



Original article

Drop for drop: A descriptive analysis of blood product usage in a South African tertiary care setting during the Covid-19 pandemic

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ABSTRACT

Background: The Covid-19 pandemic has had a drastic effect on the global community. Blood products are precious resources especially in the African context and this has been especially compounded during the Covid-19 pandemic. Concurrent to this during the Covid-19 level 5 lockdown in South Africa from 26 March – 30 April 2020, a decrease in trauma admissions to state hospitals was noted. The aim of this data collection was to assess whether lowered blood product issuance was seen during the Covid-19 pandemic lockdown.

Method: Areas at Tygerberg Hospital with trauma patients were identified, namely: the A1W intensive care unit (Surgical ICU), Trauma Front Room (Trauma Admissions), Trauma Resuscitation unit (Trauma Resus Area) and J7(Trauma Ward). Data of blood product issuance (red blood cells and fresh frozen plasma) for these 4 areas was provided by the Western Cape Blood Service for the period 26 March-30 April 2018, 2019 and 2020. This included the stage 5 Covid-19 South African lockdown, as well as Easter for all three years which is traditionally associated with raised trauma admissions. This data was quantitative.

Results: 201 products were issued in 2018 versus 103 for the same period in 2020 for the 4 trauma areas in Tygerberg Hospital. The surgical ICU received the most products over 3 years with 183 of the product issuances. **Discussion:** As expected there was a significant decrease in blood product (red blood cell and fresh frozen plasma) issuance during the 2020 period which paralleled the lowered trauma numbers. This represented a significant cost saving of over R150 000 despite increased yearly costs for blood products over the same period. This data collection did not consider the reasoning for these blood transfusions or the clinical appropriateness thereof. The author acknowledges the wide variability of transfusion thresholds and protocols within various centres around the world, including Tygerberg and was not seeking to prove commentary on the appropriateness thereof in this research.

African relevance

- South Africa accounts for approximately half of the Covid-19 cases on the African continent.
- Covid-19 created a unique scenario to consider the effect of trauma numbers being lowered in South Africa
- This data collection highlighted the need for more accurate collation of trauma data by the trauma units involved.
- This reiterates the need for consistent and responsible utilisation of scarce resources on the African continent

Introduction

The Covid-19 pandemic has had a drastic effect on the global community at large. South Africa as of 26 June 2020 had approximately

118,000 positive cases with 2286 deaths reported. Worldwide 9,61 million patients have been infected and 480,000 have lost their lives [1–5].

Blood products are precious resources especially in the African context and this has been especially compounded during the Covid-19 pandemic. With a focus on this the World Health Organisation has released specific guidelines on the management of blood supply [6–9]. Blood donations themselves have also diminished during the pandemic and this further compounds the availability and distribution limitations of blood products internationally [10,11].

Concurrent to this during the Covid-19 level 5 lockdown in South Africa from 26 March – 30 April 2020, a significant decrease in trauma admissions to state hospitals was noted around the country [1–4,12,13]. While attempting to correlate this in the Tygerberg Hospital context it was noted that Tygerberg's record keeping of trauma admissions is still

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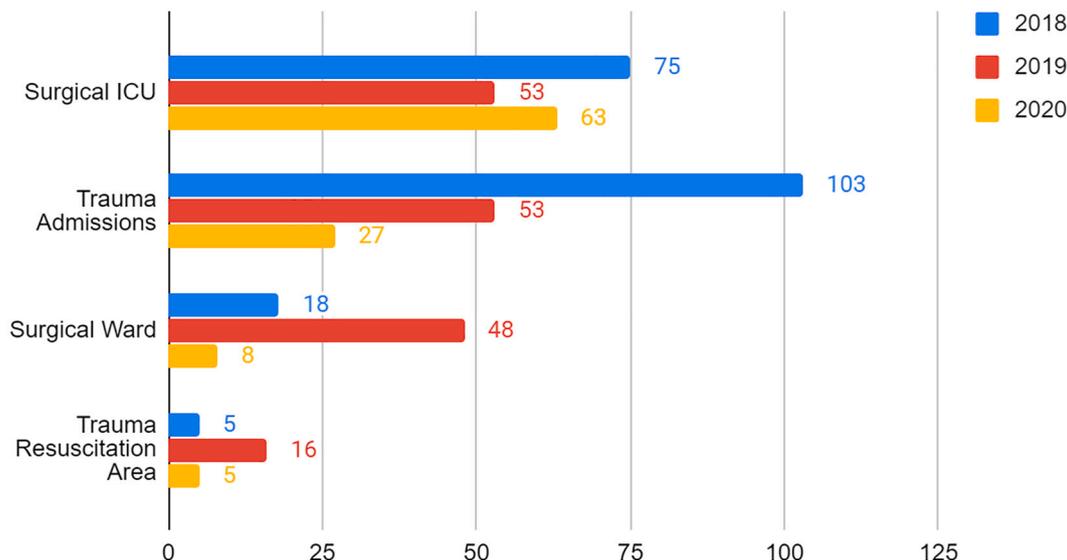
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Table 1
Blood Product Issuance at Tygerberg Hospital 26 March-30 April 2018, 2019, 2020.

