning) rather than latent themes (underlying meanings).

The six stages of analysis are outlined as follows.

1. The researcher undertook repeated readings of the transcripts to ensure familiarisation with the data.
2. Initial codes were generated.
3. The researcher examined these codes to identify themes.
4. The themes were reviewed to ensure that they were useful and accurate representations of the original data.
5. The themes were defined and named.
6. The themes were used to produce the report.

For the final three stages, excerpts of the transcripts were reviewed by two other researchers (GL and ML) independently, to further define themes and to establish how well they reflected the narrative of the overall dataset.

Guidance from Lincoln and Guba[21] was used to ensure trustworthiness of the findings. The researcher spent significant time familiarising and reviewing the data to ensure accuracy and credibility. Themes from the data are presented with quotes to show that the content and described meanings are consistent. The exact reporting of the research process and findings enable repetition and provide an audit trail to ensure dependability.

Reflexivity in terms of researcher bias was also addressed. The researcher who conducted the interviews and led the analysis (MBS) was a male cardiothoracic SCP who had worked in the KSA. Thus, he shared the culture of the SAs being interviewed and also

had prior knowledge of the role of the SA. Throughout data collection, the researcher was aware of his own personal reflections about the SA role and was careful to reflect on how this might impact on the way that questions were asked and what themes were pursued. The researcher was also closely supported during interviewing and analysis by two senior academics (GL and ML) with diverse expertise and an interest in advanced practice, but with no previous experience of SA work or the culture within KSA.

Results

Participants' characteristics

The sample was diverse in terms of age and experience, as well as academic qualifications and professional origins. The sample was however dominated by male participants. The baseline characteristics of the individuals are summarised in Table 1. In the reporting of the qualitative data, we used pseudonyms to maintain participant anonymity.

Themes

Six themes were identified relating to aspects of the role which either promoted or decreased job satisfaction in SAs. The themes were: the importance of the role, low level of autonomy, lack of recognition, inconsistency of training, poor appraisal and feedback, and feeling unappreciated and undervalued.

Table 1: Participants' characteristics

Demographic		N	%
Gender	male	12	85.7%
	female	2	14.2%
Age	25–34	8	57.1%
	35–44	5	35.7%
	45–54	1	7.1%
Qualification	bachelor degree	9	64.2%
	diploma	3	21.4%
	master's degree	2	14.2%
Experience	1–5 years	8	57.1%
	6–10 years	4	28.5%
	11+ years	2	14.2%
Professional origins	operating department practitioner (ODP)	10	71.4%
	nursing	4	28.5%

The importance of the role

Some participants explained how the novelty of the role had attracted them initially, they saw it as presenting a positive challenge. Being able to witness the immediate results of their work in terms of improving patient outcomes was also a valued part of their role which contributed to job satisfaction.

> It's nice to do something or to do an operation and you see the result immediately after doing it. It feels great, really.
>
> *Angel*

In addition, interviewees emphasised the sense of pride they felt as integral members of the surgical team. Those who were most enthusiastic about continuing in their role, despite challenges, were clearly self-motivated and felt that their role was of importance and contributed measurable value to the health system.

> I believe myself that I'm doing a great role in surgery: that's why I keep talking about our career and also encouraging other people who want to join the career to join the cardiac assistant programme.
>
> *Alex*

Low level of autonomy

Participants expressed conflicting opinions about their ability to practice to their full capability. The majority of cardiac SAs emphasised that they were practicing with low levels of autonomy, as they needed to consult the operating surgeon who made the decisions despite their skills in, for example, identifying suitable vein grafts.

> I can say it's very highly dependent on the surgeons. The role itself does not have autonomy. For example, if the leg vein was not good, I couldn't by myself decide to go to the thigh or move to the other leg.
>
> *Bev*

Others felt that they were able to practice with autonomy, but that it was often contingent upon developing a personal trusting relationship with surgeons over time.

> To be honest, I'm happy with my autonomy; however, it's gained through years of experience .... I used to be an operating room tech for ten years: therefore, I'm known by all the surgeons.
>
> *Carol*

Furthermore, when discussing their capacity to complete their work, some participants brought up issues of medical hierarchy. This is seen in the emotive language used by the participants. Some participants described the negative effects of comments from surgeons, including humiliation, and being undermined.

> Let's say there is a complication during the harvesting ... everything is under control ... I didn't ask for the surgeon's help ... and suddenly I will just see someone pushing my hand away and taking my place. You will feel just bad, and you will feel a little bit humiliated and down, but you cannot really discuss it ... I'm not satisfied at all.
>
> *Chris*

Lack of role recognition

A number of cardiac SAs spoke about the absence of recognition for their role as a factor which contributed to their lack of autonomy, and which caused frustration.

> Well, you know, I should say if they are not recognising us officially ... your job title is not clear to everyone – of course you will feel that something is missing. I believe the recognition is a must. Recognition for all the assistants is a must.
>
> *Alex*

Participants also highlighted worries about medico-legal implications because of the lack of national standardisation of cardiac SA roles. The absence of a protected job title created confusion which negatively influenced their acceptance in the clinical setting because their colleagues and the patients did not always fully understand their role.

> I am only known as an SA inside the operating room and, to be honest, I don't feel I am doing an independent profession, as my title is not known – sometimes 'technician's assistant', sometimes 'nurse assistant', even though I am not a nurse.
>
> *Ash*

Some participants explained how role definition varied between organisations, and consequently they were practising with unclear autonomy or scope. This lack of a clear role structure and formal recognition were found to be contributing factors to the poor social support experienced by the respondents.

> Without a clear structure of the role where we can feel we are doing our recognised work, I do not think we will be valued, valued by our organisation ... If I'm a leader of an organisation, how am I going to value and socially support employees without understanding the structure of the role?
>
> *Mel*

Inconsistency of training

Cardiac SAs expressed concerns regarding their ability to meet certain competencies, such as endoscopic skills to harvest conduits for CABG, and the adequacy of training provided to perform the role, e.g. training in pre- and post-operative skills. There is currently a wide range of training content for cardiac SAs, which has had an impact on the level of equivalence between different organisations. This situation was clearly of concern to participants in this study.

> I believe we need more and more training for all the surgical assistants, to at least ... remove the variations between them, to be at the same level, so they can work anywhere with more confidence.
>
> *Kris*

Participants highlighted their dissatisfaction with only receiving unstructured in-house training and were concerned about the absence of a standardised curriculum to ensure consistent and high-quality education.

> I received only in-house training. This is the problem. We don't have a well organised curriculum for training for SAs on the national level or on the centre's level.
>
> *Mel*

Additionally, some participants mentioned concerns about the unstructured approach of their on-the-job training, which relied upon surgeons who already had their own roles and responsibilities. Often there was minimal oversight to ensure that the training reached appropriate standards.

> … do you know who is doing the training? They are the surgeons. Unfortunately, the surgeons they are desiring to improve their own skills, OK. I don't think they will put you before themselves. So maybe they will give you good training, but it's not the optimum training that it should be … I'm not satisfied.
>
> *Danny*

Poor appraisal and feedback

The participants unanimously agreed that the feedback they received on their performance was inadequate and inconsistent. Often feedback was dependent on so-called 'incidents' or mistakes and this meant that much of the feedback took a critical approach, rather than being constructive. Assistants mentioned formal job appraisals which were general, not specific to SAs, and were not performed by an appropriate staff member, for example, by a senior cardiac SA.

> To be honest, usually it's an evaluation for all the hospital staff. It's a general form with general points, it's not exactly describing what I'm doing as a surgical practitioner in the theatre … to be honest, it's not specific – it's a general evaluation for all the hospital staff.
>
> *Alex*

Cardiac SAs stressed that the overall way that their performance was appraised was poor and far below their expectations and needs. Lack of constructive feedback was interpreted as lack of interest in their role, for some, and was one of the greatest sources of dissatisfaction.

Feeling unappreciated and undervalued

Several individuals declared their intention to leave the job if their role remained unchanged. Along with the factors and issues mentioned previously, cardiac SAs perceived that their role was not being properly incorporated into the organisation. They felt, in part, that this was because their profession was not widely understood by their health care colleagues.

> Sometimes you are making your effort and at the end nobody knows what you are doing. Many people ignore what you did. You feel nobody is focusing on your job.
>
> *Ash*

Several participants felt that their role was characterised by lack of reward and related this to role invisibility. Thus, despite the usefulness of their work, interviewees felt that they were unappreciated by their employers on both an individual and an organisational level. With the exception of a few SAs who expressed their satisfaction with greater autonomy, the remaining respondents felt unsupported in their workplace.

> No, no-one looks after us … maybe because we are just a few groups, that's why they are not focusing on us … It's really not fair.
>
> *Kris*

Participants also reported dissatisfaction with the current payment scale, with several participants commenting that the present scale was out of line with their actual activities and responsibilities because it was developed for technicians with minimal responsibilities who did not require sophisticated abilities.

> … frankly speaking, this scale was made for technicians whose work will not involve harvesting or any advanced task like what we are doing … So, I feel it's not fair for our payment to be equal to technicians.
>
> *Jem*

Participants described the nature of their jobs as having a 'risk to self', but many felt undervalued because they did not receive an 'infection allowance' from their employer which is typically given to practitioners who are prone to infection at work and perform high-risk jobs.

> It's not risk-free at all. We are dealing with knives and sharps at all times, and we are prone to injury, injection, infection, and until now we don't have the infection allowance, which is ten percent of the basic salary.
>
> *Jo*

Participants also felt undervalued by their organisation when they perceived that they had less resources than other professional groups. In particular, participants mentioned that SAs were not always allocated sufficient space within their hospital buildings to do their job properly, to pray or just to relax.

Discussion

This qualitative study of cardiac surgical assistants found that their autonomy was generally fairly limited and tended to be gained after having worked with surgeons for some time. These surgeons then developed confidence having had first-hand evidence of their assistants' skills and knowledge. This autonomy was not there from the outset; therefore, it had to be earned. This is referred to as 'negotiated performance autonomy' and numerous studies indicate that positive interpersonal relationships, collaboration with

medical doctors, and team trust all contribute to autonomy and informal empowerment.[22,23] However, there are issues with this type of autonomy because it is predicated on the development of trust between non-medical practitioners and medical doctors. Thus, non-medical practitioners' autonomy may be very limited if doctors are excessively authoritarian or bureaucratic.[24]

Lack of role clarity and recognition of the role at national level was a common source of dissatisfaction among participants. Indeed, a recently published review[25] discovered that a lack of role clarity among organisations was impeding effective non-medical advanced clinical practice role implementation in the UK by creating tensions when enacting role autonomy. Currently in the KSA, no national standard exists for the role of cardiac SAs, and each organisation has its own standards and governance. Furthermore, the lack of formal recognition of cardiac SAs on a national level is comparable to the situation in the UK. Although SCPs are typically registered with the Nursing and Midwifery Council or the Health and Care Professions Council, their registration is limited to their first qualification (e.g. as a nurse or operating department practitioner). The regulatory framework is insufficient to encompass their extended surgical practice, meaning that they practise in areas outside their primary (and registered) profession, which consequently limits their role autonomy.[26]

Participants in this study reported obstacles to on-the-job training, including identifying training needs and appropriate accessibility. Such challenges are the natural outcome of poor role clarity which results in an insufficient knowledge of job prerequisites.[27] As trainee cardiac SAs in KSA undergo unstructured in-house training with no university involvement, this also creates substantial concerns for both patients and trainees.[13] Even in the UK, where the Department of Health approved a curriculum in 2014 and universities began offering the MSc degree for SCPs, some hospitals continue to appoint SCP trainees for just in-house training.[13]

This study identified two main concerns for SAs regarding performance feedback, namely its inadequate nature and delivery, and the standard of annual appraisals. Ineffective performance feedback, combined with a sub-optimal appraisal system, can ultimately result in low job satisfaction.[28] However, there is a dearth of literature on how the non-medical workforce in cardiac surgery view their feedback and appraisal systems. The appraisal process is used to determine professional competency, boost staff development, encourage employees, and determine training and development.[28] However, participants in this study highlighted the lack of an appropriate competency framework and the inadequacy of their current appraisal systems.

Some participants felt as if they were invisible to their organisations and were unappreciated in terms of rewards and reimbursement. Literature on social support for non-medical workforce practitioners working within extended surgical teams is scarce. However, our findings support a single-centre study in the USA focusing on advanced practitioner burnout which discovered that these practitioners reported a lack of social support.[29] Although our study and the US study[29] examined distinct contexts and locations, participants in both studies agreed that their managers were unaware of their day-to-day job challenges.

Clinical implications

The data collected from SAs in this project suggest a number of specific recommendations which could enhance their job design in KSA (see Table 2). However, various social and political barriers which may have an impact on the ease with which these recommendations can be implemented should be acknowledged. These may include, but are not limited to, an inadequate level of management support, a lack of encouragement for cardiac SAs to work to their full scope of practise, an organisational focus on a business model rather than on care delivery, and a lack of access to and funding for cardiac SAs' educational and professional development.[30] Currently, in the KSA, cardiac SAs are not supported by any professional organisations. This is in contrast to countries such as Australia and the UK where surgical assistants are supported by their respective colleges of surgeons.[14,31] Without the support of such a body, restructuring the way SAs are trained, supported and renumerated in KSA is challenging. Robust research which promotes a better understanding of the outstanding issues and engagement of stakeholders, such as cardiac surgeons and health care managers, are key to this process. Indeed, this research has already prompted informal discussions with individuals affiliated to the Saudi Society for Cardiac Surgeons with regards to their support for several recommendations.

Strengths and limitations

Even though this small study was conducted in a single country and only focused on one non-medical practitioner role, to the best of our knowledge, this is the first qualitative study to explore the

Table 2: Recommendations for enhancing job design of cardiac SAs in Saudi Arabia

Role area	Recommendation
Organisational governance	Develop a communication strategy to promote the cardiac SA role more effectively internally and among other health care settings, defining its responsibilities, clinical scope and contributions to health care delivery. Develop clear governance on the role which includes a detailed job description of the cardiac SA role.
Legislation	Seek support for legislation from Saudi Health Commission through education and training to address medico-legal issues that have arisen as a result of a lack of national role recognition for cardiac SAs.
Training and education	Conduct learning needs analysis at both individual and service levels to assess SAs' existing competencies and inform the development of tailored training to develop the SA role and ensure job safety
Assessment and appraisal	Produce guidelines for assessment of the cardiac SA role, including identifying appropriately trained assessors to ensure constructive, useful feedback. Ensure line managers can support cardiac SAs' work and provide regular one-to-one reviews to discuss development and concerns. Conduct regular reviews of team working to ensure that cardiac SAs work in inclusive, stable, effective and, ideally, interdisciplinary teams with a suitable hierarchy.
Employment conditions	Address issues concerning poor job rewards, compensation and adequate reimbursement for the role. Ensure that cardiac SAs have access to organisational resources such as office and rest spaces in line with other professional groups.

job characteristics of non-medical practitioners who are part of the extended cardiac surgical team. Thus, the results may be of interest to cardiac surgical assistants practicing in other countries as well as other non-medical practitioners in other professions. However, interviewees in this study were from a self-selected pool of volunteers and thus their views and experiences may have been different to those who were not interviewed. In addition, given the important role that other members of the surgical team play in the satisfactory performance of the SA, this research could have been strengthened by the inclusion of other members of staff such as surgeons and line managers in the interview sample.

Future research

To understand the extent to which these results are dependent on context and role, it is suggested that the research be conducted in a variety of settings and with a variety of non-medical practitioner groups. Furthermore, when cardiac non-medical assistants engage in postgraduate and accredited study, the outcomes of job satisfaction and perceived job characteristics may be quite different. Such research could be critically important for countries like Australia, the UK and the USA, as well as for other countries aiming to advance the agenda on non-medical workforce design.

Conclusion

The findings of this study shed light on cardiac SAs' perceptions of their current role and provide suggestions on how to better design these jobs to support a more satisfied, sustainable workforce. Overall, policymakers, health administrators and employers in the KSA need to foster more accommodating professional environments for cardiac SAs and address their work design concerns. This research has contributed to the literature by generating knowledge about the job design of non-medical practitioners in the cardiac surgical field in one country. However, a knowledge gap clearly exists in other countries and other surgical specialties. Findings from this study can contribute to

advancing the agenda on non-medical workforce design globally, supporting Krishnamoorthy and Britton's[14] call for the wider assessment of the challenges of implementing surgical non-medical practitioner roles.

Acknowledgements

The authors would like to acknowledge Dr Samantha Coster, the publication coach, for her assistance editing the manuscript; as well as Dr Ali Aqarni for his help revising the tables and ensuring that the layout of the manuscript complied with journal guidelines.

References

1. Al-Maskari A, Al-Noumani H, Al-Maskari M. Patients' and nurses' demographics and perceived learning needs post-coronary artery bypass graft. Clin Nurs Res. 2021;30(8):1263–70.
2. Yan Q, Jiang Z, Clothier WT, Treffalls JA, Fox-Good CG, Davies MG. Recruiting trainees to surgery in the United States and Canadian system: What strategies are effective? Am J Surg. 2021;221(2):410–23
3. Halter M, Wheeler C, Pelone F, Gage H, de Lusignan S, Parle J et al. Contribution of physician assistants/associates to secondary care: A systematic review [Internet]. BMJ Open. 2018 [cited 2022 Mar 16];8(6):e019573. DOI: 10.1136/bmjopen-2017-019573
4. Thourani VH, Miller Jr JI. Physicians' assistants in cardiothoracic surgery: A 30-year experience in a university center. Ann Thorac Surg. 2006;81(1):195–200.
5. Gulati V, Simpson AI, Uzoigwe C, Jaggard M, Gibbons C, Gupte C et al. Surgical care practitioners in orthopaedics. J R Soc Med. 2016;109(8):295–8.
6. Miller L, Cox A, Williams J. Evaluation of the advanced practitioner roles. Brighton: Institute for Employment Studies; 2009.
7. Kumar R, Debono L, Sharma P, Basu S. The general surgical care practitioner improves surgical outpatient streamlining and the delivery of elective surgical care. J Perioper Pract. 2013;23(6):138–41.
8. Grota T, Betihavas V, Burston A, Jacob E. Current methods of nurse-surgeon training and education: Systematic review. Int J Nurs Stud Adv. 2021;3:100048.
9. Shegafi MB, Nashef S, Starodub R, Lee G. Two decades on – cardiothoracic surgical care practitioners in the UK: A narrative review. J Cardiothorac Surg. 2020;15(1):1–7.
10. Almalki M, FitzGerald G, Clark M. Health care system in Saudi Arabia: An overview. EMHJ. 2011; 17 (10): 784–793.
11. Williams S, Buchanan A, Mathews J, Marlais M, Eardley I. A question of balance: The extended surgical team. London: Royal College of Surgeons; 2016.
12. Nicholas M. The surgical care practitioner seeking consent: An appropriate delegate? J Perioper Pract. 2018;28(10):273–7.
13. Krishnamoorthy B. Life of surgical care practitioners in cardiothoracic surgery: It is sad, but true [Internet]. Association of Cardio-Thoracic Surgical Care Practitioners; 2019 [cited 2022 Mar 16]. Available from: www.actscp.co.uk/actscpweb/wp-content/uploads/2019/05/Krishnamoorthy-B-Life-of-Surgical-Care-Practitioners.pdf
14. Krishnamoorthy B, Britton CR. The current state of the surgical care team in the United Kingdom: Shall we 'do a time out'? [Internet]. J Perioper Pract. 2022 Dec [cited 2022 March 16];32(12):368–78. DOI: 10.1177/17504589211059328
15. Shegafi MB, Leamy M, Murrells T, Lee GA. What do cardiac surgical assistants in the Kingdom of Saudi Arabia think about their job? A cross-sectional survey of job and work characteristics. J Perioper Pract. 2022; 32(6):149–61.
16. Hackman JR, Oldham GR. Work Redesign. Vol. 2779. Reading: Addison-Wesley; 1980.
17. Blumer H. What is wrong with social theory? Am Sociol Rev. 1954;19:3–10.
18. Holloway I. Basic concepts for qualitative research. Hoboken: Wiley-Blackwell; 1997.
19. Onwuegbuzie AJ, Collins KM. A typology of mixed methods sampling designs in social science research. Qual Rep. 2007 (2):281–316.
20. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006;3(2):77–101.
21. Lincoln YS, Guba EG. Naturalistic inquiry. Los Angeles: Sage; 1985.
22. Maylone MM, Ranieri L, Griffin MTQ, McNulty R, Fitzpatrick JJ. Collaboration and autonomy: Perceptions among nurse practitioners. J Am Acad Nurse Pract. 2011;23(1):51–7.
23. Petersen PA, Keller T, Way SM, Borges WJ. Autonomy and empowerment in advanced practice registered nurses: Lessons from New Mexico. J Am Assoc Nurse Pract. 2015;27(7):363–70.
24. Petersen PA, Way SM. The role of physician oversight on advanced practice nurses' professional autonomy and empowerment. J Am Assoc Nurse Pract. 2017;29(5):272–81.
25. Evans C, Poku B, Pearce R, Eldridge J, Hendrick P, Knaggs R et al. Characterising the outcomes, impacts and implementation challenges of advanced clinical practice roles in the UK: A scoping review [Internet]. BMJ Open. 2021 [cited 2022 Mar 16];11(8):e048171. DOI:10.1136/bmjopen-2020-048171
26. Imison C, Castle-Clarke S, Watson R, Mortimer D, Stephen P. Reshaping the workforce to deliver the care patients need: Research report [Internet]. London: Nuffield Trust; 2016 [cited 2022 Mar 16]. Available from: www.nuffieldtrust.org.uk/publications/reshaping-the-workforce
27. Barbieri M, Micacchi L, Vidè F, Valotti G. The performance of performance appraisal systems: A theoretical framework for public organizations [Internet]. Rev Public Pers Adm. 2021 Aug 31 [cited 2022 March 10]. DOI: 10.1177/0734371X211043560.
28. Nikpeyma N, Abed Saeedi Z, Azargashb E, Alavi Majd H. Problems of clinical nurse performance appraisal system: A qualitative study. Asian Nurs Res. 2014;1;8(1):15–22.
29. Kapu AN, Card EB, Jackson H, Kleinpell R, Kendall J, Lupear BK et al. Assessing and addressing practitioner burnout: Results from an advanced practice registered nurse health and well-being study. J Am Assoc Nurse Pract. 2021;33(1):38–48.
30. Schirle L, Norful AA, Rudner N, Poghosyan L. Organizational facilitators and barriers to optimal APRN practice: An integrative review. Health Care Manag Rev. 2020;45(4):311.
31. Hains T, Turner C, Strand H. Task transfer: A survey of Australian surgeons on the role of the non-medical surgical assistant. JPN. 2018;31(1):11–8.

What do extended cardiac surgical team members in the Kingdom of Saudi Arabia think about their jobs, and what would improve them? A qualitative study

Supplement 1: Interview guide

Please describe your role as a cardiac surgical assistant.

1. What aspects do you find rewarding or most satisfying? Why?
2. Generally, what aspects of the role do you find least satisfying or fulfilling? Why?
3. How much independence would you say you have in terms of carrying out your work?
4. What aspects of your job do you have 1) complete 2) partial 3) no autonomy in? Can you provide examples of each?
5. How does this autonomy impact on your motivation and job satisfaction?
6. Is there anywhere that you would like more autonomy in your role? Is there scope for this?
7. Do you receive any feedback on your work performance? Can you give me some examples of the type of feedback you receive?
8. Do you find the feedback satisfactory? What improvements would you make, if any?
9. What are the components of your role as an SA? To what extent are you able to complete tasks without interference? Do you find this satisfactory?
10. What aspects of the job are particularly complex and need specific training?
11. To what extent are you satisfied with the level of training that you receive to perform complex tasks?
12. How much do other people (supervisor or peers) in the organisation provide information about your job performance? To what extent are you satisfied with this feedback?
13. Since commencing your job as an SA, have you received any awards as a result of your work?
14. Could you describe your working environment from a social perspective? For example, do you have the chance to build friendships with other colleagues?
15. To what extent are you satisfied with the level of social support provided by your organisation? How might you improve this?
16. To what extent do you feel that your job is risk-free? Why do you say this?
17. Based on what we've talked about – what would help to increase your job satisfaction and motivation? What aspects would you prioritise if you had to choose?
18. Is there anything you would like to ask or add?

Peer-reviewed article

Authors

Jasmine Joseph
Vydehi Institute of Nursing, Bangalore

Meinam Deepa Devi
Krupanidhi College of Nursing, Bangalore

Corresponding author

Jasmine Joseph
Vydehi Institute of Nursing, Bangalore

Optimising post-operative recovery of elective abdominal surgery patients: A multimodal approach

Abstract

Aim: This study aimed to identify and validate a multimodal approach for optimising post-operative recovery of patients admitted for elective abdominal surgery.

Background: Identifying the risk of post-operative complications after abdominal surgery enables modification of the risk through targeted interventions and enhanced monitoring. Evidence shows that patients suffer needlessly due to inadequate pre-operative preparation and lack of information regarding the post-operative journey.

Methods and materials: The study was conducted using a quasi-experimental, post-test-only, control group design. The sample comprised 60 participants, 30 each in the experimental and control groups. Four aspects of participant recovery were measured – pain (using a numerical pain rating scale), vital signs (temperature, pulse rate, respiratory rate and blood pressure), wound healing (using the Southampton wound grading system) and length of hospital stay (in days).

Results: One third of the experimental group (33.3%) had normal wound healing compared to one tenth of the control group (10%). Mean pain scores of the experimental group were significantly lower than those of the control group on post-operative days 0, 1 and 3 ($p<0.05$). The physical parameters of the experimental and control groups were not found to be significantly different other than the pulse rate on post-operative day 2 and the respiratory rate on post-operative day 0. The difference in length of hospital stay between the experimental and control groups was not found to be significant.

Conclusion: Overall, the study found that the multimodal approach was effective in promoting post-operative recovery in elective abdominal surgery.

