



## Hospital-based Clinical Transfusion Process Audit and Quality Improvement in Africa: A Critical Review

Joseph Aondowase Orkuma<sup>1\*</sup> and Michael Tyodoo Maanongun<sup>2</sup>

<sup>1</sup>Department of Haematology, College of Health Sciences, Benue State University, Makurdi, Nigeria.

<sup>2</sup>Department of Obstetrics and Gynaecology, College of Health Sciences, Benue State University, Makurdi, Nigeria.

### Authors' contributions

This work was carried out in collaboration between both authors. Author JAO designed the study, reviewed literature and wrote the first draft of the manuscript. Author MTM managed the literature searches and contributed to the intellectual content of the work. Both authors read and approved the final manuscript.

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### ABSTRACT

**Background:** Clinical transfusion process (CTP) in Africa is an age long practice yearning for scientifically sound, evidence-based findings to address existent challenges of quality.

**Objective:** To review relevant aspects of hospital-based transfusion practices in Africa wherein practices were assessed against standards (audit) and its impacts weighted on quality improvement. We also sought to identify challenges to auditing and proffered strategies for practice improvement where necessary.

**Methodology:** A systemic review of literature searched on MEDLINE, Google, other internet sources using related search words as well as hand searches of review articles and files.

**Results:** Audit reports on hospital-based transfusion process in Africa are generally few when compared to the multiple steps and procedures involved, wide geographical spread and heterogeneity of the continent. Prevailing practice challenges includes unstructured transfusion services with paucity of voluntary non-remunerated blood donors, absence of many guidelines, low funding and commitment for effective oversights and paucity of trained audit personnel.

\*Corresponding author: E-mail: [orkumajoseph@yahoo.com](mailto:orkumajoseph@yahoo.com);

**Conclusion:** Quality in hospital-based CTP in Africa can continuously improve if all stakeholders evaluate their performances against acceptable standards and provide evidence-based facts that can be deployed in correcting inadequacies existing therein and in advancing transfusion therapy as obtainable in other climes. A functional and well supported structured transfusion service in all African nations that will nurture more transfusion-based researches for guideline development is advocated. Also, increased funding, legislation and general oversights by central governments as well as synergetic continental, regional and group cooperation by hospitals in proximate locations will offer opportunities for manpower development, knowledge transfer and effective inventory management desirable for promoting hospital-based CTP audit practices in Africa.

*Keywords: Clinical transfusion process; continuous quality improvement; blood transfusion standards; guideline adherence; hospital-based; Africa.*

## 1. INTRODUCTION

Deploying instruments that produce scientifically sound, evidence-based findings that are disseminated and timely utilized in health care settings guarantees quality in service delivery. Hospital-based clinical transfusion process (CTP) audit represents one of such instruments. According to World Health Organization (WHO) and International Standard Organization (ISO), clinical audit is a systematic, independent and documented process for obtaining evidence and evaluating it objectively to determine the extent to which requisite criteria are fulfilled and by so doing identify opportunities for improvement (OFI), provide evidence to advance preventive and or corrective actions [1]. Hospital-based CTP audit, is a unique form of clinical audit, in which a systematic, critical and objective assessment of any aspect(s) of the blood transfusion process (es) or procedure(s) carried out or utilized in the hospital is/are measured against explicit standards, criteria, guidelines or benchmarks for quality. Clinical transfusion process (CTP) is a multi-step and integrated event-process, organized into laboratory and non-laboratory specialized units or departments with multidisciplinary professionals and services that run from clinical medicine, social and behavioral sciences. Quintessentially, CTP is highly error-prone and culpable of quality compromise with grave mortality and morbidity. Therefore, there must be strict adherence to standards set in each stage for all stakeholders in transfusion medicine in order to avert harm. In recent times, hospital-based CTP audit has attracted considerable attention firstly because, blood is a drug requiring absolute compliance with current good manufacturing practices (cGMP) and its utilization processes expectedly rational [2,3]. Secondly, it a form of tissue transplant that requires adequate evaluation before during and after the process. Thirdly, the current global

application of quality systems in all products and services has necessitated hospitals and their personnel to deploy operational Quality Management System (QMS) in all its processes including blood transfusions [4].

The QMS revolve around twelve pillars (organization, purchasing & inventory, documents & records, process improvement, personnel, process control, occurrence management, customer service, equipment, information management and assessment) called Quality Management Essentials (QMEs). All QMEs have standards for their operations and audit stands out for its ability to effectively evaluating all the pillars and providing desired evidence for positive interventions that may produce continuous quality improvement (CQI). Tindill and Stewart presents CQI as a comprehensive management philosophy that focuses on contentious improvement by applying scientific methods to gain knowledge and control over variations in work processes [5]. Asprang et al has opined that blood transfusion practice audits can bring attention to known deficiencies, and trigger improvement processes which previously have not been prioritized and this will aid management in securing change across departments [6].