Blood Product Issuance at Tygerberg Hospital 26 March-30 April 2018, 2019, 2020



done manually in most areas which is inconsistent and difficult to accurately quantify. Accurate patient admissions were however available for A1W surgical ICU via the Tygerberg.org electronic website. 2018, 2019 and 2020 had 100, 88 and 77 patients admitted during the specified period. This dearth of accurate data for the other areas led to the supposition that perhaps an indirect measure of decreased trauma numbers could be evaluated. Worldwide blood products are mostly utilised for trauma and obstetric patients [14–17]. An assessment of blood product [red blood cells and fresh frozen plasma] issuance by the Western Cape Blood Service at Tygerberg Hospital in Cape Town, South Africa during this period for trauma patients admitted during 2020 was compared to the same time period for 2018 and 2019.

It was expected that there would be a significant decrease in the product usage during 2020 in parallel with the lowered trauma number trend countrywide, which could translate into a counterintuitive but considerable economic saving as a result of the lockdown [18].

Methods

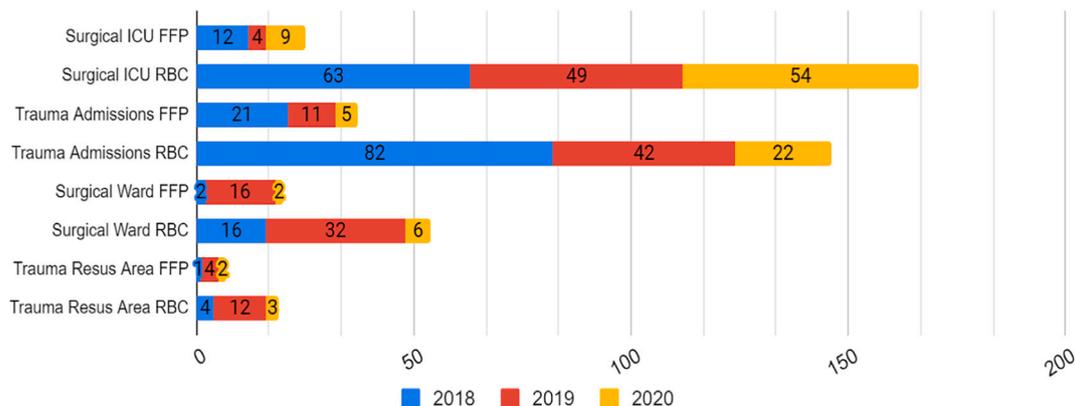
Areas at Tygerberg Hospital with trauma patients were identified, namely: the A1W intensive care unit (Surgical ICU), Trauma Front Room (Trauma Admissions), Trauma Resuscitation unit (Trauma Resuscitation Area) and J7(Trauma Ward). Data of blood product issuance (red blood cells and fresh frozen plasma) for these 4 areas was provided by the Western Cape Blood Service for the period 26 March-30 April 2018, 2019 and 2020. This data is quantitative; that is the actual number of products ordered by each unit and the specified period also included Easter for all three years to include traditionally high admission numbers of trauma patients during this holiday weekend.

All data was collated into a password protected Excel spreadsheet by the principal investigator. This data was not be used for any other purposes and will not be utilised for any other purposes.