Keywords: elective abdominal surgery, deep breathing exercise, splinting, positioning, leg and foot exercises

Introduction

Safe surgery is regarded as a public health priority. However; despite the existence of internationally recognised standards for practice, the rate of post-operative mortality and morbidity is significantly high.[1,2] Every year, 4.2 million people worldwide die within 30 days of surgery[3] and post-operative death was ranked as the third leading cause of death after ischaemic heart disease and stroke.[1,2] A significant proportion of surgery-related deaths are caused by post-operative complications, including surgical site infection (SSI).

In India, SSI ranks among the top causes of morbidity and mortality. The SSI rate varies greatly, from 1.6 to 38 per cent, depending on the type of surgery. This variability can also be due to differences in characteristics of the hospital population, clinical procedures, infection control measures and hospital environment.[4–6]

Proactive patient care and effective surgical nursing care in hospital are valuable solutions to enhance patient safety. Perioperative nurses can reduce the risk of post-operative complications by implementing targeted interventions and improved monitoring when an increased likelihood of post-operative problems following abdominal surgery has been identified.[7] In the past, attempts were made, both before and after surgery, to enhance recovery.[3] Pauwels et al[8] researched the effect of deep breathing and coughing exercises in the recovery process, while Anila et al[9] employed pre-operative education to speed up the recovery and prevent post-operative problems.

Questions about the clinical effects of pre-operative physical optimisation remain, by and large, unanswered[8] due to the absence of high-quality studies that specifically report on the effects of pre-operative care protocols. Reviewing the literature identified the need for a comprehensive study of the effect of a certain combination of strategic interventions at a specific interval for a specified duration. As the demand for surgery increases, an urgent clinical need exists to reduce the risk of surgery by using strategic, evidence-based interventions. To this end, the current study aimed to assess the effectiveness of a multimodal approach for optimising post-operative recovery of patients admitted for elective abdominal surgery in a selected hospital.

Method

Design

This study used a quasi-experimental post-test-only design with a control group.

Sample and setting

The data for the main study was collected from 60 elective abdominal surgery patients during January and February 2020. The participants included both males and females between the ages of 20 and 60 years, selected based on inclusion and exclusion criteria. Informed consent was obtained from participants after the study was explained to them.

The study was carried out at a tertiary care hospital in Bangalore run by Christian missionaries. The hospital offers a wide variety of services, including emergency care, surgery and physiotherapy, and patients are admitted for comprehensive general as well as specialised care. A wide variety of patients come to the hospital for inpatient as well as outpatient services.

Interventions

The multimodal approach had four primary components – exercise, positioning, pre-operative education and post-operative assessments.

The following exercise techniques are designed to enhance post-operative recovery from elective abdominal surgery and prevent possible complications.

- deep breathing (diaphragmatic breathing) and coughing exercise, performed every hour
- splinting the incision, while doing the deep breathing and coughing
- positioning, performed every second hour
- leg and foot exercises – gastrocnemius (calf) pumping, quadriceps (thigh) setting, foot circles, hip and knee movements – performed five times an hour.

Participants in the experimental group received about 15 minutes of education pre-operatively when the deep breathing, coughing, positioning, and leg and foot exercises were demonstrated to them. Return demonstration was taken from the patients to ensure that they had learned the techniques correctly. Participants in the experimental group were instructed to perform the exercises immediately after their transfer from the recovery room to the ward. On the day of surgery (post-operative day 0), participants were permitted to do only the exercises which they were capable of doing. On post-operative days 1 until day of discharge participants were required to perform all four exercise techniques as specified above.

Participants in the control group received routine care.

Data collection and analysis

Four aspects of the post-operative recovery of participants in both groups were assessed.

1. Pain – this was assessed using a numerical pain scale twice a day.
2. Vital signs (temperature, pulse rate, respiration rate and blood pressure) – these were assessed during nursing observations twice a day (morning and afternoon).
3. Wound healing – the researcher checked surgical wound areas daily for any redness or inflammation. The condition of the open wound was assessed using the Southampton wound grading system once before the patient's discharge. The Southampton wound grading

system classifies wound complications into six grades based on levels of bruising or erythema, inflammation, discharge and infection.

4. Length of stay in hospital – the number of days between surgery and discharge was recorded on discharge.

Data were entered into Microsoft Excel and statistically evaluated using SPSS (Statistical Package for Social Sciences) software. The independent variable was the multimodal approach in this analysis, while the dependent variables were pain, vital signs, wound healing and length of stay. Paired t-tests were used to evaluate the data.

Ethical approval

The researcher obtained prior permission from the hospital authority to conduct the study. The research proposal was presented before the institutional ethical committee on 19 March 2019 and ethical clearance was obtained. Formal written permission was obtained from the hospital for conducting the study.

Results

The majority of the participants were female (86% of the experimental group, 100% of the control group) and aged between 20 and 30 years (56.66% of the experimental group, 60% the control group). All the participants in both groups received spinal anaesthesia. Participants underwent lower segment caesarian section, or LSCS (66.6% experimental group, 60% control group), hysterectomy (20% experimental group, 40% control group) or hernia surgery (13.3% experimental group, 0% control group). The majority of participants did not have any co-morbid disease history (60% in the experimental group and 46.66% in the control group); however, some participants had hypothyroidism (33.33% in both groups) and were on thyroid medication (43.33% of the experimental group, 30% of the control group). All participants in both groups received paracetamol after the surgery. Most participants started ambulation on post-operative day 0 (80% in the experimental group and 93.33% in the control group) and the others on day 1.

Table 1: Comparison of average pain levels in experimental and control groups (n=60)

Post-operative day	Difference in mean	t-value (t^{29}=2.462)	p-value	Inference*
Day 0	-0.867	-3.791	0.001	S
Day 1	-1.267	-6.618	0	S
Day 2	1.833	2.549	0.016	S
Day 3	-1	-4.785	0	S

* S = significant, NS = not significant

Pain

Participants' pain levels were assessed twice a day using a numerical pain scale. A paired t-test was used to compute the pain score in experimental and control groups. Table 1 shows the difference in the mean pain scores of the experimental and control groups from post-operative day 0 to day 3. The computed t-value is greater than the table value (t_{29}=2.462, $p<0.05$) on days 1, 2 and 4. Thus it was inferred that the multimodal approach was effective in reducing pain in post-operative patients.

Vital signs

Participants' temperature, pulse rate, respiration rate and blood pressure were assessed during nursing observations twice a day (morning and afternoon). Table 2 shows the differences between the experimental and control groups for the mean values of these four vital signs from post-operative day 0 to day 3.

The computed t-value is less than the table value (t_{29}=2.462, $p<0.05$) on all days for temperature and blood pressure. Thus, it was inferred that the multimodal approach had no significant effect on the temperature and blood pressure of patients. The computed t-value for the pulse rate indicates that the multimodal approach had a significant effect on day 2. Similarly, significant results were obtained for respiratory rate on the day of surgery.

Wound healing

The Southampton wound grading system was used to assess the condition of participants' surgical wounds. Table 3 shows the wound scores of the experimental and control groups.

The data in Table 3 shows that ten participants (33.3%) in the experimental group had normal healing while only three (10%) of the control group had normal healing. Some bruising was observed almost equally across the groups (15 participants (50%) in the experimental group and 17 (56.7%) in the control group), while considerable bruising was higher

Table 2: Comparison of average vital signs values in experimental and control groups (n=60)

Vital sign	Post-operative day	Difference in mean	t-value (t29=2.462)	p-value	Inference*
Temperature	Day 0	-0.167	-1.306	0.202	NS
	Day 1	-0.033	-0.273	0.787	NS
	Day 2	0.1	0.722	0.476	NS
	Day 3	0.1	1	0.326	NS
Pulse	Day 0	-2.367	-1.233	0.227	NS
	Day 1	-3.367	-1.924	0.064	NS
	Day 2	-4.1	-3.019	0.005	S
	Day 3	-2.6	-1.991	0.056	NS
Respiratory rate	Day 0	-1.533	-2.808	0.009	S
	Day 1	-0.367	-0.863	0.395	NS
	Day 2	-0.3	-0.546	0.589	NS
	Day 3	-0.1	-0.231	0.819	NS
Systolic blood pressure	Day 0	-1.5	-0.471	0.641	NS
	Day 1	-27	-1.306	0.202	NS
	Day 2	-3	-1.269	0.214	NS
	Day 3	-2	-1.14	0.264	NS
Diastolic blood pressure	Day 0	0.333	0.186	0.854	NS
	Day 1	-0.5	-0.34	0.736	NS
	Day 2	-3	-1.569	0.127	NS
	Day 3	-0.833	-0.501	0.62	NS

* S = significant, NS = not significant

in the control group (3 participants (10%) in the experimental group and 6 (20%) in the control group). Clear discharge was reported from 1 participant (3.3%) in the experimental group and 2 participants (6.7%) in the control group. None of the participants had pus or severe wound infection.

Length of stay in hospital

Participants were discharged on post-operative days 3, 4 and 5. On day 3, six (20%) of the experimental group were discharged and three (10%) of the control group. On day 4, 23 (76.7%) of the experimental group were discharged and 24 (80%) of the control group. On day 5, one (3.3%) of the experimental group was discharged and three (10%) of the control group. Although the results showed that the control group had a slightly longer length of stay in hospital than the experimental group, this was not significantly different.

Discussion

This study investigated the use of a multimodal approach to optimising post-operative recovery of patients admitted for elective abdominal surgery. The results provide evidence that this approach enabled better surgical wound healing and reduced pain levels in participants in the experimental group compared to the control group. The differences in length of hospital stay and vital signs were not found to be significant.

Table 3: Participants' wound healing

Southampton grade	Condition of wound	Experimental group (n=30)	Control group (n=30)
0 (normal healing)		10 (33.3%)	3 (10%)
I (normal healing with mild erythema)	A: some bruising	15 (50%)	17 (56.7%)
	B: considerable bruising	3 (10%)	6 (20%)
	C: mild erythema	0	0
II (erythema with inflammation)	A: at one point	0	0
	B: around suture	1 (3.3%)	2 (6.7%)
	C: along wound	0	0
	D: around wound	0	0
III (clear discharge)	A: at one point only	1 (3.3%)	2 (6.7%)
	B: along wound	0	0
	C: large Volume	0	0
	D: prolonged	0	0
IV (pus)	A: at one point	0	0
	B: along wound	0	0
V (deep or severe wound infection)		0	0

As in earlier studies,[7] the participants in the present study were mainly females.This may be due to the inclusion of LSCS in abdominal surgery; 38 of the 60 participants in this study underwent LSCS. All participants received parenteral analgesics and started ambulation on post-operative day 0 or day 1.

When compared to patients who mobilise on their own, there is no evidence to suggest that planned mobilisation and exercise programs benefit post-operative recovery.[10] According to findings of previous studies, patients recovering from abdominal surgery care about different things to what is often captured by traditional outcome criteria. The patient-centred recovery assessment was more direct than outcome measures of recovery like length of stay and complication rates.[11] In contrast, a study by Thompson et al. into enhanced recovery after surgery (ERAS) and evidence-based practice for early recovery of abdominal surgery patients found that patients indicated the importance of significantly shorter hospital stays and early recovery.[12] The results of the present study indicate that the length of stay in hospital for the participants in the control group was only slightly longer than that of the experimental group. Nevertheless, given the high cost of surgery and hospitalisation reducing the hospital stay by even one day will be of benefit especially to those who do not have health insurance cover.[13]

Thompson et al[12] revealed that there was no significant difference in the complication rate and body temperature after an ERAS program was implemented for patients undergoing abdominal surgery. This is consistent with the results of our study which found no significant difference between the mean values for temperature, respiratory rate and systolic and diastolic blood pressure of the experimental and control groups. However, we did find a significant difference, only on post-operative day 2, between the mean values for pulse rate between the groups. As a number of factors (e.g. anxiety) can bring about change in the pulse rate, further investigation is needed to determine whether the change was due to the experimental multimodal approach.

In our study, pain levels from post-operative day 0 to day 3 were significantly reduced in participants who received the multimodal approach. This is in contrast to an earlier study that indicated no change in pain levels from using an ERAS program.[1] Pain is a major problem causing discomfort and anxiety to patients and reduction of pain through implementing the multimodal approach has the potential to bring great relief to post-operative patients.

This study found that normal healing of wounds occurred in one third of participants in the experimental group and one tenth of participants in the control group. Perioperative blood loss is considered a predictor of post-operative tissue and wound complications. In our study considerable bruising and erythema with inflammation around the suture were reported in double the

number of participants in the control group than in the experimental group. These findings confirm earlier reports that suggest that hypovolaemia and reduced tissue oxygenation is detrimental to healing and increase the risk of infection and tissue dehiscence.[14]

Earlier studies have reported the positive effects of physiotherapy and short-term pre-operative inspiratory muscle training in reducing post-operative complications.[8] In line with this, we included breathing and coughing exercises in our multimodal approach.

An analysis of the demographic variables of participants in the experimental group of our study revealed only three variables made a significant difference to post-operative recovery, at a 0.05 level of significance; these were habits (p=0.00), co-morbid conditions (p=0.03) and medication taken (p=0.04). Earlier studies have indicated that wound dehiscence is more common in males than females[15]; however, we did not obtain such evidence in our study, probably due to the smaller number of male participants.

Conclusion

The findings of this study reveal that implementing a multimodal approach with elective abdominal surgery patients has a significant positive effect on pain levels and wound healing. Global strategies to improve access to surgical treatment should be given importance and the multimodal approach used in this study can be recommended as evidence-based quality care for patients undergoing elective abdominal surgery.

Conflict of interest and funding statement

The authors have declared no conflict of interest and no financial interest in any element of this study.

Acknowledgements

The authors express their sincere gratitude to Krupanidhi College of Nursing for support during the study and St Philomenas Hospital for providing permission to conduct this research.

References

1. Pearse RM, Clavien PA, Demartines N, Fleisher LA, Grocott M, Haddow J et al. Global patient outcomes after elective surgery: Prospective cohort study in 27 low-, middle- and high-income countries. Br J Anaesth. 2016;117(5):601–9.
2. Cutuli SL, Carelli S, De Pascale G, Antonelli M. Improving the care for elective surgical patients: post-operative ICU admission and outcome. J Thorac Dis. 2018;10(Suppl 9):S1047–9.
3. Nepogodiev D, Martin J, Biccard B, Makupe A, Bhangu A, Ademuyiwa A et al. Global burden of postoperative death. Lancet. 2019;393(10170):401.
4. Thombare D, Joshi D. A study of incidence and risk factors in post operative abdominal wound infection in tertiary care centre. MVP J Med Sci. 2019; 6(June):8–14.
5. Agrawal A, Singh RP. Surgical site infection in abdominal surgeries: A clinical study. J Evol Med Dent Sci. 2022;3(40):10188–93.
6. Patel SM, Patel MH, Patel SD, Soni ST, Kinariwala DM, Vegad MM. Surgical site infections: Incidence and risk factors in a tertiary care hospital, western India. Natl J Community Med. 2012;3(2):193–6.
7. Udomkhwamsuk W, Vuttanon N, Limpakan S. Situational analysis on the recovery of patients who have undergone major abdominal surgery. Nurs Open. 2021;8(1):140–6.
8. Pouwels S, Stokmans RA, Willigendael EM, Nienhuijs SW, Rosman C, van Ramshorst B et al. Preoperative exercise therapy for elective major abdominal surgery: A systematic review [Internet]. Int J Surg. 2014 [cited 2020 Jun];12(2):134–40. DOI: 10.1016/j.ijsu.2013.11.018
9. Anila MP. A study to assess the effectiveness of abdominal exercise on gastric motility among post operative patients in selected hospitals, Erode District, Tamilnadu. IOSR J Sport Phys Educ. 2017;04(03):37–43.
10. Hu Y, McArthur A, Yu Z. Early postoperative mobilization in patients undergoing abdominal surgery: A best practice implementation project. JBI Database System Rev Implement Rep. 2019;17(12):2591–611.
11. Rajabiyazdi F, Alam R, Pal A, Montanez J, Law S, Pecorelli N et al. Understanding the meaning of recovery to patients undergoing abdominal surgery. JAMA Surg. 2021;156(8):758–65.
12. Thompson EGE, Gower ST, Beilby DS, Wallace S, Tomlinson S, Guest GD et al. Enhanced recovery after surgery program for elective abdominal surgery at three Victorian hospitals. Anaesth Intensive Care. 2012;40(3):450–9.
13. Chatterjee S, Laxminarayan R. Costs of surgical procedures in Indian hospitals. BMJ Open. 2013;3(6):e002844.
14. Sørensen LT, Hemmingsen U, Kallehave F, Wille-Jørgensen P, Kjærgaard J, Møller LN et al. Risk factors for tissue and wound complications in gastrointestinal surgery. Ann Surg. 2005;241(4):654–8.
15. Kapoor K, Hassan M. A clinical study of abdominal wound dehiscence with emphasis on surgical management in Bangalore medical college and research institute, Karnataka, India. Int Surg J. 2017;4(1):134–40.

Peer-reviewed article

Authors

Kevin E Tololiu
University of Pecs, Doctoral School of Psychology (Cognitive Science); Universitas Negeri Gorontalo, Faculty of Sport and Health, Nursing Study Program

Jed Duff
PhD, RN, FACORN
Queensland University of Technology, Faculty of Health; Royal Brisbane and Women's Hospital, Nursing and Midwifery Research Centre

Krisztina Csokasi
University of Pecs, Institute of Psychology

Corresponding author

Kevin E Tololiu
University of Pecs

Nonpharmacological interventions for the reduction of post-operative pain after ambulatory surgery: A systematic review of randomised controlled trials

Abstract

Aims: To examine the effectiveness of nonpharmacological interventions for the reduction of post-operative pain in patients undergoing ambulatory surgery (also known as day surgery).

Background: Post-surgical pain remains prevalent, especially in day surgery cases. When poorly managed, this acute pain can lead to chronic pain and delayed recovery. Nowadays, several nonpharmacological regimens are available for reducing pain after ambulatory surgery. Further investigation is required to assess the quality of these alternatives.

Design: Systematic review

Methods: An electronic search of PubMed, CINAHL (via EBSCOhost), Embase, and Cochrane library was undertaken to screen and assess the studies of nonpharmacological intervention in reducing post-operative pain in ambulatory surgery. Inclusion criteria covered randomised controlled trials (RCTs) on patients undergoing day surgery in which the patients received nonpharmacological intervention for post-operative pain management. This review excluded studies published more than 25 years ago, studies using languages other than English and Bahasa Indonesia, and case reports, conference abstracts and review articles.

Results: Four eligible studies provided drug-free interventions for reducing pain after day surgery; the interventions included foot massage, acupuncture, audio–visual relaxation tools delivered by mobile technology and digital video discs (DVDs). There were varying respondents and tool assessment characteristics, especially in pain level instruments and pain outcome indicators across the studies. The risk of bias found in the studies was mainly associated with incomplete data and selective reporting. Although some studies showed less significant statistical results, the mean difference in the intervention arms showed meaningful effectiveness.

Conclusion: The appropriate application of nonpharmacological interventions might reduce patient pain levels after day surgery. High-quality RCTs and specific follow-up studies are needed to investigate the effectiveness of each intervention for post-operative pain reduction.

Keywords: day surgery, nonpharmacological therapy, post-operative pain

Introduction

Pain is defined as a subjective experience associated with physical trauma and psychological discomfort. This pain process involves neurosensory physiology and endocrine pathways and, if trauma has occurred, an immune response to damaged peripheral tissue. Inflammation is produced by chemical mediators such as histamine, bradykinin and prostaglandins.[1] Pain can be acute or chronic. Post-operative acute pain is due to tissue injury and/or removal in the operational procedure, and occurs within seven days after surgery.[2]

Post-operative pain may be more prevalent in patients undergoing day surgery because day surgery patients receive less health status monitoring than patients undergoing in-patient surgery, as day surgery patients are allowed to leave the hospital on the same day as the surgical procedure.[3]

Post-operative pain is common in surgical wards. Gan et al.[4] found acute pain was experienced by nearly 80 per cent of patients undergoing surgery, with patients mostly reporting either moderate or severe pain levels. Additionally, Singh et al.[5] claimed that from the critical five hours after surgery to the third day almost 90 per cent of patients reported experiencing pain. Post-surgical pain is experienced by most patients undergoing day surgery.

Minimal supervision during the day of surgery illustrates health care providers' attitude toward pain management after ambulatory surgery.[6] Since the pain is expected to eventually resolve, pain management is not considered a priority. However, untreated pain can remain for three months or longer.[7] Uncontrolled acute pain after surgery may lead to chronic pain, and severe acute pain can predict chronic pain after surgery.[8]

This pain can result in other complications, such as delayed recovery after surgery. A prospective study conducted by McGuire et al.[9] suggested that severe acute post-operative pain is associated with delayed punch biopsy wound healing. This delayed recovery with remaining pain can also reflect a sign of infection. Millett et al.[10] cite an example of an infection with *Propionibacterium acnes* that is associated with pain after shoulder surgery.

When the supply of medication is limited or absent, non-pharmacological therapies can be worth implementing. Therapies such as soft tissue massage can also be applied at home after discharge as medical devices are not required.[11] With clinical team support through a team-based approach to follow-up monitoring, implementation of a wide range of nonpharmacological therapies can be facilitated.[12]

In the current century, several methods and novel nonpharmacological techniques have been used to relieve pain post-operatively. These alternatives to medication have been shown to have positive effects on healing and pain reduction without a high risk of side effects. Techniques include deep breathing relaxation,[13,14] audio-visual distraction,[15] exercise[16,17] and electroanalgesia and laser therapy.[18] Other techniques also need to be considered, such as acupuncture,[19,20] massage,[21,22] music therapy[23] and reflexology.[23,24]

Aim

This study aims to examine the effectiveness of nonpharmacological interventions in reducing post-operative pain in patients undergoing day surgery.

Method

This systematic review followed Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines. The review applied the PICOS (participant, interventions, comparators, outcomes, and study design) approach to formulate the search strategy in four electronic databases: PubMed, CINAHL (via EBSCOhost), Embase and Cochrane library through the Queensland University of Technology access. Cochrane risk of bias tool is used to assess the quality of the included articles.

Search strategy

The pieces of literature were searched by an independent viewer (KT) under the supervision of a second viewer (JD). The search was conducted from 24th February to 28th April 2021. The following terms were employed for the literature search: 'day surgery', 'ambulatory surgery', 'outpatient surgery', 'day-case surgery', 'nonpharmacological intervention', 'complementary therapy', 'alternative remedy', 'drug-free technique', 'post-operative pain', 'post-surgical pain', 'pain management' and 'pain remedy'. The search was filtered based on the Boolean operator (And, Or, and Not) as presented in Table 1.

Eligibility criteria

The review included peer-reviewed and randomised controlled trials (RCTs) published in the last 25 years. The authors sought to find recent research into nonpharmacological interventions for post-ambulatory surgery pain; however, the previous ten years did not provide a significant number of publications with RCTs for analysis.

Table 1: Search strategy

Population	Intervention	Comparator	Outcome
Day surgery; or	Nonpharmacological intervention; or	–	Post-operative pain; or
Ambulatory surgery; or	Complementary therapy; or	–	Post-surgical pain; or
Outpatient surgery; or	Alternative remedy; or	–	Pain management; or
Day case surgery	Drug-free technique	–	Pain remedy

The review contains studies of patients undergoing day surgery who received any nonpharmacological intervention for post-operative pain management regardless of sex or age. This review excluded studies using a language other than English and Bahasa Indonesia. Studies such as case reports, conference abstracts and review articles were also excluded due to incomplete essential information available. Additionally, psychological interventions were excluded to focus the scope of the clinical approach in the day surgery setting.

Study selection

From the four databases searched, 2050 published articles were identified, leaving 925 articles after the duplicate screening. Next, the title and abstract were screened to check the study relevance regarding the topic/research area and variable assessed (nonpharmacological method application) and 871 were excluded. This process reduced the number of studies to 54. After the full-text screening, 47 studies were excluded due to ineligible study design, language used, surgery type and lack of pain level indicator or pain outcome. After further screening, three studies were excluded due to incomplete supporting data of the research method, including the statistical result. As a result, 4 studies were selected for quality assessment. The selection process is illustrated in Figure 1.

Data extraction

Details extracted are presented as follows: First author, publication year, country of origin, topic, study sample, intervention, pain assessment schedule and pain assessment tools (see supplemental material). The primary data extraction was pain level measured in either standardised or developed pain level tools. The measures were summarised and synthesised in the narrative analysis provided by the mean pain score, statistical test and p-value. The meta-analysis was applied after filtering the studies with available mean and standard deviation as the requirement for the meta-analysis test.

Bias assessment

The quality of RCTs and clinical trials was assessed using the Cochrane risk of bias tool to identify bias risks. The risks of bias set included random sequence generation, allocation concealment, blinding, incomplete outcome data and other plausible bias. Each item was categorised as either low, unclear or high, depending on the risk of bias in the study. This overall risk of bias was based on individual studies from the Cochrane risk of bias tool.

Results

Study characteristics

The studies were conducted in England, Iceland and Canada. The sample of the studies ranged from 40 to 112, with 328 samples in total. All studies applied a randomised controlled trial design within the last twenty-five years. While one study sampled pediatric patients, two studies focused on adults as the population of interest. One study exclusively focused on females. The surgical procedures in the studies cover oral, ear nose and throat (ENT), digestive tract, reproduction system and general surgery.

The nonpharmacological interventions used included foot massage,[25] acupuncture,[26] educational DVD[27] and audio–visual relaxation tools delivered by mobile technology.[28] The interventions were delivered in different settings, including pre-operative holding area, recovery room, damage control surgery unit and patient's residence. The pain was assessed at varying times, comparing the pain level before and after the intervention. Three studies measured the pain intensity with a standardised tool – numeric rating score (NRS) or visual analog score (VAS) – while one study developed a pain measurement tool adjusted for pediatric patients. (A table of the study characteristics is included as supplemental material.)

