APPSA Journal

Association for Peri-operative Practitioners in South Africa

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- APPSA is a non-profit organisation which exists for the benefit of its members. This is accomplished by way of congresses, local meetings and travel grants, with the express goal of raising the standard of peri-operative practice in South Africa

- Revenue is raised from, among other sources, the sale of advertising in the APPSA Journal

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Association for Peri-operative Practitioners in South Africa

EDITOR:
Mrs Madeleine Hicklin

PRESIDENT:
Mrs Marilyn de Meyer

VICE-PRESIDENT:
TBC

TREASURER:
Mrs Marianne Oosthuizen

LAYOUT:
Carma Design
Tel: 072 825 3124
email: carma@gonet.co.za

CHAPTERS:

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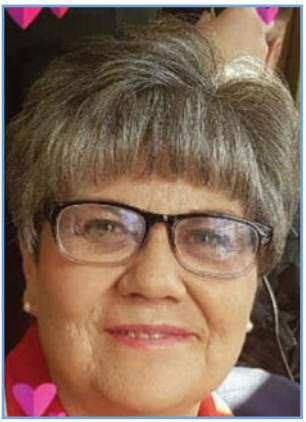

From The PRESIDENT

In the February 2022 APPSA Journal I spoke extensively about returning to 'normal' in the near future as South Africa - and indeed the world - moves towards living with COVID-19.

In Gauteng, in fact the whole of South Africa, we have lived through what appears to have been a milder version of the 5th Wave of COVID-19. While infections have been swift, they have been milder and hospitalisations have not been as severe. Yes, sadly, we have still lost a number of people to this dreadful disease, and there have been many people who have been very ill - many of them younger than they have been before. But we are a resilient people ... and yet again we have overcome and are stronger than we thought we were.

And so we are moving towards normalcy. You will see that this means the relaunch of APPSA by introducing you - our readers and members - to the APPSA Chapter Presidents in all the regions. Why are we doing this? Because we want you to make contact with us, and engage with us, so that we can TRULY become your voice and the only voice of South Africa's Peri-Operative Practitioners. There is a saying that says: You are only as strong as your weakest link. We say we are as only as strong as our members - and you are certainly NOT the weakest link. You are our strength and together WE are an incredible force. When we stand together and work together, we can achieve anything.

We are beginning to organise study days so that everyone can once again be part of the growing band of peri-operative practitioners in South Africa who are at the cutting edge of our profession. The groundswell of people who thirst for knowledge is growing and thia will push us to greatness in the months to come.

We had hoped to hold an APPSA Congress this year. After considerable discussion with all the APPSA Chapter Board members we have decided that is not currently feasible. As regrettable as it may be, it is better to hold an APPSA Congress that is well considered and well organised, rather than one that is rushed merely to have a congress. I know that you will all welcome and thoroughly enjoy the congress when it happens in 2023 - so let us work towards that and look forward to a bumper APPSA Congress next year, and plan accordingly.

As I said before, I want to call all our young Nurse Leaders who have just joined the profession or who are just entering into the profession. Please come forward and join APPSA. Contact your local APPSA Chapter President or the National Office. But please, call us, join us - and help build a better future for South African peri-operative practitioners in 2022.

God Bless
Marilyn de Meyer

From The EDITOR'S DESK

As everyone knows, 12 May was International Nurse's Day. For 2022, the International Council of Nurses (ICN) launched the theme Nurses: A Voice to Lead - Invest in nursing and respect rights to secure global health, focusing on the need to protect, support and invest in the nursing profession to strengthen health systems around the world.

This is a really tall order when one reads a mouthful like that but, in essence, what it calls for is something we really need in South Africa: a concerted investment in nursing education, and peri-operative nursing in particular. The world is still coming to terms with the ravages of COVID-19 and the havoc it has wreaked on our global population - in all walks of life. But none have suffered more than the healthcare profession. As frontline workers, as those at the coalface of this pandemic, little will ever be able to compensate our profession for the lack of preparedness our members suffered for the avalanche that descended upon us.

Burnout in the healthcare fraternity has reached epic proportions. Globally. It is with this in mind that the need to protect, support and invest in nursing (whether we are talking about general nursing or peri-operative practice) has become so critical. In South Africa, this is even more evident as our healthcare system has been in the ICU for a very long time. I have said for a long time, COVID-19 did not break the healthcare system in this country or cause it to fail, but it did reveal the dire state of its 'health' and just how close to collapse it really was. The abject failure in terms of training of adequate staff, both in terms of nursing personnel and doctors, has put a tremendous strain on the already depleted resources. Add to this the burden of failing and broken infrastructure, and the recipe for disaster becomes explosive.

If there is anything positive that can come out of this COVID-19 pandemic it is that our healthcare workers have to be protected, cared for, looked after, and nurtured. AND TRAINED. Added training opportunities have to be made available, courses have to be opened up - across the board, from basic nursing training to the most advanced training options - and in every discipline if the shortage of nursing posts is to be addressed in the years to come. If this is not done, and the National Health Insurance scheme is to be introduced as intended, the healthcare system will crash and never recover.

By current estimation, the number of nurses needed to address global nursing shortage is staggering. As South Africans, we have to do everything in our power to retain our current staff complement and keep them here to look after our own citizens. We need to be united in our efforts to uplift our peri-operative practitioners and our fellow healthcare practitioners. We need to speak with one voice as a united front to create for a profession that uplifts us and protects us in the years to come. Let us come together, united in our common vision of a better peri-operative and healthcare future, for a better South Africa.

Madeleine Hicklin

INTRODUCING
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We are pleased to introduce our countrywide Chapter Presidents. Should you require assistance regarding membership or any information regarding the APPSA organisation please do not hesitate to contact your relevant Chapter President.

MARILYN DE MEYER
APPSA President
Chapter President: Gauteng/Mpumalanga
Theatre Manager: Life Glynwood Hospital
Contact: 011 741 5296 • 083 267 1572
Email: marilyn.demeyer@lifehealthcare.co.za

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Chapter President: Pretoria/Limpopo/North West
Theatre Scrub Sister: Pretoria Eye Institute
Contact: 012 427 0000 • 076 023 4010
Email: kisten4@gmail.com

GRETHA BOTHA
Chapter President: Freestate/Northern Cape
Deputy Nursing Manager: Mediclinic Bloemfontein
Contact: 057 404 6543 • 082 413 2275
Email: gretha.botha@mediclinic.co.za

SHARMEEN ROHIT

Chapter President: KwaZulu Natal
Theatre Unit Manager: Entabeni Hospital
Contact: 031 204 1375 • 082 040 0565
Email: sharmeenrohit@yahoo.com
sharmeen.rohit@lifehealthcare.co.za

DIPUO LUPHINDO

Chapter President: Eastern Cape
Area Manager: Hewu Hospital
Contact: 040 841 0133 • 082 575 7976
Email: dluphindo380@gmail.com

LORAINE SCHUTTE

Chapter President: Western Cape
Perioperative Nursing Lecturer: Stellenbosh University
Contact: 079 493 2197
Email: lorainev@sun.ac.za

COMMUNICATION VULNERABILITY IN SOUTH AFRICAN HEALTHCARE:

The Role Of Augmentative And Alternative Communication

By Kirtsy Bastable and Professor Shakila Dada

ABSTRACT

The term 'communication vulnerability' covers long-term communication disabilities, temporary communication disabilities (for example while on ventilation), language disparities, cultural differences, and low literacy levels.

The right to health is enshrined in the South African Constitution, yet in the presence of communication vulnerability, equal access to healthcare of acceptable quality is frequently not realised. Individuals with communication vulnerability are at risk for decreased participation in the healthcare system, leading to increased risk of lack of treatment adherence and adverse events. The term 'communication vulnerability' covers long-term communication disabilities, temporary communication disabilities (for example, while on ventilation), language disparities, cultural differences, and low literacy levels. A possible mechanism to reduce the effect of communication vulnerability in the healthcare context is the use of augmentative and alternative communication (AAC). AAC uses a range of techniques to supplement language comprehension and replace speech, and may also assist persons with disabilities to express their healthcare needs.

A systematised review was done of the recent literature on use of AAC for persons with communication vulnerability in the healthcare system. The review identified 24 studies, half of which reported on the perceptions of AAC training, use, or systems. Most studies included health professionals as participants. The studies reported positive perceptions of AAC among healthcare professionals, and the effectiveness of both low-technology and high-technology AAC in intensive care, general healthcare, and dental healthcare. The effectiveness of unaided as well as low-technology AAC is most promising for South Africa. The results of the studies are considered in the context of the South African healthcare system, and policy, management and practitioner-level recommendations are suggested for the implementation of AAC.

INTRODUCTION

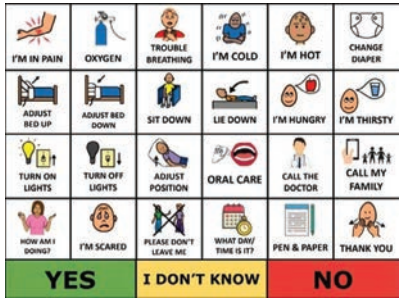
Healthcare is a fundamental right.[1] This includes access to basic and preventive healthcare, rehabilitation, physical and psycho-social support, and healthcare that is acceptable and of good quality.[2] In South Africa, individuals with disabilities face barriers when accessing healthcare, for example, challenges with transport and access to buildings, and disparities in the quality of services received compared with peers without disabilities.[3-8] In particular, these individuals face

higher risks in relation to healthcare quality and safety,[9-13] with preventable adverse events reported three times more frequently than for peers without communication vulnerability.[8, 11, 14, 15] This chapter aims to identify strategies that could facilitate communication participation among individuals with communication vulnerability in the South African healthcare system. Where communication is difficult, the caring philosophy of healthcare professionals can be eroded, and physical-based care can replace psycho-social and communication-based care.[16] A physical care philosophy increases reliance on objective assessments and decreases communication with the individual.[16] However, best practice in health management supports the sharing of information between providers and individuals, in a "process of mutual influence among people, where information serves as the content".[16]

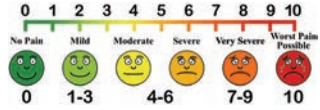
In the absence of mutual communication, declines are seen in treatment adherence and outcomes,[17] empowerment, and participation in healthcare.[18] Communication vulnerability in healthcare is not limited to individuals with established disabilities such as speech, language, hearing, cognitive or visual impairments. Temporary communication vulnerability also arises when a person is intubated or ventilated, such as during the COVID-19 pandemic, or when she or he has had a tracheostomy,[15,16] a stroke, or traumatic brain injury (among other conditions).

Although temporary communication vulnerability may resolve, the person's immediate communication needs cannot be ignored.[7, 8, 19, 20] Disparities in language between the individual and the health professional may also result in communication vulnerability.[3, 21-23] Similarly, individuals with cultural, ethnic, gender, sexual or religious diversity (cultural and linguistic diversity (CALD)), and individuals with low literacy may experience communication vulnerability.[24] For these individuals, both understanding and expression may be impacted, particularly in relation to asking questions and expression of concern and consent.[21, 24] Augmentative and alternative communication (AAC), however, provides a range of techniques and resources that facilitate non-functional communication.[24, 25] AAC includes aided techniques (alphabet boards, picture communication boards, picture-supported text, and speech-generating devices (SGDs) (See Figure 1), as well as unaided techniques (including gestures and signs from sign language).[26]

FIG. 1

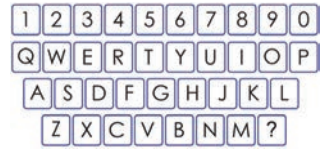


Picture Communication Board



Pain Scale Board

Eye Gaze Board



Alphabet Board

According to researchers in the field, use of AAC in healthcare can decrease the need for sedation and time in intensive care[28] (thus reducing strain on the health system during times such as the COVID-19 pandemic), improve treatment adherence,[25] and increase patient satisfaction[15, 24, 25, 28, 29] and feelings of empowerment associated with increased participation in healthcare.[29]

In South Africa, a minimum of two and a half million people are at risk for communication vulnerability in the healthcare system,[6] and many additional individuals encounter language disparities, CALD, and literacy difficulties. Yet, recent reviews on the use of visual communication aids among individuals with low literacy levels found few studies from low-and middle-income countries.[25,α] This chapter aims to highlight evidence-based recommendations for the healthcare of individuals with communication vulnerability, with a view to informing policy and practice in South Africa. A systematised review was done to identify the existing literature on AAC interventions in healthcare. The results and recommendations are presented in relation to the South African context. A systematised review has a narrow but detailed focus, rather than the broad overview of a scoping review.[30] It has similar search and quality-evaluation processes to a systematic review, but can be applied where a limited number of studies preclude statistical synthesis and meta analysis. [30]

This review included AAC interventions among individuals with communication vulnerability or their healthcare professionals, in healthcare settings. Perceptions of healthcare not related to AAC intervention, and experiences independent of AAC intervention, were excluded. Search terms and databases were identified using the population, intervention and outcomes methodology,[31] followed by piloting. The reference lists of included articles were also hand searched. Title and abstract screening, and full-text screening were conducted by both authors independently. Disagreements were discussed until consensus was reached. Reliability of 97% was found for the title and abstract, and 100% at full-text level. Quality screening of studies was conducted using the National Service Framework for long-term conditions;[32] this was done by the first author and confirmed by the second author (100% agreement). Studies of poor quality were excluded. Twenty-four articles were identified for review: 20 from high income countries and four from middle-income countries (Botswana 1, India 2, and Brazil 1). Data were extracted and synthesised using thematic analysis.[33] Themes relating to where the intervention occurred (for example intensive care, dental care), or with whom (such as adults with amyotrophic lateral sclerosis (ALS), children), and the type of AAC implemented, are reported in Table 1 on page 10 and 12. Additional themes relating to perceptions of AAC, and the effects and type of AAC, are reported in key findings.

KEY FINDINGS

The interventions in this review were implemented in the ICU,[34, 35, 37-41] general healthcare settings, [55–57] and in pre-hospital EMS.[42] The studies primarily targeted nursing staff for training in the use of AAC.[34, 35, 38-40, 55, 58, 59] One study considered the efficacy of remote training for AAC facilitators.[54] Other interventions focused on information sharing, [43,46] and patient-provider communication[44,45] with individuals with communication vulnerability. Communication also targeted individuals with amyotrophic lateral sclerosis[52, 53] or intellectual disabilities.[51] Four studies concluded that AAC improved the compliance of and communication with children who were deaf,[47] or who had autism spectrum disorder,[48, 60] or special needs,[49] during dental healthcare.

