JOURNAL OF ADVANCEMENT IN MEDICAL AND LIFE SCIENCES
Journal homepage: http://scienceq.org/Journals/JALS.php
ISSN: 2348-294X V7I2.02
Research Article Open Access

Profile of Anemia in Children Aged 0 to 59 Months Treated at Kabondo Reference General Hospital of Kisangani City, R. D. Congo

Joseph – Désiré OLEKO WA OLEKO[1], Antoinette O. HAKONYANGE[1], José TSHIBANDA[2], Dorothée D. TSHILANDA[2], Salomon A. BATINA[3], Dynamo R. KASONGO[4], Briston E. MONGITA[5], Aimé M. LUKUSA[6] and Puis T. MPIANA[2]*

[1]Institute Superior of the Medical Techniques of Tshumbe P.O. BOX. 64 Tshumbe, DR Congo
[2]Faculty of Sciences, University of Kinshasa, P.O. BOX. 190 Kinshasa XI, DR Congo
[3]Faculty of Medicine and Pharmacy, University of Kisangani, P.O. BOX. 2912 Kisangani, DR Congo
[4]Institute Superior of the Medical Techniques of Kibombo P.O. BX. 117 Kibombo, DR Congo
[5]Institute Superior of the Medical Techniques of Buta P.O. BOX. 315 Buta, DR Congo
[6] Faculty of Public Health, University CEPROMAD, P.O. BOX. 321 Kisangani, DR Congo
*Corresponding author: OLEKO WA OLEKO., Ph: +243 81 56 26 506, Email: j_d_Oleko@yahoo.fr
Received: September 12, 2018, Accepted: October 25, 2018, Published: October 25, 2018.

ABSTRACT:

Severe anemia is a major risk factor for infant mortality and is a public health problem in our country, DR Congo. Most cases require urgent medical care with blood transfusions and a very high hospital bed occupancy rate. This cross-sectional study aims to determine the profile of anemia in children from 0 to 59 months in care at the Kabondo Reference General Hospital during 2017. Our study is transversal descriptive, based on the register of consultations of the pediatric department of the reference general hospital of Kabondo in the year 2017, and 3,641 cases were selected, and based on selection criteria, 486 cases were retained. At the end of our investigations, the following results were obtained: the anemias represent a significant morbid load with a hospital prevalence of 13.3%, in children from 0 to 11 months (38.9%) predominantly female (57.5%). The dominant clinical signs were: fever (40.3%) and digestive disorders (26.1%). 94.1% of cases were cured against 3.9% of deaths. These results demonstrate the use in case management by: 95.9% antianemic agents and 70.3% antibiotic therapy. This study brings to the database more information on the anemic profile of children aged 0 to 59 months treated at the Kabondo Reference General Hospital and gives the relevance of certain drugs in case management.

Keyword: *Anemia, public health problem DR Congo, infant mortality,*

INTRODUCTION:

According to the Larousse and Robert dictionaries [1], wastes are defined as "debris, remains without values of something" or "the loss or diminution of a value that a thing undergoes in the employment which is made ".

The Code of Hygiene of the Democratic Republic of the Congo [2] to some extent incorporating the Basel Convention [3] equates "waste" with "any solid, liquid, gaseous substance or residue of a production process, processing or use of any substance that has been eliminated, intended to be disposed of or to be disposed of in accordance with the laws and regulations in force ".

In general, biomedical waste (MBW) or medical waste (MSW) refers to any waste resulting from diagnostic, monitoring, preventive, curative and palliative treatment activities in the field of human and veterinary medicine. They are produced by human health, veterinary hygiene, research and medical education establishments, clinical or clinical research laboratories and vaccine production or testing establishments [4].

BMWs are classified into five categories [5]:

- Category A: safe BMW (office waste, packaging, leftovers)
- Category B: BMWs requiring special attention (anatomical waste, sharps waste, pharmaceutical waste, blood waste and fluids);
- Category C: infectious and highly infectious waste (laboratory waste and microbiological cultures);
- Category D: other hazardous waste (chemical, gaseous, liquid or solid substances with a high content of heavy metals) ;
- Category E: radioactive BMW (cobalt, technetium, iridium).