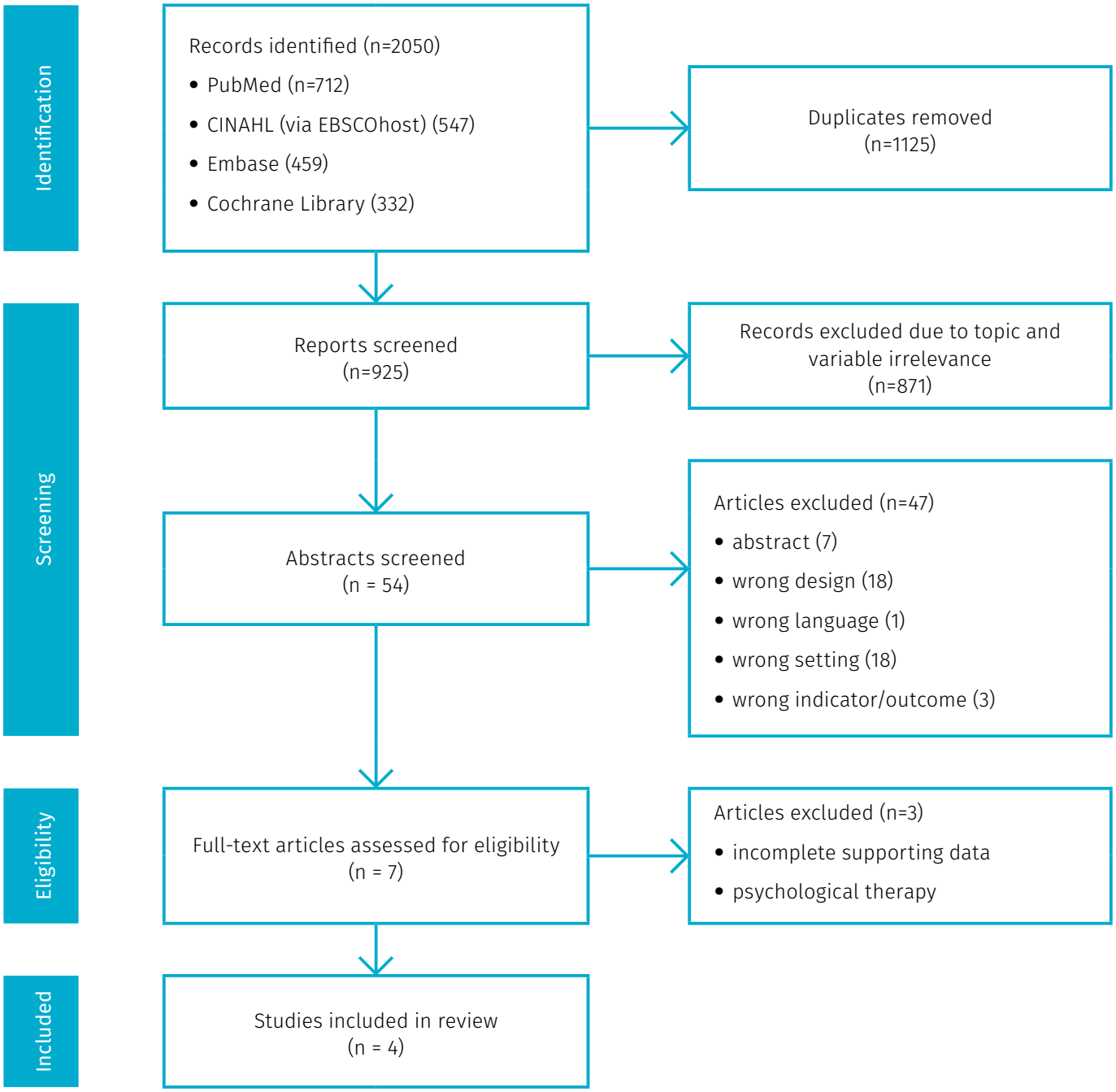


Figure 1: Flow chart of study retrieval and selection

The risk of bias

The overall risk of bias across studies is presented in Figure 2. Of the four studies reviewed, the study by Chartrand is the only one that demonstrated a random sequence generation technique by using a computer-generated list with the assistance of a third party to generate the allocation and using block randomisation to reach equal group numbers. The lack of randomisation in Hansen's study[28] is an obvious drawback of a clinically controlled trial. The allocation concealment and blinding of participants is highly vulnerable to the risk of bias in most studies. This was inevitable due to the nature of the intervention in the studies using foot massage,[25] acupuncture,[26] and DVD[27] as interventions as participants knew that they were in the experimental group once they began receiving the intervention. Additionally, those studies also provided an initial explanation of the study's aims to the participants when gaining consent which might affect the blinding of outcome assessment. However, some strategies were implemented to reduce the risk of bias – blinding the recovery nurse,[26] avoiding the discussion of effectiveness[25] and blinding the outcome assessors who were not involved in the video preparation.[27]

Incomplete outcome data and selective reporting bias were also visible in the studies. The unavailability of analgesic type, dosage and duration given as the primary prescription and the pain level data in the control group on day five after surgery demonstrated loss of follow-up by Hansen.[28] This bias might affect the pain level in each measurement point and consequently influence the results. The lack of standard deviation

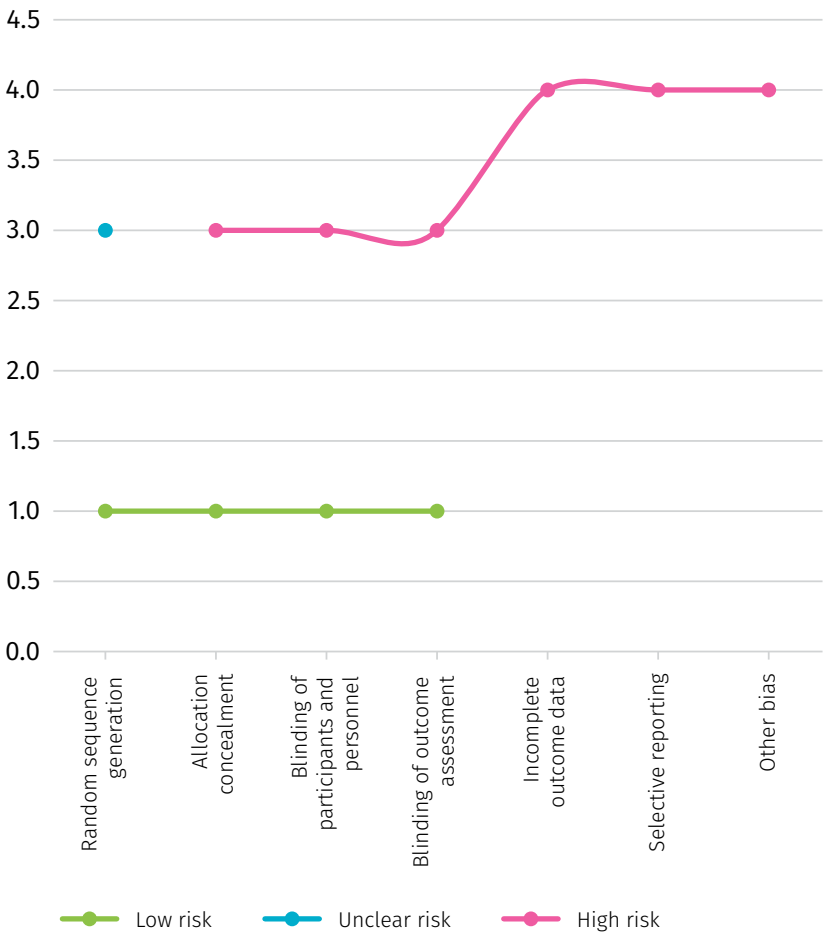


Figure 2: Risk of bias across studies

to support the data of mean pain level by Hulme,[25] Coe[26] and Chartrand[27] could also lead to bias when interpreting the effect of the interventions on pain.

Other plausible biases stemmed from the limited study sample size since some participants were unwilling to undergo specific treatments such as acupuncture.[26] Furthermore, sampling bias might occur with the educational DVD intervention[27] and affect generalisability as the samples in the study represented elective dental or ENT surgery in a single tertiary care hospital. Performance bias may have occurred with foot massage[25] as consistency of the intervention was not monitored and a more extended massage might affect endorphin release and psychological effects may have confounded the results.

The risk of bias across studies was examined using the Cochrane risk of bias tool. Regarding random sequence generation, only Chartrand et al.[27] were assessed as having low risk because a computer-generated list with the assistance of a third party was used to perform block randomisation. At the mean point, the other three studies[25,26,28] were assessed as having unclear risk due to the precise randomisation method. Regarding the allocation concealment, blinding of participants and personnel, and blinding of the outcome assessment, Hansen[28] was assessed as having a low risk

Table 2: Statistical outcomes

Author (year) Intervention	Difference in mean pain level		Statistical test	P-value	Indication (P>0.05)
	Intervention group/s	Control group			
Chartrand (2017)[27] educational DVD	• RR: 1.51 • DCS: 0.49	• RR: 2.06 • DCS: 1.16	Independent T-test	In RR, P = 0·27. In DCS, P = 0·02.	Not statistically significant in RR. Statistically significant in DCS unit.
Coe (1999)[26] acupuncture	• Recovery: 22 • 2 hours: 19 • 18 hours: 12.5 • 72 hours: 5	• Recovery: 27.5 • 2 hours: 23.5 • 18 hours: 24.5 • 72 hours: 14	T-tests and Mann–Whitney U-tests	P<0.05	Statistically significant.
Hansen (2015)[28] audio–visual relaxation tools	ART • 4 days before surgery: 2.58 • DOS, before surgery: 1.08 • DOS, after surgery: 2.58 • Day 5 after surgery: 1.58 MI • 4 days before surgery:1.78 • DOS, before surgery: 0.96 • DOS, after surgery: 2.90 • Day 5 after surgery: 1.89 NVAM • 4 days before surgery: 1.81 • DOS, before surgery: 1.31 • DOS, after surgery: 3.38 • Day 5 after surgery: 2.31 NVA • 4 days before surgery: 2.93 • DOS, before surgery: 2.29 • DOS, after surgery: 2.71 • Day 5 after surgery: 1.80	• 4 days before surgery: NA • DOS, before surgery: 2.25 • DOS, after surgery: 2.74 • Day 5 after surgery: NA	Matched-pairs T-tests and ANOVA	p=0.25 Difference significance of pain from 4 days before surgery to 5 days after. ART : p=0.01 NVAM p=0.03 NVA p=0.336 MI p=0.049	No statically significant difference between groups; however, ART and NVAM groups showed a significant difference in pain level means from four days before surgery to DOS before surgery.
Hulme (1999)[25] foot massage	• On arrival: 4.7 • Prior to massage: 4.8 • After massage: 4.1 • When ready to discharge: 3.5 • When leaving day-case unit: 3.0	• On arrival: 3.9 • 10 minutes after surgery: 5.5 • The next 10 minutes: 5.1 • When ready to discharge: 3.8 • When leaving day-case unit: 3.2	Chi-squared test, Fisher's exact test and a Mann–Whitney U-test	Difference significance between groups: >0.05 Difference significance of pain pattern over time P=0.038	Foot massage is not statistically significant compared to control but statistically significant compared to previous time

RR = recovery room; DCS = damage control surgery unit; DOS = day of surgery; ART = audio relaxation technique; MI = music intervention; NVAM = nature video application with music; NVA = nature video application without music; ANOVA = analysis of variance

of bias because the treatment allocation was not revealed until the intervention. In contrast, the other studies[25–27] had a high potential for error. The incomplete outcome data and selective report were assessed at high risk for all the studies.

Effect of nonpharmacological intervention on pain

Table 2 shows the statistical results for the outcome of interest. The results are displayed in p-value (in which 0.05 is perceived significant) and mean difference in pain levels between intervention and control groups. Hulme[25] found a lack of overall statistical difference in the pain level experienced between the foot massage and the control group by repeated-measures analysis of variance (ANOVA). Nonetheless, the score pattern difference over time between groups was significant in that the patients receiving massage reported consistent pain reduction compared to the control group before massage (10 minutes after surgery) until leaving the unit. Similarly, Hansen[28] found no significant differences in pain levels between the five groups at the measurement time by ANOVA although pain level means from the four days before surgery to pre-operation assessment time showed a significant decrease in the groups receiving audio relaxation technique (ART) and nature video application with music (NVAM).

In contrast to this, some studies found that nonpharmacological interventions could affect pain intensity. Coe[26] found that at 18 hours after surgery mean visual analog scores for patients who received acupuncture were 12.5 compared to 24.5 in the control group. And Chartrand et al.[27]found that pain levels were lower in the intervention group than the control group in the damage control surgery (DCS) unit, and pain intensity was lower in the intervention group than the control group in both the recovery room and the DCS unit.

Discussion

This review assessed the evidence for nonpharmacological treatment reducing post-operative pain levels after ambulatory surgery. Despite the risk of bias and the lack of highly significant statistical results across the studies, the findings suggest nonpharmacological interventions might serve as alternatives for pain management after day surgery. These alternatives include both contemporary therapies, such as audio–visual relaxation tools delivered by mobile technology and educational DVDs, and traditional methods, such as foot massage and acupuncture.

Digital technology nowadays makes a positive contribution to health care practice, for example, the audio–visual interventions used by Hansen which assisted in pain management through a number of mechanisms. The music intervention used by Hansen[28] had a positive effect on pain levels in adult patients undergoing ambulatory general surgery. This reduction of pain can be attributed to a psychological mechanism called the 'Mozart effect'. Electroencephalograms (EEGs) record brain activity as voltage traces often called 'brainwaves'. These waves are categorised according to frequency and can indicate states of the brain. 'Alpha' waves (8–13 Hz) are associated with a relaxed and comfortable state.[29] Auditory stimuli produced by music are transmitted through neurons to the auditory cortex in the temporal lobe of the brain and have been associated with an increase in alpha brainwaves.[29,30] The nature video interventions (with and without music)[28] provided a passive distraction from pain. According to 'gate control theory', sensory input that is not painful can prevent the sensation of pain from travelling to the central nervous system. Audio–visual distractors may activate the periaqueductal grey (PAG) region of the brain playing a critical role in responses to stimuli. This PAG activation produces enkephalin, an endogenous opioid that 'closes the gate' of pain.[31,32]

A non-randomised control group intervention study conducted by Gündüz and Çalişkan[33] revealed that using video after total knee arthroplasty reduced pain levels and drug dependency (P<0.05). Although Faramarzi et al.[34] reported insignificant findings, the role of educational and motivational information in a video might indirectly contribute to pain level reduction. As the video is prepared to meet the patient's needs, the informative presentation could cultivate familiarity and lessen the distress of the operation. This effect of familiarity and distress reduction aligns with psychological and physiological processes in which predicted cues lessen the impact of 'perception of endangerment' and reduce catecholamine (epinephrine and norepinephrine) release. As these hormones increase heart rate, blood vessel resistance and sensitivity of pain nociceptors, this technique could reduce pain.[32,35] However, this effect requires more investigation, especially when applied to paediatric subjects as they have different cognitive perceptions and neurovascular processes to adults. Vasey[36] suggested that parental support is essential when educating children using DVDs before surgery.

Pain reduction can also be achieved by conventional strategies passed

down through generations and adopted by health care institutions. One of these traditional methods is acupuncture, investigated by Coe[26] and found to alleviate the pain in the 18 hours after molar teeth extraction. A systematic review and meta-analysis by Wu et al.[19] supported this, finding that acupuncture could reduce pain intensity and opioid use of adult patients on the first post-surgical day ($P < 0.001$). This pain relief effect occurs because acupuncture procedures activate the nervous system, through needle pressure on meridian points, which triggers blood vessel vasodilatation and accelerates blood flow to inflammatory tissue resulting in improved recovery.[37] Consistent with this, RCTs by Chen[38] and Mikashima et al.[39] found that acupuncture positively contributed to pain relief after ambulatory total knee angioplasty (TKA).

Another traditional alternative is foot massage,[25] which follows a similar physiological process to acupuncture and can stimulate the blood vessels through therapeutic touch on reflexology points. An exploratory study by Ferrell-Torry and Glick[40] reported that 60 per cent of patients reported pain reduction with therapeutic massage and concluded that therapeutic massage can promote relaxation and diminish pain perception through therapeutic skin-to-skin contact. Another RCT, by Cutshall et al.[41] involving cardiovascular surgical patients, suggested that massage can minimise sympathetic nervous system activity leading to a relaxed state, decreased muscle tension, overall body relaxation and significant pain reduction ($p<0.01$). Supporting this, a study of cancer patients done by Grealish et al.[42] claimed that a ten-minute foot massage could facilitate an immediate reduction in pain.

Limitations

This research needs to include more studies for review. The small number of studies reviewed might not reflect the nonpharmacological interventions available for post-operative pain after day surgery. Additionally, one study had a randomised clinical trial in the final analysis. The high risk of bias in the studies is also another drawback. As selective reporting, incomplete data and other prejudices might be visible in all the studies, resulting bias is plausible. Lastly, this review includes a broad spectrum regardless of participant age and type of surgery. While the age difference between adults and pediatric patients reflects different psychophysiological mechanisms, pain perception and response to nonpharmacological approaches, the surgery type will influence pain perception and intervention processes. As a result, selective reporting may occur when generalising the study outcomes under discussion.

Conclusion

This review investigated evidence of nonpharmacological interventions for reducing post-operative pain levels after ambulatory surgery. Despite the lack of significant statistical results and meta-analysis in all studies, the mean pain level showed a meaningful decrease. Overall, groups who received the interventions – foot massage, acupuncture, educational DVD and audio–visual relaxation tools – saw a greater effect than the control groups. With appropriate application, these interventions can positively contribute to reducing pain after day surgery.

Recommendations for future research

Further high-quality RCTs are needed to investigate the effect of nonpharmacological interventions on post-operative pain levels after ambulatory surgery. The missing data and resulting bias can be minimised by keeping track of the data and targeting a larger sample size. Systematic reviews focussing on either adults or children, in specific day surgeries and for each type of intervention are also needed.

Acknowledgements

This paper would not be possible without the exceptional support of LPDP (Indonesian Endowment for Education) who funded the author's study in the Master of Advanced Practice Program at the Queensland University of Technology. The highest appreciation is given to the first supervisor and second author, Prof. Jed Duff, Professor of Nursing at the Queensland University of Technology and Chair of Nursing at Royal Brisbane and Woman's Hospital. His dedication, guidance, expertise and patience have greatly assisted with preparing this work for publication. The author would also like to thank Anna Doubrovsky, researcher at the Queensland University of Technology School of Nursing, and Centre of Clinical Nursing at Royal Brisbane and Woman's Hospital, for her assistance and statistics tutorial for the meta-analysis; and Dr Csókási Krisztina, Assistant Professor at the Institute of Psychology, University of Pecs, Hungary. Her clinical psychology insight contributed to solving problems in this study from a different perspective.

References

1. Hanci V, Yurtlu S, Domi R, Shibata Y, Eyigör C. Acute postoperative pain control [Internet]. Pain Res Manag. 2017[cited 2021 Jun];2017:7831014. DOI: 10.1155/2017/7831014
2. Gupta A, Kaur K, Sharma S, Goyal S, Arora S. Clinical aspects of acute postoperative pain management and its assessment. Journal Adv Pharm Technol Res. 2010;1(2): 97–108.
3. Campagna S, D'Oulx M, Rosetta P, Perretta P, Viglietti S, Berchialla P et al. Postoperative pain, an unmet problem in day or overnight Italian surgery patients: A prospective study [Internet]. Pain Res Manag. 2016[cited 2021 May];2016:6104383. DOI: 10.1155/2016/6104383
4. Gan T, Habib A, Miller T, White W, Apfelbaum J. Incidence, patient satisfaction and perceptions of post-surgical pain: Results from a US national survey [Internet]. Curr Med Res Opin. 2014 [cited 2021 May];30(1):149–60. DOI: 10.1185/03007995.2013.860019
5. Singh P, Saikia P, Lahakar M. Prevalence of acute postoperative pain in patients in adult age-group undergoing inpatient abdominal surgery and correlation of intensity of pain and satisfaction with analgesic management: A cross-sectional single institute-based study. Indian J Anesth. 2016[cited 2021 May];60(10):737–43. DOI: 10.4103/0019-5049.191686
6. Bell, F. (2000). A review of the literature on the attitudes of nurses to acute pain management [Internet]. J Orthop Nurs. 2000[cited 2022 Oct];4(2):64–70. DOI: 10.1054/joon.2000.0073
7. Glare P, Aubrey K, Myles P. Transition from acute to chronic pain after surgery [Internet]. The Lancet. 2019[cited 2021 Jun];393(10180):1537–46. DOI: 10.1016/S0140-6736(19)30352-6
8. Eisenach, JC. Preventing chronic pain after surgery: Who, how and when? Reg Anesth Pain Med. 2006[cited 2021 Jun];31(1):1–3. DOI: 10.1016/j.rapm.2005.11.008
9. McGuire L, Heffner K, Glaser R, Needleman B, Malarkey W, Dickinson S et al. Pain and wound healing in surgical patients [Internet]. Ann Behav Med. 2006[cited 2021 Jun];31(2):165–72. DOI: 10.1207/s15324796abm3102_8
10. Millett PJ, Yen YM, Price CS, Horan MP, van der Meijden OA, Elser F. Propionobacter acnes infection as an occult cause of postoperative shoulder pain: A case series. Clin Orthop Relat Res. 2011[cited 2021 Oct];469(10):2824–30. DOI: 10.1007/s11999-011-1767-4
11. Cronfalk BS, Strang P, Ternestedt BM, Friedrichsen M. The existential experiences of receiving soft tissue massage in palliative home care: An intervention. Support Care Cancer. 2009[cited 2021 Jun];17(9):1203–11. DOI: 10.1007/s00520-008-0575-1
12. Becker WC, Dorflinger L, Edmond SN, Islam L, Heapy AA, Fraenkel L. Barriers and facilitators to use of nonpharmacological treatments in chronic pain [Internet]. BMC Fam Pract. 2017[cited 2021 Oct];18(1);41. DOI: 10.1186/s12875-017-0608-2
13. Aulia A, Yesi M. Effect of deep breathing relaxation techniques for reducing pain after hernia surgery in inpatient of Regional Hospital Pariaman West Sumatera Indonesia [Internet]. IJRR. 2019[cited 2021 Jun]; 6(8):444–7. Available from: www.ijrrjournal.com/IJRR_Vol.6_Issue.8_Aug2019/IJRR0058.pdf
14. Sunadi A, Ifadah E, Syarif M. The effect of deep breathing relaxation to reduce postoperative pain in lower limb fracture [Internet]. Enferm Clin. 2020[cited 2021 Jun];30 (3):143–5. DOI: 10.1016/j.enfcli.2019.12.045
15. Finlay K, Wilson J, Gaston P, Al-Dujaili E, Power, I. Postoperative pain management through audio-analgesia: Investigating musical constructs [Internet]. Psychology of Music 2016[cited 2021Jun];44(3):493–513. DOI: 10.1177/0305735615577247
16. Florez-García M, García-Pérez F, Curbelo R, Curbelo R, Pérez-Porta I, Nishishinya B et al. Efficacy and safety of home-based exercises versus individualised supervised outpatient physical therapy programs after total knee arthroplasty: A systematic review and meta-analysis [Internet]. Knee Surg Sports Traumatol Arthrosc. 2017[cited];25(11):3340–53. DOI: 10.1007/s00167-016-4231-x
17. Gilmore S, Hahne A, Davidson M, & McClelland J. Predictors of substantial improvement in physical function six months after lumbar surgery: Is early postoperative walking important? A prospective cohort study [Internet]. BMC Musculoskelet Disord. 2019[cited 2021 Jun];20(1): 418. DOI: 10.1186/s12891-019-2806-7
18. White P, Lazo O, Galeas L, Cao X. Use of electroanalgesia and laser therapies as alternatives to opioids for acute and chronic pain management [Internet]. F1000 Res. 2017[cited 2021 Jul];6:2161. DOI: 10.12688/f1000research.12324.1
19. Wu M, Chen K, Chen I, Huang S, Tzeng P, Yeh M et al. The efficacy of acupuncture in postoperative pain management: A systematic review and meta-analysis. PloS One. 2016[cited 2021 Jul];11(3):e0150367. DOI: 10.1371/journal.pone.015036
20. Zhao Y, Zhang L, Wang Y, Liao C, Chen Y, Zhen Q et al. Acupuncture therapy for postoperative pain of anorectal diseases: A systematic review protocol [Internet]. Medicine. 2020; 99(7):e19112. DOI: 10.1097/MD.0000000000019112
21. Kukimoto Y, Ooe N, Ideguchi N. The effects of massage therapy on pain and anxiety after surgery: A systematic review and meta-analysis [Internet]. Pain Manag Nurs. 2017[cited 2021 Jul];18(6): 378–90. DOI: 10.1016/j.pmn.2017.09.001
22. Ramesh C, Pai V, Patil N, Nayak B, George A, George L et al. Effectiveness of massage therapy on postoperative outcomes among patients undergoing cardiac surgery: A systematic review. Int J Nurs Sci. 2015[cited 2021 Jul];2(3):304–12. DOI: 10.1016/j.ijnss.2015.07.006
23. Bab R, Babu D. Effectiveness of music therapy vs foot reflexology on pain among postoperative patients in selected hopitals at Mangalore. Int J Nurs Educ. 2014[cited 2021 Jul];6(1):226–8. DOI: 10.5958/j.0974-9357.6.1.046
24. Pa ESS, D'souza L. Effectiveness of foot reflexology on incisional pain among post LSCS mothers in selected hospitals, Mangaluru. AJNER. 2019[cited 2021 Jul];(1):155–9. DOI: 10.5958/2349-2996.2019.00032.6
25. Hulme J, Waterman H, Hillier F. The effect of foot massage on patients' perception of care following laparoscopic sterilisation as day case patients [Internet]. J Adv Nurs. 1999[cited 2021 May];30(2):460–8. DOI: 10.1046/j.1365-2648.1999.01101.x
26. Coe T. The effect of acupuncture on pain and swelling after day case molar teeth extraction under general anaesthesia [Internet]. Ambul Surg. 1999[cited 2021 May];7(1):45–9. DOI: 10.1016/S0966-6532(98)00049-3
27. Chartrand J, Tourigny J, MacCormick J. The effect of an educational preoperative DVD on parents' and children's outcomes after a same-day surgery: A randomised controlled trial [Internet]. J Adv Nur. 2017[cited 2021 May];73(3):599–611. DOI: 10.1111/jan.13161