Continuous quality improvement is apt in Africa where quality and safety of blood transfusion therapies constitute important public health challenge impacting morbidities and mortalities in vulnerable groups. Therefore deploying evidence-based facts in blood transfusion services may help address prevailing challenges. Considering the dearth in knowledge on this area in Africa, we sought to assess the impacts of hospital-based CTP audits for quality improvement, identify practices challenges and proffer viable strategies where necessary for quality improvement in transfusion processes.

## 2. METHODOLOGY

A systemic review of literature searched on MEDLINE, Google, other internet sources and hand searches of review articles and related files on relevant aspects of hospital-based CTP audits globally and in Africa was accessed. Search words employed included “hospital transfusion audit”, “hospital transfusion medicine”, “hospital transfusion in Africa”, “transfusion medicine”, “blood transfusion practice” and clinical transfusion practice. The clinical transfusion process was conveniently stratified into procedures, stages or steps (related to the transfusion chain involved from blood sourcing to transfusion act, outcomes and related research). For convenience, some of the stratified steps or stages were grouped together. A total of 16264 publications were retrieved and 95 met the content of this review and were included.

## 3. REVIEW

### 3.1 Historical Perspectives

An age long practice existed in USA which necessitated that, products, services and practices were benchmarked against leaders in such industries in order to assure quality and this was also applied to clinical services [7]. It is also anecdotally perceived that, preceding clinical transfusion audit activities paved way for the emergence of modern blood transfusion practice pioneered by Dr. Blundell in 1818 [8]. Hospital-based CTP audit was heralded with the opening of the first blood bank at the Cook County Hospital but it remained informal, uncoordinated and lowly publicized [9]. The first reported audit of transfusion practice was done by Bock in 1936 [10]. Between 1996 and 2005, documented reports by the Serious Hazard of Transfusion (SHOT) revealed that, 105 deaths and 296 patients developed morbidity due to transfusion risks [11]. Also, the serious hazard of Transfusion Adverse incident reporting scheme (SHOT-Annual Reports 1996-2008) also reported that, 30-40% of “wrong blood” event errors were due to errors originating in the hospital blood transfusion practices [12]. However, modern hospital-based CTP audit became popularized by the United Kingdom (UK) in late 1980s when monies were devoted in financing clinical audit in professional health care through the National Health Service (NHS) and was followed by the development and publishing of audit tools for blood transfusion practice through a collaboration between Royal Colleges and blood transfusion

related specialist Societies [13]. Thereafter, a national hospital-based CTP audit was carried out involving 50 hospitals in the first audit and 23 of the same hospitals in the second audit (re-audit). The audit methodologies, results and data analytical methods formed a major thrust of the national guidelines in blood administration and also set performance indicators for the clinical transfusion process generally [13]. Plausible outcomes of these audits have institutionalized audits in UK through the NHS and specialists are dedicated to annual audit of blood transfusion activities since 2005/2006 up to 2016 [14-18]. Furthermore, in recognition of its importance, medical consultants were statutorily required to allocate time within their job schedules for audit activities as part of their professional health care service [7]. In Africa, on the other hand, the origin of CTP audit is not clear to the best knowledge of the authors. Anecdotal reports however, suggest that, the popular dogma “In God we trust and all others we audit” has a long history in Africa and has contributed to the current developmental milestones witnessed in her CTP.

### 3.2 Impact of CTP Audits on Quality Improvement

Quality in the clinical transfusion process is “ the transfusion of the right unit of blood to the right patient at the right time and in the right condition and according to appropriate guidelines [19,20]. In other instances, quality is addressed by considering how safe and efficacious blood, blood components, reagents, and services can be provided through the application of an effective quality management system [21]. In blood transfusion practice, quality improvement, attainment and maintenance are a continuum and all continents and nations irrespective of their levels of economic development, strive to attain set their quality levels. Audit and assessment are often used interchangeably, but are different. For instance, while “audit” usually involve using a standard to check on what people are told should be doing, an “assessment”, does not employ a “standard” and instead, a set of concepts and principles that describe desirable outcomes are used leaving the specifics on how they should be achieved at the discretion of the organization [22]. Relatedly, CTP audit is different from service evaluation wherein a systematic assessment of aims, objectives, activities, output, outcomes and costs is used to judge a service delivery, but not necessarily with emphasis on measuring practice against guidelines or standards [23]. It also differs from

haemovigilance which is a set of surveillance procedures covering the entire transfusion chain from the donation and processing of blood and its components to their provision and transfusion to patients and their follow up [24]. Also different from audit is a research wherein an idea or hypothesis is explored to create new knowledge that may in future form the basis of agreed guidelines or standards [25].