Table 1: Type of AAC intervention and results

Type of AAC	Intervention	Results
Communication in the ICU		
LT-AAC	Training of ICU nurses in AAC.[34,35]	Nurses reported: • Increased knowledge, skills and confidence. • A need for management support. • An appreciation of AAC. • Attitude changes. • The need for ongoing skill sharing.
HT-AAC	Introduction of HT-AAC to patients in the ICU and clinical staff.[36-38]	Patients reported that: • HT-AAC was significantly better than no access. • Pre-programmed messages were most successful, but additional strategies were needed as time progressed. • The device was often placed out of reach. Nurses reported that: • The app was easy for nurses and patients to use. • The app facilitated patient communication.
LT-and HT-AAC	Training of ICU nurses.[39-41]	Researchers reported an: • Increase* in communication acts. • Increase* in clarification acts. • Increase* in successful communication of pain. • Increase* in the quality of positive communication from nurses. Nurses reported that: • Challenges were related to patient fatigue, cognitive impairment, reduced muscle strength, time constraints, and the limited number of staff trained. • AAC was not always necessary. • The best way to facilitate communication was through a systematic strategy initiated by the nurse. • Training was helpful for basic communication strategies, but advanced strategies were not always useful.
Communication in general healthcare settings		
LT-AAC	Training of nurses/EMS personnel.[42,43]	EMS personnel and nurses reported: • Increased confidence communicating with individuals with communication vulnerability. • That the supports were helpful and needed.
HT-AAC	Information videos and pictorial supports.[44-46]	Patients reported: • Increased knowledge, skills and satisfaction. • Concerns regarding information access and security on electronic devices. • That a visual application can provide fast, intuitive communication options in emergency situations.
Communication and compliance in dental health care		
Unaided AAC	Training of dentists in sign language.[47]	Researchers reported: • An increase* in understanding after training.
LT-AAC	PECS visual schedule provided to children with ASD.[48]	Researchers reported: • An increase in the number of steps, and speed of completion when PECS was used. • Lower levels of distress when PECS was used.
LT-and HT-AAC	Pre-dental visit information provision for children with special needs, HT- and LT-AAC.[49] A comparison of PECS and HT-AAC for visual schedule presentation to children with ASD.[50]	Researchers reported: • Improvements* in behaviour and dental health care when either HT- or LT-AAC were used. • Children using HT-AAC acquired skills faster.
Communication for individuals with neurological impairments		
Unaided AAC	KWS training for caregivers.[51]	Researchers reported that: • Direct training resulted in increased* use of keyword signing and was more accurate than secondary training. • Attitude did not correlate with KWS usage.

a. Mbanda N, Dada S, Bastable K, Gimbler-Berglund I, Schlosser RW. *A scoping review of the use of visual aids in health education materials for persons with low-literacy levels.* Manuscript submitted for publication.

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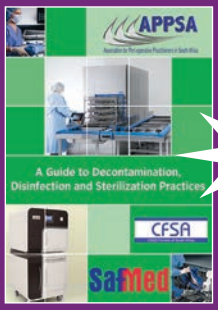

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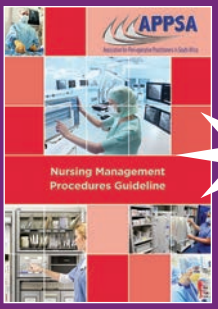

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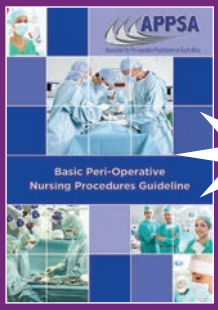

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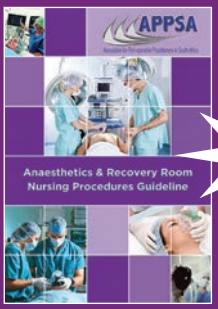

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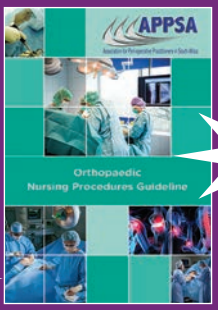

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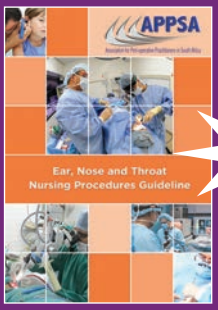

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Type of AAC	Intervention	Results
HT-AAC	HT-AAC implementation.[52,53]	Researchers reported that:
	HT-AAC device training remotely for facilitators.[54]	• Participants were able to use and enjoy the HT-AAC systems in various situations. • Facilitators were successfully trained using the remote training programme.
Anxiety and behaviour management for children		
LT-AAC	Symbol-supported story intervention prior to intervention to explain procedures.[55-57]	Nurses reported: • Use of the LT-AAC as a positive distraction during procedures. • Anxiety reduction, behaviour calming and increased co-operation during assessments and procedures. • An objective measure of cortisol levels did not show differences with the use of the LT-AAC, but methodological challenges were reported.

** A significant difference was reported in the study.*
ASD = autism spectrum disorder; EMS = emergency medical services; HT-AAC = high-technology-aided AAC; ICU = intensive care unit; KWS = key word signing; LT-AAC = low-technology-aided AAC; PECS = picture-exchange communication system.

Perceptions of AAC
Perceptions of high-and low-technology AAC were positive in 12 studies. Nurses reported increased confidence in using AAC to communicate with patients.[34, 35, 38-43, 55] Dependence on management support and lack of time were identified as barriers to the use of AAC.[41] Similarly, individual limitations were identified, including fatigue and low levels of alertness.[34,37,40,41]

Effects of AAC
Use of AAC increased compliance and decreased distress among children with special needs during dental procedures,[48, 49, 59] but was inconclusive in a day hospital setting.[55-57] Studies involving adults with communication vulnerability provided evidence of successful use of high technology AAC among participants.[36, 37, 52, 55]

High-technology or low-technology AAC
Studies comparing the efficacy of low-technology AAC (PECS, symbol-supported stories) and high-technology AAC (iPad apps, interactive videos), reported that high-tech AAC was more effective than low-tech AAC in the ICU[40] and dental health clinics.[49, 60] However, the studies also reported that low-tech AAC was more effective than no AAC.[39,49]

DISCUSSION
AAC could improve communication in healthcare for persons with communication vulnerability. However, for communication to be enhanced through AAC it is imperative that mutual sharing of information be facilitated.[21] Studies in this review reported on the success of mutual information sharing across settings and types of AAC.[36, 43-45, 47-49] The results were primarily from high-income countries, and half of the studies reported only on perceptions of AAC. Although perceptions of healthcare professionals and users can influence the success or abandonment of an AAC system,[61] further clarity on the efficacy of interventions is required. This review highlighted the on-going challenge of physical care taking precedence over psycho-social and communication care, as doctors and rehabilitation professionals (who set the tone for patient care [62, 63]) were found to be largely excluded from AAC training and studies. In South Africa, where systemic

challenges also include ineffective communication and financial and staff shortages,[64] the support of management is particularly relevant, as the pressure exerted on the system drives behaviour in the system. For example, limited staff reduces the time available for each patient and may lead to a physical care focus.[16, 34, 37, 40, 41]

This review also highlighted successful training in basic communication skills [36, 39] using low-technology and high-technology AAC,[34, 35, 42] but emphasised the need for on-going training,[35] supported by communication professionals.[41] In the South African setting, basic communication skills training could be conducted and supported by speech or occupational therapists who have received AAC training, and these interventions should include a range of unaided and low-tech AAC strategies.[37, 39-41] Unaided and low-technology AAC interventions have been found to be effective in improving patient-provider communication[47-49] and require generic materials that are cost-effective and available in most healthcare settings (for example pen and paper, a printer, photographs or real objects).

Although resource-friendly unaided low-tech AAC may be preferred in South Africa, higher-efficacy high-tech AAC [37, 39, 41] should not be overlooked. Specifically, the efficacy of universal technology (for example commercially available tablets or phones) and downloadable applications has been highlighted.[38, 40, 46] Approximately 51% of South African adults are reported to own a smart phone.[65] Hence it may be feasible to implement high-tech AAC with an individual's personal phone/tablet, which she or he can then take home. Use of an individual's personal device may be particularly applicable for individuals with permanent communication vulnerability. Conversely, the suitability of applications needs to be considered, as most are in English and are developed in high-income countries.

In South Africa, training of professionals in the use of AAC and the provision of materials with AAC supports (such as picture communication) could increase the mutual sharing and understanding of information between individuals with communication vulnerability and healthcare professionals, leading to improved participation in healthcare, better health outcomes, and increased empowerment. Nevertheless, this recommendation is made with the caveat that communication varies across cultures, which may impact the perception of symbols[66] or the acceptability of an AAC system, hence a one-size-fits-all model cannot be applied in South Africa.

RECOMMENDATIONS ON USE OF AAC IN THE SOUTH AFRICAN HEALTHCARE SETTING

The following recommendations were developed in alignment with the results of the systematised review and the mission of the National Department of Health, namely to facilitate the development of a culture of communication participation in healthcare.[67] Management and/or leadership recommendations are given in Table 2, and provider education recommendations are given in Table 3. It is recommended that individuals with communication vulnerability be included in all stages of training and implementation.

POLICY RECOMMENDATIONS

It is recommended that national policy be developed on communication vulnerability and the facilitation of communication participation in healthcare. This should help to guide budget and resource allocation.

Table 2: Management/ leadership recommendations – AAC implementation

Aims	Personnel	Intervention
Institutional level		
Facilitate a culture of communication.	Healthcare facility management: financial, medical, nursing, allied health professional, communication, patient-care and support-service managers.	Training on communication vulnerability: • Who has communication vulnerability? • Risk of adverse events, treatment adherence, participation. Staff to drive the culture of communication. Needs identification for AAC: • Training • Materials • Support • Local languages and cultures • Specialised units (ICU,[16] paediatric ICU (PICU),[58] surgical,[15] neurological[24]). Allocation of budget.
Unit level		
Provide training and a support system to grow the culture of communication.	Unit management, healthcare professionals and support services. All staff who come into contact with patients in the unit. Medical doctors should be trained with their unit.	Direct (in person) basic communication skills training with all staff (all shifts). Identification of an individual to lead AAC implementation, encouraging others and ensuring availability of materials (liaise with management). Unit guidelines: • Who determines communication vulnerability? • How will this be recorded? • Where will materials be stored? (in and out of use) Identification of a clearly defined communication support and referral process. Evaluation of training and future needs identification.

Table 3: Practitioner recommendations – AAC education

Phase 1: Pre-need identification of at-risk individuals, and communication needs assessment Communication needs: Training in AAC tools; AAC resources; recording tools for current preferences and needs.
Screen all individuals on entry to the units for communication vulnerability risks, including: • Established communication vulnerability (e.g. ASD, ALS). • Acute-onset speechlessness (e.g. neurological conditions, pulmonary or airway disease, trauma, spinal injury). • At risk (e.g. postoperative intubation or tracheostomy, head and neck surgery). • Individuals with CALD (e.g. language disparities, low literacy). • Individuals receiving palliative care and end-of-life support.
Identify communication needs: Current AAC user: • What is the individual's current communication system? How will the individual access his/her system in the healthcare setting? For example, direct access, partner-assisted scanning, eye gaze, switch access. • Ensure that this communication system is noted and available in the ward. User at risk for short-term communication disability: • Introduce individuals to AAC and train them in the use of the system that will be available when they are unable to speak. • Discuss communication preferences with individuals and their families. • Identify additional needs the individual might want to communicate, but that are not available on the standard board. • Adapt the communication board to meet those needs.
Phase 2: Emerging from sedation Communication needs: To gain attention. AAC for basic communication, and an option to indicate 'what I want to say is not here'.
Ensure that individuals are able to communicate the following needs: • Gain attention, e.g. a communication button or noisemaker. • Express yes/no answers to basic questions. • Express pain. • Express basic needs.
Phase 3: Increased wakefulness Communication needs: Extend communication boards, including mechanisms to format individual communication options or topics.
Provide for: • More complex communication with healthcare providers using symbols and text. • Communication with family, expression of personality, including humour and non-medical communication.
Phase 4: Diverse and broad communication access Communication needs: A complex communication system including multiple modes of communication and the ability to create and use novel messages independently.
A broad communication system is able to support communication across multiple life situations and includes: • Broad vocabulary. • Multiple pages. • A range of communication topics. • Individuals may have multiple systems for use across different settings. • Access methods may change across different environments and over time as a person becomes fatigued.

PRACTITIONER RECOMMENDATIONS

The aim of AAC is `to facilitate communication through a systematic communication strategy'.[38] Santiago and Costello[68] describe three phases of AAC need. An additional`pre-need' phase has been added here. The phases are described in Table 3 seen above.

LIMITATIONS OF THE REVIEW

Limitations of this review include use of a limited date range for the search, and restriction on chapter length. A further limitation was use of studies from high-income countries to guide the development of recommendations for South Africa.

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Professor Shakila Dada is a Professor at the University of Pretoria for the Centre for Augmentative and Alternative Communication. Kirtsy Bastable is a Post-Doctoral Fellow at the University of Pretoria for the Centre for Augmentative and Alternative Communication.

References:

1. Office of the United Nations High Commissioner for Human Rights. Fact Sheet No. 31, The Right to Health. Geneva: OHCHR; 2008. URL: *https://www.ohchr.org/documents/publications/factsheet31.pdf.*
2. Republic of South Africa. Constitution of the Republic of South Africa (Act No. 108 of 1996). URL: *https://www.gov.za/documents/constitution-republic-south-africa-1996.*
3. Gibson JC, O'Connor RJ. *Access to health care for disabled people: A systematic review.* Soc Care Neurodisabil. 2010;1(3):21-31.
4. Rotarou ES, Sakellariou D. *Inequalities in access to health care for people with disabilities in Chile: the limits of universal health coverage.* Crit Public Health. 2017;27(5):604-16.
5. Hurtig RR, Alper RM, Berkowitz B. *The cost of not addressing the communication barriers faced by hospitalized patients.* Perspect ASHA Spec Interest Groups. 2018;3(12):99-112.
6. Sherry K. *Disability and rehabilitation: Essential considerations for equitable, accessible and poverty reducing health care in South Africa.* In: Padarath A, King J, English R, editors. South African Health Review 2014/15. Durban: Health Systems Trust; 2015. p. 89-97.
7. Mutwali R, Ross E. *Disparities in physical access and healthcare utilization among adults with and without disabilities in South Africa.* Disabil Health J. 2019;12(1):35-42.
8. Moodley J, Ross E. *Inequities in health outcomes and access to health care in South Africa: A comparison between persons with and without disabilities.* Disabil Soc. 2015;30(4):630-44.
9. Ward KF, Rolland E, Patterson RA. *Improving outpatient health care quality: Understanding the quality dimensions.* Health Care Manage Rev. 2005;30(4):361-71.
10. Ängerud KH, Boman K, Ekman I, Brännström M. *Areas for quality improvements in heart failure care: quality of care from the patient's perspective.* Scand J Caring Sci. 2017;31(4):830-8.
11. Etchegaray JM, Ottosen MJ, Aigbe A, *et al. Patients as partners in learning from unexpected events.* Health Serv Res. 2016;51:2600-14.
12. Mohammed K, Nolan MB, Rajjo T, *et al. Creating a patient-centered health care delivery system: A systematic review of health care quality from the patient perspective.* Am J Med Qual. 2016;31(1):12-21.