28. Hansen M. A feasibility pilot study on the use of complementary therapies delivered via mobile technologies on Icelandic surgical patients' reports of anxiety, pain, and self-efficacy in healing [Internet]. BMC Complementary and Alternative Medicine. 2015[cited 2021 May];15:92. DOI: 10.1186/s12906-015-0613-8
29. Kučikienė D, Praninskienė R. The impact of music on the bioelectrical oscillations of the brain [Internet]. Acta Med Litu. 2018[cited 2021 Dec];25(2):101–6. DOI: 10.6001/actamedica.v25i2.3763
30. Sendelbach E, Halm A, Doran A, Miller H, Gaillard P. Effects of music therapy on physiological and psychological outcomes for patients undergoing cardiac surgery [Internet]. J Cardiovasc Nurs. 2006[cited 2021 Jul];21(3): 194–200. DOI: 10.1097/00005082-200605000-00007
31. Johnson MH. How does distraction work in the management of pain? [Internet] Curr Pain Headache Rep. 2005[cited 2021 Dec];9(2):90–5. DOI: 10.1007/s11916-005-0044-1
32. Pereira PJ, Lerner EA. Gate control theory springs a leak [Internet]. Neuron. 2017[cited 2021 Dec];93(4):723–4. DOI: 10.1016/j.neuron.2017.02.016
33. Gündüz CS, Çalişkan N. The effect of preoperative video-based pain training on postoperative pain and analgesic use in patients undergoing total knee arthroplasty: a non-randomized control group intervention study [Internet]. Clin Nurs Res. 2021[cited 2021 Dec];30(6):741–52. DOI: 10.1177/1054773820983361
34. Faramarzi M, Roosta S, Faramarzi A, Salehi A, Matani N. The effectiveness of a preoperative multi-component non-pharmacologic preparation on post-tonsillectomy pain: A randomized controlled clinical trial [Internet]. Int J Pediatr Otorhinolaryngol. 2020[cited 2021 Dec];138:110359. DOI: 10.1016/j.ijporl.2020.110359
35. Holsboer F, Ising M. Stress hormone regulation: Biological role and translation into therapy [Internet]. Annu Rev Psychol. 2010[cited 2021 Dec];61:81–109. DOI: 10.1146/annurev.psych.093008.100321
36. Vasey J. Using DVDs to educate children before surgery [Internet]. Nurs Child Young People. 2017[cited 2021 Dec];29(9):22. DOI: 10.7748/ncyp.29.9.22.s21
37. Chen T, Zhang W, Chu X, Wang Q. Acupuncture for pain management: Molecular mechanisms of action [Internet]. Am J Chin Med. 2020[cited 2021 Jul];48(4):793–811. DOI: 10.1142/S0192415X20500408
38. Chen C, Yang C, Hu C, Shih H, Chang H, Hsieh H. Acupuncture for pain relief after total knee arthroplasty: A randomised controlled trial [Internet]. Reg Anaesth Pain Med. 2015[cited 2021 Jul];40(1): 31–6. DOI: 10.1097/AAP.0000000000000138
39. Mikashima Y, Takagi T, Tomatsu T, Horikoshi M, Ikari K, Momohara S. Efficacy of acupuncture during post-acute phase of rehabilitation after total knee arthroplasty [Internet]. J Tradit Chin Med. 2012[cited 2021 Jul];32(4):545–8. DOI: 10.1016/s0254-6272(13)60068-0
40. Ferrell-Torry T, Glick J. The use of therapeutic massage as a nursing intervention to modify anxiety and the perception of cancer pain [Internet]. Cancer Nurs. 1993[cited 2021 Jul];16(2):93–101. Available from: https://journals.lww.com/cancernursingonline/Abstract/1993/04000/The_use_of_therapeutic_massage_as_a_nursing.2.aspx
41. Cutshall M, Wentworth J, Engen D, Sundt, M, Kelly F, Bauer A. Effect of massage therapy on pain, anxiety and tension in cardiac surgical patients: A pilot study. Complementary Ther Clin Pract. 2010;16(2):92–5. 10.1016/j.ctcp.2009.10.006
42. Grealish L, Lomasney A, Whiteman B. Foot massage: A nursing intervention to modify the distressing symptoms of pain and nausea in patients hospitalised with cancer [Internet]. Cancer Nurs. 2000[cited 2021 Jul];23(3):237–43. DOI: 10.1097/00002820-200006000-0001

Nonpharmacological interventions for the reduction of post-operative pain after ambulatory surgery: A systematic review of randomised controlled trials

Supplement: Characteristics of included studies

Author (year) Country of origin	Title	Study sample	Intervention	Pain assessment schedule / time points	Pain assessment tools
Chartrand (2017)[1] Canada	The effect of a pre-operative educational DVD on parents' and children's outcomes after same-day surgery: A randomised controlled trial	123 children aged between three and ten years with ENT or dental surgery in a Canadian paediatric hospital.	A 12-minute DVD about preparation for surgery, pain management to support children and images of positive interaction between a nurse, family/parents and children.	In the recovery room and in the day surgery unit.	mCHEOPS a total of five items – cry, facial, verbal, torso and legs – each scored 0–2 (e.g. for 'facial' item 0 = smiling, 1 = composed, 2 = grimace).
Coe (1999)[2] England	The effect of acupuncture on pain and swelling after day-case molar teeth extraction under general anaesthesia	Forty patients aged 18–40 undergoing molar teeth extraction were allocated to the intervention and control groups. The intervention group received acupuncture with general anaesthesia, the control group received general anaesthesia only.	Acupuncture therapy using four needles located in primary meridian point followed by 2.5 Hz electric stimulation, adjusted to suit the patient, and maintained until the operation ended.	In recovery and at hours 2, 18 and 72 hours after the operation.	VAS with 0–100 score from minimum to maximum pain perceived.
Hansen (2015)[3] Iceland	A feasibility pilot study on the use of complementary therapies delivered via mobile technologies on Icelandic surgical patients' reports of anxiety, pain, and self-efficacy in healing	105 adults aged 18–75 undergoing general surgeries. The samples were divided as follows: • 25 audio relaxation technique (ART) • 25 music intervention (MI) • 15 nature video application with music (NVAM) • 16 nature video application without music (NVA) • 24 control group. All the samples were given standard operative care.	The patients were instructed to view or listen to the material twice a day for at least 15 minutes from four days before surgery to five days after surgery. The material consisted of a recorded relaxation technique (ART), non-lyrical musical pieces (MI) and specially designed nature videos with and without background music (NVAM and NVA).	Four days before the surgery, just before the surgery, straight after surgery and day five after surgery.	NRS with 0–10 score from minimum to maximum pain perceived.
Hulme (1999)[4] England	The effect of foot massage on patients' perception of care following laparoscopic sterilisation as day case patients	59 women undergoing laparoscopic sterilisation were divided into intervention and control groups. The intervention group received foot massage and standard post-operative analgesia, the control group received standard post-operative analgesia only.	A five-minute foot massage using standard technique, without referring to reflexology massage points, with style adjusted to suit the therapist and patient.	Pain assessment for the control group was performed on arrival to the ward, 10 minutes after surgery, the next 10 minutes, when ready for discharge and when leaving the day surgery unit. Pain assessment for the intervention group was performed on arrival to the ward, immediately before and after the massage was given, when ready for discharge, when leaving the day surgery unit.	NRS with 0–10 score from minimum to maximum pain perceived.

ENT = ear, nose and throat; MCHEOPS = modified Children's Hospital of Eastern Ontario pain score; VAS = visual analog scale; NRS = numeric rating scale

References

1. Chartrand J, Tourigny J, MacCormick J. The effect of an educational preoperative DVD on parents' and children's outcomes after a same-day surgery: A randomised controlled trial [Internet]. J Adv Nur. 2017[cited 2021 May];73(3):599–611. DOI: 10.1111/jan.13161
2. Coe T. The effect of acupuncture on pain and swelling after day case molar teeth extraction under general anaesthesia [Internet]. Ambul Surg. 1999[cited 2021 May];7(1):45–9. DOI: 10.1016/S0966-6532(98)00049-3
3. Hansen M. A feasibility pilot study on the use of complementary therapies delivered via mobile technologies on Icelandic surgical patients' reports of anxiety, pain, and self-efficacy in healing [Internet]. BMC Complementary and Alternative Medicine. 2015[cited 2021 May];15:92. DOI: 10.1186/s12906-015-0613-8
4. Hulme J, Waterman H, Hillier F. The effect of foot massage on patients' perception of care following laparoscopic sterilisation as day case patients [Internet]. J Adv Nurs. 1999[cited 2021 May];30(2):460–8. DOI: 10.1046/j.1365-2648.1999.01101.x

Peer-reviewed article

Authors

Rami Kamel Mustafa Aldwikat
Deakin University, School of Nursing and Midwifery, Centre for Quality and Patient Safety Research; Monash University, School of Nursing and Midwifery; The Royal Melbourne Hospital

Elizabeth Manias
Monash University, School of Nursing and Midwifery; Deakin University, School of Nursing and Midwifery, Centre for Quality and Patient Safety Research, Institute for Health Transformation; The Royal Melbourne Hospital, Department of Medicine; The University of Melbourne,

Dr Pat F Nicholson
Deakin University, School of Nursing and Midwifery, Centre for Quality and Patient Safety Research, Institute for Health Transformation

Corresponding author

Rami Kamel Mustafa Aldwikat
Monash University, School of Nursing and Midwifery

Nurses' perceptions of screening for delirium in the Post Anaesthesia Care Unit and orthopaedic surgical wards: A qualitative study

Abstract

Purpose: The aims of this study were to explore nurses' perceptions of the usability and clinical utility of two screening tools for delirium detection in the Post Anaesthesia Care Unit (PACU) and orthopaedic surgical wards settings, and to identify nurses' decisions about patient care delivery based on delirium assessment outcomes. The tools studied were the 3D-CAM and 4AT – the three-minute diagnostic interview for CAM (Confusion assessment method) delirium and the 4 'A's test, respectively.

Method: A focus group methodology was used. Five semi-structured focus groups were conducted with 24 nurses working in the PACU and orthopaedic surgical wards. Focus group sessions were digitally recorded and transcribed verbatim. Thematic analysis was used to analyse the data.

Findings: Five major themes were identified: 1. nurses' previous experience assessing patients for delirium, 2. usability of the screening tools, 3. clinical utility of the screening tools, 4. changes to improve the usability of screening tools in clinical practice, and 5. decision-making and clinical judgement.

Nurses in the PACU and orthopaedic surgical wards confirmed that the 4AT tool was quick and easy to use. PACU nurses were largely willing to adopt it into their practice, but nurses working in the orthopaedic surgical wards expressed that the 4AT tool was too generic and could not be used as the only screening tool to detect delirium. On the other hand, nurses working in the orthopaedic surgical wards viewed the 3D-CAM as more thorough and expressed their willingness to adopt it into their clinical practice.

Nurses in both wards believed that in order to increase the utilisation and adoption of the tools in practice some modifications are required; for example, reducing the number of observation-based questions and repetitive questions in the 3D-CAM and having an alternative question to measure attention criteria in the 4AT tool.

Conclusion: While the 4AT screening tool was feasible for use in the PACU the 3D-CAM was feasible for use in orthopaedic surgical wards. However, both tools require some modification to the content to facilitate routine use in clinical practice.

Keywords: delirium, screening tools, usability, utility, focus group, nurses, Post Anaesthesia Care Unit

Background

Delirium is an acute decline in cognition, awareness and attention that tends to fluctuate in severity during the day and arises from physiological disturbance.[1] It is common in post-operative patients, with an incidence of 15 to 25 per cent reported after major elective surgery, and 50 per cent after emergency surgery.[2] In the Post Anaesthesia Care Unit (PACU), the incidence of post-operative delirium varies between 4.1 and 45 per cent.[3,4] Post-operative delirium contributes to several adverse outcomes, including worsening functioning performance, accelerated cognitive decline, increased need for long-term care and increased mortality.[5–7]

The 3D-CAM is a three-minute delirium assessment method derived and simplified from the Confusion assessment method (CAM).[8] The 3D-CAM takes four features into consideration for determining whether a patient is delirious or not:

1. acute change and fluctuating course
2. inattention
3. disorganised thinking
4. altered level of consciousness.[8,9]

Each feature is rated as positive or negative for delirium. To detect delirium using the 3D-CAM tool, information is required from both subjective and objective testing.[8] Subjective testing is usually based on clinician assessment, observation of the patient and information gathered from family and carers. In contrast, objective testing is typically based on structured tests that require direct answers from the patient.[10]

The 4 'A's test (4AT) is a simple delirium detection tool that takes less than two minutes to complete (see www.the4AT.com).

The 4AT comprises assessment of four items:

1. alertness
2. cognition (using the Abbreviated Mental Test-4 (AMT4), which requires the patient to state their age, date of birth, present location and current year)
3. attention (the patient is asked to state the months of the year in reverse order)
4. acute changes (or fluctuating alertness or cognition arising in the last two weeks and still evident in the last 24 hours – a core diagnostic feature of delirium. Information may be obtained from different sources, including next of kin, nurses and carers of the patient, and also from patient medical records.[11]

When the 3D-CAM was evaluated against the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5, reference standard) in the PACU, a value of 100 per cent was achieved for sensitivity and 88 per cent for specificity.[9] Similarly, when the 4AT was evaluated against the DSM-5 criteria in the PACU, it achieved high diagnostic performance, with sensitivity and specificity values of 95.5 per cent and 99.2 per cent, respectively.[3] Nevertheless, despite the availability of highly sensitive and specific tools, delirium is still under-recognised by nurses in the PACU and orthopaedic surgical wards. This is partially due to lack of implementation of recommendations, such as those in the Australian Commission on Safety and Quality in Health Care clinical care standard for delirium screening, in the PACU.[12]

While recent studies have focused on diagnostic accuracy and validation of screening tools for delirium detection in the PACU and orthopaedic surgical wards settings,[12,13] there have been no known published studies of nurses' perceptions of the usability and clinical utility of these tools. Thus, delirium may be under-recognised if nurses perceive the tool as being unreliable or time consuming to conduct in a busy clinical setting. Understanding nurses' perception of usability and clinical utility of the 3D-CAM and the 4AT may provide insights into how delirium detection in the PACU and orthopaedic surgical wards can be improved. Therefore, this study investigated nurses' perceptions of the usability and clinical utility of the 3D-CAM and 4AT screening tools for delirium detection in the PACU and orthopaedic surgical ward settings. The study also identified nurses' decisions about the delivery of patient care based on delirium assessment outcomes.

Method

Design

A focus groups methodology was chosen for this study to obtain the individual and collective views of nurses participating in the study.[14] It was anticipated that focus groups would promote free expression, conversation and interaction between nurses about their perceptions and experiences of using the 3D-CAM and 4AT tools, and reveal the diversity of opinions and thoughts about the usability and clinical utility of the tools in the PACU and orthopaedic surgical wards. The first author coordinated the recruitment of the nurses, while the first and last author facilitated the focus groups.

Setting and participants

The study was undertaken in the PACU, and two orthopaedic surgical wards (one with elective cases, one with trauma cases) at a tertiary care university hospital that delivers a comprehensive range of health care services in metropolitan Victoria, Australia.[15] The researcher conducting the research obtained permission from the nurse unit managers of the PACU and orthopaedic surgical wards to present details about the study during the units' weekly meetings. Once permission was granted, the researcher visited each of the units twice to provide verbal and written information about the study to nurses who were eligible to participate and answer questions about participation. Nurses were eligible to particate if they were employed at the hospital in a permanent full-time or part-time position and had a minimum of one year of clinical experience. Nurses employed as a casual worker at the hospital were excluded.

Nurses who elected to participate in the study provided written consent. Once the nurses had been recruited, the researcher provided the training required to use the 3D-CAM and the 4AT screening tools. Nurses in the PACU were trained in using both the 3D-CAM and the 4AT screening tools. Nurses in the orthopaedic ward that included patients who had undergone elective surgery were trained to use the 3D-CAM, while nurses in orthopaedic ward that included orthopaedic trauma cases were trained to use the 4AT screening tool. Nurses were required to use the tool as allocated, and screen at least one patient daily for 30 days.

Five focus groups were conducted: two involving PACU nurses, two involving nurses on a trauma orthopaedic surgical ward and one involving nurses on an elective orthopaedic surgical ward.

Data collection

Semi-structured probe questions were developed by the research team (see supplemental material) from prior research in the topic area[16] and integrated into focus group sessions. In collaboration with the nurse unit managers, focus group sessions were conducted at 2.00 pm, immediately after nurses' verbal handover, which maximised nurses' participation and minimised disruption to their work day and patient care processes. Five focus groups were held during April and May 2022, led by two facilitators (RA and PN). Twenty-four nurses participated, including clinical nurse specialists (n = 7) and registered nurses (n = 17). The number of participants in each focus group ranged from four to eight nurses. Focus groups had a mean duration of 38.8 minutes (range 32–45). Focus group sessions were digitally recorded and transcribed verbatim. The study protocol was approved by Melbourne Health Human Research Ethics Committee (Ref: HREC/74575/MH-2021) and Deakin University Human Research Ethics Committee (Ref: 2021-295).

Data analysis

Thematic analysis was undertaken to analyse the qualitative data. The researcher (RA) transcribed each focus group session's audio recording verbatim. The transcripts were checked for accuracy by one researcher (RA). The first transcript was coded by two researchers (RA and PN) and consensus was reached through discussion. The remaining transcripts were coded by the researcher (RA).

Analysis began with familiarisation with transcripts and review of accuracy, which allowed for data immersion to search for meanings and patterns. Themes and sub-themes were organised using the qualitative research software NVivo 11.[17]

An inductive thematic analysis was undertaken, as developed by Ritchie and Spencer.[18, p. 173–194] Thematic analysis was used to generate an understanding of the perceptions of the PACU and orthopaedic surgical ward nurses regarding usability and clinical utility of screening tools, e.g. ease of use and time constraints when screening patients post-operatively for delirium. Themes and sub-themes were identified through careful reading and re-reading of the transcipts.[19] This approach allowed the recognition of patterns in the data, whereby emerging codes became categories and categories became themes and sub-themes. A table of emerging themes and sub-themes was created first by researcher (RA) and revised by other research team members (PN and EM) who are experts in qualitative research analysis. The research team then discussed these emerging themes and sub-themes, with further refinement to ensure that the reported themes accurately reflected participants' perceptions.[20]

Results

A total of 24 nurses working in the PACU and orthopaedic surgical wards were recruited, including eight nurses from each setting (PACU, elective orthopaedic surgical ward, trauma orthopaedic surgical ward). Five major themes and ten sub-themes were derived from the data (see Table 1).

Themes and sub-themes are described below. All quotes have been anonymised and labelled with focus group number (FGx), participant number (Px) and setting – orthopaedic ward (OW) or PACU.

Nurses' previous experience assessing patients for delirium

One sub-theme was identified: 'previous experience of delirium assessment'.

Previous experience of delirium assessment

There were mixed levels of experience in delirium assessment among participants. These differences in experience levels were notable between participants in the PACU and orthopaedic surgical wards. Most participants from orthopaedic surgical wards expressed that they had some experience in delirium assessment using a screening tool.

> I have used DOS [delirium observation scale] previously and it's a scoring system. (FG3/P1-OW)

> I've used multiple different ones, including the DOS and the 4AT. (FG3/P2-OW)

> We generally use the DOS, which is like 50 questions. That's the one we mainly use in our ward. (FG1/P1-OW)

In contrast participants from the PACU shared that they had little or no previous experience in delirium assessment.

> I don't have any experience with a specific delirium tool, but I would use the Glasgow coma scale to assess if a patient is confused. (FG4/P3-PACU)

> I have only used one tool previously, the 4AT tool. (FG5/P1-PACU)

Some participants from the PACU were aware of their limited skills in assessing for delirium, which led to depending on other clinicians to assess and confirm whether the patient had delirium.

> We also rely on anaesthetists giving [confirmation of delirium during] handover if patient is in delirium state out of post-op. (FG5/P2-PACU)

One participant acknowledged the valuable experience of screening patients for delirium.

> Even [though] I have not used a screening tool before, screening with the 4AT in this study I was comfortable using this tool, and I feel I have learnt a lot about delirium. (FG4/P1-PACU)

Table 1: Themes and sub-themes identified

Themes	Sub-themes
Nurses' previous experience assessing patients for delirium	Previous experience of delirium assessment
Usability of the screening tools	Accuracy of the screening tool in detecting delirium
	Content formatting of screening tool
Clinical utility of the screening tools	Time constraints
	Ease of use
	Determining cognitive baseline
	Barriers to using the screening tool
Changes to improve the usability of screening tool in clinical practice	Modification in question types
Decision-making and clinical judgment	Delirium and opioid administration
	Nursing interventions in response to delirium positive screening

Usability of the screening tools

Two sub-themes were identified: 'accuracy of the screening tool in detecting delirium' and 'content formatting of screening tool'.

Accuracy of the screening tool in detecting delirium

Participants from the PACU and orthopaedic surgical wards agreed that the 3D-CAM is thorough and effective in detecting delirium in the PACU and orthopaedic surgical wards.

> I think it's more thorough than other tools I used before. (FG5/P1-PACU)

> I feel like it would pick up a little bit [sic] more cases. If we were to do it on every patient on admission, and then every patient who's [at] post-op showing earlier signs of delirium, I feel like it might help us pick up signs of delirium a little bit earlier because there might be smaller details in how they're responding to these questions that we otherwise [do] not just pick up, that then three days later we would. (FG2/P3-OW)

One participant expressed that when using the 3D-CAM they were better able to identify patients with delirium than when using other tools that required an assessment to be conducted over three shifts.

> With the DOS we use, it takes 24 hours to be able to decide whether or not they're positive for delirium or not. But with the 3D-CAM, you're getting a result straight away over one assessment. So, you are determining straight away whether or not they're positive delirium [sic] or if it's something else or if they're not delirious at all. I feel it is an excellent tool in detecting delirium. (FG2/P2-OW)

Participants also expressed how guidance in using tools helped them in detecting delirium.

> Actually, I feel like it gives [a] more accurate outcome when you use the tool and, especially, it's really nice that there's guidance on how to ask the questions properly. (FG1/P2-OW)

Conversely, participants from the orthopaedic surgical wards expressed that the 4AT tool is more general in nature when using it to detect delirium in surgical patients compared to other tools, such as the DOS.

> I feel like the 4AT's more surface level, whereas the DOS goes into more detail in depth. The DOS, because it is so specific and you do it once a shift, so it's done three times a day, it's better at potentially identifying any changes in their cognitive state in the ward; whereas with the 4AT, we literally normally just do [it] once. (FG3/P6-OW)

Another participant expressed similar concern about the nature of the 4AT.

> I think the DOS is more able to detect more cases of delirium than the 4AT, to be honest. Only because I think the DOS is more specific and thorough. It's got the agitation questions, it's got the 'Do they know where they are? Are they making sense with their train of thoughts?' It's really more specific and thorough. (FG3/P1-OW)

Participants who used the 4AT discussed the need to complete an additional assessment using a different tool, such as the DOS, to detect delirium. They expressed the view that a more thorough examination would be better at detecting delirium in surgical patients.

> We usually do the 4AT when they're admitted to the ward. It's not something that we redo during the day and, sometimes, there could be potential fluctuations in their delirium state so, in this case, we wouldn't score with the 4AT again, we use [an] additional tool, we use the DOS. (FG3/P1-OW)

Further, one participant viewed the 4AT primarily as a tool to identify patients at risk of delirium and not a screening tool for delirium. They felt it was important to establish whether a patient was at risk of developing delirium based on the presence of risk factors rather than using the tool to detect or diagnose delirium, which may prejudice their willingness to implement it as a regular screening tool.

> I think the 4AT identifies that there's a risk for delirium and then DOS is done in more detail for every shift. (FG3/P3-OW)

Content formatting of the screening tool

Although the majority of participants perceived the 3D-CAM tool as a well-structured tool, some participants expressed concern about the content of the tool, particularly the inclusion of numerous observation-based questions.

> My experience of the tool is that some of the questions are observation based. For example 'Did the patient's level of attention fluctuate?' and there are lots of questions like that. That sort of thing is quite subjective and there's a range of determinants that could influence that. Perhaps being able to ask more concrete questions, such as 'Listen, I'm going to ask you three specific words. I want you to remember them in half an hour'. And then asking them in half an hour to repeat that back. That would probably give a more concrete view of the patient's attention versus just eyeballing the patient. (FG1/P1-OW)

Another participant expressed their concerns about the content of the tool, particularly the use of repetitive questions.

> I quite liked that it was well-structured, but I did find that it's quite long and it seemed like a lot of things are being repeated. Particularly with patients that either have a history of dementia or delirium, they can get a bit frustrated when you're asking them the same questions, repetitively. Like 'count backwards by this' or 'go backwards by month', which can be a bit challenging. (FG2/P1-OW)

Conversely, although participants who screened patients using the 4AT praised the simple structure of the tool, concerns were raised about the structure of the questions, particularly the lack of alternative questions to measure attention. There was only one question specifically related to attention criteria.

> I think that because you don't have any other question to assess attention criteria that you can ask as an alternative, with only the month backward question to assess attention. You only got that one question, and a lot of our patients are under strong pain medication and opioids all the time. Just having that one question can put them in a delirious category, even if they're just affected by something else. (FG3/P2-OW)

> I have a 95-year-old patient and she's completely with it. Telling me about all the great-grandchildren, how many she has – completely smart as a tack – but she could not do the months backwards, but I would say she's GCS 15 [normal consciousness on the Glasgow coma scale]. I just feel like having the month backward as the only question to measure attention is a bit tricky. Because obviously when they don't get the months correct, that puts you a point down and then flicks you into [the] delirium-positive side. There are many elderly people who are cognitively intact, they just can't say the months backwards. (FG3/P1-OW)

Consistent with the lack of alternative questions to measure attention criteria in the 4AT, participants were concerned that the tool could potentially affect nursing care. They believed there may be a degree of resistance to routine screening of delirium in clinical practice.