The risks associated with BMW are psychosocial, traumatic, infectious, toxic, radioactive and environmental. BMW management is described as the process of ensuring the health of health care facilities, the safety of health personnel and the community. It includes the planning, provisioning, training and behavior of health personnel, the correct use of tools, equipment and pharmaceuticals, and appropriate treatment methods inside or outside the health facilities. Care and evaluation [6].

The African Institute of Urban Management organized, between 1997 and 1999, a study in four cities in West Africa including Bamako, Ouagadougou, Cotonou and Dakar; which had shown the mismanagement of BMW and a lack of palliative strategies [7].

WHO's 2002 survey of 22 developing countries found that the proportion of health facilities that did not use appropriate methods of disposing of HCW varied from 18% to 64% [8].

In view of this worrying situation, the WHO launched the global challenge for the safety of care in 2005 and proposed, as the main strategy, the management of BMW to prevent different risks [9].

In this context we had studies on the management of the BMW within four hospital structures of the city of Kisangani in order to reduce the related risks and improve the conditions of hygiene and safety in the environment working.

STUDY AREA AND METHOD

Study area

This biomedical waste management study is organized in four hospitals in Kisangani: Mangobo Reference General Hospital, R.G.H. Lubunga, R.G.H. Kabondo and R.G.H. Tshopo which make up the reference urban centers for patients, training and learning for health professionals. And to begin this investigation, a letter from the Head of Division of Health was

sent beforehand to the different heads of the hospital structures to obtain their availability and support. This survey was conducted from 02 to 22 July 2018.

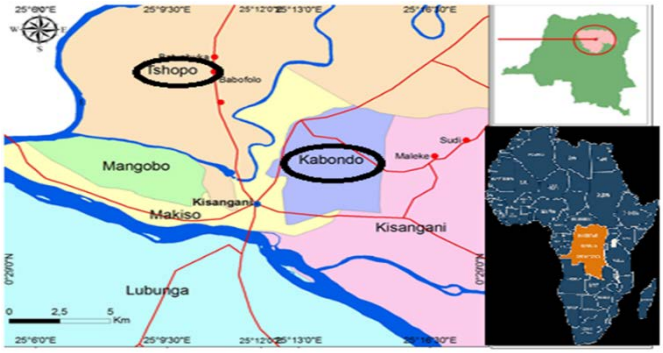


Fig. 1: Location of Reference General Hopital Mangobo, Kabondo, Lubunga and Tshopo in Kisangani City, DRC.

Size of the sampling

The simple random sampling technique allowed us to choose four out of five Reference General Hospitals located in Kisangani.

The study population was made up of hospital managers (director, human resources manager), heads of medical, surgical, pharmaceutical and laboratory services, service supervisors, hospital hygiene managers, medical staff, and medical staff care, surface technicians and incinerator operators.

Type of study

Our study is descriptive transverse.

Study parameters

The data collection tools were:

- a questionnaire addressed to the heads of the structures, department heads, service supervisors and hospital hygiene managers to assess the management mechanisms of the BMWs;
- an interview guide for BMW operators (surface technicians, incinerator operators) and care staff (doctors, nurses, midwives) to assess their knowledge of BMW management;
- an observation grid to link and objectify the information collected during questionnaires, interviews and observations in the services;
- a digital camera to support observations in departments;
- a data entry form for their treatment. The method of data collection was based on direct observation, questionnaire, interviews and photographs.
- The variables studied were:
- the different categories of BMW produced;
- the different stages of BMW management (sorting, packaging, storage, transport, disposal);
- the means of protection available to staff;
- staff knowledge and practices on management;
- Health risks related to BMW.

Analysis

The collected data were captured using Epi Info version 6 software. The difficulties encountered were mainly related to the difficulties of collecting survey questionnaires filed in certain services.

RESULTS

Of the 38 questionnaires distributed to hospital managers, department heads, service supervisors and hospital hygiene managers, 34 responses were obtained, representing a response rate of 89.5%.

The four hospitals, under review by this study, are respectively built on an area of 900 Ares for the widest RGH Kabondo and 25 Ares for the least extensive RGH Tshopo. (Table 1).