13. Stans SEA, Dalemans RJP, Roentgen UR, Smeets HWH, Beurskens AJHM. *Who said dialogue conversations are easy? The communication between communication vulnerable people and health-care professionals: A qualitative study.* Health Expect. 2018;21(5):848-57.
14. Lang S, Garrido MV, Heintze C. *Patients' views of adverse events in primary and ambulatory care: A systematic review to assess methods and the content of what patients consider to be adverse events.* BMC Fam Pract. 2016;17(1):1-9.
15. Santiago R, Howard M, Dombrowski ND, *et al. Preoperative augmentative and alternative communication enhancement in pediatric tracheostomy.* Laryngoscope. 2020;130(7):1817-22.
16. Handberg C, Voss AK. *Implementing augmentative and alternative communication in critical care settings: Perspectives of healthcare professionals.* J Clin Nurs. 2018;27(1-2):102-14.
17. Náfrádi L, Nakamoto K, Schulz PJ. *Is patient empowerment the key to promote adherence? A systematic review of the relationship between self-efficacy, health locus of control and medication adherence.* PLoS One. 2017;12(10):1-23.
18. Edwards LB, Greeff LE. *Evidence-based feedback about emotional cancer challenges experienced in South Africa: A qualitative analysis of 316 photovoice interviews.* Glob Public Health. 2018;13(10):1409-21.
19. Blackstone SW. *What does the patient want? ASHA Lead.* 2016;21(3):38-44.
20. Turner-Bowker DM, Saris-Baglama RN, Smith KJ, DeRosa MA, Paulsen CA, Hogue SJ. *Heuristic evaluation and usability testing of a computerized patient-reported outcomes survey for headache sufferers.* Telemed J E-Health. 2011;17(1):40-5.
21. Abelsson T, Morténius H, Bergman S, Karlsson AK. *Quality and availability of information in primary healthcare: the patient perspective.* Scand J Prim Health Care. 2020;38(1):33-41.
22. Claassen J, Jama Z, Manga N, Lewis M, Hellenberg D. *Building freeways: piloting communication skills in additional languages to health service personnel in Cape Town, South Africa.* BMC Health Serv Res. 2017;17(1):1-9.
23. Matthews MG, van Wyk JM. *Exploring a communication curriculum through a focus on social accountability: A case study at a South African medical school.* Afr J Prim Health Care Fam Med. 2018;10(1):1-10.
24. Blackstone SW, Pressman H. *Patient communication in health care settings: new opportunities for augmentative and alternative communication.* Augment Altern Commun. 2016;32(1):69-79. 116 South African Health Review 2020.
25. Park J, Zuniga J. *Effectiveness of using picture-based health education for people with low health literacy: An integrative review.* Cogent Med. 2016;3(1264679):1-14.
26. Beukelman DR, Mirenda P. *Augmentative and Alternative Communication: Supporting children and adults with complex communication needs.* 4th ed. Baltimore, MD: Paul H. Brookes; 2013.
27. DART – Centre for AAC and AT. Bildstöd. URL: *http://bildstod.se.*
28. Happ MB, Roesch TK, Garrett K. *Electronic voice-output communication aids for temporarily non-speaking patients in a medical intensive care unit: A feasibility study.* Heart Lung. 2004;33(2):92-101.
29. Patak L, Gawlinski A, Fung NI, Doering L, Berg J, Henneman EA. *Communication boards in critical care: patients' views.* Appl Nurs Res. 2006;19(4):182-90.
30. Grant MJ, Booth A. *A typology of reviews: An analysis of 14 review types and associated methodologies.* Health Info Libr J. 2009;26(2):91-108.
31. Schlosser RW, Koul R, Costello J. *Asking well-built questions for evidence-based practice in augmentative and alternative communication.* J Commun Disord. 2007;40(3):225-38.
32. The UK Department of Health Long-term Conditions NSF Team. The National Service Framework for Long-term Conditions; 2005. URL: *https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/198114/National_Service_Framework_for_Long_Term_Conditions.pdf.*
33. Clarke V, Braun V. *Thematic analysis.* Journal of Positive Psychology. 2017;12(3):297-8.

34. Dithole KS, Thupayagale-Tshweneagae G, Akpor OA, Moleki MM. *Communication skills intervention: promoting effective communication between nurses and mechanically ventilated patients.* BMC Nurs. 2017;16:1-6.
35. Vento-Wilson MT, McGuire A, Ostergren JA. *Augmentative and alternative communication for acute care patients with severe communication impairments.* Dimens Crit Care Nurs. 2015;34(2):112-9.
36. Hurtig RR, Alper RM, Bryant KNT, Davidson KR, Bilskemper C. *Improving patient safety and patient-provider communication.* Perspect ASHA Spec Interest Groups. 2019;4(5):1017-27.
37. Rodriguez C, Rowe M. *Use of a speech-generating device for hospitalized postoperative patients with head and neck cancer experiencing speechlessness.* Oncol Nurs Forum. 2010;37(2):199-205.
38. Santiago C, Roza D, Porretta K, Smith O. *The use of tablet and communication app for patients with endotracheal or tracheostomy tubes in the medical surgical intensive care unit: A pilot, feasibility study.* Can J Crit Care Nurs. 2019;30(1):17-23.
39. Happ MB, Garrett KL, Tate JA, *et al. Effect of a multilevel intervention on nurse-patient communication in the intensive care unit: Results of the SPEACS trial.* Heart Lung. 2014;43(2):89-98.
40. Holm A, Dreyer P. *Use of communication tools for mechanically ventilated patients in the intensive care unit.* Comput Inform Nurs. 2018;36(8):398-405.
41. Radtke J V, Tate JA, Happ MB. *Nurses' perceptions of communication training in the ICU. Intensive* Crit Care Nurs. 2012;28(1):16-25.
42. Eadie K, Carlyon MJ, Stephens J, Wilson MD. *Communicating in the pre-hospital emergency environment.* Aust Health Rev. 2013;37(2):140-6.
43. Thunberg G, Ferm U, Blom Å, Karlsson M, Nilsson S. *Implementation of pictorial support for communication with people who have been forced to flee: Experiences from neonatal care.* J Child Health Care. 2019;23(2):311-36.
44. Ferguson M, Maidment D, Henshaw H, Gomez R. *Knowledge is power: Improving outcomes for patients, partners, and professionals in the digital age.* Perspect ASHA Spec Interest Groups. 2019;4(1):140-8.
45. Piper AM, Hollan JD. *Supporting medical communication for older patients with a shared touch-screen computer.* Int J Med Inform. 2013;82(11):e242-50.
46. Wołk K, Wołk A, Glinkowski W. *A cross-lingual mobile medical communication system prototype for foreigners and subjects with speech, hearing, and mental disabilities based on pictograms.* Comput Math Methods Med. 2017: Article ID 4306416.
47. Jain S, Duggi V, Avinash A, Dubey A, Fouzdar S, Sagar MK. *Restoring the voids of voices by signs and gestures, in dentistry: A cross-sectional study.* J Indian Soc Pedod Prev Dent. 2017;35(2):115-22.
48. Mah JWT, Tsang P, Mah JWT. *Visual schedule system in dental care for patients with autism: A pilot study.* J Clin Pediatr Dent. 2016;40(5):393-9.
49. Grewal N, Sethi T, Grewal S. *Widening horizons through alternative and augmentative communication systems for managing children with special health care needs in a pediatric dental setup.* Spec Care Dentist. 2015;35(3):114-9.
50. Zink AG, Molina EC, Diniz MB, Rodrigues Santos MTB, Guaré RO, Santos MTBR. *Communication application for use during the first dental visit for children and adolescents with autism spectrum disorders.* Pediatr Dent. 2018;40(1):18-22.
51. Rombouts E, Maes B, Zink I. *Attitude and key word signing usage in support staff.* Res Dev Disabil. 2016;55:77-87.
52. Ball LJ, Nordness AS, Fager SK, *et al. Eye-gaze access to AAC technology for people with amyotrophic lateral sclerosis.* J Med Speech Lang Pathol. 2010;18(3):11-23.
53. Lancioni GE, Simone IL, De Caro M, *et al. Assisting persons with advanced amyotrophic lateral sclerosis in their leisure engagement and communication needs with a basic technology-aided program.* NeuroRehabilitation. 2015;36(3):355-65.

54. Quinn E, Beukelman D, Thiessen A. *Remote instruction of potential AAC support personnel.* Perspect Augment Altern Commun. 2011;20(3):97-101.
55. Drake J, Johnson N, Stoneck A V, Martinez DM, Massey M. *Evaluation of a coping kit for children with challenging behaviors in a pediatric hospital.* Pediatr Nurs. 2012;38(4):215-21.
56. Nilsson S, Buchholz M, Thunberg G. *Assessing children's anxiety using the Modified Short State-Trait Anxiety Inventory and talking mats: A pilot study.* Nurs Res Pract. 2012;2012:1-7.
57. Thunberg G, Törnhage C-J, Nilsson S. *Evaluating the impact of AAC interventions in reducing hospitalization related stress: Challenges and possibilities.* Augment Altern Commun. 2016;32(2):143-50.
58. Radtke JV, Baumann BM, Garrett KL, Happ MB. *Listening to the voiceless patient: Case reports in assisted communication in the intensive care unit.* J Palliat Med. 2011;14(6):791-5.
59. Holmqvist E, Thunberg G, Dahlstrand MP. *Gazecontrolled communication technology for children with severe multiple disabilities: Parents and professionals' perception of gains, obstacles, and prerequisites.* Assist Technol. 2018;30(4):201-8.
60. Zink AG, Diniz MB, Rodrigues dos Santos MTB, Guaré RO. *Use of a picture exchange communication system for preventive procedures in individuals with autism spectrum disorder: pilot study.* Spec Care Dent. 2016;36(5):254-9.
61. Moorcroft A, Scarinci N, Meyer C. *A systematic review of the barriers and facilitators to the provision and use of low-tech and unaided AAC systems for people with complex communication needs and their families.* Disabil Rehabil Assist Technol. 2019;14(7):710-31.
62. Agaronnik N, Campbell EG, Ressalam J, Iezzoni LI. *Communicating with patients with disability: Perspectives of practicing physicians.* J Gen Intern Med. 2019;34(7):1139-45.
63. Gilmore M, Sturgeon A, Thomson C, *et al. Changing medical students' attitudes to and knowledge of deafness: a mixed methods study.* BMC Med Educ. 2019;19(1):227.
64. Abrahams N, Gilson L, Levitt NS, Dave JA. *Factors that influence patient empowerment in inpatient chronic care: Early thoughts on a diabetes care intervention in South Africa.* BMC Endocr Disord. 2019;19(1):1-11.
65. Silver L, Johnson C. *Majorities in sub-Saharan Africa own mobile phones, but smartphone adoption is modest.* Pew Research Center, Global Attitudes & Trends; 9 October 2018. URL: *https://www.pewresearch.org/global/2018/10/09/majorities-in-sub-saharan-africa-own-mobile-phones-but-smartphone-adoption-is-modest/.*
66. Blake Huer M. *Examining perceptions of graphic symbols across cultures: Preliminary study of the impact of culture/ethnicity.* Augment Altern Commun. 2004;16(3):180-5.
67. South African National Department of Health. Vision and mission; 2020. URL: *http://www.health.gov.za/index.php/shortcodes/vision-mission.*
68. Santiago R, Costello JM. *AAC Assessment and intervention in pediatric ICU/acute care: From referral through continuum of care.* Perspect Augment Altern Commun. 2013;22(2):102-11.

PRE-OPERATIVE MANAGEMENT OF CAESAREAN SECTION-RELATED HAEMORRHAGE IN A MATERNAL NEAR-MISS POPULATION: A Retrospective Study

By R Iputo,[1] S Maswime,[2] P Motshabi[2]

ABSTRACT

Background: Maternal near-miss (MNM) is a risk stratification for maternal morbidity. The purpose of this study was to describe the peri-operative care given in the management of this particular population of women who have undergone a caesarean section (CS).

Methods: This was a retrospective, descriptive study at a single tertiary institute over a one-year period (01 January to 31 December 2018) at the Chris Hani Baragwanath Academic Hospital. The aim of this study was to describe the anaesthetic and surgical management of CS-related haemorrhage in an MNM population. The primary objectives were to determine the MNM rate from CS-related obstetric haemorrhage during the study period, and to describe the intervention strategies employed in peri-operative management for women with CS-related obstetric haemorrhage. The secondary objectives were to determine factors associated with massive transfusion and major estimated blood loss. The primary outcome was the MNM rate for CS deliveries.

Results: A total of 8 306 women had CS of whom 105 (1.26%) were classified as MNM due to bleeding during and after the procedure. The median age was 28, with a median parity of 2 (44%), and overall estimated median (IQR) blood loss volume of 1 800ml (1 200ml to 2 100ml). The leading cause of haemorrhage was post-partum haemorrhage (87%). Eighteen (17%) of the women had relook surgery for post-partum CS sepsis. Age and parity of ≥ 3 had a uni-variate association with major estimated blood loss. The use of general anaesthesia (GA) and parity of ≥ 3 had an adjusted association with the institution of massive transfusion protocol (adjusted odds ratio [aOR] 5.28, 95% confidence interval [CI] 1.03 to 27.01 and aOR 3.88, 95% CI 1.47 to 10.25, respectively).

Conclusion: MNM from bleeding during or after a CS occurred in approximately 1 in 80 women who delivered by CS. These women required multiple interventions to arrest the haemorrhage and to achieve haemodynamic stability. Women with a higher parity and undergoing general anaesthesia were associated with severe bleeding. Approximately 1 in 4 women required an exploratory laparotomy and less than 7% required a hysterectomy.

BACKGROUND

The World Health Organisation (WHO) considers any health condition attributed to, or aggravated by, pregnancy and childbirth which has negative effects on maternal wellbeing, as maternal morbidity.[1] Severe acute maternal morbidity is also referred to as a maternal near-miss (MNM) and has been defined by the WHO as any woman who nearly dies from either a complication of pregnancy, or within 42 days of delivery or termination of the pregnancy.[1] The MNM classification was first described by Mantel *et al.*[2] who subdivided these criteria into an organ-based system

classification (end organ dysfunction) and a management-based system classification (emergency hysterectomy and massive blood transfusion), and which has been widely used internationally. Although caesarean section (CS) has been shown to reduce maternal and neonatal adverse outcomes, the increase in CS in high-income countries has not translated into improvements for maternal outcomes,[3] where very high rates of CS may lead to increases in mortality. Concomitantly, very low CS rates as seen in low-income and middle-income countries due to the lack of access to CS may also substantially increase mortality. Maternal morbidity from perioperative haemorrhage is a cause for concern. Post-partum haemorrhage (PPH) after CS accounts for 9.3% and 45.7% of maternal deaths, in high-income and low-income countries respectively.[4, 5] In our institution, the prevalence of MNM and its peri-operative course and management, which depends on a multi-disciplinary team, has not been well described. The aim of this study is to describe the anaesthetic and surgical management of CS-related haemorrhage in an MNM population.

METHODS

This was a single centre, observational study at the Chris Hani Baragwanath Academic Hospital (CHBAH) maternity theatre complex. CHBAH is a tertiary state hospital attached to the University of the Witwatersrand. It is situated in Soweto, a suburb of Johannesburg, and serves a majority African population with a lower-income to middle-income socio-economical background. It houses approximately 3 700 beds, 300 of which are obstetric, with an average of 4 500 CSs performed per annum.[6] This study has a retrospective, contextual and descriptive design. Approval to conduct the study was granted by the University of Witwatersrand Human Research Ethics Committee (M190516). Data were extracted from the medical records of women who underwent a CS during the period 01 January 2018 to 31 December 2018, and who met the criteria for MNM and intra-operative or post-operative haemorrhage with an estimated blood loss (EBL) > 1 000ml. At the CHBAH, a modified WHO MNM criteria was used, reflecting only the intervention classification suitable to limited resource settings: hysterectomy; exploratory laparotomy; ventilation; intensive care unit (ICU) admission; dialysis; and massive transfusion (MTF). MTF is defined as transfusion of ≥ 4 units of packed red cells (PRC). Major EBL is defined as ≥ 2 000ml which is consistent with the Royal College of Obstetricians and Gynaecologists (RCOG) guidelines.[7]

The primary objectives of this study were to determine the MNM rate from CS-related obstetric haemorrhage during the study period, and to describe the intervention strategies employed in the peri-operative management of women with CS-related obstetric haemorrhage. The primary outcome was the MNM rate for CS deliveries. The secondary objectives were to determine the factors associated with MTF and major EBL. Two sub-population groups were delineated based on the timing of haemorrhage and MNM classification: women who were identified as MNM at the time of CS delivery; and those who were identified as MNM at the time of an exploratory laparotomy after CS.