> If you got behavioural patients, and you ask them the months backward, I don't think they feel comfortable. I think that just sort of 'What's the point of asking me this? Why do I have to tell you the months backwards?'. Some of patients are sort of like 'You're wasting my time. Go away', and this can be a tricky way to start a relationship with the patients and assessing them properly. (FG3/P3-OW)

Clinical utility of the screening tools

Four sub-themes were identified: 'time constraints', 'ease of use', 'determining cognitive baseline' and 'barriers to using the screening tool'.

Time constraints

Although most participants perceived the 3D-CAM as easy to use, the length of time required to conduct the assessment in the PACU and orthopaedic surgical wards was a concern.

> Yeah, it just got a bit long-winded in that way at times. (FG4/P1-PACU)

> I just found it quite long, quite timely [sic]. (FG3/P3&4-OW)

Participants spoke about the challenges of using the 3D-CAM and the importance of needing more time to complete a thorough assessment of surgical patients.

> I found the tool quite long-winded; I think having to have the time to go through it with patients has been quite challenging from my experience. I think conducting the tool with the acuity of patients has been quite challenging. (FG2/P2-OW)

Some participants also anticipated that the 3D-CAM tool was too long when completing an assessment of patients recovering from anaesthesia in the PACU.

> It's just the length of the tool, the number of questions – too long for [a] patient recovering from anaesthesia. (FG4/P3-PACU)

Participants felt that the repetitive questions in the tool impacted on the time required to complete the assessment.

> It's probably too long, and there are a few questions that are repetitive, makes it longer to conduct. (FG4/P1-PACU)

In contrast, all participants who screened using the 4AT stated that the tool was quick to use when conducting screening in clinical practice.

> It takes sixty seconds to complete. (FG3/P6-OW)

> It's not a lot of work. (FG3/P2-OW)

> Definitely very quick to conduct. (FG3/P1-OW)

Having only seven questions to measure delirium criteria in the 4AT, one participant appreciated the time required to use the tool taking into consideration their workload and lack of time.

> It's really quick, which is nice because a lot of the things we have to do and document, so much. It's nice just to be able to have something that you just go, 'yes, no, yes, yes, yes, done'. (FG3/P7-OW).

Ease of use

Overwhelmingly, participants from both the PACU and orthopaedic surgical wards who used the 4AT expressed that it was simple to use and did not require extensive training.

> It's quite easy. It's very quick. Well, it's easy. (FG3/P1-OW)

> Yeah, it is simple to use. (FG5/P2-PACU).

> It's so quick. It's straightforward. It does not require training. (FG3/P2-OW)

Similarly, participants who used the 3D-CAM agreed that it is easy to administer in the PACU and orthopaedic surgical wards, and additional education and training was not required to administer it in practice.

> I think the 3D-CAM is quite easy to use. It's quite easy to follow. (FG2/P4-OW).

> I felt comfortable using it without having too much extra training or anything like that. (FG2/P1-OW).

Consistent with its ease of use, participants expressed that the 3D-CAM helped them recognise the features of delirium.

> I think it was easy to use. I think the actual questions and everything, it does come up with a pretty clear answer and interpretations of delirium features [to] make you recognise delirium really easily. (FG1/P3-OW)

Determining cognitive baseline

Determining cognitive baseline was one of the challenges of using the tool for some participants who administered the 3D-CAM, especially for patients admitted to hospital unaccompanied by next-of-kin or a caregiver.

> One of the issues I faced with the 3D-CAM is determining cognitive baseline of a patient. It's hard to really get the baseline, especially when there's no family member to ask. (FG1/P4-OW)

Similarly, another participant expressed the same challenge of determining cognitive baseline when using the 4AT in the orthopaedic surgical ward.

> Sometimes we've got the patients that don't have any family member or next-of-kin so that makes it a little bit tricky and hard as well to know their cognitive baseline when doing this 4AT. (FG3/P1-OW)

Concerns were also raised about difficulties in determining the cognitive baseline for older patients admitted to the hospital with dementia, and trying to establish which symptoms represented delirium and those that represented dementia.

> I found with the 3D-CAM, with regard to certain patients – people who come in with a history of dementia – it can be quite challenging to know what their baseline is and then how much of this is an acute change that would represent delirium versus how much of that is their baseline functioning. It's particularly challenging at the moment where we might have less access to family members with visitor restrictions, so you can't clarify as easily. (FG2/P1-OW)

It was also expressed that determining cognitive baseline was very challenging when using the 4AT tool for surgical patients admitted to the PACU. Participants debated the value of the tool in the PACU, particularly when asking certain questions.

> Another thing with the 4AT is that when you ask the question for acute change or fluctuating course, it requires assessing changes in cognition in the last two weeks, which is quite difficult in the PACU for post-op patients because we only see the patients post-operatively and they normally stay for half an hour to an hour, so it is hard to know the baseline of cognition and any changes. (FG5/P2-PACU)

Barriers to using the screening tool

Although participants reported that both the 4AT and the 3D-CAM were easy to administer in practice, they described a range of practical barriers, including language barriers and communication difficulties, for administering the tools in their clinical settings. These were seen as a practical challenge for both tools' usability in practice.

> Also, we cannot use the tool with non-English-speaking background patients, and a lot of our patients are from a non-English-speaking background. (FG2/P4-OW)

> It is also difficult to use the tool with patients that are deaf or having hearing difficulties. (FG1/P1-OW)

> It is difficult to use the [3D-CAM] tool with patients with tracheostomy. (FG4/P1-PACU).

> We cannot use the 4AT in the PACU with patients with tracheostomies. (FG4/P2-PACU)

Some participants argued against using the 3D-CAM or the 4AT for patients who were administered sedatives. They were concerned

that the tools are not usable for this cohort of patients due to the risk of providing an incorrect diagnosis of delirium.

> Because the patients are, they're sedated, in the post-operative [phase], they are in recovery situations and they're not able to communicate very well using the tool. It is really difficult to use the 3D-CAM with those patients, because if you use it with those patients, it may give [a] wrong diagnosis. I just think its barriers [sic] to using the tool. (FG4/P2-PACU)

Changes to improve the usability of screening tools in clinical practice

One sub-theme was identified: 'modification in question types'.

Modification in question types

Although most participants who used the 3D-CAM perceived the tool to be easy to use and well-structured, participants raised concerns about the lack of space for open-ended text to allow for notes to be added. Participants expressed the need for modifications in the design of the tool to facilitate communication between nurses about the patient's condition.

> It would be good to have like a little section to put comments in. For example, the patient had a really poor sleep, and maybe they're not normally this inattentive, or just something to give a context so the next team can have that to build on. (FG1/P4-OW)

Similarly, with the 4AT, while participants perceived the tool to be brief and easy to use in their practice, participants expressed their concerns about the cognition-related questions (item 2 of the tool). Participants suggested that having different sets of questions to assess cognition would improve the feasibility of the tool, thus, improve delirium detection in clinical practice.

> Asking questions such as 'What is your name and date of birth?' could sometimes give wrong indications of delirium, because some patients learn to answer those questions, especially when they get asked [the] same questions all the time. So, it would be good almost for there to be another option of a question that measures delirium. (FG3/P2-OW)

Decision-making and clinical judgement

Two sub-themes were identified: 'delirium and opioid administration' and 'nursing interventions in response to delirium positive screening'.

Delirium and opioid administration

Participants were aware of patients with complex health care needs, such as those with multiple comorbidities, who screened positive for delirium using the 3D-CAM or the 4AT. They found that screening positive for delirium influenced their clinical judgement and decision-making, especially when patients had been administered an opioid medication. Participants felt that opioids should be discontinued, or the dose altered when caring for those patients with complex health care needs.

> We have a lot of patients who are on opioids, which is like a green light for delirium. Actually, most of our patients are on opioids, so they're all a bit loopy. So sometimes, we need to re-assess the opioid situation when they're diagnosed for delirium with the 3D-CAM. (FG3/P2-OW)

> When a patient [is] identified with delirium in the PACU using the 4AT, and if the patient has required opioids, I am a bit more reluctant using opioids. So, I would need to discuss with the anaesthetists to see what the dosage is, and the dosage might be changed, or change medication to non-opioids. (FG5/P2-PACU)

Some participants anticipated that there were instances when patients with multiple comorbidities had received opioid medications post-operatively and were sometimes wrongly identified as positive for delirium using the 4AT tool.

> The 4AT features include changes in cognition, including paranoia and hallucinations and things like that, and some of our patients have those features, but it's because they're drug affected, on opioids, normally when they're admitted. So, it's an automatic 'yes' for delirium on the 4AT tool. (FG3/P1-OW)

In these instances, the participants described using their clinical judgement to determine whether it was delirium, and therefore perform a full delirium assessment using the DOS, or if it was a side-effect of opioid medications.

> But we use our clinical judgement and trace it back to what it is and decide whether to proceed with full delirium assessment or not. (FG3/P1-OW).

Nursing interventions in response to delirium positive screening

There was consensus among participants about the clinical decisions that were made once

patients screened positive for delirium using the 3D-CAM or the 4AT.

Participants emphasised that modifying the environment to provide a safe environment for surgical patients who screened positive for delirium was a priority decision when caring for those patients.

> We modify the environment, reduce the noise levels in environment, or keeping them nice and warm and comfortable, that's what we could do when we have patients screened positive for delirium. (FG4/P3-PACU)

> Well, it depends on the patients, if they are highly agitated and hyperactive, I make sure that they're in a high visibility bed. Also, lowering the bed, depending on the severity of their delirium, and providing them with nursing special [care], I prioritise what they need to make sure they are safe. (FG2/P4-OW)

Some participants explained that when a patient screened positive for delirium using the 4AT or the 3D-CAM this instigated conducting further investigations. Participants felt they are responsible for communicating with the medical team the need to further investigate and identify causes of delirium and commence treatment.

> We notify a consultant once we screen positive for delirium and then the team just have to order a delirium screen, to do a chest x-ray, urine cultures, blood cultures. Just kind of head-to-toe stuff to find the cause of the delirium. So that getting a positive screen should take all this over then to start. But sometimes we have to tell the medical team you have to do all these things, then put through the referral to get the patients started on delirium treatment. (FG2/P2-OW)

Participants also emphasised that when a patient screened positive for delirium, involving the family was a priority when decisions were made about ongoing care for surgical patients.

> For me as well, first thing [I] will do is talking with the family and trying to get strategies. A lot of the time you'll see with delirium, they'll be worse because they're in an environment that they're not familiar with. So, finding things that they like helps in bringing their cognitive [function] back. (FG1/P2-OW)

Others supported patient's cognitive re-orientating as a priority strategy when screened positive for delirium using the 3D-CAM or the 4AT.

> Yeah, re-orientating them. Every time we come in, we're like 'Oh, hi, my name's this and today's Tuesday' or something like that. That always helps them kind of get back into reality. (FG3/P2-OW)

Participants also discussed communicating with the treating team and documenting their observation of the patient's condition when screened positive for delirium using the 3D-CAM or the 4AT in medical records.

> We notify the anaesthetist and report in the EMR, and also hand over to the ward nurses, because more testing needs to be done. (FG4/P3-PACU)

Discussion

This study contributes valuable insight into nurses' perceptions of the usability and clinical utility of the 3D-CAM and the 4AT in the PACU and orthopaedic surgical wards. Our findings demonstrate that nurses working in the PACU are willing to adopt the 4AT tool in their practice as they perceived the tool to be brief, easy to use and not requiring extensive training to administer. On the other hand, nurses working in the orthopaedic surgical wards viewed the 4AT as general in nature, suitable for one-time screening and less appealing than a more thorough tool to assess patients for delirium. Thus, they perceived the 3D-CAM as being appropriate for ongoing delirium assessments in their practice, as they perceived the tool as being easy to use and well structured. Further, participants from the PACU and the orthopaedic surgical wards expressed concerns regarding determining cognitive baseline and recommended some modifications to both tools to make them more usable in practice. Considering the lack of evidence concerning nurses' perceptions of the usability and clinical utility of these two delirium screening tools in the PACU and orthopaedic surgical wards, we believe our study contributes new knowledge.

Participants from the PACU perceived the 4AT as a brief, well-structured tool and easy to use for delirium screening in their unit. They highlighted that having a tool with short questions will support the usability and adoption of the tool in clinical practice, considering the short amount of time spent with surgical patients in the PACU. This finding is consistent with a previous study which highlighted the simplicity of the 4AT tool and structure using short questions, supporting its use in routine clinical practice.[11] On the other hand participants from the PACU perceived the 3D-CAM as not suitable for the PACU setting as it required a long time to conduct the assessment and, considering their workload, this could limit its usability. According to Shenkin et al.[21] the longer the test takes to screen for delirium, the less

likely nurses will perform the test, which could lead to this condition being under-detected in practice.

Participants from both elective and trauma orthopaedic surgical wards expressed that the 4AT tool is suitable for one-time screening and regarded the tool as not being suitable for ongoing delirium assessment in orthopaedic surgical wards. On the other hand, participants from both elective and trauma orthopaedic surgical wards supported the use of the 3D-CAM tool for ongoing delirium assessment, as they perceived the tool as well structured and more thorough in nature.

Further, there was strong consensus among participants about the tool's ability to detect delirium in orthopaedic surgical patients in comparison to other screening tools such as the DOS. This finding is supported by recent research that demonstrated that the 3D-CAM is more likely to be adopted in practice due to the structure of the tool and the high diagnostic performance.[22]

An interesting finding was that most participants from the PACU and orthopaedic surgical wards expressed that both tools, the 4AT and the 3D-CAM, did not detect changes in patients' cognition, especially when their next of kin or caregiver were not present. Failure to detect changes in cognition and attention from baseline presents a great challenge to clinicians when attempting to diagnose delirium[23] and could thus lead to delirium being under diagnosed. This is supported in a previous study where the lack of ability to establish a cognitive baseline is of critical significance in under-diagnosis of delirium when screening using the 4AT.[24]

Another finding of this study is that participants from the PACU and orthopaedic surgical wards recommended modifications to the content of both tools to increase the usability in practice. This included having fewer observation-based questions and more open-ended questions in the 3D-CAM. Participants expressed that the current format of the 3D-CAM incudes too many observation-based questions which, from their point of view, may limit its usability in clinical practice. According to Tieges et al.[25] subjective testing of inattention and disorganised thinking may lead to under-detection of delirium in clinical practice because judgements based on observation are open to more variability between delirium assessors than objective testing.

Regarding the 4AT tool, participants agreed that the tool lacked alternative questions to measure attention. Given that only one question asks patients to list the months backwards, this could easily lead to an inaccurate assessment of attention which, in turn, could lead to an inaccurate delirium diagnosis.[26] According to O'Regan et al.,[27] for correct measurement of attention a minimum of three questions are required including, spelling 'world' backwards, counting down from one hundred by sevens ('serial sevens' from Folstein's mini-mental state examination) and reciting the months of the year or the days of week backwards. Therefore, participants recommended having more questions to assess attention could perhaps improve the recognition of delirium in practice.

Lastly, the nurses had similar responses to clinical judgment and decision-making actions in regard to positive delirium screening. Their decision-making included employing safety measures, communicating with the treating team, instigating further examinations and assessments, documenting the outcome in patient medical records and communicating during handover to nursing staff when changing shifts. These decision-based actions are supported by the American Geriatrics Society that has called for an interdisciplinary program to be implemented with patients screened positive for delirium. The Hospital Elder Life Program (HELP) is such a program and has been shown to reduce the incidence and severity of delirium cases in older patients.[28]

Strengths and limitations

This study was conducted at a single site in a tertiary care metropolitan hospital in Victoria. Therefore, its findings may not be transferable to other diverse care settings, such as those in regional, rural and remote areas.

Furthermore, night shift nurses were less represented because of difficulties in recruitment. However, we believe our findings are applicable to nurses across a broad range of clinical settings because we used a wide range of selection criteria. We included nurses with different levels of experience from three different clinical settings: PACU, elective orthopaedic ward and trauma orthopaedic ward within the hospital.

The key strength of this study is its inclusion of nurses' voices about their experiences of using the 3D-CAM and 4AT screening tools to detect delirium in two clinical settings where post-operative delirium is common. Investigating nurses' perceptions about using screening tools such as these is an important aspect of delirium detection and recognition, given that nurses are responsible for detecting delirium when caring for surgical patients and can make significant contributions to improving delirium detection in practice.

Conclusion

This study evaluated nurses' perceptions of screening for delirium in the PACU and orthopaedic surgical wards and identified important elements in the usability and clinical utility of the 3D-CAM and 4AT screening tools which may provide direction for improving delirium detection and recognition in these clinical settings. Nurses working in the PACU and orthopaedic surgical wards perceived the 4AT tool to be brief and easy to use. PACU nurses were willing to adopt it into their clinical practice, although this was conditional on further investigation of its content and accuracy prior to campaigning for routine use.

Nurses working in the PACU and orthopaedic surgical wards perceived the 3D-CAM tool as easy to use, and more thorough and accurate than other tools in detecting delirium. Nurses working in the orthopaedic surgical wards were willing to adopt the 3D-CAM tool into their practice; however, they highlighted some issues with the clinical utility and feasibility of the tool and stressed that some of those issues may limit the usability of the tool in practice. Nurses perceived that it is important that a tool should be brief, easy to use, accurate and have content that involves fewer repetitive questions and more objective testing in seeking to enhance delirium screening and delirium recognition for ongoing practice.

Acknowledgments

We extend our gratitude to Dr Emily Tomlinson for her expert advice and invaluable contribution to the initial conceptualisation and design of the research. We would also like to acknowledge the contribution of nurses working in the PACU and orthopaedic surgical wards who participated in this study and the support of their managers. And we thank the Australian College of Perioperative Nurses (ACORN) for awarding the first author a PhD Research Grant for the year 2022 that supported him in conducting this study.

Conflict of interests

The authors have no competing interests to declare.

References

1. American Psychiatric Association. The diagnostic and statistical manual of mental disorders: DSM–5. 5th ed. Washington DC: American Psychiatric Publishing; 2013.
2. Marcantonio ER. Postoperative delirium: A 76-year-old woman with delirium following surgery. JAMA. 2012(1):73.
3. Saller T, MacLullich AMJ, Schafer ST, Crispin A, Neitzert R, Schule C et al. Screening for delirium after surgery: Validation of the 4 'A's test (4AT) in the post-anaesthesia care unit. Anaesthesia. 2019;74(10):1260–6.
4. Neufeld KJ, Leoutsakos JS, Sieber FE, Joshi D, Wanamaker BL, Rios-Robles J et al. Evaluation of two delirium screening tools for detecting post-operative delirium in the elderly. Br J Anaesth. 2013;111(4):612–8.
5. Morandi A, Davis D, Fick DM, Turco R, Boustani M, Lucchi E et al. Delirium superimposed on dementia strongly predicts worse outcomes in older rehabilitation inpatients. J Am Med Dir Assoc. 2014;15(5):349–54.
6. Davis DHJ, Muniz-Terrera G, Keage HAD, Stephan BCM, Fleming J, Ince PG et al. Association of delirium with cognitive decline in late life: A neuropathologic study of 3 population-based cohort studies. JAMA psychiatry. 2017;74(3):244–51.
7. Olofsson B, Persson M, Bellelli G, Morandi A, Gustafson Y, Stenvall M. Development of dementia in patients with femoral neck fracture who experience postoperative delirium: A three-year follow-up study. Int J Geriatr Psychiatry. 2018;33(4):623–32.
8. Marcantonio ER, Ngo LH, O'Connor M, Jones RN, Crane PK, Metzger ED et al. 3D-CAM – derivation and validation of a 3-minute diagnostic interview for CAM-defined delirium: A cross-sectional diagnostic test study. Ann Intern Med. 2014;161(8):554–61.
9. Olbert M, Eckert S, Morgeli R, Kruppa J, Spies CD. Validation of 3-minute diagnostic interview for CAM-defined delirium to detect postoperative delirium in the recovery room: A prospective diagnostic study. Eur J Anaesthesiol. 2019;36(9):683–7.
10. Alastalo M, Salminen L, Vahlberg T, Leino-Kilpi H. Subjective and objective assessment in skills evaluation: A cross-sectional study among critical care nurses. Nordic Journal of Nursing Research. 2022:20571585221089145.
11. Bellelli G, Morandi A, Davis DHJ, Mazzola P, Turco R, Gentile S et al. Validation of the 4AT, a new instrument for rapid delirium screening: A study in 234 hospitalised older people. Age Ageing. 2014;43(4):496–502.
12. Aldwikat RK, Manias E, Tomlinson E, Amin M, Nicholson P. Delirium screening tools in the post-anaesthetic care unit: A systematic review and meta-analysis. Aging Clin Exp Res. 2022;34(6):1225–351.
13. Radtke FM, Franck M, Schneider M, Luetz A, Seeling M, Heinz A et al. Comparison of three scores to screen for delirium in the recovery room. Br J Anaesth. 2008;101(3):338–43.
14. Morrison-Beedy D, Feinstein NF, Côté-Arsenault D. Maximizing results with focus groups: Moderator and analysis issues. Appl Nurs Res. 2001;14(1):48–53.
15. Melbourne Health. Melbourne Health Annual Report 2019 [Internet]. Melbourne: The Royal Melbourne Hospital; 2019 [cited 2022 September]. Available from: www.thermh.org.au/sites/default/files/media/documents/Melbourne%20Health%20Annual%20Report%202018-19.pdf.
16. Hosie A, Lobb E, Agar M, Davidson PM, Chye R, Phillips J. Nurse perceptions of the Nursing Delirium Screening Scale in two palliative care inpatient units: A focus group study. J Clin Nurs. 2015;24(21–22):3276–85.
17. QSR International Pty Ltd. NVivo qualitative data analysis Software. 10 ed. Doncaster: QSR International Pty Ltd; 2012.
18. Richie J, Spencer L. Qualitative data analysis for applied policy research. In: Bryman B, Burgess R, editors. Analayzing qualitative data. London: Routledge; 1994.
19. Rice P, Ezzy D. Qualitative research methods: A health focus. Melbourne: Oxford University Press; 1999.
20. Liamputtong P. Focus group methodology: Principles and practice. London: SAGE Publications Ltd; 2011.

21. Shenkin SD, Fox C, Godfrey M, Siddiqi N, Goodacre S, Young J et al. Delirium detection in older acute medical inpatients: a multicentre prospective comparative diagnostic test accuracy study of the 4AT and the confusion assessment method. BMC medicine. 2019;17(1):138.
22. Brefka S, Eschweiler GW, Dallmeier D, Denkinger M, Leinert C. Comparison of delirium detection tools in acute care: A rapid review. Zeitschrift für Gerontologie und Geriatrie. 2022;55(2):105–15.
23. Woten MRB, Pilgrim JRBM. Delirium in Older Patients: Providing Care in the Acute Care Setting. Ipswich, Massachusetts: EBSCO Publishing; 2017.
24. Alhaidari AAO, Matsis KP. Barriers to completing the 4AT for delirium and its clinical implementation in two hospitals: a mixed-methods study. European Geriatric Medicine. 2021:1–10.
25. Tieges Z, MacLullich AMJ, Evans JJ, Neufeld KJ. The neuropsychology of delirium: advancing the science of delirium assessment. International Journal of Geriatric Psychiatry. 2018;33(11):1501–11.
26. Albrecht JS, Marcantonio ER, Roffey DM, Orwig D, Magaziner J, Terrin M et al. Stability of Postoperative Delirium Psychomotor Subtypes in Individuals with Hip Fracture. Journal of the American Geriatrics Society. 2015;63(5):970–6.
27. O'Regan NA, Ryan DJ, Boland E, Connolly W, McGlade C, Leonard M et al. Attention! A good bedside test for delirium? Journal of Neurology, Neurosurgery & Psychiatry. 2014;85(10):1122–31.
28. Hshieh TT, Yang T, Gartaganis SL, Yue J, Inouye SK. Hospital Elder Life Program: Systematic Review and Meta-analysis of Effectiveness. The American Journal of Geriatric Psychiatry. 2018;26(10):1015–33.

Nurses' perceptions of screening for delirium in the Post Anaesthesia Care Unit and orthopaedic surgical wards: A qualitative study

Supplement: Questions for focus group sessions

Using the 3D-CAM

1. Can you share any previous experiences you have had using a screening tool for detecting delirium in your clinical practice?

   Follow–up questions: So, what tool did you use previously? And, how easy was it to use this tool?

2. Can you share your experiences when using the 3D-CAM screening tool in your clinical setting?

3. How easy was it to use the 3D-CAM tool to detect delirium in surgical patients?

   Follow–up questions: Did you experience any difficulties using the 3D-CAM?

4. When using the 3D-CAM tool were you able to identify more patients with delirium than previously?

   Follow–up question: How did you identify patients with delirium before using the 3D-CAM tool?

5. How long did it take you to complete screening a patient for delirium using the 3D-CAM tool?

6. What actions did you take after a patient was identified as having delirium?

7. Based on your experience of using the 3D-CAM screening tool what do you think the strengths of the 3D-CAMscreening tool are?

   Follow–up question: What do you think some of the limitations of using the 3D-CAM screening tool are?

8. Given your experience of using the 3D-CAM tool, do you think that the 3D-CAM should be implemented as a routine screening tool for detecting delirium in your clinical setting?

9. Is there anything else you would like to share about screening surgical patients for delirium in your clinical setting?

Using the 4AT

1. Can you share any previous experiences you have had using a screening tool for detecting delirium in your clinical practice?

   Follow–up questions: So, what tool did you use previously? And, how easy was it to use this tool?

2. Can you share your experiences when using the 4AT screening tool in your clinical setting?

3. How easy was it to use the 4AT tool to detect delirium in surgical patients?

   Follow–up question: Did you experience any difficulties using the 4AT?

4. When using the 4AT tool were you able to identify more patients with delirium than previously?

   Follow–up question: How did you identify patients with delirium before using the 4AT tool?

5. How long did it take you to complete screening a patient for delirium using the 4AT tool?

6. What actions did you take after a patient was identified as having delirium?

7. Based on your experience of using the 4AT screening tool what do you think the strengths of the 4AT screening tool are?

   Follow–up question: What do you think some of the limitations of using the 4AT screening tool are?