Evidence-based medicine (EBM) practices such as that provided by CTP audit has been despised by some researchers doubting the true desirability of such evidences arguing that, clinical judgement, experience, pathophysiological rationale, clinical consultations of attending clinicians and laboratorians as well as views of patients often form sufficient grounds for making valid quality improvement decisions by clinicians [26,27]. There have also been reports that, many audits have one or more flaws in their design, execution and result interpretation. Concerns of Hawthorne effect and investigators preference of reporting positive finding and concealing negative outcomes have also been advanced which seem to limit the relevance of CTP audits in modern practice [28,29]. Coming from this standpoint, some have argued that eliminating audit activities circumvents the practice of utilizing audit data analyzed and interpreted by non-clinicians for the clinicians in a seeming systematic and objective manner so as to provide the perceived "evidence-based" results [30]. It is also reasoned that individual institutions should rather assess critically whether or not their current system of transfusion audits is useful as transfusion audits appear most successful when there is a high baseline rate of inappropriate transfusions and in which case interventions other than the audit itself are required [30].

On the other hand however, many reports suggest that, blood transfusion audits are significant for quality improvement in the hospitals including its effectiveness in reducing unnecessary transfusions and averting the risk of blood shortages, providing information on the level of service quality, cost-effectiveness and development [31,32]. Relatedly, the deployment of audit for continuous quality improvement (CQI) in transfusion therapy has been demonstrated by different researchers globally [6,31,33-39].

To this end, audit in transfusion medicine in particular and clinical audits in general have assumed focal positions as quality improvement

essential and a pillar of clinical governance in health care settings and it's becoming a profession in its own right [40-45]. These evidences overwhelmingly favour the positive impacts of CTP audit globally and routine audit of prevailing practices in all aspects of hospital-based CTP has assumed focal points for safety, products availability and CQI in modern transfusion practice.

In Africa, the desire for quality improvement necessitated an intervention strategy by the WHO in 2012 through the establishment of regional blood safety programme that emphasized on an improved organization and management, blood donor recruitment and collection, testing of donor blood as well as appropriate clinical use of blood [46]. In spite of this, transfusion safety is still a daunting challenge and providing evidence-based findings on the level of compliance to standards seem lowly perceived.

In this systematic review, available CTP audits have been summarized into different sub headings and discussed.

**i. Audits on blood donor education, motivation, recruitment and retention:**

The bane of quality in transfusion therapy is hinged on availability of safe donors who are appropriately motivated, recruited and retained to sustain the supply of safe blood. Audits of this section of transfusion are apt in Africa considering the heterogeneity of continent in terms of geographic spread, religion, practices and belief systems. In Ivory Coast and Togo, some researchers advocated for public awareness creation and education of prospective blood donors as a panacea to improving donor recruitment. They also opined that, improvements in donor and donation indices were necessary in ensuring a prudent and sustainable clinical use of blood products [47-49]. Sadly, these audits are few for a desirable quality improvement intervention in the entire continent.

**ii. Audits on the process of Blood Donation (phlebotomy) and informed consent:**

The experience of a blood donor at a donation centre that relates to physical, emotional or traumatic torture before, during and after the art of blood donation influences greatly if such a blood donor would return as a voluntary non-

remunerated blood donor. Quintessentially, even mild experiences like vasovagal effect sometimes deter blood donor in subsequent blood donation. Unfortunately, no audit has been recorded in this review that assessed the experience of phlebotomy amongst hospital-based blood donors in Africa with a view to improving voluntary blood donation. Relatedly, a valid informed consent in transfusion process that provides education to blood donors and recipients on possible risks, complications, alternatives and implications of refusing to undertake such procedures including reasonable expectations for actions and inactions associated with these procedures seem lowly audited in Africa. Informed consent helps in scaling up blood donation, encourage donors to become VNRBDs and help clear myths to blood donation and transfusions thereby improving the quality of hospital-based transfusion processes. Inadequate practice and audit of phlebotomy experience and consent in hospital-based transfusion processes continues to deny quality improvement in Africa's transfusion therapies. In developed climes and some Asian countries, audits in this area is well appreciated [50-51].