STATISTICAL ANALYSIS

Descriptive statistics were used to analyse numerical data. Demographic data were presented as median and interquartile range (IQR) because data were not normally distributed, and categories were reported as proportions and percentages. Parametric data were compared using

the Mann-Whitney and Wilcoxon test, and the Kruskal Wallis test which are used to compare three and more datasets. Associations were determined by using univariate regression analysis between MTF and clinically relevant variables and major EBL and clinically relevant variables. The results of the univariate regression analysis with a p-value of ≤ 0.1 were included in the multivariable regression analysis. Statistical significance was set at $p < 0.05$. Results were analysed using SAS© version 9.4 (SAS Inc. Cary, NC, USA).

RESULTS

A total of 105 (1.26%) out of 8 306 women were classified as MNM due to bleeding during and after CS during the study period at the CHBAH (see Figure 1). The median (IQR) EBL was 1 800ml (1 200ml to 2 100ml). The median (IQR) age was 28 years (24 to 32), and the majority of the patients (46%) were classified as American Society of Anaesthesiology (ASA) II. In most women (82%), PPH was recorded as the main cause of haemorrhage (see Table I). Univariate regression analysis demonstrated that the severity of bleeding was associated with age, parity, primary indication for surgery and whether the CS was the index procedure (see Table I).

The association between management strategies and EBL are shown in Table II. An increased median (IQR) EBL was found in patients who had a conversion from spinal anaesthesia (SA) to general anaesthesia (GA) ($p = 0.007$), who received a combination of blood products including PRC, FFP, PLT and cryoprecipitate ($p < 0.001$), tranexamic acid (TXA) ($p < 0.001$) and who had surgical interventions such as balloon tamponade or hysterectomy ($p < 0.001$) (see Table II).

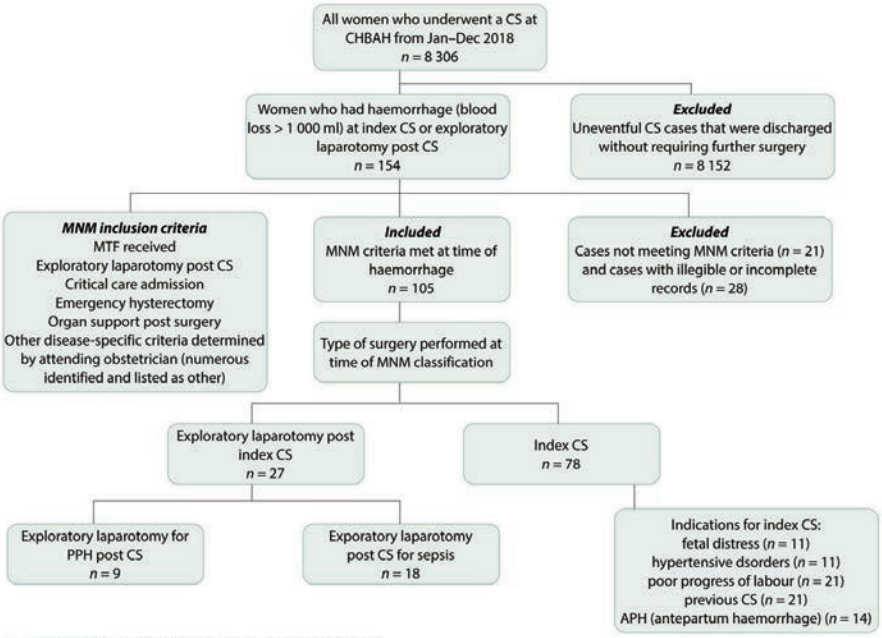

Figure 1: STROBE flow diagram of inclusion and exclusion criteria

Table I: Demographic and clinical characteristics with estimated blood loss

Variable		Proportions	Estimated blood loss in ml	p-value
		n (%)	median (IQR)	
Age in years	≤ 27	50 (48)	1 500 (1 200–2 000)	0.0045
	> 27	55 (52)	1 800 (1 300–2 250)	
Parity	1	20 (19)	1 450 (1 200–1 950)	0.0185
	2	47 (45)	1 600 (1 200–2 000)	
	3	24 (23)	2 125 (1 500–2 450)	
	4	13 (12)	1 800 (1 400–2 000)	
ASA status	1	40 (38)	1 550 (1 200–2 025)	0.8043
	2	48 (46)	1 800 (1 225–2 100)	
	3	17 (16)	1 800 (1 300–2 250)	
Main cause of haemorrhage	Antepartum	2 (2)	1 400 (1 000–1 800)	0.0002
	Intrapartum	5 (5)	1 200 (1 100–1 300)	
	Postpartum	86 (82)	2 000 (1 500–2 150)	
	Combination	12 (11)	2 400 (2 100–2 500)	
Primary indication for surgery	APH	14 (13)	2 250 (2 000–2 500)	< 0.001
	Hypertensive disorder	11 (11)	1 800 (1 200–2 000)	
	Fetal distress	11 (11)	1 300 (1 050–2 050)	
	Poor progress of labour	21 (20)	2 000 (1 600–2 250)	
	Previous CS	21 (20)	2 000 (1 600–2 100)	
	PPH post CS	9 (9)	1 250 (1 200–1 400)	
	Relook laparotomy for sepsis post CS	18 (17)	1 175 (1 080–1 300)	
Timing of surgery	Day	32 (31)	1 550 (1 150–2 200)	0.5529
	Night	73 (70)	1 800 (1 250–2 050)	
Type of surgery	CS	78 (74)	1 900 (1 400–2 200)	< 0.0001
	EL post CS	27 (26)	1 175 (1 100–1 300)	

MNM – maternal near-miss, APH – antepartum haemorrhage, PPH – postpartum haemorrhage, EL – exploratory laparotomy, CS – caesarean section

Table II: Comparison between estimated blood loss and management strategies

Variable		Proportions	Estimated blood loss in ml	p-value
		n (%)	median (IQR)	
Anaesthesia technique	Spinal	23 (23)	1 400 (1 100–1 800)	0.0007
	GA	48 (47)	1 400 (1 175–2 000)	
	Conversion	31 (30)	2 000 (1 500–2 300)	
Blood product administration	PLT only	1 (1)	1 500 (1 500–1 500)	< 0.001
	PRC only	37 (41)	1 500 (1 150–1 800)	
	PRC + FFP	16 (18)	1 500 (1 200–2 050)	
	PRC + PLT	5 (6)	1 300 (1 200–2 000)	
	PRC + FFP + PLT	29 (32)	2 200 (2 000–2 300)	
	PRC + FFP + PLT + cryoprecipitate	3 (3)	2 600 (2 500–2 700)	
IV fluids	Crystalloids only	66 (65)	1 600 (1 200–2 100)	0.1329
	Crystalloids and colloids	36 (35)	2 000 (1 350–2 100)	
Tranexamic acid use	Yes	68 (65)	2 000 (1 300–2 225)	0.0003
	No	37 (35)	1 300 (1 150–1 800)	
Uterotonic drugs	Oxytocin	53 (52)	1 800 (1 200–2 000)	0.1657
	Oxytocin + ergometrine	50 (49)	1 800 (1 400–2 200)	
Surgical intervention	B-Lynch procedure	14 (14)	2 000 (1 800–2 100)	< 0.0001
	Balloon tamponade	18 (17)	2 200 (1 900–2 300)	
	Hysterectomy	7 (6.73)	2 200 (1 200–2 500)	
	Other	37 (36)	1 300 (1 150–2 000)	
	Not documented	28 (27)	1 400 (1 100–1 650)	
Outcome	ICU	9 (9)	2 200 (1 500–2 500)	0.1158
	High care	96 (91)	1 650 (1 200–2 000)	
MNM criteria	Ventilated	4 (4)	1 100 (1 000–1 250)	< 0.001
	Massive transfusion	20 (19)	2 000 (1 400–2 275)	
	Relook laparotomy	18 (17)	1 175 (1 100–1 300)	
	Combination	33 (31)	2 100 (2 000–2 500)	
	Other	30 (29)	1 550 (1 200–1 800)	

GA – general anaesthesia, APH – antepartum haemorrhage, PPH – postpartum haemorrhage, EL – exploratory laparotomy, CS – caesarean section, EL – exploratory laparotomy, PRC – packed red cells, PLT – platelets, FFP – fresh frozen plasma, ICU – intensive care unit

The majority of women with increased median (IQR) EBL experienced a combination of MNM criteria including ventilation, MTF and relook laparotomy ($p < 0.001$). The intervention rate was 17% for uterine balloon tamponade, 14% for haemostatic suture (B-Lynch) and 6% for hysterectomy. Univariate associations with major EBL are shown in Table III. Women with major EBL (≥ 2 000ml) had a median age of 30 and a higher parity, and were undergoing an index CS at the time of MNM classification. They also had a significantly higher number of multiple interventions such as GA, MTF, TXA, surgical interventions (particularly balloon tamponade) and ICU admission. The main cause of haemorrhage was PPH in both EBL groups.

Table III: Comparison between categories of blood loss and perioperative factors

Variable		Estimated blood loss 1 000–2 000 ml (*n* = 77), *n* (%)	Estimated blood loss ≥ 2000 ml (*n* = 28), *n* (%)	*p*-value
Age years, median (IQR)		27 (23–31)	30 (27–33)	0.0129
Parity	1	17 (22)	3 (11)	< 0.001
	2	38 (40)	9 (32)	
	3	11 (14)	13 (46)	
	4	10 (13)	3 (11)	
ASA classification	1	30 (39)	10 (36)	0.0414
	2	35 (46)	13 (46)	
	3	12 (16)	5 (18)	
Indication for surgery	CS – hypertensive disorder	10 (13)	1 (4)	< 0.0001
	CS – fetal distress	8 (10)	3 (11)	
	CS – poor labour progress	13 (17)	8 (29)	
	APH	4 (5)	10 (36)	
	EL for PPH	9 (12)	-	
	EL for sepsis	18 (23)	-	
	CS for previous CS	15 (20)	6 (21)	
MNM criteria	Ventilated	4 (5)	-	< 0.001
	Massive transfusion	13 (17)	7 (25)	
	Relook laparotomy	18 (23)	-	
	Combination	14 (19)	19 (68)	
	Other	28 (36)	2 (7)	
Main cause of haemorrhage	Antepartum	2 (3)	-	< 0.0001
	Postpartum	67 (87)	19 (68)	
	Intrapartum	5 (7)	-	
	Combination	3 (4)	9 (32)	
Anaesthesia technique	Spinal anaesthesia	22 (29)	1 (4)	0.0003
	General anaesthesia	37 (48)	11 (44)	
	Conversion	18 (23)	13 (52)	
Uterotonic agents	Oxytocin	42 (56)	11 (39)	0.0573
	Oxytocin + ergometrine	33 (44)	17 (61)	
Tranexamic acid use	Yes	43 (56)	25 (89)	0.0008
	No	34 (44)	3 (1)	
Blood products	PRC only	35 (56)	2 (7)	< 0.0001
	PLT only	1 (2)	-	
	PRC + FFP	12 (19)	4 (14)	
	PRC + FFP + PLT	11 (18)	18 (64)	
	PRC + PLT	4 (6)	1 (4)	
	PRC + FFP + PLT + cryoprecipitate	-	3 (11)	
Surgical intervention	B-Lynch procedure	10 (13)	4 (15)	< 0.0001
	Balloon tamponade	6 (8)	12 (44)	
	Hysterectomy	2 (3)	5 (19)	
	None documented	32 (42)	5 (19)	
	Other	27 (35)	1 (4)	

IQR – interquartile range, MNM – maternal near-miss, APH – antepartum haemorrhage, PPH – postpartum haemorrhage, EL – exploratory laparotomy, CS – caesarean section, EL – exploratory laparotomy, PRC – packed red cells, PLT – platelets, FFP – fresh frozen plasma

The independent associations with major EBL and MTFs are shown in Table IV and Table V, respectively. There were no independent associations for major EBL (see Table IV), and GA and parity of ≥ 3 were independently associated with MTF (see Table V).

Table IV: Factors associated with major estimated blood loss

Parameter		uOR (95% CI)	*p*-value	aOR (95% CI)	*p*-value
Age		1.12 (1.03–1.22)	0.006	1.09 (0.99–1.20)	0.073
Parity	1 and 2	1 (base)		1 (base)	
	3 and more	2.71 (1.19–6.15)	0.018	1.54 (0.58–4.08)	0.387
ASA classification	1	1 (base)			
	2	1.97 (0.82–4.77)	0.131		
	3	2.33 (0.71–7.67)	0.163		

ASA – American Society of Anaesthesiology, uOR – unadjusted odds ratio, aOR – adjusted odds ratio

Table V: Factors associated with massive transfusion

Parameter		uOR (95% CI)	*p*-value	aOR (95% CI)	*p*-value
Parity	1 and 2	1 (base)		1 (base)	
	3 and more	3.35 (1.35–8.30)	0.009	3.88 (1.47–10.25)	0.006
ASA classification	1	1 (base)			
	2	1.575 (0.59–4.15)	0.359		
	3	2.8 (0.76–10.26)	0.120		
Anesthetic technique	Regional	1 (base)		1 (base)	
	General	4.65 (0.96–22.32)	0.055	5.28 (1.03–27.01)	0.045
Timing of surgery	Day	1 (base)			
	Night	1.16 (0.452–2.95)	0.762		

ASA – American Society of Anaesthesiology, uOR – unadjusted odds ratio, aOR – adjusted odds ratio

DISCUSSION

The key findings of this study were that a total of 1.26% of all CSs were classified as MNM due to bleeding during and after the CS with intervention rates of 17% for uterine balloon tamponade, 14% for haemostatic suture (B-Lynch) and 6% for hysterectomy. The African Surgical Outcomes Study (ASOS) described a maternal mortality rate of 0.5% in 3 684 women, with severe intra-operative and post-operative bleeding for 3.8% of the women.[8] In contrast to this multi-country multi-centre study, the current study was conducted at a tertiary facility where women often have 24-hour access to specialist and multi-disciplinary care, which is not the case in the majority of hospitals in low-income and middle-income countries.

Parity of ≥ 3 and GA were independently associated with MTF. This finding is predictable as the nature of severe bleeding perioperatively often requires that women be managed under GA as the circumstances demand comprehensive interventions aimed at maintaining systemic and haemodynamic stability. A previous study found that although GA was associated with a higher blood loss than SA, the need for blood transfusion was not necessarily greater.[9] Similarly, our data showed that women who received GA, especially those who were converted from SA to GA, had significantly higher intra-operative EBL than those who only received SA. The increased need for transfusion has been shown to be almost certainly related to the underlying disease process (APH, pre-eclampsia and placenta praevia/accreta), that often preclude the use of neuraxial anaesthesia techniques.[10] Equally, pre-morbid disease such as pregnancy-induced hypertension which is a well-described risk factor for APH, especially abruptio placentae,[11] may be accompanied by thrombocytopaenia or altered consciousness/seizures. These scenarios would also preclude the use of neuraxial anaesthetic techniques.[12]

Overall, 47% of patients were classified as ASA II, implying the presence of systemic disease without target organ damage.[13] The ASA classification, which is observer dependent, has often been criticised due to its failure as a good predictor of post-operative mortality.[14] This study population had a median age of 28 years and median parity of 2. Notably, the APH group included older and more multiparous women, which corroborates the observation of a higher incidence of morbidity with advancing age and parity. Comparable sociodemographic data have been reported for women in Brazil and France.[15] Only 19% of the women received an MTF.