While personal clinical records are a vital tool for clinical and

Table 2
Blood Product Usage Tygerberg Hospital – RBC and FFP use.

Blood Product Usage Tygerberg Hospital - RBC and FFP use



epidemiological research, they were not required for this data collection. No confidential patient information was required for this audit. This research was non-invasive, involving no risk and no interference with the mental or physical integrity of any patient. This research was approved by the HREC division of Stellenbosch University 26/5/2020Project ID 15477 with HREC Reference No: X20/05/001_COVID-19.

Results

A total of 201 products were issued in 2018 versus 103 for the same period in 2020 for the 4 trauma areas in Tygerberg Hospital. The surgical ICU received the most blood products over all 3 years with 183 of the total product issuances with the Trauma Resuscitation Area having the lowest amount ($n=26$) issued. The surgical ICU had increased product usage for the period in 2020 versus 2019 despite lowered trauma numbers, a possible reflection of medical patients being admitted to the unit during the Covid-19 lockdown and its changed patient demographic for this period (i.e. both medical and surgical patients were treated in the ICU during this period). The specific usage of Fresh Frozen Plasma and Packed Red Blood Cells is depicted in Tables 1 and 2

Discussion

Evaluation and improvement of the quality of care provided to our patients is of crucial importance in our daily clinical practice and in health policy planning and financing, irrespective of the Covid-19 pandemic and especially in a resource constrained health environment like South Africa's. This data collection has highlighted the need for and opened the door to more accurate data collation of trauma patients admitted to Tygerberg Hospital. The primary aim of this data collection was to assess whether lowered blood product (red blood cells and fresh frozen plasma) usage in trauma patients was seen during the Covid-19 pandemic and it was. As per the South African Blood Service's 2018 and 2020 pricing guidelines for blood products [19,20], the total cost of FFP'S for 2018 and 2020 was R59 182,20 and R25 518,60 respectively. The total cost for red blood cells for 2018 and 2020 was R292 454,25 and R 174 670,75 respectively. This considers the increased costs of products in 2020 versus 2018 and still shows a saving of R 151 447,10 in the 2020 period.

Interestingly the blood usage in the surgical ICU patterns was consistent over the three years. It is unclear why this is so, and the author can only speculate as to the reasons for this. This study was able to provide descriptive information on precious resource distribution without negatively affecting patient autonomy and sought to quantify whether a true decrease in blood product usage was seen during the Covid-19 lockdown. As such it did not consider the reasoning for these blood transfusions or the clinical appropriateness thereof. The author acknowledges the wide variability of transfusion thresholds and protocols within various centres and amongst clinicians around the world, including Tygerberg hospital and is not seeking to provide commentary on the appropriateness thereof in this research [10,16,18–21].

Adverse blood transfusion reactions within this data collection were not evaluated and the author therefore cannot provide comment as to whether this could have potentially offset the potential economic benefit of less product usage during this time but it is unlikely [22].

Conclusions

A true decrease in blood product (red blood cells and fresh frozen plasma) usage was seen during the Covid-19 lockdown amongst trauma patients at Tygerberg Hospital with a 51% decrease in blood product issuance in 2020 versus 2018. This represented a significant cost saving of over R150 000 despite increased costs for blood products over the same period. In a hospital where patient numbers are inaccurately

collated in certain areas, this provides an interesting parallel to the expected decrease in trauma patients that has been seen in the South African healthcare sector because of the Covid-19 lockdown.

Dissemination of results

Results from this study were shared with staff members at the data collection site through an informal presentation.

Author Contribution

The author contributed to all aspects of the conception or design of the work; the acquisition, analysis, or interpretation of data for the work; and drafting the work or revising it critically for important intellectual content. The author approved the version to be published and agreed to be accountable for all aspects of the work.

Declaration of competing interest

The author declares no conflict of interests.