- iii. **Audit on blood transfusion requests, levels of compliance to requests, record keeping and documentation towards quality:** It is understandable that, the quality of requests influence the products available for transfusion therapy. In Uganda, Ghana, Nigeria, Zambia and Tanzania, some workers have shown the value of adequate requests, records and documentation but decry poor compliance of transfusion prescribers with hospital blood request forms [52-56]. These audits have implied consequences on quality improvement in the continent.
- iv. **Audits on screening blood donors for transmission transmissible infections (TTIs):** Africa is generally plagued with poverty, ignorance and diseases resulting in high prevalence of transfusion transmissible infectious amongst blood donors. In recent times, the world has witnessed an upsurge of new and emerging infections including malaria, west Nile virus, and human T cell Lymphotropic virus (HTLV), chikungunya virus, variant Creutzfeldt-Jacob disease (vCJD), *Trypanosoma cruzi* etc. The prevalence of

these new and emerging TTIs across Africa is largely unknown due to limited financial commitment and willingness to imbibe technological advancements to screen for them. In many nations in Africa, screening for TTIs is limited to Human Immunodeficiency virus, Hepatitis B and C viruses and syphilis which are mandatory tests for all member states of WHO. Worse still is the fact that, in many of African nations, rapid tests are still being deployed for TTI testing despite widespread concerns of low sensitivity [57,58].

- v. **Audits on blood products and component production and availability:** The availability of blood products and components when needed is a panacea to quality transfusion therapy. Hospitals should develop capacity for component preparation, embark on regular audit of transfusion practices and foster an improved communication to derive the gains of blood component therapy and availability.  
In Nigeria, South Africa and Egypt, some audits of blood shortages were said to prevail amongst adults and children due to multiple causes including transportation difficulties, choice of blood provider or facility and unclear referral systems, delayed hospital admission, assessment or initiation of resuscitation and of medical or surgical interventions, blood ordering, receipt and administration. Also, insufficiencies of some products were traced to inappropriate usage [59-61]. More audits that could facilitate universal products and component availability in Africa are however lacking.
- vi. **Audit on blood grouping, cross-matching, compatibility testing, clinical Use, bed-side transfusion practices and blood inventories:** The anticipatory planning for quality transfusions is often based on knowledge of what products are available, where they are kept, who is using which product at what time. It also often involves how long such products can be kept or a replacement sought to assure availability in the hospital. These are achieved through audits of blood grouping, cross-matching and good inventory and stock management practices. Quality in transfusion practice is also related to how clinical transfusions take place or are initiated at the bed-side by physicians, nurses or other medical personnel. Many

audits in different parts of Africa including South Africa, Nigeria, Ethiopia and Uganda have documented that, hospitals need to develop their blood ordering schedules as unnecessary cross-match bear great financial and personnel implications on their transfusion service. Also, the need to avoid bleeding the rare & Rh negative blood when necessary and to maintain proper inventory management practices has been emphasized. Regular audit of blood issue and discard in hospitals remain essential [61-68].

- vii. Audits on transfusion outcomes and haemovigilance, guidelines development and researches:** Audits on outcomes of transfusion are inevitable for health planning in the blood transfusion service of a hospital towards quality service delivery. A look at haemovigilance and adverse events of transfusion helps in identifying areas needing further research and guides towards guideline development in gray areas of transfusion practice. Some workers in South Africa and Nigeria have reported the need for developing blood component use guidelines in hospitals that reflect the national blood transfusion policy. Also, regular audit of blood bank services needs to be initiated in all blood banks and the results discussed among the managements, colleagues, and staffs of blood bank. Also reported is the skew in transfusion-based researches to countries like Nigeria and South Africa while other countries are at the low ebb [69-71]. While haemovigilance practices are lowly practiced in hospital-based transfusion practice in Africa, many developed countries have derived quality in their blood transfusion system through haemovigilance practices [72].

These findings generally suggest paucity of CTP audits in Africa when compared to the multiple processes associated with clinical transfusion, geographical spread and heterogeneity of the continent with racial, ethnic, religious, cultural and belief systems. There are also skewed audit reports in favor of clinical use of blood and bed side transfusion practices while many aspects of safe donor motivation, recruitment and retention, donor phlebotomy, component preparation, haemovigilance and research are lowly reported. Meanwhile, many relevant areas for quality improvement in hospital-based transfusion practice are omitted.