A recent report from the United Kingdom, in which MTF was defined as a transfusion of more than 10 units of packed red blood cells (PRBC), described a lower transfusion rate of 8.5 per 10 000 deliveries (0.085%), with half of all MTF related to CS.[16] Our institute has a limited number of blood banks and shortages of blood, MTF is thus classified as 4 units of blood or more. Despite major EBL, these women survived the MNM event and less than a tenth required a hysterectomy to arrest haemorrhage. Surgical interventions are employed when pharmacological management alone fails. Hysterectomy is seen as a last resort intervention for protracted bleeding.[17]

A strength of this study is that it described the outcomes for women with MNM from bleeding during and after CS in an African hospital which serves a very large population in South Africa, and it outlined both the anaesthetic and surgical management of major EBL and MNM during and after CS, using peri-operative data. The results describe which intra-operative interventions were implemented. Process mapping may be a better indicator of the access and quality of care available.

STUDY LIMITATIONS

It is a retrospective study and is therefore limited by the quality and completeness of hospital records. Maternal deaths were not included in the study. The population MNM rate, including non-CS patients, was not determined and should be a subject of future studies.

CONCLUSION

MNM from bleeding during or after CS occurred in approximately one in 80 women who delivered by CS. A higher parity was associated with severe bleeding and management requiring GA. Multiple interventions were required to arrest haemorrhage and achieve haemodynamic stability. Exploratory laparotomy was required in approximately one in four patients, while hysterectomy to arrest haemorrhage was required in less than 7% of the patients. This highlights the importance of the anaesthetist's role in the fluid resuscitation and medical management of a bleeding patient during a CS.

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RA Iputo is from the Department of Anaesthesiology, School of Clinical Medicine, Faculty of Health Sciences, University of the Witwatersrand, South Africa

S Maswime and P Motshabi are from the Department of Anaesthesiology, School of Clinical Medicine, Faculty of Health Sciences, University of the Witwatersrand, South Africa

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References:

1. Donati S, Senatore S, Ronconi A. *Obstetric near-miss cases among women admitted to intensive care units in Italy.* Acta Obstet Gynecol Scand. 2012;91(4):452-7. *https://doi.org/10.1111/j.1600-0412.2012.01352.x.*

2. Mantel GD, Buchmann E, Rees H, Pattinson RC. *Severe acute maternal morbidity: a pilot study of a definition for a near-miss.* Br J Obstet Gynaecol. 1998;105(9):985-90. *https://doi.org/10.1111/j.1471-0528.1998.tb10262.x.*

3. Kallianidis AF, Schutte JM, Van Roosmalen J, Van den Akker T. *Maternal mortality after cesarean section in the Netherlands.* Eur J Obstet Gynecol Reprod Biol. 2018;229:148-52. *https://doi.org/10.1016/j.ejogrb.2018.08.586.*

4. Biccard BM, Alphonsus CS, Bishop DG, *et al. National priorities for perioperative research in South Africa.* S Afr Med J. 2016;106(5):58-9. *https://doi.org10.7196/ SAMJ.2016.v106i5.10269.*

5. Tuncalp O, Hindin MJ, Souza JP, Chou D, Say L. *The prevalence of maternal near miss: a systematic review.* BJOG. 2012;119(6):653-61. *https://doi.org/10.1111/j.1471-0528.2012.03294.x.*

6. Chris Hani Baragwanath Academic Hospital. The world's 3rd biggest hospital in South Africa [Internet]. Available from: *https://www. chrishanibaragwanathhospital.co.za/contact.* Accessed 10 Jun 2020.

7. Mavrides E, Allard S, Chandraharan E, *et al. Postpartum haemorrhage, prevention and management (green-top guideline no. 52).* London, UK: Royal College of Obstetricians and Gynaecologists; 2016 [updated 2021]. Available from: *https://www.rcog.org.uk/en/guidelines-research-services/guidelines/gtg52/.* Accessed 10 Jun 2021.

8. Bishop D, Dyer RA, Maswime S, *et al. Maternal and neonatal outcomes after caesarean delivery in the African Surgical Outcomes Study: a 7-day prospective observational cohort study.* Lancet Glob Health. 2019;7(4):e513-e22. *https://doi.org/10.1016/s2214-109x(19)30036-1.*

9. Heesen M, Hofmann T, Klöhr S, *et al. Is general anaesthesia for caesarean section associated with postpartum haemorrhage? Systematic review and meta-analysis.* Acta Anaesthesiol Scand. 2013;57(9):1092-102. *https://doi.org/10.1111/aas.12178.*

10. Fadl SA, Linnau KF, Dighe MK. *Placental abruption and hemorrhage-review of imaging appearance.* Emerg Radiol. 2019;26(1):87-97. *https://doi.org/10.1007/s10140-018-1638-3.*

11. Takai IU, Sayyadi BM, Galadanci HS. *Antepartum hemorrhage: a retrospective analysis from a northern Nigerian teaching hospital.* Int J Appl Basic Med Res. 2017;7(2):112-6. *https://doi.org/10.4103/2229-516x.205819.*

12. Ker K, Roberts I, Chaudhri R, *et al. Tranexamic acid for the prevention of postpartum bleeding in women with anaemia: study protocol for an international, randomised, double-blind, placebo-controlled trial.* Trials. 2018;19(1):712. *https://doi.org/10.1186/s13063-018-3081-x.*

13. Mayhew D, Mendonca V, Murthy BVS. *A review of ASA physical status – historical perspectives and modern developments.* Anaesthesia. 2019;74(3):373-9. *https:// doi.org/https://doi.org/10.1111/anae.14569.*

14. Sankar A, Johnson SR, Beattie WS, Tait G, Wijeysundera DN. *Reliability of the American Society of Anesthesiologists physical status scale in clinical practice.* Br J Anaesth. 2014;113(3):424-32. *https://doi.org/10.1093/bja/aeu100.*

15. Monte AS, Teles LMR, Oriá MOB, *et al. Comparison between near miss criteria in a maternal intensive care unit.* Rev Esc Enferm USP. 2018;52:e03404. *https://doi.org/10.1590/s1980-220x2017038703404.*

16. Thurn L, Wikman A, Westgren M, Lindqvist P. *Massive blood transfusion in relation to delivery: incidence, trends and risk factors: a populationbased cohort study.* BJOG. 2019;126(13):1577-86. *https://doi.org/10.1111/1471-0528.15927.*

17. Sentilhes L, Winer N, Azria E, *et al. Tranexamic acid for the prevention of postpartum hemorrhage after vaginal delivery: the TRAAP trial.* Am J Obstet Gynecol. 2018;218. *https://doi.org/10.1016/j.ajog.2017.10.412.*

PERI-OPERATIVE OUTCOMES OF MITRAL VALVE SURGERY

At Charlotte Maxeke Johannesburg Academic Hospital

By Drs Tebogo Mokotong-Mosekama Tabane, Tristan Leonard and Thomas Kleyenstuber

ABSTRACT

Background: The distribution and determinants of heart disease vary greatly between high-income countries and sub-Saharan Africa where rheumatic heart disease (RHD) is a major public health challenge. Studies from Africa report that RHD is the main cause of cardiovascular morbidity and mortality in the young. Data on mitral valve surgery outcomes in South Africa are limited. The aim of this study was to describe the peri-operative outcomes of patients that have undergone mitral valve surgery at the Charlotte Maxeke Johannesburg Academic Hospital (CMJAH).

Methods: All patients older than 18 years who underwent mitral valve surgery at CMJAH between 01 January 2015 and 31 December 2018 were retrospectively included. Cardiac intensive care records including anaesthesia charts were assessed to describe pre-operative, intra-operative and post-operative data of each patient. Pre-operative data included patient demographics and comorbidities. Intra-operative data included aortic clamp and bypass times. Post-operative variables included outcomes such as sepsis, bleeding, re-operation, and the development of acute kidney injury (AKI). The pre-operative, intra-operative and post-operative outcomes were compared to determine the effect each variable had on post-operative mortality.

Results: Two hundred and seventeen patients underwent mitral valve surgery at CMJAH between 01 January 2015 and 31 December 2018. Four patients' records were incomplete. RHD was found to be the primary aetiology for mitral valve surgery at CMJAH with a mortality rate of 6.1%. Pre-operative findings that contributed to mortality were: EuroSCORE>2%, pre-operative ventilation, dialysis dependence, pre-operative inotropic support, chronic obstructive pulmonary disease (COPD), congestive cardiac failure, renal insufficiency, low ejection fraction and New York Heart Association functional class ≥III. Post-operative findings that contributed to increased mortality were prolonged mechanical ventilation, pneumonia, re-operation, AKI, sepsis, bleeding, and transfusion. Increased aortic clamping and cardio-pulmonary bypass times increased the risk of prolonged mechanical ventilation, re-operations, pacemaker implantations, AKI, and bleeding.

Conclusions: RHD was found to be the primary aetiology for mitral valve surgery at CMJAH with a mortality of 6.1%. Pre-operative, intra-operative and post-operative predictors of outcomes in this study confirm observations made in other parts of the world.

INTRODUCTION

Distribution and determinants of heart disease vary greatly between high-income countries and sub-Saharan Africa where rheumatic heart disease (RHD) is a major public health challenge.[1] RHD is the predominant cause of valve disease in Africa,[2] resulting in Africa having the highest prevalence of cardiac disease in children and young adults.[1] Cumulative effects of poverty, social instability and lack of infrastructure, resources and awareness contribute to the underestimated impact of RHD.[1, 2] Studies from Africa confirm that RHD is the main cause of cardiac morbidity and mortality from heart surgery. [1-3]

Mitral valve disease, in the form of mitral stenosis and mitral regurgitation, is the commonest form of valve disease and its treatment usually involves surgical repair or replacement. These surgical procedures are highly invasive and not without risk of complications.[3] In South Africa, data on the management and outcomes of mitral valve surgery are limited.[4] Operative mortality in mitral valve replacement surgery is 5% - 6% and 1% - 2% in mitral valve repair.[5] Complications associated with mitral valve surgery are commonly related to cardio-pulmonary bypass (CPB).[6] Platelets are activated and subsequently bind to the exposed subendothelium, the CPB circuit or to the circulating monocytes and neutrophils, resulting in a decrease in platelet numbers.[7] The decrease in platelet numbers and altered platelet function is the rationale behind the major blood loss encountered during cardiac surgery.[7, 8]

Multiple studies report that CPB has negative effects on haemostasis and the inflammatory response.[7, 9, 10] The blood cell activation and plasma protein alteration that occurs during CPB increases bleeding time, post-operative blood loss and increases the risk for massive blood transfusion.[7] Bleeding occurs commonly in cardiac surgery and is a significant cause of morbidity and mortality.[11] 2% to 8% of cardiac re-operations are indicated for uncontrolled bleeding. [11-13] Prolonged cardiopulmonary bypass time (CPBT) was associated with haemostatic abnormalities.[7] CPBT >90 minutes resulted in higher mean blood losses peri-operatively.[7] Re-operation in mitral valve surgery was closely linked to prolonged CPBT.[14] An African study identified CPB >120 minutes was associated with reduction in platelet counts in comparison with CPBT <60 minutes.[15]

In addition to the major blood loss attributed to CPB, there is a significant association with increased CPBT and the development of acute kidney injury (AKI).[16] AKI develops in 2.8% of patients following valvular heart surgery.[6, 17] In one study, 38.7% of patients who underwent mitral valve surgery had post-operative AKI, and presented with pre-operative New York Heart Association (NYHA) functional class III and IV, a dilated left ventricle (LV) and low LV ejection fraction (LVEF), all of which lead to hypo-perfusion of the kidneys and AKI.[18] AKI prolongs hospital stay and increases the risk of infectious complications and mortality.[17, 18] Risk of infection significantly increases with prolonged CPBT.[10, 14] Prolonged CPBT resulted in an increased incidence of prolonged mechanical ventilation, increasing the post-operative risk of pneumonia and peri-operative infection.[19] Surgical site infection (SSI) due to prolonged CPBT ranges from 0.3% to 8%.[20, 21] Patients who developed post-operative infection had prolonged CPB and operative times.[20] Shorter operative times, higher haemoglobin (Hb) and higher haematocrit significantly decreased the post-operative risk of infection. The incidence of post-operative infection was 4.5%.[20] Despite advances in surgical techniques, anaesthesia and critical care, cardiac surgery is associated with high peri-operative risk. Risk stratification scores in cardiac surgery are sophisticated and are used worldwide to determine peri-operative risk.[22] The

European System for Cardiac Operative Risk Evaluation II (EuroSCORE II) has been validated in the UK, Europe and North America, [22] and shown to be predictive of peri-operative outcomes in cardiac surgery.[23] However, data from Africa describing the ability of risk scoring systems to predict peri-operative outcomes in African patients undergoing cardiac surgery have not been validated.[22, 24] Anaesthesiologists need to assess symptom severity and effort tolerance pre-operatively to determine risk. Advanced NYHA functional class was a risk factor for early mortality.[26, 27] Therefore, the aim of this study was to describe the peri-operative outcomes of patients that have undergone mitral valve surgery at the Charlotte Maxeke Johannesburg Academic Hospital (CMJAH).

METHODS

This study was a retrospective, descriptive review of all patients who underwent mitral valve surgery at CMJAH between 01 January 2015 and 31 December 2018. A maximum of 60 patients undergo mitral valve surgery per annum at CMJAH. All patients above the age of 18-years-old were included in the study. Cardiac intensive care unit records including anaesthesia charts were assessed to describe pre-operative, intra-operative and post-operative data of each patient included in the study. Pre-operative data included patient demographics and comorbidities. Intra-operative data included aortic clamp and bypass times. Post-operative variables assessed included outcomes such as sepsis, bleeding, re-operation and the development of AKI. The pre-operative, intra-operative and post-operative outcomes were then compared to determine the effect each variable had on post-operative mortality.

STATA (version 15) was used to analyse the data. Descriptive statistics were used for pre-operative, intra-operative and post-operative data. Categorical variables were described using frequencies and percentages. Inferential statistics were used to compare different variables. A p-value <0.05 was deemed statistically significant. The effect of categorical variables (pre-operative demographics and post-operative outcomes) on mortality were analysed using the Fishers exact test due to the limited sample size. The Shapiro-Wilk test was used to test for the normality of distribution of the continuous variables (aortic clamping and bypass times). As the data was not normally distributed, medians and inter-quartile ranges were used to describe the continuous variables. The two-sample Wilcoxon Rank-Sum Mann-Whitney test was used to compare variables.

Approval (M220343) from the Human Research and Ethics Committee (Medical) and all other relevant authorities was obtained. Data was managed according to the standards stipulated by the University of the Witwatersrand. RedCap® was the data management tool used to obtain information. Each patient was assigned a study number and a separate list of patient details was available only to the researcher.

RESULTS

217 patients underwent mitral valve surgery at CMJAH between 01 January 2015 and 31 December 2018. Four of the patients had incomplete records, therefore 213 were included in the study. The pre-operative demographic data of these patients is described in Table I. Of them, 135 patients (63.4%) were female and 78 were male; 86.2% were <60 years of age. A large group of patients, 135 (63.4%) did not have a documented EuroSCORE II. Of those

TABLE I: Pre-operative demographic data of mitral valve surgery patients at CMJAH.