8. Given your experience of using the 4AT tool, do you think that the 4AT should be implemented as a routine screening tool for detecting delirium in your clinical setting?

9. Is there anything else you would like to share about screening surgical patients for delirium in your clinical setting?

Peer-reviewed article

Authors

Sepideh Totonchilar
Isfahan University of Medical Sciences, School of Nursing and Midwifery, Department of Operating Room Nursing

Akram Aarabi
Isfahan University of Medical Sciences, School of Nursing and Midwifery, Nursing and Midwifery Care Research Center

Aygineh Hairabedian
Isfahan University of Medical Sciences, School of Nursing and Midwifery, Nursing and Midwifery Care Research Center

Corresponding author

Akram Aarabi
Isfahan University of Medical Sciences, School of Nursing and Midwifery, Nursing and Midwifery Care Research Center

The impact of quality improvement interventions on compliance with standardised surgical count protocol and count discrepancies: A quality improvement study

Abstract

Background: Unintentionally retained surgical items (RSI) are a global problem contributing to adverse events for surgical patients. The Association of periOperative Registered Nurses (AORN) has developed a standardised protocol for the surgical count; however, many hospitals do not follow the protocol for the surgical count. This study was conducted to investigate the effect of implementing quality improvement interventions, for counting surgical sponges, on compliance with the AORN surgical count protocol and occurrence of count discrepancies.

Method: This study was performed as an interventional quality improvement project from 1 February to 20 September 2022 with an intervention and a control group in the gynaecology operating rooms of two selected hospitals. Thirty perioperative nurses and surgical technologists working in the gynaecology operating room participated in this study and the count process was observed during 130 open gynaecological surgeries performed through abdominal incision – 65 surgeries in one hospital were assigned to the control group and 65 surgeries in the other hospital were assigned to the intervention group. Data were collected through direct observation and interview with perioperative nurses using a tool designed by the researcher. The quality improvement interventions implemented in the intervention group were training in and use of sponge counter bags and surgical sponge count sheets and training about the AORN surgical count protocol. No quality improvement interventions were implemented in the control group, and the surgical count was performed as it had been before the study.

Results: Compliance with the AORN surgical count protocol was significantly (26.87%) higher in the intervention group than the control group. Count discrepancies were also significantly higher in the control group than the intervention group (21 vs 9, P = 0.04). The mean time required to correct count discrepancies was less in the intervention group, but the difference was not statistically significant. All count discrepancies in both the control and intervention groups were corrected and radiography to correct the discrepancies was not required in any of the surgeries included in the study.

Conclusion: The implementation of quality improvement interventions, including training in count protocol and using counter bags and count sheets, is recommended to improve the counting performance of perioperative nurses and reduce the incidence of count discrepancies and incorrect counts.

Keywords: retained surgical sponges, count discrepancies, incorrect counts, surgical count, protocol

Introduction

Unintentionally retained surgical item (RSI) events were the most common surgery-specific never events reported by the Joint Commission from 2018 to 2021, with a frequency of 459.[1] Due to legal and medical problems the prevalence of RSIs can never be precisely determined but, in most studies, the frequency varies between one in 5500 to 18 760 hospitalisations and one in every 1000 to 1500 intra-abdominal operations.[2–4] In Iran, there are no documented statistics of the number of RSI events in operating rooms due to legal issues.[5] RSI is a catastrophic medical error and may lead to pain, infection, intestinal obstruction, abscess, peritonitis, adhesion, gastrointestinal and urinary damage, increased hospital stay, reoperation and even death for the patient, and legal costs and financial consequences for the hospital.[6–8] The hospital cost of each undetected RSI is estimated to be approximately US$166 135.[7]

Surgical cotton sponge products account for approximately 70 per cent of RSIs,[9] possibly because they are easily retained inside the patient's body due to their relatively small size, ubiquitous use and the difficulty in distinguishing a blood-soaked sponge from the surrounding tissues.[10] Gynaecology is among the surgical specialties with the highest prevalence of retained surgical sponges.[11–13] The occurrence of RSI in open surgeries such as caesarean section and abdominal hysterectomy is significantly high.[14]

The most widely used measure to prevent retained surgical sponges is accurate counting of all surgical sponges by perioperative personnel before and after use during the procedure and in accordance with established policies.[15,16]

The updated Association of periOperative Registered Nurses (AORN) guidelines for preventing RSI provide guidance for manual counting.[17–19] Technologies that are available to help with manual counting include radiography, barcoding and radiofrequency technology.[7,15,20,21] However access to surgical counting technology does not significantly improve RSI rates and the main cause of sponge retention is related to human factors, lack of adherence to policies and poor communication.[22] In a survey conducted by *AORN Journal* in 2022, respondents ranked personnel 'not following policy' as the most important factor preventing elimination of RSI events.[23] As technology-based interventions may not be financially feasible in low and middle-income countries, interventions that promote best practice may be more appropriate in these countries.[24] Applying a historical perspective to RSI events shows that our advances are not as significant as was proposed over 100 years ago. Unless a standardised counting process and counting technology is used, unacceptable rates of RSIs will continue.[25] Therefore, to safely take care of the patient during a surgical procedure perioperative nurses must follow the best practices for RSI prevention.[17]

There are many factors that increase the risk of an RSI, including surgical complexity, large number of surgical team members, presence of more than one surgical team, long surgical procedure, emergency surgery, high blood loss (more than 500 ml), high body mass index (BMI), lack of standardised counting processes, inability to communicate and count discrepancies.[3,15,26–30] A count discrepancy may be an incorrect surgical count or a counting error. An incorrect surgical count is a count discrepancy that remains unsolved after a visual search and preliminary wound exploration[30]; a counting error is incorrect reporting and recording of the count. When a counting error results in the count incorrectly given as correct, personnel may not attempt to correct the discrepancy and don't do a visual search. Counting error is the most common risk factor for RSI.[3,15,28,30–32] Previous reports indicate that 62 to 88 per cent of RSIs occurred when a correct count was reported suggesting that counting error is common.[2,3,33] Counting error can increase the risk of RSI because there is no longer an accurate picture of the current status of sponges and other accountable items.[33]

An RSI is 100 times more likely to occur in cases where there is a discrepancy in counting.[31] In addition, attempting to locate sponges and reconcile count discrepancies increases the duration and cost of surgery.[34] These detected discrepancies in counts should never be dismissed as human error[33]; implementing quality improvement measures, including a standardised manual counting process, aims to eliminate count discrepancies, both incorrect surgical counts and counting errors, and thus reduce the risk of RSI events.[35]

Before the beginning of this study, there was no standardised protocol for counting surgical sponges in either of the hospitals where the study was carried out, and there was a gap between the routine sponge counting method and the protocol recommended by AORN. In order to reduce this gap, the researcher implemented the quality improvement interventions developed for this study.

Aim

The aim of this project was to achieve the following measurable objectives:

1. increase the quality of surgical sponge manual counting
2. reduce the frequency of sponge count discrepancy
3. investigate the cause of discrepancies (based on misplaced sponges, miscounted sponges, documentation error).

Literature review

Various studies have investigated count discrepancies and the implementation of quality improvement interventions to reduce these count discrepancies as a measure to prevent RSI events. In their prospective observational field study Greenberg et al.[33] observed count discrepancies in 12.8 per cent of surgeries and recommended that any count discrepancy should be interpreted as a potential RSI event and never be ignored. Norton et al.[7] reported that a standardised count process and a team approach to the surgical count led to a reduction in count discrepancies by about 50 per cent. Similarly, after conducting an evidence-based quality improvement study to evaluate count discrepancies and the quality of the surgical count, Nelson[36] reported a 71.43 per cent reduction in incorrect surgical counts and concluded that implementation of the AORN surgical count guidelines by the perioperative nursing team improved the surgical count process. Also, a retrospective clinical trial study by Susmallian et al.[37] reported that after the implementation of an RSI prevention program the number of cases of serious consequences resulting from an RSI reduced despite an increase in the number of count discrepancies.

Method

Study design

This study was performed as a quality improvement project from 1 February to 20 September 2022 with an intervention and a control group in the gynaecology operating rooms of two hospitals in Iran.

Participants and setting

The participants were 30 circulating nurses, instrument nurses and surgical technologists who worked in gynaecology operating rooms. The reason for choosing gynaecology operating rooms was because, as mentioned previously, gynaecology has a higher prevalence of retained surgical sponges than most other surgical specialties.[12]

The setting was two hospitals affiliated with Isfahan University of Medical Sciences, Iran. All gynaecological open surgery procedures that were performed through an abdominal or pelvic incision were investigated. The procedures were allocated to the control and intervention groups by hospital – those performed in hospital A were allocated to the control group, those performed in hospital B to the intervention group. To randomise the procedures in both hospitals, patients whose medical record numbers were even numbers were included in the study.

Inclusion and exclusion criteria

Inclusion criteria for personnel were working in gynaecology operating rooms and willingness to participate in the study. Circulating nurses, instrument nurses and surgical technologists of all ages, levels of experience and levels of education were included, and their informed consent obtained. Personnel at hospital B who did not participate in the intervention training sessions were excluded, as were those who did not want to continue participating. Of the 15 nurses and surgical technologists working in gynaecology operating rooms at hospital A, none were excluded. Of the 23 perioperative nurses and surgical technologists working in the gynaecology operating rooms at hospital B, 19 were willing to participate in the study and four of those were excluded from the study due to not participating in the training session.

Inclusion criteria for procedures were abdominal or pelvic gynaecologic elective surgeries performed through an open incision and all surgeries performed by four particular surgeons in both hospitals. Exclusion criteria for procedures were the patient's condition becoming so critical that it was not possible to follow some stages of the surgical count and if the surgical sponge count sheet was not completed. Of the 130 eligible surgeries (65 in hospital A and 65 in hospital B), no surgery was excluded from our study; therefore, 65 surgical sponge counting processes by 15 perioperative nurses and surgical technologists were observed at both hospitals.

Sampling

The sample size was obtained based on previous similar studies[5] using the following formula.

$$n = \frac{(z_1 + z_2)^2 (2s^2)}{d^2}$$

The sample size of each group (with a 1:1 ratio of group size) is denoted by 'n'. The value of 'Z_1' for a confidence level of 95 per cent is 1.96, the value of 'Z_2' for a test power of 90 per cent is 1.28, 's' is an estimate of the average standard deviation of the

number of count discrepancies in two groups and 'd' is the minimum difference in the number of count discrepancies between the two groups that shows the difference to be significant, and is considered to be 0.6s. Allowing for a ten per cent sample attrition the final number of 65 procedures in each group was calculated. All perioperative nurses and surgical technologists who met the inclusion criteria were included in the study by census.

Interventions

The AORN protocol for counting surgical sponges includes 75 items: 27 items performed only by circulating personnel, 24 items performed by both circulating and instrument personnel, 15 items performed only by instrument personnel and nine items that relate to when counts should be performed (see figures 1–4 for lists of the items). Three quality improvement interventions based on the AORN protocol were implemented at hospital B.

1. Sponge counter bags

Commercially made blue sponge counter bags were used to facilitate ease of visibility when counting. The bags were in a coated steel rack attached to the IV pole. The rack had a basket for the box of unused sponge counter bags and prongs on both sides on which to hang the bags being used. Each bag contained ten pockets, in five rows of two, for 4x4 Raytec® sponges. There was a thin centre divider that could be broken to convert the bag to have five pockets for laparotomy sponges.

2. Standardised surgical sponge count sheet

The researcher prepared the surgical sponge count sheet after reviewing the AORN guidelines[13,38] and using the count sheet developed by the Australian College of Perioperative Nurses (ACORN)[39] as a model. Subsequently, based on the opinions of faculty members and specialists in the field, the count sheet was edited and a final version was examined for validity. The count sheet included the types of items being counted (e.g. 4x4 Raytec® sponges, laparotomy sponges), the number of counts, the names of personnel performing the counts, confirmation of counting when personnel changed during surgery, results of surgical sponges counts (i.e. correct, incorrect), the surgeon's awareness of count results, any adjunct technology that was used and associated records, an explanation for any waived counts, the number and location of radiopaque sponges intentionally retained as therapeutic packing, actions taken in the event of count discrepancies and a rationale if counts were not done or completed according to policy with the result of actions taken.

3. Training sessions

A two-hour training session was held in the operating room to educate personnel working at hospital B about the AORN protocol for counting surgical sponges and how to use the sponge counter bags and teach circulating personnel how to fill in the surgical sponge count sheet. The session consisted of power-point presentations by one of the researchers and a question time when all questions from participants were answered and ambiguities resolved. An educational pamphlet was provided for each participant, and the educational file was sent to the group of perioperative nurses and surgical technologists on one of the social networks. Since all personnel could not participate in this session simultaneously, the training session was held on two different days, coordinated by the operating room manager. For equity and ethical reasons, the personnel in the control group at hospital A were offered the same training after the study was completed.

None of these interventions were implemented at hospital A for the control group. In this group, surgical sponges were counted inside the surgical sponge bowl and the circulating nurses or surgical technologists recorded the number and type of sponges in a visible location (whiteboard) for the surgical team.

Data collection

The researchers observed and evaluated 65 surgical counting processes for the initial assessment in hospital A and 65 surgical counting process after the interventions were implemented in hospital B. For the first week of the study the researcher was present in the operation rooms of both hospitals but did not collect any data. This normalised the researcher's presence in the operation rooms in order to eliminate the Hawthorne effect.

Data collection for each case began from pre-operative setup and continued until all counting activities were completed and the patient was discharged from the operating room. All data were collected by the same

researcher in both hospitals through observation of counting activities and interviews with personnel. Data were recorded using an observational tool for each surgery on the day of surgery.

Data collection tool

A paper-based, structured observational tool was used for assessing surgical sponge count processes. The researcher developed the tool based on the AORN competency verification tools,[40,41] audit tool[42] and guidelines.[18,19,38,43] Subsequently, the tool was edited, based on the opinions of five faculty members and specialists in the field, and examined for validity. To verify the reliability, the tool was completed simultaneously by the researcher and a research colleague for five surgeries, and the similarity of the results was approved.

The tool was structured in four parts:

1. demographic characteristics of the participating perioperative nurses and surgical technologists (age, sex, years of experience, level of education)
2. characteristics of the surgical procedure (patient's BMI, duration of surgery, number of 4x4 Raytec® and laparotomy sponges used, personnel changes during the surgery, intra-operative blood transfusion, distraction during surgical count, number of sterile surgical team members, type of surgery)
3. details of counts and discrepancies (the number of counts performed, the number of count discrepancies, the reason for discrepancies (e.g. miscount, misplaced sponges and documentation error), the location of misplaced sponges, whether count discrepancies were corrected or not, the time required to reconcile the count, the sponge type with discrepancy and whether an x-ray was required to resolve the discrepancy)
4. count protocol recommended by AORN, consisting of 75 items, formatted with 'Yes', 'No' and 'N/A' (not applicable) tick boxes for recording observed count activity. If the item was performed, the option 'Yes' was marked and otherwise, the option 'No' was marked. The 'N/A' tick box was used for any item that was not required during the surgical sponge count process (e.g. the item 'using the sponge count sheet' was marked 'N/A' when observing surgeries at hospital A as count sheets were not provided to the control group). These 75 items were scored from 0 to 75 (1 = Yes and 0 = No). The data 'N/A' (not applicable) tick boxes were not considered in the analysis. For this reason, the protocol compliance score was calculated as a percentage from the following formula:

$$\text{compliance score} = \frac{Y \times 100}{75 - N/A}$$

where Y is the number of 'Yes' boxes ticked and N/A is the number of 'not applicable' boxes ticked.

Statistical analysis

SPSS version 22 software was used for data analysis. Descriptive statistics were used to determine the mean, standard deviation, number and percentage. The normality of the data was checked by the Kolmogorov-Smirnov test. T-test and Mann-Whitney test were used, respectively, based on the normality and non-normality of the data. Chi-square test was used for qualitative variables and t-test was used for quantitative variables. The significance level of the data was considered to be 0.05 ($P<0.05$).

The data for the 75 items in the AORN protocol were analysed in four clusters – Cluster 1 is items performed only by circulating personnel (27 items), Cluster 2 is items performed by both circulating and instrument personnel (24 items), Cluster 3 is items performed only by instrument personnel (15 items) and Cluster 4 is items that relate to when counts should be performed (nine items).

Ethical considerations

This study was approved by the Research Ethics Committee of Isfahan University of Medical Sciences, Isfahan, Iran (code: IR.MUI.NUREMA.REC.1401.042). A written informed consent was obtained from each participant before their participation in the study and the purpose of the study was explained to them. Participants were assured that their participation in this study was completely voluntary and that they could withdraw from the study at any time.

Table 1: Demographic characteristics of participants in the control and intervention groups

Characteristic		Control group (hospital A) N=15	Intervention group (hospital B) N=15	P (< 0.05)
Age (in years)		31.13 (SD=4.24)	29.26 (SD=5.89)	0.32
Work experience (in years)		8.6 (SD=5.16)	5.33 (SD=5.44)	0.10
Education level	bachelor (surgical technology)	15	12	0.18
	bachelor (nursing)	0	2	
	associate (surgical technology)	0	1	

SD=Standard deviation

Table 2: Characteristics of surgical cases in the control and intervention groups

Characteristic		Control group (hospital A) N=15	Intervention group (hospital B) N=15	P (< 0.05)
Patient's BMI (kg/m^2)		27.47 (SD=5.5)	27.27 (SD= 3.46)	0.80
Operative time (min)		201.15 (SD=82.81)	202.85 (SD=86.87)	0.91
Raytec® 4x4 sponges used		32.53 (SD=10.75)	30.46 (SD=12.55)	0.42
Laparotomy sponges used		3.6 (SD=1.72)	3.72 (SD=1.54)	0.42
Personnel change		21 (32.3%)	24 (36.9%)	0.58
Blood transfusion		17 (26.2%)	26 (40%)	0.09
Presence of distraction during counting		32 (49.3%)	33 (50.8%)	0.86
Sterile surgical team members	3 members	12	7	0.58
	4 members	42	44	0.09
	5 members	11	14	0.86
Type of surgery	TAH	21	18	0.97
	Caesarean	15	16	
	Caesarean hysterectomy	6	7	
	TAH + BSO	7	7	
	TAH, BSO, OMT, LND	3	5	
	TAH, BSO, HC	1	1	
	TAH, Cystoscopy	0	1	
	Myomectomy	7	5	
	Ovarian cystectomy	2	3	
	Oophorectomy	3	2	

SD = standard deviation, BMI = body mass index, TAH = total abdominal hysterectomy, BSO = bilateral salpingo-oophorectomy, OMT = omentectomy, LND = lymphadenectomy, HC = hemicolectomy

Results

The samples of this research consisted of 30 perioperative nurses and surgical technologists, and 130 open gynaecological surgeries in two selected hospitals. All personnel in the two hospitals were women. The control group and intervention group had no statistically significant differences in terms of demographic characteristics or surgical case characteristics (see tables 1 and 2).

Compliance with Cluster 1 items was 28.15 per cent higher in the intervention group than the control group. Compliance with Cluster 2 items was 32.22 per cent higher, compliance with Cluster 3 items was 20.32 per cent higher, and compliance with Cluster 4 items was 24.75 per cent higher. Overall compliance with all recommended items was 26.87 per cent higher in the intervention group than the control group. (See Table 3.)

Out of 130 surgeries, 30 count discrepancies for surgical sponges were observed. In the intervention group, there were nine discrepancies in nine surgeries. In the control group, there were 21 discrepancies in 18 surgeries (three surgeries had two discrepancies, i.e. more than one discrepancy per surgery). The reasons for the discrepancies included misplaced (missing) sponges, miscounted sponges and errors in recording the count. (See Table 4).

Table 3: Mean scores for compliance with AORN count protocol in the control and intervention groups

AORN recommended items	**Control group** (hospital A) M+/-SD	**Intervention group** (hospital B) M+/-SD	**P** (< 0.001)
Cluster 1: Items performed only by circulating presonnel (n=27)	62.61 +/- 10.93	90.76 +/- 5.98	<0.001
Cluster 2: Items performed by both circulating and instrument personnel (n=24)	66.54 +/- 7.37	86.86 +/- 6.50	<0.001
Cluster 3: Items performed only by instrument personnel (n=15)	52.06 +/- 11.43	84.28 +/- 9.17	<0.001
Cluster 4: Items relating to when counts should be performed (n=9)	66.96 +/- 17.31	91.71 +/- 10.95	<0.001
All items overall (N=75)	61.52 +/- 6.59	88.39 +/- 5.21	<0.001

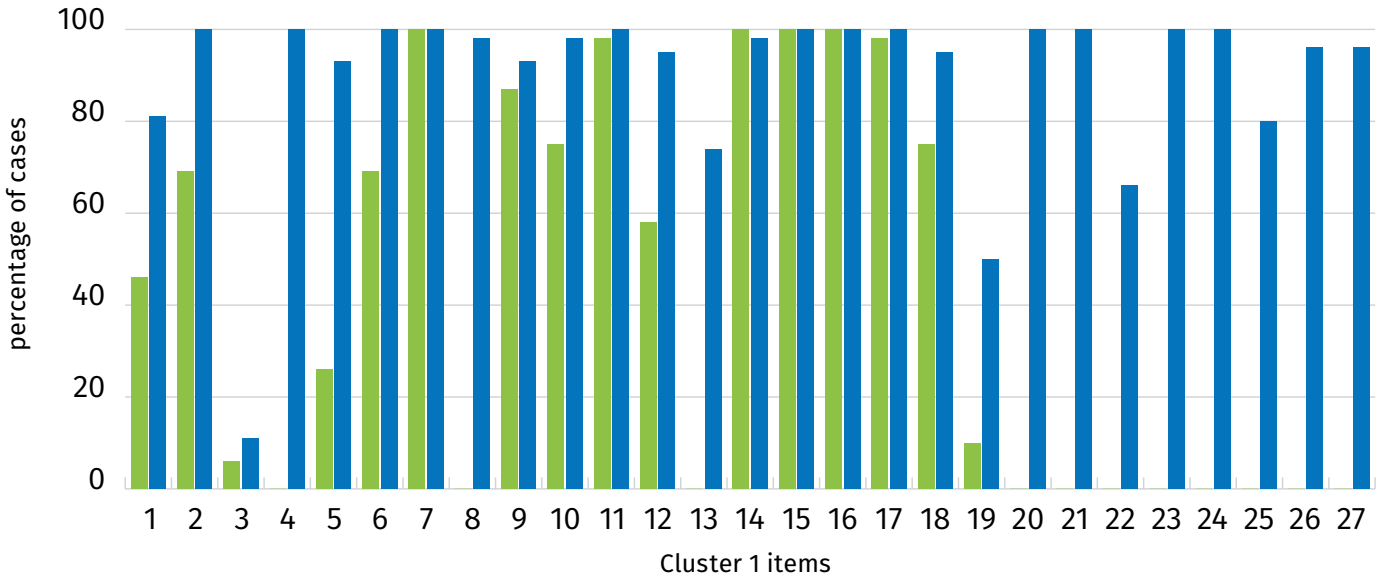
M = mean, SD = standard deviation

Table 4: Frequency and characteristics of count discrepancies in the control and intervention groups

Count discrepancy characteristics	**Control group** (hospital A) n (%)	**Intervention group** (hospital B) n (%)	**P** (< 0.05)
Total sponge discrepancy	21 (100)	9 (100)	0.04
Misplaced or retained sponges	10 (47.6)	3 (33.3)	0.04
Miscounted sponges	6 (28.6)	2 (22.2)	0.14
Error in recording the count	5 (23.8)	4 (44.4)	0.73
Misplaced sponges inside the patient's body	3 (30)	1 (33.3)	0.09
Misplaced sponges outside the patient's body	7 (70)	2 (66.7)	0.09
Reconciled discrepancies	21 (100)	9 (100)	
Mean time to resolve discrepancy (M+/-SD)	4.00+/-2.20 min	2.33+/-1.56 min	0.058
X-ray required to resolve discrepancy	0	0	
Mean total count activities (M+/-SD)	4.27+/-1.91	6.07+/-1.93	<0.001

M = mean, SD = standard deviation

Figures 1–4 show the percentage of cases in which each of the 75 items from the AORN protocol for counting surgical sponges were followed in the control and intervention groups.



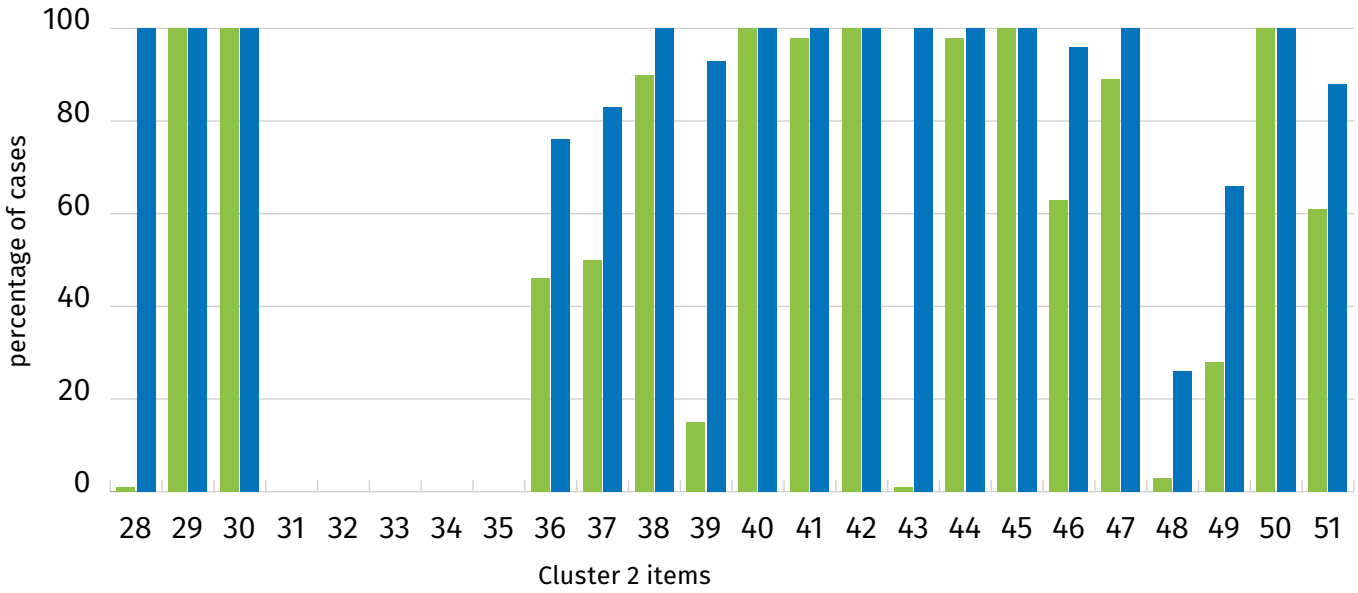
Control	0.46	0.69	0.06	0	0.26	0.69	1		0.87	0.75	0.98	0.58	0	1	1	1	0.98	0.75	0.1								
Intervention	0.81	1	0.11	1	0.93	1	1	0.98	0.93	0.98	1	0.95	0.74	0.98	1	1	1	0.95	0.5	1	1	0.66	1	1	0.8	0.96	0.96

Figure 1: Compliance with the AORN protocol in the control and intervention groups for items performed only by circulating personnel (Cluster 1, items 1–27)

Note: The sponge counter bag and count sheet were not available in the control group so 'N/A' was recorded for items 8 and 20 to 27 in the control group.