### **3.3 Practice Challenges against CTP Audits in Africa**

#### **3.3.1 Predominance of unstructured blood transfusion practice**

Africa is plagued with predominance of unstructured practice. Hospital-based transfusion service managements depend largely on their initiatives and lean resources of their organizations to finance all the processes of blood acquisition and utilization. The World Health Organization (WHO) has advocated the implementation of national blood transfusion services (NBTS) or structured systems for achieving quality, cost-effectiveness and safety of blood supplies in countries worldwide [73]. However, only 12 sub-Saharan countries including Botswana, Burundi, Central African Republic, Cote d'Ivoire, Malawi, Namibia, Rwanda, Senegal, South Africa, Swaziland, Togo and Zimbabwe have achieved centralized systems supplying 100 percent unpaid blood donations [74]. About thirty three sub-Saharan African countries do not have a functionally operated quality system in blood transfusion services and instead, maintain a formidable unsafe hospital-based transfusion system [74]. The prevailing fragmentation and decentralization of hospital-based CTP in Africa makes audits in areas of donor recruitment, motivation and retention difficult. Complete and accurate data for hospitals and national use on compliance to standards are not usually available. Besides, this prevailing unstructured system denies opportunities for economies of scale and cost-effectiveness offered by centralization. It also breeds heterogeneity and indiscriminate application of methodologies and interpretation of results, screening materials and reagents in different hospital even for those in close proximities. These practices allow for diversity and ambiguity in assessment of safety and quality improvement parameters in hospital. As such, even within the same state, province, government establishment or country, hospitals attain different levels of quality in their transfusion therapies. Furthermore, existent decentralization encourages the choice of reagents and screening assays that should guarantee quality in these hospitals to be influenced by their lean financial resources rather than the certified quality and safety parameters used in assessing screening kits or assays. Yet, there are concerns of compromised quality of reagents, consumables and screening kits or assays circulating in many markets in Africa [75].

In this way, existent unstructured transfusion practice denies initiation and coordination of external audit activity to hospitals. It also denies effective supervision and monitoring of hospital-based transfusion therapies that is obtainable where structured blood transfusion systems operate.

### **3.3.2 Paucity of voluntary donors and high dependence of family and replacement donors**

There is a paucity of voluntary non-remunerated blood donor (VNRBD) population in Africa. The WHO target for all countries to obtain their blood supplies exclusively from VNRBD by 2020 (in less than three years' time) is still far from being realizable in Africa. Emerging facts suggest that, blood shortages prevail in most of Africa, as only 4.3% of global donations take place in the continent. The desired minimum 10 safe donations per 1000 of the population estimated to meet the minimum clinical blood needs in individual countries is hardly ever being achieved in majority of Africa even though she accounts for about 12% of the world population [76,48]. In its place, a de facto practice in which "family replacement" or "family donors" prevails in hospital-based transfusion services. Many of those included as "family" donors are those that masquerade as family members, relatives or close associates but are in fact commercial or paid donors reputed for high risks but disguising for financial or other selfish motivations to taint transfusion processes. Paid, family and replacement donations in Africa in most instances are "semantically indistinguishable". Therefore, given the wide diversity, heterogeneity and ambiguity of this unsafe group, the criteria and methodologies for hospital-based CTP audit in providing CQI remains blurred and unattainable.

### **3.3.3 Absence or inadequate criteria or guidelines**

Many aspects of hospital-based transfusion practice desire new or improved guidelines. Generally, a guideline or criterion is a principle, reference, benchmark or standard set by requisite organization(s) and or body (ies) upon which something may be performed, measured, judged or accessed [77]. Guidelines, regulations or criteria are vital instruments that guarantee quality and safety in transfusion therapies. They are inevitable in accreditation and certification for many transfusion units, departments and serve

as a day to day guide in all transfusion processes for stakeholders. In hospital settings they assist health facilities and practitioners comply with cGMP and are mandatory for executing hospital-based CTP audits. Guidelines or criteria may be developed locally, nationally or internationally by governments or non-governmental organizations to reflect accepted ethics, rules, or benchmarks for best practices. However, guidelines from other sovereign nations that are adopted and implemented in other countries should recognize the diversities, sovereignty and peculiarities of the applied and applying populations. Generally, an audit criterion applied in transfusion therapy, should describe the aspect of CTP that is being measured explicitly or "SMART" (specific, measurable, achievable, relevant and timely) [77]. Specificity implies being unambiguous and covering only one topic of interest at a time; measurable implies that, it is objectively comparable; Achievable implying a realizable goal within available resources, personnel's, logistics etc; relevant implying being beneficial to relevant interest groups including staff, patients, hospital administrators, blood transfusion regulatory bodies, governments and governmental agencies, legal authorities, donor agencies and other stakeholders; and timely implying realizable within a reasonable period of time such that, necessary actions or interventions if taken will be prompt and reflect current best practices. It is argued that, the absence of guidelines in some aspects of Africa's transfusion therapy is a global phenomenon rather than an African curse [78,79]. The considerable multi-process nature and multidisciplinary adjudication over different aspects of therapy in Medicare delivery services is perceived universal. It is however believed that, the absence of requisite criteria, guidelines or benchmarks in many aspects of Africa's CTP has contributed to the comparatively higher risks in Africa's transfusion therapy when compared to developed nations in USA, Britain, Australia, Canada, France and many countries in Asia. Relatedly, the development of indigenous guidelines in some gray areas of transfusion are lacking as exemplified by the fact that, family donor practices have long served hospital-based blood transfusion services in Africa but has remained ill-studied, un-standardized and marred with varied practices across the continent [80]. Even though researchers are currently questioning whether Africa's transfusion models completely fit the western model [71], many indigenous practices remain gray and efforts at developing these guidelines seem low.