Demographics	Variable	Frequency	Missing data
EuroScore II (%)	<2%	71 (91.03)	135
	2%- 5%	6 (7.69)	
	>5%	1 (1.28)	
Age Group (years)	<60	175 (82.16)	0
	>60	38 (17.84)	
Sex	Male	78 (36.62)	0
	Female	135 (63.38)	
BMI (kg/m^2)	<20	1 (0.49)	7
	21-34	196 (95.61)	
	>35	8 (3.90)	

TABLE II: Pre-operative comorbidities.

Cardiac history	Variable	Frequency	Missing data
Previous cardiac surgery	No	177 (85.10)	5
	Yes	31 (14.9)	
Unstable angina	No	204 (99.03)	7
	Yes	2 (0.97)	
LV dysfunction	No	186 (89.86)	6
	Yes	21 (10.14)	
Recent myocardial infarct	No	205 (99.51)	7
	Yes	1 (0.49)	
Hypercholesterolaemia	No	179 (85.65)	4
	Yes	30 (14.35)	
Ischaemic heart disease	No	197 (95.63)	7
	Yes	9 (4.37)	
Hypertension	No	147 (70.33)	9
	Yes	62 (29.67)	
Congestive cardiac failure	No	178 (85.58)	5
	Yes	30 (14.42)	
LVEF	No	8 (4.21)	23
	Yes	182 (95.79)	
Aetiology (primary)	RHD	119 (58.33)	9
	Myxomatous	13 (6.37)	
	Endocarditis	19 (9.31)	
	MV prolapse	28 (13.37)	
	Other	25 (12.25)	
Aetiology (secondary)	IMR (Ischaemic mitral regurgitation)	181 (88.73)	9
	DCMO	4 (1.96)	
	Other	19 (9.31)	
NYHA functional class	< Class III	133 (77.78)	42
	≥ Class III	38 (22.22)	
Smoker	No	190 (91.35)	5
	Yes	18 (8.65)	
COPD	No	194 (92.82)	4
	Yes	15 (7.18)	
Pulmonary arterial pressure (mmHg)	<30	44 (22.45)	17
	>30	152 (77.55)	
Serum creatinine	<110µmol/L	180 (88.24)	9
	>110µmol/L	24 (11.76)	
Kidney disease	No	177 (88.94)	14
	Yes	22 (11.06)	

TABLE III: Post-operative outcomes not pre-operative outcomes.

Variable	Class	Frequency	Missing data
Arrythmias	No	96 (45.93)	4
	Yes	113 (54.07)	
Prolonged mechanical ventilation	No	185 (87.26)	1
	Yes	27 (12.74)	
Pneumonia	No	202 (95.73)	2
	Yes	9 (4.27)	
CVA	No	199 (93.87)	1
	Yes	13 (6.13)	
Re-operation	No	187 (87.79)	0
	Yes	26 (12.21)	
Pacemaker insertion	No	184 (87.62)	3
	Yes	26 (12.38)	
PAP (pulmonary artery pressure)	No	5 (41.67)	201
	Yes	7 (58.33)	
HPT	No	210 (99.53)	2
	Yes	1 (0.47)	
AKI	No	176 (83.02)	1
	Yes	36 (16.98)	
Sepsis	No	186 (88.57)	3
	Yes	24 (11.53)	
Death	No	200 (93.90)	0
	Yes	13 (6.10)	
Bleeding	No	185 (86.85)	0
	Yes	28 (18.15)	
Transfusion	No	171 (80.66)	1
	Yes	41 (19.34)	

TABLE IV: Association between pre-operative factors and mortality.

Variable	Class	Dead n (%)	Alive n (%)	P-value
EuroScore	< 2 %	1 (1.41)	70 (98.59)	0.020
	2- 5 %	2 (3.33)	4 (66.7)	
	>5 %	0 (0.00)	1 (100.00)	
Pre-operative ventilation	No	8 (3.96)	194 (96.04)	0.028
	Yes	2 (33.33)	4 (66.67)	
Dialysis dependent	No	9 (4.35)	198 (95.65)	0.048
	Yes	1 (100.00)	0 (0.00)	
Pre-operative inotropic support	No	7 (3.45)	196 (96.55)	0.01
	Yes	2 (50.00)	2 (50.00)	
PAP (mmHg)	<30	4 (9.09)	40 (90.91)	0.27
	>30	7 (4.61)	145 (95.39)	
LV dysfunction	No	8 (4.30)	178 (95.70)	0.27
	Yes	2(9.52)	19 (90.48)	
Smoker	No	9 (4.74)	181 (95.26)	0.60
	Yes	1 (5.56)	17 (94.44)	
COPD	No	8 (4.12)	186 (95.88)	0.035
	Yes	3 (20.00)	12 (80.00)	
CCF	No	4 (2.25)	174 (97.75)	0.004
	Yes	5 (16.67)	25 (83.33)	
Renal insufficiency	No	5 (2.82)	172 (97.18)	0.046
	Yes	3 (18.64)	19 (86.36)	
EF%	<35%	2 (25.00)	6 (75.00)	0.03
	>35%	5 (2.75)	177 (97.25)	
Aetiology (primary)	RHD	4 (3.36)	115 (96.64)	0.043
	Myxomatous	0 (0.00)	18 (100.00)	
	Endocarditis	4 (21.05)	15 (78.95)	
	MV prolapse	2 (7.14)	26 (92.86)	
	Other	2 (8.00)	23 (92.00)	
Aetiology (secondary)	IMR	10 (5.52)	171 (94.48)	0.29
	DCMO	1 (25.00)	3 (75.00)	
	Other	1 (5.26)	18 (94.74)	
NYHA	< Class 3	2 (1.50)	131 (98.50)	0.006
	≥Class 3	5 (18.16)	33 (86.84)	

with a documented EuroSCORE II, 71 (91%) had a score <2%, six (7.7%) had scores between 2% - 5% and one (1.3%) had a score >5%. Patients' pre-operative comorbidities are described in Table II. 182 patients (95.8%) had LVEF >35%. Of these, 152 (77.6%) had pulmonary artery pressures (PAP) >30mmHg. RHD was diagnosed in 119 (55.9%) as the primary aetiology for patients undergoing mitral valve surgery. Ischaemic mitral regurgitation (IMR) was diagnosed in 81 (38%) as the main secondary aetiology. 62 (29.7%) patients had hypertension, 38 (22.2%) had NYHA functional class ≥III, 31(15%) had previous cardiac surgery, 30 (14.4%) had hypercholesterolaemia and 30 (14.4%) had congestive cardiac failure. Serum creatinine >110µmol/L was observed in 24 (11.8%) patients, 22 (11.1%) had abnormal renal function, and 21 (10.1%) presented with LV dysfunction.

TABLE V: Association between post-operative outcomes and mortality.

Variable	Class	Death n (%) n=13 (6.10%)	Alive n (%) n=200 (93.10%)	P-value
Arrythmias	Yes	7 (6.19)	106 (93.81)	1.00
	No	5 (5.21)	91 (94.79)	
Prolonged mechanical ventilation	Yes	10 (37.04)	17 (62.96)	<0.01
	No	2 (1.08)	183 (98.92)	
Pneumonia	Yes	3 (3.33)	6 (66.67)	<0.01
	No	8 (3.96)	194(96.04)	
CVA	Yes	2 (15.38)	11 (84.62)	0.16
	No	10 (5.03)	189 (94.97)	
Re-operation	Yes	9 (34.62)	17 (65.38)	<0.01
	No	4 (2.14)	183(97.86)	
Pacemaker insertion	Yes	1 (3.85)	25 (96.15)	1.00
	No	10 (5.43)	174 (94.57)	
AKI	Yes	7 (19.44)	29 (80.56)	<0.01
	No	5 (2.84)	171 (97.16)	
Sepsis	Yes	7 (29.17)	17 (70.83)	<0.01
	No	3 (1.61)	183 (98.39)	
Bleeding	Yes	8 (28.57)	20 (71.43)	<0.01
	No	5 (2.70)	180 (97.30)	
Transfusion	Yes	8 (19.51)	33 (80.49)	<0.01
	No	4 (2.34)	167 (97.66)	

TABLE VI: Association between post-operative outcomes and the intra-operative times.

Variable	Class	Aortic clamp time Median (IQR)	P-value	Bypass time Median [IQR]	P-value
Arrythmias	No	91(40.5)	0.37	133(43.5)	0.12
	Yes	98(43)		147(55)	
Prolonged mechanical ventilation	No	91(41)	0.55	137(50.5)	0.029
	Yes	107(51)		156(55)	
Pneumonia	No	92(42)	0.54	140(52)	0.76
	Yes	96.5(53)		141.5(20)	
CVA	No	92(43)	0.92	139(52)	0.28
	Yes	94(37)		151.5(43)	
Re-operation	No	91(41)	0.40	137(53)	0.03
	Yes	106(46)		146.5(66.5)	
Pacemaker insertion	No	91(40)	0.20	136(51)	0.01
	Yes	108(59)		157(57)	
AKI	No	91(42)	0.40	137(52)	0.01
	Yes	105.5(46.5)		157.5(45)	
Sepsis	No	91.5(42.5)	0.98	138(52)	0.36
	Yes	100(33)		147(71)	
Death	No	92(41)	0.66	141(52)	0.30
	Yes	86(63)		150.5(83)	
Bleeding	No	91(42)	0.15	137(51)	0.02
	Yes	106(51)		154(61)	
Transfusion	No	92(40)	0.93	140(52.5)	0.33
	Yes	98(44)		145(53)	

18 (8.7%) were smokers and 15 (7.2%) presented with pre-operative chronic obstructive pulmonary disease (COPD). Diabetes was present in 21 (10.2%) patients and 9 (4.4%) patients had ischaemic heart disease. 105 patients (75%) were started on inotropic support and 48 (35.9%) had intra-operative blood transfusions. The mean aortic clamping and bypass time were 97.01 and 144.19 minutes, respectively. Arrythmias were documented in 113 (54.1%) patients, 41 (19.3%) were transfused post-operatively, and AKI was present in 36 (17%) as shown in Table III. Twenty-eight (18.2%) had significant bleeding and 27 (12.7%) had prolonged mechanical ventilation. Re-operations were done in 26 (12.2%) patients, 26 (12.4%) had pacemakers implanted post-operatively, 24 (11.5%) had sepsis, and cerebro-vascular accidents (CVA) were noted in 13 (6.1%) patients. 13 (6.1%) patients died, 9 (4.3%) developed pneumonia and 1 (0.5%) patient had hypertension post-operatively.

Pre-operative data that was associated with mortality included dialysis dependence, pre-operative inotropic support, pre-operative ventilation, LVEF <35%, COPD, NYHA functional class ≥III, renal insufficiency, cardiac failure, and a EuroSCORE II >2% as shown in Table IV. Post-operative features that were independent risk factors for mortality were prolonged mechanical ventilation, re-operation, bleeding, transfusion, AKI, sepsis, and pneumonia as shown in Table V. Results from univariate analysis showed no significant association between aortic clamping time and post-operative outcomes. However, CPBT had a significant influence on post-operative outcomes. Post-operative variables associated with increased CPBT were prolonged mechanical ventilation, re-operation, pacemaker use, AKI and bleeding as shown in Table VI.

DISCUSSION

Published data approximate the peri-operative mortality rate of mitral valve surgery to be 3%, dependent on the population and the peri-operative risk of the patient prior to surgery.[3, 28] In contrast to internationally-published data, our peri-operative mortality rate was 6.1%. RHD is the main form of valve heart disease in Africa. Multiple studies across Africa confirm that RHD is the primary cause of morbidity and mortality seen in younger populations undergoing cardiac surgery.[2] Findings from our study are consistent with other data from Africa, where RHD is the primary indication for mitral valve surgery, commonly performed in patients below the age of 60 years.

Advanced age and NYHA class ≥III have been shown to increase peri-operative mortality of valve surgery. [26, 27, 29] Our study did not show age having a direct effect on peri-operative mortality but confirmed that NYHA class ≥III is an independent risk factor for mortality, likely due to more patients in our study being younger than 60 years and a relatively small sample size. We also found that LVEF <35% was a strong predictor of mortality, confirming the importance of pre-operative echocardiography and functional assessment of the patient. An increase in mortality was noted in patients presenting pre-operatively with COPD, heart failure and need for inotropic support. A limitation of our study is the lack of documentation of the rationale for pre-operative inotropic support. It was difficult to determine whether inotropic support was an independent risk factor for mortality or if the pre-operative state requiring inotropic support was a greater contributor to the increase noted. LV dysfunction, atrial fibrillation and pulmonary hypertension are identified risk factors for peri-operative morbidity and mortality.[30] In our study, arrythmias and pulmonary arterial pressures >30mmHg were commonly documented. A limitation of our study is that pulmonary artery pressures were only documented prior to surgery in most

patients, making it difficult to assess whether increasing pressures had a direct correlation with the risk of mortality. Risk scoring systems for predicting peri-operative morbidity and mortality are mandatory.[31] There are no risk scoring systems validated in large population groups like sub-Saharan Africa.[22, 24] In our study, the EuroSCORE II was used as a pre-operative assessment to predict the risk of mortality. Unfortunately, there were many missing data and very few patient records had a documented EuroSCORE II score. We suggest that a risk scoring system be validated in Africa to assist in predicting mortality in our population. AKI and its detrimental peri-operative effects during mitral valve surgery have been extensively reviewed.[6, 16, 17] Patients undergoing mitral valve surgery commonly display a decrease in the volume of blood ejected from the mitral valve due to regurgitation, resulting in poor perfusion to the kidneys. A third of patients who underwent mitral valve surgery developed AKI,[18] and patients presenting with AKI had increased prevalence of hypertension and diabetes. Although patients in our study did not have high rates of hypertension and diabetes, AKI proved to be a major independent predictor of mortality. We also found that increased CPBT of ≥157.5 minutes and aortic clamping times ≥105.5 minutes directly increased the risk of AKI, which is in keeping with prior reports.[6, 18, 32]

Increased CPBT is an independent risk factor for bleeding and subsequent blood transfusion following cardiac surgery.[7, 15] In addition to the above findings, our study confirmed that increased CPBT and aortic clamping times increased the risk of prolonged mechanical ventilation and subsequent pneumonia.[19] A novel finding in our series is the increased use of pacemakers associated with increased bypass and aortic clamping times. Contrary to previous studies, we did not find that sepsis was directly linked to increased CPBT and aortic clamping times. Sepsis, however, was a strong predictor of peri-operative mortality seen in our study. The economic cost of transfusing blood products and associated complications are high.[33] The limitation in this study is that data on the number of blood products transfused was not collected nor were the negative outcomes of transfusion documented. The peri-operative outcomes of mitral valve surgery found in this study can be avoided, anticipated, and effectively managed. A multi-disciplinary team of anaesthesiologists, cardiac surgeons, physicians, nurses and allied health professionals are needed to decrease morbidity and assess each patient pre-operatively for the risk of peri-operative mortality.

CONCLUSION

RHD was the predominant primary aetiology for mitral valve surgery in our institution with an overall mortality rate of 6.1%. Pre-operative findings that contributed to increased mortality were EuroSCORE II ≥2%, pre-operative ventilation, dialysis dependence, pre-operative inotropic support, COPD, heart failure, renal insufficiency, LVEF <35% and NYHA ≥III. Post-operative findings that contributed to increased mortality were prolonged mechanical ventilation, pneumonia, re-operation, AKI, sepsis, bleeding, and transfusion. Increased aortic clamping and CPBT significantly increased the risk of prolonged mechanical ventilation, re-operations, use of pacemakers, AKI, and bleeding.