Key to items:

1. Searching the room to make sure there is no sponge from the previous procedure before the initial count.
2. Confirming the absence of previous procedure information on the whiteboard.
3. An auxiliary circulating nurse being present if the initial count is not performed before the patient enters.
4. Isolating the sponge used for skin antisepsis.
5. Viewing sponges being counted by the instrument nurse.
6. Counting sponges audibly.
7. Separating the sponges while counting.
8. Using the sponge count sheet.
9. Recording the number and type of sponges immediately after being added to the sterile field.
10. Recording sponges in a standard pattern.
11. Recording sponges in a visible location for the surgical team.
12. Recording sponges in agreement with the instrument nurse.
13. Recording all sponges placed in the surgical wound on placement and at removal.
14. Keeping counted sponges in the room until the count is completed.
15. Keeping waste containers in the room until the count is completed.
16. Disposing of counted sponges only after the patient leaves the room.
17. Not opening the dressing sponges until the closing count.
18. If a sponge is dropped from the sterile field, retrieving it and showing it to the instrument nurse, and including it in the final count.
19. Consulting with the surgical team about whether any supplies will be needed before the closing count.
20. Organising sponges with sponge counter bag.
21. Monitoring the placement of sponges in a suitable location (e.g. kick bucket) until transferred to bag.
22. Opening and separating the sponges completely before placing them in the bag.
23. Not putting the sponges on the edge of the kick bucket.
24. Placing only one sponge in each pocket of the bag.
25. Placing the sponge inside the bag so that its radiopaque marker is visible.
26. Filling the bag from bottom to top.
27. Placing unused sponges in the counter bag when final count is performed.



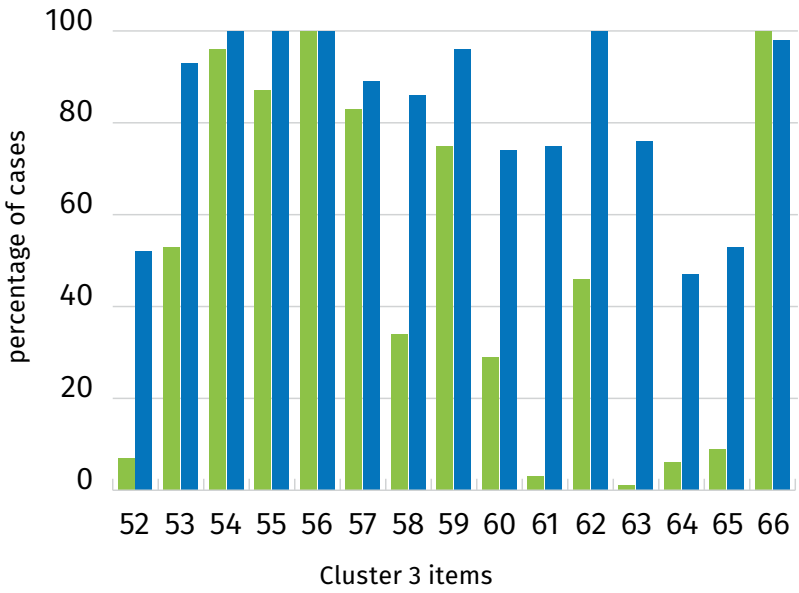
Control	0.01	1	1						0.46	0.5	0.9	0.15	1	0.98	1	0.01	0.98	1	0.63	0.89	0.03	0.28	1	0.61
Intervention	0.18	1	1						0.76	0.83	1	0.93	1	1	1	1	1	1	0.96	1	0.26	0.66	1	0.88

Figure 2: Compliance with the AORN protocol in the control and intervention groups for items performed by both circulating and instrument personnel (Cluster 2, items 28–51)

Note: In none of the surgeries were packages containing an incorrect number of sponges or sponges with a manufacturing defect encountered so items 31 to 35 were not observed in either the control group or the intervention group.

Key to items:

28. Performing initial count before patient enters the room, if possible.
29. Counting in a special place.
30. Counting packaged sponges according to the number of sponges in the packet.
31. When encountering packages containing an incorrect number of sponges, or sponges with a manufacturing defect, excluding the sponges from the count.
32. Removing incorrect packets and defective sponges from the field.
33. Isolating incorrect packets and defective sponges from the rest of the countable sponges.
34. Labelling incorrect packets and defective sponges.
35. Removing incorrect packets and defective sponges from the room before the patient's entry.
36. Reducing distractions and noise during counting.
37. Creating an uninterrupted environment and preventing rush in counting.
38. Maintaining the count running total in one location.
39. Performing final count when skin closure begins or at the end of surgery when counted sponges are no longer used.
40. Not providing counted sponges to the anaesthesia team.
41. Not performing counts during critical phases of the surgery, including time-out periods, critical dissections, confirming and opening of implants, induction of and emergence from anesthesia, and during care for and handling of specimens.
42. Using only radiopaque sponges in surgical wound.
43. Using non-radiopaque sponges for skin antisepsis.
44. Using non-radiopaque sponges for dressing.
45. Recounting, when counting is interrupted for any reason.
46. Performing counts in a specific order (e.g. large to small item size, proximal to distal from the wound).
47. Confirming the final count verbally as part of the surgical safety checklist.
48. Training the surgical team regarding the counting process.
49. Performing a structured hand-over communication of surgical count at times of relief of the registered circulating or instrument nurse.
50. Not subtracting or removing an item from the count.
51. Announcing a count discrepancy out loud.

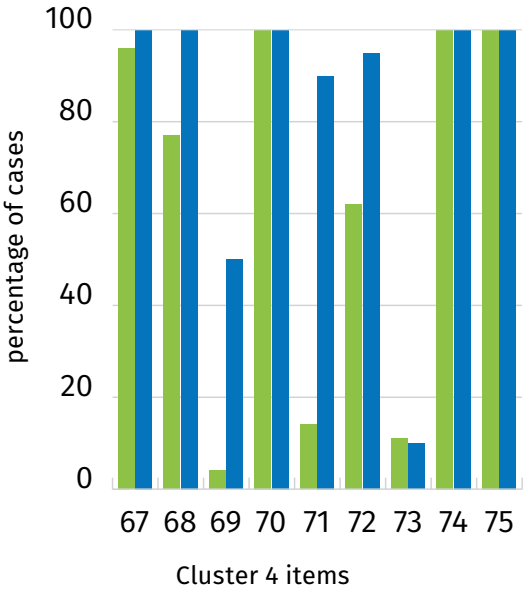


Control	0.07	0.53	0.96	0.87	1	0.83	0.34	0.75	0.29	0.03	0.46	0.01	0.06	0.09	1
Intervention	0.52	0.93	1	1	1	0.89	0.86	0.96	0.74	0.75	1	0.76	0.47	0.53	0.98

Figure 3: Compliance with the AORN protocol in the control and intervention groups for items performed only by instrument personnel (Cluster 3, 15 items)

Key to items:

52. Viewing sponges being counted by the circulating nurse.
53. Counting sponges audibly.
54. Separating the sponges and pointing at them while counting.
55. Using a standardised setup of the surgical field similarly to other personnel.
56. Not changing the original configuration of sponges.
57. Checking the integrity of the sponges when they are returned from the surgical site.
58. Knowing the location of sponges inside the wound and the sterile field during surgery.
59. Immediately removing used sponges from the sterile field.
60. Monitoring, if feasible, that a portion of any sponge placed in the surgical wound is left outside the wound so that the item remains visible.
61. Verifying methodical exploration of the surgical wound by the surgeon prior to wound closure.
62. Notifying the circulating nurse who is performing other patient care activities to record a sponge that was opened to assist the surgical team.
63. Notifying the circulating nurse when inserting and removing the sponge inside the surgical wound for documentation.
64. Notifying the circulating nurse about any sponge dropped from the surgical field.
65. Consulting with the surgeon about whether any supplies will be needed before performing the closing count.
66. Keeping the dressing sponges in their packaging until wound closure.



Control	0.96	0.77	0.04	1	0.14	0.62	0.11	1	1
Intervention	1	1	0.5	1	0.9	0.95	0.1	1	1

Figure 4: Compliance with the AORN protocol in the control and intervention groups for items relating to when counts should be performed (Cluster 4, 9 items)

Key to items:

67. Before skin incision (initial count)
68. When adding radiopaque sponges to the field.
69. Before closure of uterus or cavity within a cavity.
70. When closing the wound (closing count).
71. When closing the skin.
72. When changing a nurse permanently (e.g. end of shift).
73. When changing a nurse temporarily (e.g. rest, meal break).
74. When doubting the count is correct.
75. When any surgical team member requests a count.

Discussion

Our observations showed that the intervention group had higher mean scores for compliance with the AORN protocol for counting surgical sponges not only overall but also for each of the four clusters of items (items performed only by circulating personnel, items performed by both circulating and instrument personnel, items performed only by instrument personnel and items relating to when counts should be performed). We also found that there were fewer count discrepancies and discrepancies took less time to resolve in the intervention group than in the control group. Implementing the three quality improvement interventions in this study increased compliance with the AORN protocol for counting surgical sponges and significantly improved the quality of the surgical sponge count. This result is consistent with many studies into prevention of RSI events that emphasise the need to standardise the surgical count to improve the counting process and reduce incorrect counting.[15,17,44,45]

Structured observations of perioperative personnel during surgical counts in the current study provided a picture of the challenges that they face during the counting process. Warwick et al.[46] conducted an observational study to investigate compliance with the ACORN standard for counting surgical items and found that the rate of compliance was less than expected (60 per cent). Warwick et al.[46] identified challenges that perioperative nurses face during the counting process and argued that health service organisations need to develop policies and guidelines to support nurses to follow a standardised counting process.

Based on a finding of 1062 count discrepancies among 153 263 surgeries and one RSI event per 70 count discrepancies, Egorova et al.[31] concluded that count discrepancies increased the risk of RSI more than 100 times. As previously mentioned, gynaecology has a high prevalence of retained surgical sponges[11–13] and identifying count discrepancies is an important measure to prevent RSI events. The results of our study showed that implementing the three quality improvement interventions resulted in a significant reduction (up to 57 per cent) in count discrepancies.

In a study by Greenberg et al. nurses counted surgical items according to the AORN protocol and observed 13 sponge count discrepancies among 148 general surgeries (8.78%). Greenberg et al.[33] asserted that any count discrepancy should be interpreted as a potential RSI event and showed the need for measures to increase the accuracy of surgical sponge count. In our study we observed nine count discrepancies among 65 gynaecological surgeries (13.85%) in the intervention group. This is a higher frequency than found by Greenberg et al. and may be caused by gynaecological surgery being the specialty in our study, longer mean duration of surgery (203 minutes our study vs. 120 minutes Greenberg et al.) and, as is typical in gynaecological surgery, more sponges used per case (34 our study vs. 29 Greenberg et al.).

Our findings are consistent with a number of other studies. Nelson's quality improvement study[36] collected data from 455 surgical cases and 118 nurses over an eight-week period in 2018 using the Plan, Do, Study, Action (PDSA) method after implementing AORN practice guidelines for preventing RSIs. Prior to the study there was no standardised and consistent counting process used by nurses and, in 2015–2016, 408 count discrepancies and 13 RSI incidents had been reported. The results of the study showed that using AORN guidelines improved the surgical count process and led to a 71.43 per cent reduction in incorrect counts with no incidents of RSI.[36] Similarly, Norton et al.[7] reported that implementing a quality improvement program helped to reduce incorrect counts and count discrepancies by about 50 per cent. Further, Cima et al.[9] reported a 486 per cent improvement in efficiency after quality improvement interventions and the prevalence of RSIs events dropped from one in 70 426 cases before the interventions to one in 5500 cases after the interventions.

Susmallian et al.[37] reported an increase in count discrepancies after implementation of an RSI prevention program. This is perhaps because a major part of the program was introducing an error reporting system. Susmallian et al. divided count discrepancies into three categories: discrepancies that were corrected without any complications; discrepancies with minor complications, such as increased surgery time, which were finally corrected; and discrepancies with severe complications (RSI). Despite the increase in count discrepancies, the number of RSIs decreased.[37] In our study there were no RSI events. Although a sponge was misplaced in the patient's body in four cases (three in the control group and one in the intervention group), all count discrepancies were resolved in both the control and intervention groups.

In Greenberg's study,[33] in which the counting process was carried out according to the AORN protocol, the reasons for count discrepancies included misplaced sponges (59%), errors in recording the count (38%) and miscounted sponges (27%). In our study misplaced (missing) sponges was the most

common reason, overall, for count discrepancies, followed by miscounted sponges and errors in recording the count. Count discrepancies due to misplaced sponges were significantly lower in the intervention group compared to the control group (47.6% and 33.3% respectively, P = 0.04). Count discrepancies due to miscounted sponges were also reduced in the intervention group compared to the control group although the difference was not statistically significant (22.2% and 28.6% respectively, P = 0.14). Using sponge counter bags to separate sponges and make them visible to the surgical team increased counting accuracy and reduced count discrepancies due to misplaced and miscounted sponges.

In our study, the number of count discrepancies due to errors in recording the count was higher in the intervention group than the control group (44.4% and 23.8%, respectively). This is because circulating personnel forgot to document the number of sponges added to the sterile field during surgery. Butler et al.[47] found that, of 140 count errors, 64 per cent were documentation errors and 36 per cent were misplaced items and recommended measures to reduce documentation errors in the surgical count. Gibbs[48] recommends the use of a transparent and visible system, including a count board and a sponge counter bag, to increase counting accuracy. In this system, during the final count (after skin closure) the circulating nurse together with other members of the surgical team confirm that the number of sponges visible inside the count bag is equal to the number of sponges recorded on the count board.

All count discrepancies in our study were corrected in the intervention and control groups and there was no need for x-ray to resolve discrepancies in any of the surgeries. Studies show that most count discrepancies are eventually corrected. Geeroms et al.[49] conducted a survey among 100 plastic surgeons and residents using an online questionnaire and found that in 34.3 per cent of cases the number of sponges in the first count was incorrect but subsequently corrected, and that x-ray was required in, on average, 8.7 per cent of surgeries to rule out a retained surgical sponge in the patient. Greenberg et al. reported that out of 29 count discrepancies, 28 (96.%) were finally corrected.[33]

Resolving count discrepancies takes time and adds to the cost of surgery. Steelman et al.[34] found that perioperative nurses needed up to 90 minutes to resolve a count discrepancy which added, on average, US$1003 to the cost of the surgery. In our study, the mean time for reconciling count discrepancies was lower in the intervention group than the control group. Although the difference was not statistically significant, even a small reduction in duration of surgery can reduce costs, and reducing the frequency of count discrepancies, in turn, reduces the need to resolve them.

Limitations

This study was unable to examine the direct impact of our quality improvement interventions on RSIs because a very large sample size would be required to obtain conclusive results. Also, due to limited time and financial resources, only the field of gynaecological surgery was studied.

Conclusion

This study found that implementing quality improvement interventions increased compliance with the AORN protocol for counting surgical sponges, improved the quality of the counting process and significantly reduced surgical sponge count discrepancies. Therefore, the implementation of quality improvement interventions, including training in and use of sponge counter bags and surgical sponge count sheets and training in standardised surgical count protocol, are recommended to improve the counting performance of perioperative nurses and reduce count discrepancies, incorrect counts, the duration of surgery and frequency of RSI events.

Funding

This work was supported by the Vice Chancellor's Office for Research at Isfahan University of Medical Sciences, Isfahan, Iran. The funding source did not interfere with the study design and other parts of the research.

Declaration of conflicting interests

The authors declare no conflict of interest.

Acknowledgements

This article is the result of a master's thesis in operating room nursing, with the ethical code IR.MUI.NUREMA.REC.1401.042. The researcher expresses their utmost gratitude to the respected officials of Isfahan University of Medical Sciences, the respected officials of Shahid Beheshti and Alzahra Hospitals of Isfahan and all the nurses and surgical technologists who participated.

References

1. The Joint Commission. Summary data of sentinel events reviewed by The Joint Commission [Internet]. Oakbrook Terrace: The Joint Commission; 2021 [cited 2022 Apr 3]. Available from: www.jointcommission.org/-/media/tjc/documents/resources/patient-safety-topics/sentinel-event/annual-se-report-2021.pdf.
2. Cima RR, Kollengode A, Garnatz J, Storsveen A, Weisbrod C, Deschamps C. Incidence and characteristics of potential and actual retained foreign object events in surgical patients [Internet]. J Am Coll Surg. 2008[cited 2022 Apr 3];207(1):80–7. DOI: 10.1016/j.jamcollsurg.2007.12.047
3. Gawande AA, Studdert DM, Orav EJ, Brennan TA, Zinner MJ. Risk factors for retained instruments and sponges after surgery [Internet]. N Engl J Med. 2003[cited 2022 Apr 3];348(3):229–35. DOI: 10.1891/JDNP-D-20-00045
4. Osborne SR, Cockburn T, Davis J. Exploring risk, antecedents and human costs of living with a retained surgical item: A narrative synthesis of Australian case law 1981–2018 [Internet]. J Multidiscip Healthc. 2021[cited 2022 Apr 3];14:2397–413. DOI: 10.2147/JMDH.S316166
5. Maraki F, Irani M, Akbari L, Aarabi A. The effects of using intraoperative care documentation forms on the number of reported errors [Internet]. Nurs Midwifery Stud. 2019[cited 2022 Apr 3];8(3):137–42. DOI: 10.4103/nms.nms_76_18
6. Berger P, Sanders G. Objects retained during surgery: Human diligence meets systems solutions [Internet]. PSQH. 2008[cited 2022 Apr 3];5(5). Available from: www.psqh.com/sepoct08/objects.html
7. Norton EK, Martin C, Micheli AJ. Patients count on it: An initiative to reduce incorrect counts and prevent retained surgical items [Internet]. AORN J. 2012[cited 2022 Apr 3];95(1):109–21. DOI: 10.1016/j.aorn.2011.06.007
8. Hariharan D, Lobo D. Retained surgical sponges, needles and instruments [Internet]. Ann R Coll Surg Engl. 2013[cited 2022 Apr 3];95(2):87–92. DOI: 10.1308/003588413x13511609957218
9. Cima RR, Bearden BA, Kollengode A, Nienow JM, Weisbrod CA, Dowdy SC et al. Avoiding retained surgical items at an academic medical center: Sustainability of a surgical quality improvement project. Am J Med Qual. 2022[cited 2022 Apr 3];37(3):236–45. DOI: 10.1097/jmq.0000000000000030
10. Copeland AW, Sanfey H, Collins K. Retained surgical sponge (gossypiboma) and other retained surgical items: Prevention and management [Internet]. UpToDate. 2021[updated 25 May 2021; cited 2021 Dec 4]. Available from: www.uptodate.com/contents/retained-surgical-sponge-gossypiboma-and-other-retained-surgical-items-prevention-and-management.
11. Steelman VM, Shaw C, Shine L, Hardy-Fairbanks AJ. Retained surgical sponges: A descriptive study of 319 occurrences and contributing factors from 2012 to 2017 [Internet]. Patient Saf Surg. 2018[cited 2021 Dec 4];12(1). DOI: 10.1186/s13037-018-0166-0
12. Did You Know? [Internet]. AORN J. 2019[cited 2021 Dec 4];110(2):P16. DOI: 10.1002/aorn.12793
13. Steelman VM. Retained surgical items: Evidence review and recommendations for prevention. AORN J. 2019[cited 2021 Dec 4];110(1):92–6. DOI: 10.1002/aorn.12740
14. Gavrić LV, Cokan A, Lukman L, Arko D, Takač I. Retained surgical needle and gauze after cesarean section and adnexectomy: A case report and literature review [Internet]. J Int Med Res. 2018[cited 2021 Dec 4];46(11):4775–80. DOI: 10.1177/0300060518788247
15. Freitas PS, Silveira RC, Clark AM, Galvão CM. Surgical count process for prevention of retained surgical items: An integrative review [Internet]. J clin Nurs. 2016[cited 2021 Dec 4];25(13–14):1835–47. DOI: 10.1111/jocn.13216
16. Rowlands A. Risk factors associated with incorrect surgical counts [Internet]. AORN J. 2012[cited 2021 Dec 4];96(3):272–84. DOI: 10.1016/j.aorn.2012.06.012
17. Fencl JL. Guideline implementation: Prevention of retained surgical items. AORN J. 2016[cited 2021 Dec 4];104(1):37–48. DOI: 10.1016/j.aorn.2016.05.005
18. Spruce L. Back to basics: Counting soft surgical goods. AORN J. 2016[cited 2021 Dec 4];103(3):297–303. DOI: 10.1016/j.aorn.2015.12.021
19. Association of periOperative Registered Nurses (AORN). Guidelines for perioperative practice: Guideline for prevention of unintentionally retained surgical items. Denver: AORN; 2022 pp.827–894.
20. Greenberg CC, Diaz-Flores R, Lipsitz SR, Regenbogen SE, Mulholland L, Mearn F et al. Bar-coding surgical sponges to improve safety: A randomized controlled trial [Internet]. Ann Surg. 2008 [cited 2021 Dec 4];247(4):612–6. DOI: 10.1097/SLA.0b013e3181656cd5
21. Lazzaro A, Corona A, Iezzi L, Quaresima S, Armisi L, Piccolo I et al. Radiofrequency-based identification medical device: An evaluable solution for surgical sponge retrieval? [Internet]. Surg Innov. 2017[cited 2021 Dec 4];24(3):268–75. DOI: 10.1177/1553350617690608
22. Szymocha M, Pacan M, Anufrowicz M, Jurek T, Rorat M. Leaving a foreign object in the body of a patient during abdominal surgery: Still a current problem [Internet]. Pol Przegl Chir. 2019[cited 2021 Dec 4];91:35–40. DOI: 10.5604/01.3001.0013.2024
23. Saver C. Retained surgical items: Overview of a persistent problem in health care. AORN J. 2022[cited 2021 Dec 4];116(2):111–5. DOI: 10.1002/aorn.13747
24. Sirihorachai R, Saylor KM, Manojlovich M. Interventions for the prevention of retained surgical items: A systematic review [Internet]. World J Surg. 2022[cited 2021 Dec 4];46(2):370–81. DOI: 10.1007/s00268-021-06370-3
25. Cima RR, Newman JS. A historical perspective on the problem of the retained surgical sponge: Have we really come that far? [Internet]. Surgery. 2021[cited 2021 Dec 4];170(1):146–52. DOI:10.1016/j.surg.2021.01.035
26. Jackson S, Brady S. Counting difficulties: Retained instruments, sponges, and needles [Internet]. AORN J. 2008[cited 2021 Dec 4];87(2):315–21. DOI:10.1016/j.aorn.2007.07.023
27. Hibbert PD, Thomas MJW, Deakin A, Runciman WB, Carson-Stevens A, Braithwaite J. A qualitative content analysis of retained surgical items: Learning from root cause analysis investigations [Internet]. Int J Qual Health Care. 2020[cited 2021 Dec 4];32(3):184–9. DOI: 10.1093/intqhc/mzaa005
28. Weprin S, Crocerossa F, Meyer D, Maddra K, Valancy D, Osardu R et al. Risk factors and preventive strategies for unintentionally retained surgical sharps: a systematic review [Internet]. Patient Saf Surg. 2021[cited 2021 Dec 4];15(1):24. DOI: 10.1186/s13037-021-00297-3
29. Moffatt-Bruce SD, Cook CH, Steinberg SM, Stawicki SP. Risk factors for retained surgical items: a meta-analysis and proposed risk stratification system [Internet]. J Surg Res. 2014[cited 2021 Dec 4];190:429–36. DOI: 10.1016/j.jss.2014.05.044
30. Fang JM, Yuan X, Fan L, Du ML, Sui WJ, Ma WX et al. Risk factors for incorrect surgical count during surgery: An observational study [Internet]. Int J Nurs Pract. 2021[cited 2021 Dec 4];27(4):7. DOI: 10.1111/ijn.12942