In some African countries, there exist regulations or criteria in some aspects of transfusion therapy but, there is poor compliance to them by practitioners due to ignorance or individual practitioners' unsubstantiated opinions, beliefs or preferences. Worsening this development is the fact that, researches into hospital-based transfusion practices in Africa are still rudimentary, poorly encouraged, coordinated and publicized. Reports indicate that, between 2008 and 2015, researches have been intensified on transfusion therapy in Africa but have been skewed in favour of Nigeria and South Africa in spite of the heterogeneity and diversity of the African population [71]. Relatedly, a cooperative alliance for the development of local agreements or consensus in gray areas of transfusion practice that should have evolved into guidelines, benchmarks or standards for hospital-based CTP audits is lowly perceived.

#### **3.3.4 Absence of legislations on transfusion practices and CTP audits in hospitals**

Guidelines governing operations of all aspects of CTP in hospitals require legislations in order to empower it to legitimately direct and regulate hospital-based transfusion processes. Legislations and ethical guidelines adopted from international agencies, developed economies, continental and regional levels of government are to be domesticated in that African country through legislative means as it is done in Europe and other developed climes. The European regulation on blood and blood components declined in directives 2002/98/EC, 2004/33/EC, 2005/61/EC and 2005/62/EC have been transposed and legislated in the laws of member states as appropriate [81-85]. In many African countries however, legislations on transfusion processes are largely deficient thereby allowing for perpetuation of errors, malpractices and negligent practices by practitioners. It has also encouraged poor oversights and supervision, non-recording and reporting of misses or near misses associated with transfusion therapies [86]. The absence of this legitimacy has encouraged the propagation of the false belief that "the blood must be good" without frantic efforts at attaining, improving and maintaining quality practices through quality improvement initiatives like routine auditing of hospital-based clinical transfusions services.

#### **3.3.5 Low priority for quality in hospital-based transfusion therapies**

In many countries in Africa, blood transfusion services are a low priority in health service

development and effective oversight over blood transfusion is still a great challenge. [20,86] Designate governmental agencies fail in their statutory responsibilities to initiate external audits as required. They also fail in stimulating manpower development in this sector through oversight activities. Relatedly, top management staff, departmental management committees, unit managers and other stakeholders to blood quality and safety in hospitals fails in maintaining an organizational structure that upholds quality interventions including audits. In this circumstance, the appointment of auditors, safety managers, quality desk officers, hospital transfusion committees and proactive management boards is neglected. Yet, this is requisite in upholding audit activities and nurturing CQI in the hospitals. Coupled with these, there is generally a low priority to audits even where it could be carried out successfully at low or no extra costs to individuals or groups in the hospital-based transfusion centre. These probably accounts for the fewer number of reported audits in Africa when compared to developed countries and many parts of Asia.

#### **3.3.6 Low budgetary allocations and financing**

Blood transfusion services are generally expensive and require adequate budgetary allocation and funding by governments as an integral part of her national healthcare policy and health care infrastructure [76]. Hospital-based transfusion services form an integral part of national blood supplies whether in government, private, groups or faith-based organizations and should be secured for quality by central governments including adequate funding interventions. Unfortunately, most hospital-based transfusion services are resource-constrained and are "stand-alone" entities that depend solely on their poor budgetary allocations and financing from their owners without being included in national funding of blood safety programme by the central government. Therefore, in the face of competing financial demands, hospital-based transfusion services easily compromise quality in their CTP. Some hospital-based transfusion services have introduced complementary fees to improve funding and support transfusion services [87,88]. Such charges negate best practices of quality by denying the vulnerable from assessing transfusion services due to financial limitations and eroding the global principles of safe blood practice. Supports from international agencies are often sporadic, inadequate and under subjective control by governmental agencies



making them fail in meeting the desired quality improvement especially amongst rural majority and vulnerable groups of the population. Quintessentially, financial challenges of low budgetary allocation and funding has hampered hospital-based CTP audits and denied opportunities for CQI in Africa.