References

- Al DM. et. Impact of lockdown measures implemented during the Covid-19 pandemic on the burden of trauma presentations to a regional emergency department in Kwa-Zulu Natal, South Africa. *African J Emerg Med* 2020. <https://doi.org/10.1016/j.afjem.2020.06.005> [Internet]. Available from.
- Writer S. COVID-19 Quick Insights From 7 April [Internet]. *Eyewitness News*. 2020. p. 1–3 [cited 2020 May 14]. Available from, <https://ewn.co.za/2020/04/08/covid-19-quick-insights-from-7-april>.
- Maliba BA. Covid-19: Ban on alcohol sees trauma unit numbers significantly lowered, say healthworkers [Internet]. *IOL*. 2020 [cited 2020 May 14]. p. 1–10. Available from: <https://www.iol.co.za/sundayindependent/news/covid-19-ban-on-alcohol-sees-trauma-unit-numbers-significantly-lowered-say-healthworkers-46980267%0D>.
- Isaacs L. Groote Schuur: two-thirds drop in trauma cases due to lockdown's booze ban. *EWN*. 2020 (published 08/04/2020, Accessed 12/06/2020).
- Gould C. Gender-based violence during lockdown: Looking for answers [internet]. Available from: <https://issafrica.org/iss-today/gender-based-violence-during-lockdown-looking-for-answers>; 2020.
- Bloch EM, Vermeulen M, Murphy E. Blood transfusion safety in Africa: a literature review of infectious disease and organizational challenges *Evan. NIH Public Access* 2013;26(2):164–80.
- Tapko JB, Toure B, Sambo LG. Status of blood safety in the who African Region [Internet]. Available from, <https://www.afro.who.int/sites/default/files/2017-06/status-of-blood-safety-in-the-who-african-region.pdf>; 2010.
- SANBS. Clinical Guidelines for the use of Blood Products in South Africa [Internet]. Available from, https://www.wcbs.org.za/village/wpbnw/sites/default/files/clinical_guidelines_5thEdition_2014.pdf; 2014.
- World B, Organ H, Aff H. The blood drought in context strengthening emergency care: experience in central Haiti. *Lancet*. 2015;3(April).
- Thomson J, Chh MB, Med MI, Clinical C, Sa H, Hofmann A, et al. IN PRACTICE patient blood management: a solution for South Africa. *SAMJ*. 2019;109(7):471–6.
- X CAI, Ren M, Chen LL F. Blood transfusion during the COVID-19 outbreak Xiaohong. *Blood Transfus*. 2020;18:79–82.
- Matzopoulos R, Prinsloo M, Pillay-van V, Gwebushe N, Mathews S, Lorna J, et al. *Bulletin of the World Health Organization Injury-related Mortality in South Africa: A Postmortem Investigations*. 2015.
- Reuter H, Jenkins LS, De Jong M, Reid S, Vonk M. Prohibiting alcohol sales during the coronavirus disease 2019 pandemic has positive effects on health services in South Africa. *African Journal of Primary Health Care & Family Medicine* 2020;12.
- Zbrozek A, Magee G. Cost of bleeding in trauma and complex cardiac surgery. *Clin Ther* 2015;37(9):1966–74. Internet. Available from, <https://doi.org/10.1016/j.clinthera.2015.06.007>.
- Fan BE, Ong KH, Seok S, Chan W, Edward B, Cui V, et al. Blood and Blood Product Use During COVID-19 Infection. *April: Am J Haematol*; 2020.
- Hebert P, MA Blajchman J, Marshall CM, et al. A multicenter, randomized, controlled clinical trial of transfusion requirements in critical care. *N Engl J Med* 1999;340(6):409–17.
- Chevalier MS, Kuehnert M, Basavaraju SV, Bjork A, Pitman JP. Progress toward strengthening national blood transfusion services —. *Mortal Marbidity Wkly Rep* 2016;65(5):2011–4.
- Anthes E Save Blood. *Save Lives Nature* 2015;520(2 April 2015):24–6.
- SANBS. State patients pricelist April 2017–March 2018. 2018.

20. SANBS. State patients pricelist April 2019–March 2020. 2020.
21. Zhu C, Gao Y, Li Z, Li Q, Gao Z. Meta-Analysis A systematic review and meta-analysis of the clinical appropriateness of blood transfusion in China. 2015;94(50): 1–14.
22. Van Der Linden P. Implementation of patient blood management remains extremely variable in Europe and Canada: the NATA benchmark project an observational study. *EJA*. 2016;33:913–21.