31. Egorova NN, Moskowitz A, Gelijns A, Weinberg A, Curty J, Rabin-Fastman B et al. Managing the prevention of retained surgical instruments: What is the value of counting? [Internet]. Ann Surg. 2008[cited 2021 Dec 4];247(1):13–8. DOI: 10.1097/sla.0b013e3180f633be
32. Stawicki SP, Moffatt-Bruce SD, Ahmed HM, Anderson HL, Balija TM, Bernescu I et al. Retained surgical items: A problem yet to be solved [Internet]. J Am Coll Surg. 2013[cited 2021 Dec 4];216(1):15–22. DOI: 10.1016/j.jamcollsurg.2012.08.026
33. Greenberg CC, Regenbogen SE, Lipsitz SR, Diaz-Flores R, Gawande AA. The frequency and significance of discrepancies in the surgical count [Internet]. Ann Surg. 2008[cited 2021 Dec 4];248(2):337–41. DOI:10.1097/sla.0b013e318181c9a3.
34. Steelman VM, Schaapveld AG, Perkhounkova Y, Storm HE, Mathias M. The hidden costs of reconciling surgical sponge counts [Internet]. AORN J. 2015[cited 2021 Dec 4];102(5):498–506. DOI:10.1016/j.aorn.2015.09.002.
35. Sebastian T, Dhandapani M, Lakshmanan G, Dhandapani S. Retained surgical items: A review on preventive strategies [Internet]. AJNER. 2020[cited 2021 Dec 4];10:375–9. DOI: 10.5958/2349-2996.2020.00080.4
36. Nelson P. Incorrect surgical counts: A potential for retained surgical items [Internet]. J Doct Nurs Pract. 2021[cited 2021 Dec 4];14(3):213–24. DOI: 10.1891/jdnp-d-20-00045
37. Susmallian S, Barnea R, Azaria B, Szyper-Kravitz M. Addressing the important error of missing surgical items in an operated patient [Internet]. Isr J Health Policy Res. 2022[cited 2021 Dec 4];11(1):1–10. DOI: 10.1186/s13584-022-00530-z
38. Association of periOperative Registered Nurses (AORN). Policy and procedure templates: Retained surgical items [Internet]. Denver: AORN; 2016 [cited 2022 Jan 3]. Available from: https://aornguidelines.org/tool/content?gbosid=396818
39. Australian College of Perioperative Nurses (ACORN). ACORN generic perioperative count record [Internet]. ACORN; 2012 [cited 2021 Oct 3]. Available from: www.ifpn.world/application/files/1515/5480/6535/Generic_count_sheet_sample_from_ACORN_2012.pdf
40. Association of periOperative Registered Nurses (AORN). Competency verification tool: Practice: Prevention of retained surgical items – RN [Internet]. Denver: AORN; 2016 [cited 2022 Jan 3]. Available from: https://aornguidelines.org/tool/content?gbosid=396554
41. Association of periOperative Registered Nurses (AORN). Competency verification tool: Practice: Prevention of retained surgical items – Scrub person (RN or Non-RN) [Internet]. Denver: AORN; 2016 [cited 2022 Jan 3]. Available from: https://aornguidelines.org/tool/content?gbosid=396555
42. Association of periOperative Registered Nurses (AORN). AORN Guideline audit tool: Retained surgical items [Internet]. Denver: AORN; 2016 [cited 2022 Jan 3]. Available from: https://aornguidelines.org/tool/filter?gboscontainerid=166&categoryid=42852
43. Association of periOperative Registered Nurses (AORN). Guideline at a glance: Retained Surgical Items [Internet]. AORN J. 2016[cited 2022 Jan 3];104(5):474–7. DOI: 10.1016/s0001-2092(16)30704-9
44. Freitas PS, Mendes KDS, Galvão CM. Surgical count process: Evidence for patient safety [Internet]. Revista Gaucha de Enfermagem. 2016[cited 2022 Jan 3];37. DOI:10.1590/1983-1447.2016.04.66877
45. Edel EM. Surgical count practice variability and the potential for retained surgical items [Internet]. AORN J. 2012[cited 2022 Jan 3];95(2):228–38. DOI: 10.1016/j.aorn.2011.02.014
46. Warwick NR, Gillespie BM, McMurray A, Clark-Burg KG. Undertaking the surgical count: An observational study [Internet]. JPN. 2021[cited 2022 Jan 3];34(3):e3–e14. DOI: 10.26550/2209-1092.1089
47. Butler M, Ford R, Boxer E, Sutherland-Fraser S. Lessons from the field: An examination of count errors in the operating theatre. JPN. 2010;23(3):6–16.
48. Gibbs V. NoThing left behind: The prevention of retained surgical items multi-stakeholder policy-job aid-reference manual. San Francisco: Verna C. Gibbs; 2018.
49. Geeroms M, Pai A, Ceuterick B, Kapila A. Is the systematic sponge count an impediment to patient care during plastic surgical procedures? [Internet]. Plast Aesthet Nurs (Phila). 2022[cited 2022 Jan 3];42(2). DOI: 10.1097/PSN.0000000000000433

Authors

Maureen Joye
MCN (Anaesthetics and Recovery), BN, GCert (EmergN)

Dr Paula Foran
PhD, RN, FACORN, FACPAN, MACN

Strategies to optimise culturally appropriate perioperative care for Aboriginal and Torres Strait Islander peoples: A discussion paper

Abstract

The disparity in health outcomes between Indigenous and non-indigenous Australians continues to increase. Barriers to accessing health care, particularly surgical treatment, contribute to health inequalities among Indigenous Australians. Despite a positive correlation between improved patient experiences and health outcomes, there is little research available on nursing interventions to improve Indigenous patients' perioperative health care treatment.

This discussion paper investigates culturally appropriate and evidence-based nursing interventions that can be applied in the perioperative setting to improve the surgical experience of Indigenous patients. It was shown that establishing trust among Aboriginal and Torres Strait Islander patients through anaesthetic nurse practices and advocating for family involvement is critical in providing culturally safe care and enhancing patient experiences. Indigenous health liaison officers were also identified as a valuable resource in bridging cultural and communication gaps between health care providers and Indigenous patients. These findings demonstrate that using tailored nursing strategies while providing perioperative care to Indigenous Australians can enhance their perioperative health care experience and contribute to improving health outcomes of Indigenous Australians.

It is therefore recommended that perioperative nurses adopt these strategies; however, further research is needed to investigate implementation of an enhanced role for anaesthetic nurses, advocating for family involvement and referral to Indigenous health liaison officers. Such research should evaluate the impact of these new holistic and patient-centred approaches on the health outcomes and experiencecs of Indigenous patients.

Keywords: Aboriginal and Torres Strait Islander, perioperative health care experience, Indigenous, Indigenous health liaison officers, perioperative nursing

Introduction

Indigenous Australians continue to experience poorer health outcomes than non-Indigenous Australians, despite decades of government initiatives aimed at closing this gap.[1–3] Continued barriers to accessing specialised care, such as surgery, contributes to disease progression, causing patients to present at later stages of illness which, in turn, leads to increased rates of post-operative complications, morbidity and mortality.[4,5] According to Jones et al.[6] some of these barriers include a lack of culturally appropriate care and previous negative health care experiences.

As health care decision-making often involves family and community participation, community members' shared health care experiences can influence Aboriginal and Torres Strait Islander people's decisions to seek health care.[6,7] In order to facilitate a positive surgical and health care experience, perioperative nurses must provide high-quality and culturally appropriate care. By doing so, positive health care experiences may be disseminated throughout Indigenous families and communities, therefore encouraging others to seek health care and ultimately contribute to improved health outcomes.[6]

This discussion paper aims to highlight two key perioperative nursing strategies to optimise the perioperative care and experiences of Aboriginal and Torres Strait Islander people.

Discussion

Extensive reading of literature until saturation had occurred, allowed for thematical analysis, critique and evaluation, and synthesis of the relevant literature. This discussion paper presents five themes: 'background to the problem', 'current perioperative practice', 'building trust with Aboriginal and Torres Strait Islander patients', 'the anaesthetic nurse as a trust builder' and 'advocating for Indigenous health liaison officers'.

The discussion will highlight two key perioperative nursing strategies to optimise the perioperative care and experiences of Aboriginal and Torres Strait Islander patients – the nurse's role in advocating for Indigenous health liaison officers (IHLOs) in the perioperative setting and building trust between the patient and clinicians. The impact of these strategies and the barriers to their use will be explored.

Background to the problem

Indigenous Australians' spiritual, social, mental and physical well-being continues to be adversely affected by the historical and intergenerational trauma caused by British colonisation.[8] Long-term health implications include mistrust of health care systems, unwillingness to seek treatment, burden of disease and poorer health outcomes.[8] Despite Australia being a wealthy and developed nation, the life expectancy of Indigenous Australians remains comparable to underdeveloped nations.[8,9] Government programmes and initiatives, such as the 'Close the gap' campaign, have been ineffective in addressing these disparities, emphasising the need for an immediate transformation.[1–3]

Indigenous Australians are further disadvantaged in the perioperative context due to surgical disparities such as inequitable timely access to surgical services, difficulty building patient–clinician trust, and lack of culturally appropriate services.[5,10,11] In a systematic review of Aboriginal and Torres Strait Islander people's health care experiences, Jones et al.[6] highlighted that improving patient experiences can lead to improved patient outcomes. Therefore, perioperative nurses should adopt strategies that optimise patient experiences in the perioperative setting in order to improve culturally safe patient care.

Current perioperative practice

Although the Nursing and Midwifery Board of Australia (NMBA) mandates cultural safety training, the techniques and tools for providing culturally safe care are generalised across all areas of nursing.[12,13] A scoping review of nursing initiatives to enhance cultural safety and the perioperative experiences of Indigenous Australians yielded limited findings. Significant gaps in the literature demonstrate the need for immediate action at both national and local levels, beginning with perioperative nursing care at the forefront of optimising patient experience. Perioperative care is extremely valuable and contributes to improved quality of life for Australians.[14–16] As perioperative nursing is a vast and well-resourced specialty, perioperative nurses have the power to make meaningful changes to ensure that Indigenous Australians have equal access and receive culturally appropriate care while undergoing surgery.[6,14,17]

Building trust with Aboriginal and Torres Strait Islander patients

The significance of establishing trust was one of the most prevalent themes that emerged from a review of the available literature.[4–6,18,19] Trust, according to Ozaras and Abaan,[20] is defined as believing in each other without fear or hesitation and interacting with compassion that develops over time. Trust has two dimensions: institutional trust at the government level and interpersonal trust at the professional level.[20] Many Indigenous Australians have inherent mistrust in government services in both these aspects of trust, leading to an unwillingness to access health care which results in a continuous cycle of poor health outcomes.[6,8] In a qualitative study conducted by Nolan-Isles et al.,[8] interviews (n=31) with Indigenous Australians in remote communities were used to identify enablers to accessing health care services. Trust in the service provider and the experience of cultural safety emerged as a major finding.[8] These findings highlight the value of establishing trust between nurses and their patients in order to enhance the surgical care experience for Indigenous Australians.

The anaesthetic nurse as a trust builder

A strategy for building trust with Aboriginal and Torres Strait Islander patients in perioperative care is to have the same health practitioner interact with the patient at all stages of the perioperative journey.[6,7] The anaesthetic nurse may be ideal for this role as they are typically the first health professional to greet the patient in the operating suite, they spend the most time with the patient while the patient is awake, and they are often the last person the patient sees before being anaesthetised.[21] When performing the pre-operative safety checklists, the anaesthetic nurse should communicate with cultural sensitivity and respect which, in turn, will allow the patient to ask questions and feel more comfortable, welcomed and safe.[6,8,16] This approach is supported by Jones et al.[6] who conducted a systematic review of 54 studies on Indigenous Australians' experiences in health care and stated that establishing trust was one of the three most important factors in improving the health care experience. Twelve of the publications analysed by Jones et al. indicated that spending more time with patients allowed for the development of stronger and more trusting relationships.[6] Although this review was of high quality and met PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) criteria, it should be noted that this research did not specifically focus on perioperative care, with only one paper investigating the operating suite environment.

While it has been suggested that constraints due to fast turnover of operating lists may not allow enough time to build trust, the anaesthetic nurse may still be an ideal health professional for this role as they are considered to be 'the patient advocate'. Thus, they are tasked to care for and speak up for their patients,[22] which is especially important for the more vulnerable populations, such as Aboriginal and Torres Strait Islander patients.[12,23]

Another strategy the anaesthetic nurse could use to build trust among Indigenous patients is, when appropriate, to advocate for family presence in the operating theatre. Ristevski et al.[24] and Wotherspoon and Williams[25] report positive effects on health outcomes associated with family involvement, as well as the personal and cultural importance of family presence when receiving care. When a family member is present, Indigenous patients are more likely to feel culturally safe and empowered to make decisions, which improves trust and the quality of care.[6,24,25] This practice is supported by the Australian College of Perioperative Nurses (ACORN). The ACORN standard, Visitors to the perioperative environment, states 'Patients with special needs or requirements shall have a patient support person to accompany them in the perioperative environment. [The support person] cares for the unique needs of the patient e.g. effective communication on behalf of the patient with unique psychological or spiritual requirements'.[26, p335]

Further, Nolan-Isles et al.[8] report that having a trusted family member present can provide additional information, explanation or support to Indigenous patients, as well as break down any communication barriers between the patient and health care professionals. While this qualitative study emphasises the importance of family presence while receiving health care, the interviewed sample size (n=31) only reflects the perspectives of a limited number of individuals and therefore cannot be generalised to all Indigenous Australians.[8] Consideration should also be given to the possibility that Indigenous patients might not want family members present owing to cultural beliefs, privacy, confidentiality or personal preference.[8]

The evidence demonstrates that building trust through the implementation of these strategies will mean patients are more likely to engage in health care in the future and share their experiences with family and community, therefore removing a barrier to Indigenous people seeking surgical treatment.

Advocating for Indigenous health liaison officers (IHLOs)

IHLOs are Aboriginal and/or Torres Strait Islander health care workers who collaborate with Indigenous patients to achieve better access to health care, bridge communication gaps, provide emotional support and advocacy, and assist with social services.[27] According to Mackean et al.,[27] IHLOs are crucial for closing the gap in health outcomes; and Jones et al.[8] concur, adding that IHLOs help move the power dynamic back towards the patient and re-establish their identity and status as clients within the health care system. IHLOs are accessible in most hospital specialities, but not usually in the perioperative setting or pathway to surgery.[27,28]

Aboriginal and Torres Strait Islander people tend to nod or say 'yes' even when they do not understand what is being said, either out of respect for health care professionals or because the patient is too intimidated to ask questions.[29] This sense of disempowerment is exacerbated when engaging with health care professionals in positions of power or multiple health care professionals, such as in surgical

clinics or operating theatres, and raises concerns about obtaining informed consent.[30] It is therefore suggested that surgical clinic nurses and perioperative nurses ask the question, 'Would you like an IHLO to provide support to you and your family?'

When IHLOs are used in surgical clinics, they provide the opportunity to empower patients to ask questions, clarify any medical jargon, facilitate an informed consenting process and work with individuals, families and social services to facilitate travel and accommodation during perioperative care.[28,29] The perioperative nurse should also advocate for using an IHLO for Indigenous patients requiring emergency surgery.[22,23] While there is little data on IHLOs being used in perioperative care, Topp et al.[28] argue the importance of IHLOs in emergency situations. Topp et al.[28] interviewed IHLOs and Indigenous and non-Indigenous community members (n=83) to determine the distinctive skills, scope and value of IHLOs. It was discovered that IHLOs within emergency departments are crucial in translating language and explaining situations at a level that patients and families understand.[28] Although this study was limited to emergency departments, the findings are also applicable to emergency surgery as IHLOs would perform the same role in providing patient and family support and can assist in the informed consenting process. Furthermore, effective information exchange is crucial in surgical settings[4] where Indigenous patients are more likely to feel powerless, intimidated and confused by medical terminology.[29] IHLO involvement in these situations is integral to bridging any cultural and communication gaps between patients and health care professionals.[28] Therefore, the simple nursing intervention of offering IHLO assistance in surgical clinics or in perioperative settings can give Indigenous patients a better surgical experience and contribute to safe outcomes.[27,28]

Barriers to establishing a perioperative IHLO include the expenses related to employing personnel, difficulties recruiting qualified staff and the possibility that IHLOs might not be available to provide a 24/7 service.[30] Additionally, not all Indigenous patients accept IHLO support, particularly in smaller communities where there may be concerns about privacy and confidentiality.[8] To address these barriers, drawing on existing IHLOs in surgical wards or emergency departments is proposed when clinic and perioperative IHLO assistance is required.

Conclusion

This discussion paper has illustrated the existing gaps in nursing literature and clinical practice regarding culturally appropriate perioperative care of Aboriginal and Torres Strait Islander patients. The discussion presents unique strategies to build trust and improve the health care experience and health outcomes of Indigenous Australians. The innovative nursing strategy of fostering IHLO involvement in surgical clinics and the perioperative setting may enhance culturally appropriate care and improve perioperative experiences.

Developing strong and trusting nurse–patient relationships with Indigenous patients in the perioperative environment is one of the most effective ways nurses can provide culturally safe care and contribute to closing the gap in health outcomes. Trust-building strategies include having the anaesthetic nurse interact with the patient throughout the perioperative journey, tailoring care to the individual needs of each patient and informing them of the option to have a family member and/or IHLO present in the perioperative unit. Indigenous Australians' perioperative experience can also be improved by outsourcing IHLOs to surgical clinics and operating theatres. Adopting these strategies to improve the health care experience of Indigenous Australians can potentially encourage families and communities to access health care, ultimately contributing to the improvement of Aboriginal and Torres Strait Islander people's health and wellbeing.

It is recommended that further research be conducted specifically into Aboriginal and Torres Strait Islander people's experiences in perioperative care and, when introduced, how the discussed strategies have impacted patient experiences and health outcomes.

While trust-building strategies, family involvement and IHLO involvement have not been well utilised in perioperative practice, the positive lessons from other health care environments are evident, providing impetus to trial such interventions in perioperative practice. The ability to improve the quality of Aboriginal and Torres Strait Islander patients surgical journey relies on such change.

Acknowledgement

This paper was submitted to the University of Tasmania as part fulfilment of subject CNA803, Advanced Clinical Nursing Practice, for the Master of Clinical Nursing (Anesthetics and Recovery). The author sincerely wishes to thank Dr Paula Foran, unit coordinator, for her guidance throughout the master's course and work in preparing this paper for publication.

References

1. Deravin L, Francis K, Anderson J. Closing the gap in Indigenous health inequity – is it making a difference? [Internet]. Int Nurs Rev. 2018[cited 2022 Oct 5];65(4):477–483. DOI: 10.1111/inr.12436
2. Bond CJ, Singh D. More than a refresh required for closing the gap of Indigenous health inequality [Internet]. Med J Aust. 2020[cited 2022 Oct 5];212(5):198. DOI: 10.5694/ mja2.50498
3. Commonwealth of Australia. Closing the gap retrospective review [Internet]. Canberra: Commonwealth of Australia; 2018 [cited 2022 Oct 5]. Available from: www.niaa.gov.au/sites/default/files/publications/closing-gap-retrospective-review-accessible.pdf
4. O'Brien P, Bunzli S, Lin I, Bessarab D, Coffin J, Dowsey MM et al. Addressing surgical inequity for Aboriginal and Torres Strait Islander people in Australia's universal health care system: A call to action [Internet]. ANZ J Surg. 2021[cited 2022 Oct 5];91(3):238–44. DOI: 10.1111/ans.16557
5. Crosland P, Ananthapavan J, Davison J, Lambert M, Carter R. The health burden of preventable disease in Australia: A systematic review. ANZ J Public Health. 2019[cited 2022 Oct 5];43(2):163–70. DOI: 10.1111/1753-6405.12882
6. Jones B, Heslop D, Harrison R. Seldom heard voices: A meta-narrative systematic review of Aboriginal and Torres Strait Islander peoples' healthcare experiences [Internet]. Int J Equity Health. 2020[cited 2022 Oct 5];19(1). DOI: 10.1186/s12939-020-01334-w
7. Durey A, McEvoy S, Swift-Otero V, Taylor K, Katzenellenbogen J, Bessarab D. Improving healthcare for Aboriginal Australians through effective engagement between community and health services [Internet]. BMC Health Services Research. 2016[cited 2022 Oct 5];16(1):1–13. DOI: 10.1186/s12913-016-1497-0
8. Nolan-Isles D, Macniven R, Hunter K, Gwynn J, Lincoln M, Moir R et al. Enablers and barriers to accessing healthcare services for Aboriginal people in New South Wales, Australia [Internet]. IJERPH. 2021[cited 2022 Oct 6];18(6). DOI: 10.3390/ijerph18063014
9. Chino M, Ring I, Pulver LJ, Waldon, J, King, M. Improving health data for indigenous populations: The international group for indigenous health measurement [Internet]. Stat J IAOS 2019[cited 2022 Oct 6];35(1):15–21. DOI:10.3233/SJI–180479
10. McLeod M, Signal V, Gurney J, Sarfati D. Postoperative mortality of indigenous populations compared with nonindigenous populations. JAMA Surgery. 2020[cited 2022 Oct 6];155(7):636–656. DOI: 10.1001/jamasurg.2020.0316
11. Williams CJ, Kander Y, Law K, Kennedy P, Binge G, Strathdee E. Culturally focused pre-surgery screening to reduce Aboriginal and Torres Strait Islander patient surgical cancellations [Internet]. JPN. 2021[cited 2022 Oct 6];34(3):33–41. DOI: 10.26550/2209-1092.1133
12. Nursing and Midwifery Board of Australia (NMBA). NMBA – Joint statement – Cultural safety: Nurses and midwives leading the way for safer healthcare [Internet]. Canberra: NMBA; 2018 [cited 2022 Oct 7]. Available from: www.nursingmidwiferyboard.gov.au/Codes-Guidelines-Statements/Position-Statements/leading-the-way.aspx
13. Hunter K, Coombes J, Ryder C, Lynch P, Mackean T, Kairuz Santos C et al. Cultural safety training: Analysis of national survey results and literature review [Internet]. Canberra: Australian Commission on Safety and Quality in Health Care; 2022 [cited 2022 Oct 7]. Available from: www.safetyandquality.gov.au/sites/default/files/2022-07/cultural_safety_training_-_analysis_of_national_survey_results_and_literature_review_-_final_report_with_preface.pdf
14. Australian Institute of Health and Welfare (AIHW). Australia's hospitals at a glance [Internet]. Canberra: Australian Government; 2022 [cited 2022 Oct 8]. Available from: www.aihw.gov.au/getmedia/0b67bd7f-b481-464e-bbef-6501151aa7eb/Australia-s-hospitals-at-a-glance.pdf.aspx?inline=true
15. Tang H, Besson A, Deftereos I, Mahon B, Cho J, Faragher I et al. The health-related quality of life changes following surgery in patients with colorectal cancer: A longitudinal study. ANZ J Surg. 2022[cited 2022 Oct 8];92(6):1461–5. DOI: 10.1111/ans.17602
16. World Health Organisation (WHO). Safe surgery [Internet].Geneva: WHO; 2009 [cited 2022 Oct 8]. Available from: www.who.int/teams/integrated-health-services/patient-safety/research/safe-surgery
17. Gobbo M, Saldaña R, Rodríguez M, Jiménez J, García-Vega MI, de Pedro JM et al. Patients' experience and needs during perioperative care: a focus group study. Patient Preference and Adherence. 2020 May [cited 2022 Oct 8];14:891–902.
18. Topp SM, Tully J, Cummins R, Graham V, Yashadhana A, Elliott L et al. Building patient trust in health systems: A qualitative study of facework in the context of Aboriginal and Torres Strait Islander health workers' role in Queensland, Australia. Soc Sci Med. 2022[cited 2022 Oct 7];302:114984. DOI: 10.1016/j.socscimed.2022.114984
19. Wilson AM, Kelly J, Jones M, O'Donnell K, Wilson S, Tonkin E et al. Working together in Aboriginal health: A framework to guide health professional practice. BMC Health Serv Res. 2020 [cited 2022 Oct 7];20(1):1–11. DOI: 10.1186/s12913-020-05462-5
20. Ozaras G, Abaan S. Investigation of the trust status of the nurse–patient relationship. Nurs Ethics. 2018[cited 2022 Oct 8];25(5):628–39. DOI: 0.1177/0969733016664971
21. Australian College of Perioperative Nurses (ACORN). Nursing roles [Internet]. 2022 [cited 2022 Oct 8]. Available from: www.acorn.org.au/nursing-roles
22. Australian College of Perioperative Nurses (ACORN). Anaesthetic nurse. In: Standards for perioperative nurses in Australia, 16th ed, vol. 2, pp. 15–27. Adelaide: ACORN; 2020.
23. Sundqvist A-S, Nilsson U, Holmefur M, Anderzén-Carlsson A. Promoting person-centred care in the perioperative setting through patient advocacy: An observational study. J Clin Nurs. 2018 Jan 8 [cited 2022 Oct 9];27(11–12):2403–15. DOI: 10.1002/hpja.415
24. Ristevski E, Thompson S, Kingaby S, Nightingale C, Iddawela M. Understanding Aboriginal peoples' cultural and family connections can help inform the development of culturally appropriate cancer survivorship models of care. JCO Glob Oncol. 2020[cited 2022 Oct 9];6(6):124–32. DOI: 10.1200/JGO.19.00109
25. Wotherspoon C, Williams CM. Exploring the experiences of Aboriginal and Torres Strait Islander patients admitted to a metropolitan health service. Aust Health Rev. 2019[cited 2022 Oct 9];43(2):217–223. DOI: 10.1071/AH17096
26. Australian College of Perioperative Nurses (ACORN). Visitors to the perioperative environment. In: Standards for perioperative nurses in Australia, 16th ed, vol. 1, p. 335. Adelaide: ACORN; 2020.
27. Mackean T, Withall E, Dwyer J, Wilson A. Role of Aboriginal health workers and liaison officers in quality care in the Australian acute care setting: A systematic review. Aust Health Rev. 2020[cited 2022 Oct 9];44(3):427–33. DOI: /10.1071/AH19101

28. Topp SM, Tully J, Cummins R, Graham V, Yashadhana A, Elliott L et al. Unique knowledge, unique skills, unique role: Aboriginal and Torres Strait Islander health workers in Queensland, Australia. BMJ Glob Health. 2021[cited 2022 Oct 9];6(7):e006028. DOI: 10.1136/bmjgh-2021-006028
29. Jennings W, Bond C, Hill PS. The power of talk and power in talk: A systematic review of indigenous narratives of culturally safe healthcare communication. Aust J Prim Health. 2018[cited 2022 Oct 09;24(2):109–15. DOI: 10.1071/PY17082
30. Bailey J, Blignault I, Renata P, Naden P, Nathan S, Newman J. Barriers and enablers to Aboriginal and Torres Strait Islander careers in health: A qualitative, multisector study in western New South Wales. AJRH. 2021[cited 2022 Oct 10];29(6). DOI: 10.1111/ajr.12764