### **3.3.7 Inadequate trained manpower, publicity and patronage of CTP audits**

There are inadequate personnel's proficient in developing, initiating and implementing CTP audits in many African countries. This has hampered audit activities at national, state, local, regional, provincial governments and hospital levels. Trained and competent external auditors, internal auditors, quality managers and quality-conscious hospital transfusion committee members are few. The WHO quality management programme (QMP) in support of member states had deployed strategies for manpower development wherein blood transfusion service (BTS) directors were trained in 100 countries including those in Africa. This was expected to include follow up and step down trainings [89]. Regrettably, the impact of this programme is yet to be appreciated in many Africa countries as trained personnel's for CTP audit is still lagging. Relatedly, there is a low reportage or publicity given to audits conducted in and on hospital-based transfusion processes even in some instances. This may be related to ignorance, poor circulation of findings by practitioners, low reliability of findings as a result of confounding factors, poor protocols, non-standardizations etc. that are often associated with some of these CTP audits.

## **3.4 Feasible Solutions for Successful Hospital-based CTP Audits in Africa**

Undoubtedly, effective utilization of reports from acceptable, well planned, systematically executed and well publicized CTP audits provide platforms through which hospitals, practitioners and blood servicing agents or organizations advance their therapies and practices. In the face of prevailing threats and challenges in Africa, some measures of remedy have been proffered herein as follows:

### **3.4.1 Integrating hospital-based transfusions in a functional and structured transfusion system**

There is generally a need for adequate funding of centralized transfusion services at all levels of

government in Africa in order to promote quality, safety and economy of scale in the hospital-based transfusion services.

Also, the long held belief system of "African generosity" that has permeated deeply in hospital-based transfusion practice wherein family replacement or family donation on demand is deemed a hall mark to a responsive giving to a needy "brother" need a review. This practice is not often weighted critically against the enormous negative health implications of the art that includes quality compromise.

The conscious and continuous deployment of family replacement donations and family donations in hospital-based transfusion services runs down the gains of VNRBD. It is therefore time for this African generosity in blood donations to be expanded and extended to mean that, a donor donates willfully and with acceptable repetitions as a social responsibility to "any other brother" (non-directed) and preferably at a centralized unit with capacity to run quality service in a cost-effective manner. It should deemphasize donating for a particular "brother".

Centralized systems should also be empowered to meet the blood products and components demands of hospital-based transfusion centres in a timely and responsive manner. It should also, encourage the development of standards for all hospital-based transfusion services within the country, proactively monitor compliance as well as engage on regular audits and quality improvement initiatives. Under a functional structured system, family and replacement donors could be motivated, recruited and retained amongst the predominantly youthful populations of Africa to become voluntary blood donors through education and enlightenment programmes in religious, social and age group meetings, social group platforms including Facebook, LinkedIn, and twitter, Instagram etc in a systematic and auditable manner. Additionally, centralization of transfusion systems will encourage robust researches on peculiar motivations to blood donation amongst Africans given her peculiar cultural diversity but related ancestry. For instance, researches and audits may redefine the criteria for non-remunerated blood donation in Africa considering her peculiarities of poverty, hunger and lowered immunity to possibly skew towards providing monetary and material gifts that will provide nourishment and protection to successful blood donors without compromising the principle of safe blood. Governments, NGOs and hospital

managements should educate, encourage, implement and enforce the practice of adherence to standards and auditing in all hospital-based transfusion centres.

As external funding and financial support for Medicare in most African countries gradually decline, all nations must stand up to support themselves towards quality in transfusion therapies. More indigenous non-governmental organizations with interest in safe transfusion practices and licensed to do so in different parts of Africa should step up their campaigns and advocacies. Governments should increase funding to hospital-based transfusion centres as a priority to increasing safety of the nation's blood supplies. One of the viable alternatives is to provide information to blood donors and recipients in hospital-based facilities in languages or dialects best understood by blood donors or recipients with intent to encourage VNRBD and nurture centralized blood supply system in each country.

The WHO has recommended that, continued success in improving quality and achieving safety targets in transfusion therapy depends on the commitment of the central government to increase public financing and diversified funding mechanisms for transfusion-related activities through centralized systems [90].

While there may be concerns on the implied running-costs of structured transfusion system on the economies of many poor countries in Africa, it must be upheld that, life is golden. Therefore, no amount of money can suffice for a single life lost due to a preventable quality compromise arising a persisting unstructured transfusion system.