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Drs Tebogo Mokotong-Mosekama Tabane and Thomas Kleyenstuber are with Department of Anaesthesia, Rahima Moosa Mother and Child Hospital, University of the Witwatersrand, Johannesburg, South Africa; while Tristan Leonard is with the Department of Anaesthesia, Chris Hani Baragwanath Academic Hospital, University of the Witwatersrand, Johannesburg, South Africa

References:

1. Zuħlke L, Mirabel M, Marijon E. *Congenital heart disease and rheumatic heart disease in Africa: Recent advances and current priorities.*
Heart. 2013; 99(21):1554-61.doi: 10.1136/heartjnl-2013-303896.
2. Nkomo VT. *Epidemiology of valvular heart diseases in Africa.*
SA Heart. 2009;6:12-8.doi: 10.24.24170/6-1-2006.
3. Al Naili M, Herbst PG, Doubell AF, *et al. A retrospective audit of mitral valve repair surgery at Tygerberg Hospital.* SA Heart. 2018;15(3):182-9.doi: 10.24170/15-3-3182.
4. Harkey A, Kwok H, Fan K. *The evolution of mitral valve surgery: The future in the hand of robots.*
Braz J Cardiovasc Surg. 2020;35(4):555-64.doi: 10.21470/1678-9741-2019-0192.
5. Looney Y, Quinton P. *Mitral valve surgery.*
BJA Educ. 2005;5:199-202.doi: 10.1093/bjaceaccp/mki051.
6. Leballo G, Chakane PM. *Cardiac surgery-associated acute kidney injury: Pathophysiology and diagnostic modalities and management.* Cardiovasc J Afr. 2020;31(4):205-12.doi: 10.5830/cvja-2019-069.
7. Jubayer Ahmed RR, Heemel Saha. *Effect of cardiopulmonary bypass on haemostasis in patients undergoing cardiac surgery.*
Bangabandu Sheikh Mujib Med Univ J. 2018;11:134-8.doi: 10.3329/bsmmuj.v11i2.35780.
8. McKenna R, Bachmann F, Whittaker B, *et al. The haemostatic mechanism after open-heart surgery. II. Frequency of abnormal platelet functions during and after extracorporeal circulation.*
J Thorac Cardiovasc Surg. 1975; 70(2):298-308.doi: 10.1016/S0022-5223(19)40355-3.
9. Petrou A, Tzimas P, Siminelakis S. *Massive bleeding in cardiac surgery. Definitions, predictors and challenges.* Hippokratia. 2016;20(3):179-86. *doi:* Available: *https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5654433/pdf/ hippokratia-20-179.pdf.* (Accessed 20-01-2021)
10. Roy S, Saha K, Mukherjee K, *et al. Activation of coagulation and fibrinolysis during coronary artery bypass grafting: A comparison between on-pump and off-pump techniques.*
Indian J Hematol Blood Transfus. 2014;30(4):333-41. doi: 10.1007/s12288-013-0250-7.
11. Saber I, Omran AM, Elameen S, *et al. Risk scoring for prediction of postoperative bleeding in cardiac surgery.* J Egypt Soc Cardiothorac Surg. 2018;26:185-90.doi: 10.1016/j.jescts.2018.04.003.
12. Vivacqua A, Koch CG, Yousuf AM, *et al. Morbidity of bleeding after cardiac surgery: Is it blood transfusion, reoperation for bleeding, or both?*
Ann Thorac Surg. 2011;91(6):1780-90.doi: 10.1016/j. athoracsur.2011.03.105.
13. van de Watering L, Brand A. *Independent association of massive blood loss with mortality in cardiac surgery.*
Transfusion. 2005;45(7):1235; author reply -6.doi: 10.1111/j.1537-2995.2005.00185.x.
14. David TE. *Durability of mitral valve repair for mitral regurgitation due to degenerative mitral valve disease.* Ann Cardiothorac Surg. 2015;4(5):417-21. doi: 10.3978/j.issn.2225-319X.2015.08.07.

15. Tettey M, Antiteye L, Sereboe F, *et al. Predictors of postoperative bleeding and blood transfusion in cardiac surgery.* Ghana Med J. 2009;2:71-6.doi:10.4314/gmj.v43i2.55316.
16. Mao MA, Thongprayoon C, Wu Y, *et al. Incidence, severity, and outcomes of acute kidney injury in octogenarians following heart valve replacement surgery.*
Int J Nephrol. 2015;2015:237951.doi: 10.1155/2015/237951.
17. Rather FA, Najar SM, Malla HA, *et al. Profile of acute kidney injury after open heart surgeries in a tertiary care hospital.*
Saudi J Kidney Dis Transpl. 2015;26(6):1177-82.doi: 10.4103/1319-2442.168601.
18. Chang CH, Lee CC, Chen SW, *et al. Predicting Acute Kidney Injury Following Mitral Valve Repair.*
Int J Med Sci. 2016;13(1):19-24.doi: 10.7150/ijms.13253.
19. Nadeem R, Agarwal S, Jawed S, *et al. Impact of cardiopulmonary bypass time on postoperative duration of mechanical ventilation in patients undergoing cardiovascular surgeries: A systemic review and regression of metadata.* Cureus. 2019;11(11):e6088.doi: 10.7759/cureus.6088.
20. Jamil DD, Baram A, Saqat BH. *Impact of prolonged cardiopulmonary bypass and operative exposure time on the incidence of surgical site infections in patients undergoing open heart surgery: Single center case series.* Int J Surg Open. 2020;22:55-6.doi: 10.1016/j.ijso.2019.12.001.
21. Milano CA, Kesler K, Archibald N, *et al. Mediastinitis after coronary artery bypass graft surgery. Risk factors and long-term survival.* Circulation. 1995; 92(8):2245-51.doi: 10.1161/01.cir.92.8.2245.
22. Cornelissen H, Arrowsmith J. *Preoperative assessment for cardiac surgery.*
BJA Educ. 2006;6(3):109-13.doi: 10.1093/bjaceaccp/mk1013.
23. Toumpoulis I, Anagnostopoulos C, Swistel D. *Does EUROscore predict length of hospital stay and specific postoperative complications after cardiac surgery?*
Euro J Cardiothorac Surg. 2005;27:128-33.doi: 10.1016/j.ejcts. 2004.09.020.
24. Hote M. *Cardiac surgery risk scoring systems: In quest for the best.*
Heart Asia. 2018;10.doi: 10.1136/heartasia-2018-011017.
25. Kurlansky P, Soo-Hoo S, Nemeth S. *East meets West: the influence of racial, ethnic and cultural risk factors on cardiac surgical risk model performance.* Heart Asia. 2018;10:1-6.doi: 10.1136.
26. Hellgren L, Kvidal P, Hörte LG, *et al. Survival after mitral valve replacement: rationale for surgery before occurrence of severe symptoms.*
Ann Thorac Surg. 2004;78(4):1241-7.doi: 10.1016/j.athoracsur.2004.04.017.
27. Fernandes AM, Andrade GM, Oliveira RM, *et al. Evaluation of variables responsible for hospital mortality in patients with rheumatic heart disease undergoing double valve replacement.*
Rev Bras Cir Cardiovasc. 2014; 29(4):537-42.doi: 10.5935/1678-9741.20140044.
28. Chatterjee S, Rankin JS, Gammie JS, *et al. Isolated mitral valve surgery risk in 77 836 patients from the Society of Thoracic Surgeons database.*
Ann Thorac Surg. 2013;96(5):1587-94; discussion 94-5.doi: 10.1016/j.athoracsur.2013.06.051.
29. Reisman AM, Thomas AT, Boateng P, *et al. Predictors of 30-day outcomes following mitral valve repair.* Ann Med Surg (Lond). 2019;47:5-12.doi:10.1016/j.amsu.2019.09.001.
30. Lombard F, Liang Y. *Risk factors for mitral valve surgery: Atrial fibrillation and pulmonary hypertension. S*emin Cardiothorac Vasc Anesth. 2019;23:57-69.doi: 10.1177/1089253218821694.
31. Bonnet V, Boisselier C, Saplacan V, *et al. The role of age and comorbidities in postoperative outcome of mitral valve repair: A propensity-matched study.*
Medicine. 2016;95(25):e3938.doi: 10.1097/md.0000000000003938.
32. Yamauchi T, Miyagawa S, Yoshikawa Y, *et al. Risk index for postoperative acute kidney injury after valvular surgery using cardiopulmonary bypass.*
Ann Thorac Surg. 2017;104(3):868-75.doi: 10.1016/j.athoracsur.2017.02.012.
33. Tempe DK, Khurana P. *Optimal blood transfusion practice in cardiac surgery.*
J Cardiothorac Vasc Anesth. 2018;32(6):2743-5.doi: 10.1053/j.jvca.2018.05.051.

PrionTex

WHEN IT COMES TO CHOOSING YOUR NEXT SET OF SCRUBS...

It is important to first consider your options. What fabrics are there to choose from? And how knowing the difference could help you make an informed decision. We have to agree that reading an article on fabric types for medical uniforms, is probably not the first thing to do on your bucket list. However, we hope that the following short, informative summary, will assist you in deciding which scrubs fabric is best suited for you.

KNOWING WHAT IS OUT THERE

There are a variety of scrub suit fabric options in our healthcare market such as cotton, polyester and blends. The choices can be very confusing if you are not a textile guru, but for the sake of keeping things simple, let's take a closer look at 100% cotton scrubs vs 100% polyester scrubs.

100% COTTON SCRUBS

Cotton is a soft, fluffy, natural fiber that grows in a protective case, around the seeds of the cotton plant. The fiber is almost pure cellulose. The fluffy white fibers are then harvested, spun into yarn, and woven into fabric.

It is important to point out that the market also offers different types of cotton, ranging in quality, texture and price. You may have received a high-quality organic cotton piece of clothing as a gift at some point in time, yet it doesn't mean every piece of cotton clothing will compare equally.

Generally, cotton is lightweight, breathable and freely available. As a natural fiber it has limitations.

Being in a profession where you are required to wear scrubs for long hours with lots of movement and daily washing, the disadvantages of cotton scrubs may become clear.

THE COTTON DOWNSIDE

Keep in mind, cotton shrinks! Caring for your cotton scrubs will require special care.

Unfortunately, any natural fiber will wear down faster than its synthetic fiber counterparts. Your cotton scrubs will not be as durable, and sooner or later may have holes, especially when the same set of scrubs are worn day after day.

Cotton fabric is absorbent, but not in a good way. If you require barrier protection, cotton when wet creates a pathway for bacteria and possible infectious agents. Unforeseen spills will take longer to dry and sweat stains are inevitable. Because it is very absorbent, cotton requires more water for washing than most synthetic alternatives.

Cotton releases fluff, sometimes referred to as lint. These particles can become airborne and are a potential carrier of bacteria. Lint should be avoided in a healthcare environment.

100% POLYESTER SCRUBS

Cotton and polyester are worlds apart. Let's compare them quickly. Polyester is man-made or synthetic fiber created in a laboratory. The process of manufacturing polyester fabric involves melting down small polyester pellets, which are then forced through tiny-tiny holes and then stretched.

Once the process of cooling and solidifying is complete, it produces a very strong fiber. These synthetic fibers are then spun and woven into the polyester fabric.

Polyester fabric date back to the 1940's and technology has played a great role in its development. Today, we have high-quality performance polyester fabrics, with amazing touch-and-feel properties.

THE POLYESTER UPSIDE

Polyester is a very strong fiber that will withstand heavy washing. Polyester scrubs are colourfast, lightweight, and durable. Your polyester scrubs will look newer for longer.

Polyester scrubs will offer very low linting compared to cotton scrubs - a key factor for consideration in the operating theatre environment.

Polyester is hydrophobic. In other words, polyester scrubs will dry faster, wicking moisture away from your skin, and leaving you cool and comfortable for longer periods of time.

Polyester fabric is naturally wrinkle-resistant and will not shrink. A professional look is easily achieved with polyester scrubs.

So, the next time you are considering buying a set of scrubs, think of them as your endurance uniform. They need to withstand far more wear and tear than your average dress or shirt. Just like an athlete needs the very best garment for optimal performance, so do you!

As a leading manufacturer of performance medical textiles, PrionTex recommends scrubs that are manufactured from a high quality 100% polyester microfiber fabric.

Choose your scrubs, demand the best.

PrionTex

SUPPORTING FRONTLINE SUPERHEROES

TRACKING THE RISE IN OBESITY
In England

By Kate Woodhead, RGN, DMS

INTRODUCTION

Obesity is a growing issue for population health and healthcare around the world. It is associated with serious psycho-social comorbidities as well as several other diseases including diabetes, heart disease and some cancers. In England, it has been described as one of the greatest health challenges we are facing, and around two thirds of adults are above a healthy weight - and of these, half are living with obesity. Even more concerning is that one in three children leaving primary school is already overweight, and one in five is living with obesity.

The causes of obesity are many and prevalence is highest among the most deprived groups. In 2019/2020 there were more than a million hospital admissions of people with a primary or secondary diagnosis of obesity, an increase of 17% over 2018/2019[1]. It is estimated that by 2050 we will be spending £9.7-million on treating obesity-related ill health. The UK compares poorly to other high-income countries and has one of the highest European rates of obesity. According to OECD data, average prevalence across EU countries where data is collected, the rate is 23% percent, while in UK it is 28%[2].

The most important risk factors are an unhealthy diet and a lack of physical activity. Those who live in deprived areas often face difficulties in accessing healthy affordable food and in taking regular exercise. The rising prevalence of obesity is driven by a number of behavioural and environmental factors, including urbanisation, increased sedentary lifestyles and widespread marketing and availability of fast foods. The prevalence of low fruit and vegetable consumption is said to be 58% higher among low-educated women compared to high-educated women.

POLITICAL ACTION ON OBESITY

A number of political initiatives have occurred over the last 10 years to address obesity in England. A plan for action to tackle childhood obesity was published by the Cabinet Office in 2016 followed by a further plan in 2018, known as Chapter 2, and Chapter 3 was published a year later. Adult obesity was identified in 2020 by a report entitled *Tackling Obesity: Empowering Adults and Children To Live Healthier Lives*[3]. The latter report plans to legislate to improve the quality of food labelling by requiring restaurants to put calorie labels on menus. There are also plans to ban television advertising of junk food before the watershed.

A further number of objectives for action on obesity include:

- Introducing a new campaign: A call to action for everyone who is overweight to take steps to move towards a healthier weight, with evidence-based tools and apps with advice on how to lose weight and keep it off
- Working to expand weight management services available through the NHS, so more people get the support they need to lose weight

- Publishing a four-nation public consultation to gather views and evidence on our current `traffic light' label to help people make healthy food choices
- Introducing legislation to require large out-of-home food businesses, including restaurants, cafes and takeaways with more than 250 employees, to add calorie labels to the food they sell
- Consulting on our intention to make companies provide calorie labelling on alcohol
- Legislating to end the promotion of foods high in fat, sugar or salt (HFSS) by restricting volume promotions such as buy one get one free, and the placement of these foods in prominent locations intended to encourage purchasing, both online and in physical stores in England
- Banning the advertising of HFSS products being shown on TV and on-line before 21:00 and holding a short consultation as soon as possible on how we introduce a total HFSS advertising restriction on-line

There has been previous action on tackling obesity in children with the introduction of the soft drinks levy, introduced in the 2016 budget. The levy targets the producers and importers of sugary soft drinks to encourage them to remove added sugar, promote diet drinks, and reduce portion sizes for high sugar drinks. The levy makes soft drinks companies pay a charge for drinks with added sugar, on total sugar content of five grams or more per 100 millilitres. That is about 5% sugar content. There is a higher charge for the drinks that contain eight grams or more per 100 millilitres, or about 8% sugar content.