#### **3.4.2 Harnessing cooperation for risk reduction, manpower development and advancement in quality of transfusion therapy**

According to WHO experts, collaboration to achieve public health goals is no longer simply an asset but a critical necessity [91]. Such collaboration is apt in Africa. Therefore, the health wing of African Union (AU) can evolve to carter for and encourage collaborations in transfusion practice. This may involve supporting the development of national blood transfusion policy document that can be domesticated in member countries. Such document may incorporate necessary checks for quality transfusions; develop acceptable methodologies,

data analysis, interpretation and reporting criteria for hospital-based audits including suitable timelines for re-auditing in each process. Additionally, such document could clearly identify the roles of the different stakeholders required for audits in hospital setting thereby covering for the current knowledge gaps existent in many clinical transfusion processes and procedures in Africa. In this way also, CTP audit will be guided at continental and regional levels for best practices especially now that, "transfusion oversight is still being improved in Africa", [86]. Furthermore, this co-operation in Africa is capable of encouraging the development of regulatory guidelines that can be applicable to people of related cultures instead of relying on regulations from different temperate climes, regions, cultures, beliefs and of unrelated descent. As researchers are asking if the African model of transfusion truly fits the western model, [71] this is perhaps the time AU steps up its collaborative activities on the African continent. The WHOAFRO organization is helping in strengthening transfusion therapies in most countries in Africa but, greater achievements will be gained through an effective synergy and collaboration with the health wing of AU.

#### **3.4.3 Developing audit criteria and enshrining legal frameworks to CTP audits**

The development of standards, criteria and procedures to warrant a regular comparison of practices amongst Africans is apt but hardly being pursued. All stakeholders should develop attitudes towards undertaking research and development of standards, criteria and benchmarks for effective audit activities. Also, wide dissemination of available criteria or standards where in existent should be encouraged in all hospital-based transfusion services. Where no published or recommended standards are available, there have to be established by local agreement or consensus [31]. Transfusion researches have been intensified but this has been lob-sided in favour of few countries thereby necessitating recommendation for collaboration with higher institutions and research centres in all African countries in order to advance transfusion researches [71]. Relatedly, research institutions, funding partners, national and international agencies and Non-Governmental Organizations should support transfusion researches that will evolve guidelines where necessary. Also, there should be requisite ethical and legal frameworks that legalize practices in all hospitals in African

countries through legislative enactment at local, state, regional or federal government levels for quality transfusion practice. At hospital level, hospital transfusion policies should legitimate audits in line with enacted regulations and be entrenched in the hospitals blood policy documents. Governments, hospital owners and support groups should increase logistic support and budgetary allocation for quality improvement, providing efficient oversight for implementation of audit practices and a timely enforcement or implementation or application of audit findings in conformity with the aims for which such audit was embarked upon.

Hospital management, departments, units and stakeholders involved CTP should be committed to audits (internally and externally) and lay formidable structures dedicated to coordinating CTP audits in the hospital [92]. This may include development of a responsive quality management team, hospital transfusion committees, auditors and quality managers etc. Additionally, the synergy, support and cooperation of staff and stakeholders in audit activities in the hospital including timely dissemination of audit or re-audit reports for utilization will help in providing quality improvement in service delivery in the overall interest of blood donors and recipients.

#### **3.4.5 Prioritization of CTP audits for contentious quality improvement**

Considering the wide scope of CTP, auditing could be overwhelming and expensive unless it is prioritized based on the strength, weaknesses, opportunities and threats available to the department, unit or hospital. It is useful that, over a period of one year, every part of the CTP should have been audited. It is advised for small bench-specific or section-specific audits rather than trying to carry out all at the same time. Any faults identified in an audit should lead to an immediate corrective action including appropriate changes in documentation and a discussion in management reviews where necessary [93]. In auditing the operation of the blood bank, all aspects should be covered in year audit cycle. It is better to have a regular audit system in place that will provide a continual practice improvement system rather than a reactive corrective action following an audit. It is also advisable to go around the audit cycle for the second time (re-audit) in order to discover whether agreed actions have occurred, changes have achieved the desired improvements and to tell whether

changes were required at all for improvements or whether changes were not required as standards continue to be met [94]. In order to improve the effectiveness of the audit programmes, the frequency of audits has to be maintained and there should be continual reinforcement of policies [95].

## **4. CONCLUSION**

Quality in hospital-based CTP in Africa can continuously be improved if all stakeholders imbibe attitudinal change towards evaluating their performances against acceptable standards and provide for evidence-based facts that may be explored in correcting inadequacies existing therein and to advance transfusion therapy as it is obtainable in other climes. The need for further research on other continuous quality improvement strategies in Africa's transfusion therapies is also recommended.

## **CONSENT**

It is not applicable.

## **ETHICAL APPROVAL**

It is not applicable.

## **COMPETING INTERESTS**

Authors have declared that no competing interests exist.

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