Money made from the levy is re-directed to helping schools to support children with a healthier more physical school day. For example, many primary schools now manage `the daily mile', which all children take part in and enjoy.

EXCESS WEIGHT AND COVID-19

As Public Health England's report[4] in July last year has made clearer, new evidence from UK and international research indicates links between being overweight and living with obesity is associated with an increased risk of hospitalisation, severe symptoms, advanced levels of treatment such as ventilation or admission to ICU and death from COVID-19. These risks increase progressively as an individual's BMI increases.

Evidence on the links between weight status and COVID-19 outcomes are drawn primarily from three sources: retrospective cohort studies, clinical audits of patients with COVID-19 in hospital and routine primary care records with data linkage to outcomes. Clinical data suggest the effects of excess adipose tissue on respiratory function, metabolic dysfunction, the cardio-vascular system, enhanced inflammatory response and impaired response to infection. There may also be an interaction with weight-related comorbidities, including type 2 diabetes, cardio-vascular and respiratory diseases, which are also associated with more severe COVID-19. In addition, socio-economic and demographic factors associated with excess weight, are also associated with COVID-19 severity. Stigma experienced by people living with obesity, may delay interaction with healthcare professionals and may also contribute to increased risk of severe complications arising from COVID-19.[5] One study found that for people with a BMI of 35 to 40, risk of death from COVID-19 increases by 40% and with a BMI over 40 by 90%, compared to those not living with obesity. Other data found that in intensive care units, 7.9% of critically ill

patients with COVID-19 had a BMI over 40 compared with 2.9% of the general population. Excess weight is one of the few modifiable factors for COVID-19 and so the process of supporting individuals to achieve a healthier weight will be crucial to managing the effects of COVID-19 on the UK population.

BETTER HEALTH CAMPAIGNS

Public Health England has launched a number of Better Health campaigns[7] including one to encourage adults to lose weight, eat more healthily and get active. The campaigns offer those wishing to lose weight, access to a number of NHS endorsed apps. The actions follow a survey across England which identified that four in 10 adults say they have gained weight since the first lockdown. The campaign focused on supporting weight management and health behaviours among people living with overweight and obesity, and in particular men over 40 years, lower socio-economic groups and Black, Asian and Minority Ethnic groups and those living with long-term health conditions. The campaign was designed as a direct response to the risk factors identified in the above paragraph and the new evidence available.

Via a number of different targets, users can undertake a 12-week plan for healthy eating. A daily diary tracks their food and calorie intake against meals, amount of fruit and vegetables and minutes of physical activity. It is suggested that those who used the plan over 12 weeks reported a loss on average of almost a stone. However, anyone who has tried to lose weight knows that it is a long, tedious and difficult activity. The government has signed up to expanding weight management services locally, so that more people get the support they need to lose weight. From 2022, the NHS Long Term Plan has determined that there will be more support available. These services will be focused, initially on areas of the country that suffered most from the pandemic.

PRIMARY CARE

GPs and healthcare professionals in the community are often the first port of call when health advice and support are required. This includes learning the lessons from smoking, where GPs played a key role in raising the topic and undertaking behavioural interventions, including referrals to stop-smoking services. The frequency of these types of interventions for obesity in primary care also needs to increase. A programme of incentives for GPs and referral pathways into weight management services in every local health care system will be devised via the Quality Outcomes Framework.

Many GPs around the country can already refer people living with obesity to weight management services. Local authorities will be encouraged to expand their provision and where these services are not available doctors can guide people to the free NHS 12-week plan. In addition, there is a plan to train primary care staff to become weight coaches, as it is reported that many of them find it very uncomfortable to have conversations with patients about their weight. In order to change behaviours, there will need to be an advisory role assumed by GPs. Social prescribing is a further way of supporting those with weight problems to become more active. This relates to health professionals being able to refer individuals for non-clinical interventions which might include cookery classes, physical activities such as walking groups or sports. There is no specific evidence of weight loss from social prescribing but an improvement in well being , health and reductions in the use of health services have been identified.

WEIGHT LOSS SURGERY

As with many serious interventions such as weight loss surgery, it is treated as a last resort and patients are only referred when they have undertaken many years of other methods of weight loss. To be eligible, a person must be obese or morbidly obese with a BMI of greater than 40. Due to the serious nature of the surgery and it's impact on the rest of the patient's life, those units undertaking bariatric surgery tend to provide support for the psychological aspects of care and management in perpetuity or as long as the patient perceives the need for them. Sleeve Gastrectomy is the most commonly undertaken surgical procedure although there are others. This operation removes a considerable proportion of the stomach, so only smaller portions of food are possible after surgery.

CONCLUSION

There is action being proposed to reduce the obesity burden on the NHS although during the last 10 years the political dimensions of management have been intermittent and fragmented. Many individuals constantly try to manage their weight themselves or by using slimming clubs. Some of these actions are successful but many are not and cause considerable depression, loss of self-esteem and heartache. The Department of Health and Social Care aims to make changes to the self-management schemes, by expanding local services. Children who have weight problems are setting themselves up for unhealthy futures and frequently issues of bullying and low achievement at school may result. Adults often know very well whether they should or need not lose weight. Ensuring they get the correct advice at the right time is improving, but only slowly. To ensure that public health is as good as it can be, we need proactive means by which we can access appropriate advice, knowing that prevention is better than cure.

This article first appeared in the Clinical Services Journal and appears here, courtesy of the author. Kate Woodhead qualified in 1978. She has worked in peri-operative care since then and runs her own business as an Operating Theatre Consultant. Kate was Chairman of NATN from 1998 to 2001. She is the former President of the IFPN (2002 to 2006) and now works as an Advisor to WHO on the Safe Surgery Saves Lives Campaign. She is the Chairman of Trustees at Friends of African Nursing. For more information on FoAN please go to www.foan.org.uk.

References:

1. NHS Digital, 2021. *Statistics on obesity, physical activity and diet England 2021.* Statistics on Obesity, Physical Activity and Diet - NHS Digital
2. *OECD, 2020. Health at a Glance: Europe 2020. Health at a Glance: Europe 2020 - OECD*
3. Department of Health and Social Care, 2020. *Tackling obesity: empowering adults and children to live healthier lives* - GOV.UK (www.gov.uk)
4. Public Health England, 2020. *Excess Weight and Covid-19: insights from new evidence.* Excess weight and COVID-19: insights from new evidence - GOV.UK (www.gov.uk)
5. *Ibid*
6. PHE, 2020. Better Health - NHS (www.nhs.uk)
7. *Better Health Plan Phase 1 evaluation of the NHS weight loss plan app. 2021. Better Health campaign. Phase 1: Evaluation of the NHS weight loss plan app.* (publishing.service.gov.uk)

HOW ARE YOU LIVING?
What Will Be Your Legacy?

By Sheila L Allen, BSN, RN, CNOR, CRNFA(E)

Have you ever thought about your legacy to the world/your family/your colleagues? As we live our lives, we perhaps need to consider how we want to be remembered. We all want to be remembered for something, to be known as more than merely ordinary. We all want to be known as someone who truly made a difference, to leave an imprint on this world and to leave behind something that can make the future a little brighter. From an early age, we are encouraged to choose what we want to be and what we want to do. We are told it is our world and we can do anything we set our minds to do. We all have our roles and responsibilities; nevertheless, it's not what we do, but how we do it that makes the difference.

The Greatest Generation taught us to adhere to our values that were embedded in our culture. Stated simply, those were: don't hide behind an excuse, don't allow your problems to decide your current situation or to govern your future. Our own personal code or set of values determines how we behave toward others. This personal discipline is referred to as integrity. There are different kinds of strength and all are needed. You need integrity more than bodily strength. Integrity means having a core of goodness in you and acting on it for the benefit of others. It means keeping your word and speaking the truth. It means thinking and acting for those in your care.

WHAT IS A LEGACY?

A legacy is the symbol or characteristic made in life that continues to demonstrate your contribution to the world/community/organisation that you made a difference. While you might think of a legacy as being 'at the end of your life', it actually how you live your life every day. We meet people or interact with colleagues daily. The shadow of the influence that you cast will fall across somebody's path every day of your life. It's really your choice what kind of example you will be and what kind of influence you will have. You may think only leaders have a chance to leave legacies, but actually we are all leaders in some setting. Some of the suggestions for becoming a great leader to leave a memorable legacy could easily apply to our every day lives:

- Concentrate on building your character, not your status. The way you act needs to align with your values. If you always keep your word, everyone may not like you; but they will respect your integrity
- Don't be afraid to do the right thing, even if it is a hard decision. Even if you do not succeed, the lessons you learn from making mistakes are also important in building your character
- Act authentically, respectfully, honestly, and with kindness. As Mother Theresa said: "If you cannot find a kind person, be one." How you behave will cast that shadow that touches the people with whom you connect. If your actions are consistent and congruent with your values, you will build the legacy of your vision

FOUNDATIONS OF YOUR LEGACY

To begin building a legacy of leadership, we must lead from within, because a legacy is not left for people; actually, it is leaving something IN people. Lolly Daskal calls that foundation the pillars of building a legacy. She describes the six pillars as the following:

- Your *reputation* is what people think of you, while your *character* is who you truly are. If your character is consistent with your values, that's the component of leadership that will leave the impression that will be a positive re-inforcement of you legacy
- Throughout our lives we make an enormous number of choices. Your character shapes the choices made. When you choose wisely or learn from your mistakes, those choices and your behaviour because of those choices will leave a positive mark
- How you behave will make an impact. Your conduct reflects your integrity: such as how you treat others respectfully and how you are demonstrate your dependability
- When you are trustworthy and keep your word, you are known for the consistency of your behaviour. Even in your unguarded moments, someone is watching. The manner in which you are responsible and accountable will be remembered
- Trustworthy leaders know who they are and what they know. Confidence is believing in yourself. A confident leader will help others feel empowered and important
- The ability to connect with others is compassion. Although we are not born with it, it grows out of considerate behaviour. Kindness is always appreciated

The manner in which you build, create, and grow your legacy will determine how you will be remembered. The pillars of character, choices, conduct, consistency, confidence, and compassion will establish a firm foundation.

Legacy story

You are all familiar with my appreciation for stories that make lessons memorable. The following example will hopefully serve that purpose:

A successful businessman was growing old and knew it was time to planning for leadership succession. Instead of choosing one of his directors or one of his children, he decided to do something different. He called together his young executives and explained he would be choosing one of them would be based on how they performed. He gave them each a seed to plant. He told them to take care of it and come back in a year. Then he would judge the plants and choose which of them was to be the new CEO.

A man named Jim was one of the young men who received the seed and the directions. He explained the task to his wife, and they excitedly set about nurturing the seed he had been given. Two, three, four, five weeks went by and absolutely nothing happened to his seed. Others at work talked about their plants and how they were growing; however, Jim's plant didn't grow at all. Jim just knew he had failed; however he kept trying. When the year was up, Jim told his wife he was embarrassed to take an empty pot to the meeting, but she convinced him to take it and be honest about what happened. At the meeting, Jim was surprised by the variety of plants the other executives brought. Their plants were beautiful, but Jim put his empty pot on the floor beside his chair.

When the CEO entered the room, he welcomed all the men and reminded them one of them would be the new leader of the organisation. He noticed Jim in the back of the room and asked him to come to the front. When Jim got up to the front with his empty pot, the CEO asked him what happened. Jim held his head high and honestly told the story of his inability to make that seed grow. The CEO then announced that Jim would be the new CEO. The CEO explained that he had given everyone in the room boiled seeds; they were dead. All except Jim returned with trees, plants, and flowers because they substituted the seeds with ones that would grow. Jim was the only one with the honesty and courage to bring him a pot with a dead seed in it.

The lessons taught were the following: if you plant honesty, you will reap trust; if you plant humility, you will reap greatness; if you plant consideration, you will reap perspective; if you plant goodness, you will reap friends; if you plant perseverance, you will reap contentment; if you plant forgiveness, you will reap reconciliation; if you plant faith in God, you will reap a harvest; and if you plant hard work, you will reap success. Jim proved that acting on his principles being courageous and honest gained the trust and confidence of the CEO. The wise businessman left a legacy of a code of conduct that demonstrated the value of integrity and accountability.

Through actions and words leaders build and strengthen the cultural values of the organisation, but also provide a clear picture to employees or members what really matters. The focus of a leader should not be directed on themselves, but on being transparent with what matters most to the success of the organisation and the people within their care.

Naseer's three tactics to improve team solidarity:

1. Build relationships to understand the needs of those you serve. If employees are clear about what matters to the organisation, they are empowered to engage their talents and insights to carry out their roles and responsibilities thus ensuring success.

2. Demonstrate your commitment to doing right and not just being right. Leaders must be accountable for their mistakes to demonstrate that success isn't dependent on only one person, but on the ability of the team to work toward a common goal.

3. Create an environment where all feel heard and understood. When a group is diverse, a leader can expect competing viewpoints about what is important. The value of hearing all voices enriches the dialogue and allows for appropriate problem solving. Leadership's role is to bridge the variety of needs of those served around shared goals and purpose.

CONCLUSION

The greatest legacy is to develop other leaders to carry on the organisation, community, or family. Invest the time to coach and actively share what you know and believe. Teach your values to those to whom you serve to invest in the future. People are what matter. The legacy should be to grow people to do great things without them. A leader's legacy is less about who or what they lead and more about how they lead. American religious leader and author, Gordon B Hinckley said: "Being humble means recognising that we are not on earth to see how important we can become, but to see how much difference we can make in the lives of others."

As nurses, we share the opportunity to be with patients and families at some of the most critical times in their lives. We are the hand that holds, the smile that encourages, and the heart

that cares. As May is a month that America celebrates nurses, please know that the legacy of all nurses is that "***You Make a Difference***." Thank you for your care and commitment; you are all leaders.

Sheila Allen served as the National AORN President between 2001 and 2002 and the IFPN Secretary between 2001 and 2007. She is a regular contributor to the APPSA Journal and offers contemporary studies and opinions of great value and interest. She wrote this paper specifically for the APPSA Journal.

References:

Daskal L. *https://www.lollydaskal.com/leadership/how-to-leave-a-great-leadership-legacy/#:~:text=Character%2C%20choices%2C%20conduct%2C%20consistency,It's%20leaving%20something%20in%20people.*
Accessed April 20, 2022.

Luongo N. *https://www.huffpost.com/entry/what-do-you-want-your-leg_b_1879134.*
Accessed April 18, 2022.

Maxwell J. *"What should be the legacy of a successful leader?" https://www.johnmaxwell.com/blog/what-should-be-the-legacy-of-a-successful-leader/.*
Accessed April 18, 2022.

McDonald S. *https://soniamcdonald.com.au/2019/09/24/leadership-legacy/.*
Accessed April 20, 2022.

Naseer T. *https://tanveernaseer.com/3-tactics-for-building-successful-teams/.*
Accessed April 18, 2022.

Naseer T. *https://tanveernaseer.com/leadership-succession-and-understanding-our-legacy/.*
Accessed April 18, 2022.

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