Table 1: Distribution of General Reference Hospitals by Plot Size

RGH	**Parcel area (Ares)**	*%*
Mangombo	*90*	*5.5*
Lubunga	*625*	*38.1*
Kabondo	*900*	*54.9*
Tshopo	*25*	*1.5*
Total	*1640*	*100.0*

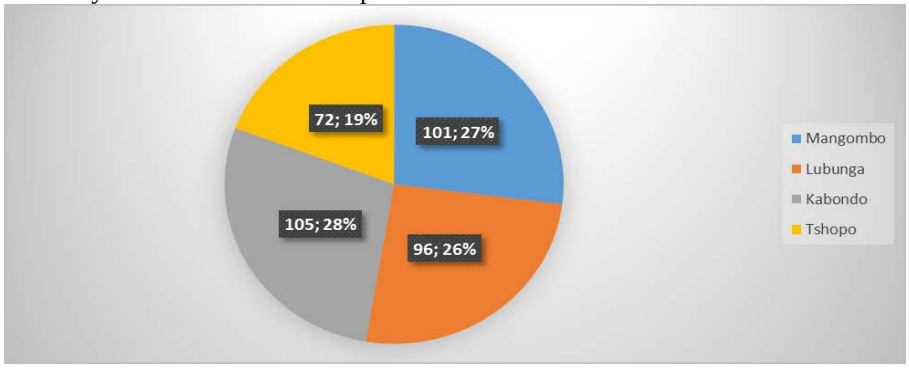
The hospitals surveyed included 30 services including 4 internal medicine departments, 4 surgical, 3 medical imaging, 1 dentistry, 2 pharmacy, 4 laboratory, 3 maternity, 4 pediatric, 1 urgency, 3 gynecology and 1 laundry room (Table 2).

Table 2: Distribution of services concerned by reference general hospital

GRH	*Medicine*	*Chirurgic*	*Imagery*	*Dentistry*	*Pharmacy*	*Laboratory*	*Maternity*	*Pediatric*	*Urgency*	*Genesco*	*utility room*	*Total*
Mangombo	*1*	*1*	*1*	*0*	*1*	*1*	*0*	*1*	*0*	*0*	*0*	*6*
Lubunga	*1*	*1*	*1*	*0*	*0*	*1*	*1*	*1*	*0*	*1*	*0*	*7*
Kabondo	*1*	*1*	*0*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*10*
Tshopo	*1*	*1*	*1*	*0*	*0*	*1*	*1*	*1*	*0*	*1*	*0*	*7*
Total	*4*	*4*	*3*	*1*	*2*	*4*	*3*	*4*	*1*	*3*	*1*	*30*

Figure 1 shows the number of workers employed in these Reference General Hospitals of which: 27.0% at RGH Mangombo, 26.0% at RGH Lubunga, 28.0% at RGH Kabondo and 19.0% at RGH Tshopo.

Figure 1: Distribution of staff by Reference General Hospital



The results in Table 3 show that the personnel producing BMW in hospitals consisted of: nurses 56.6%, doctors 18.1%, surface technicians 10.0%, laboratory assistants 5.7%, midwives 3.6%, pharmacists 3.2%, anesthetists 2.5% and incinerator operators 0.3%.

Table 3: Distribution of Medical Staff by Reference General Hospital

GRH	***Doctor***	***Pharmacist***	***Nurse***	***Midwives***	***laboratory assistants***	***Anesthetist***	***surface technicians***	***Incinerator operator***	***Total***
Mangombo	*18*	*1*	*48*	*4*	*7*	*2*	*9*	*1*	*90*
Lubunga	*15*	*1*	*44*	*2*	*4*	*2*	*7*	*1*	*76*
Kabondo	*12*	*1*	*54*	*3*	*4*	*3*	*15*	*1*	*93*
Tshopo	*11*	*7*	*19*	*2*	*3*	*1*	*6*	*1*	*50*
Total	*56*	*10*	*175*	*11*	*18*	*8*	*31*	*4*	*309*
Percentage	*18.1*	*3.2*	*56.6*	*3.6*	*5.7*	*2.5*	*10.0*	*0.3*	*100.0*

After the various visits to the four hospitals, it appears that all RGH departments manage BMWs in proportion to: 51.7% of pharmaceutical waste, 41.4% of infectious waste and 17.2 % of anatomical waste, with the exception of pharmacy services (Table 4).

Table 4: Distribution of Biomedical Waste by RGH Services

WASTE	**SERVICES**											
	Medicine	Chirurgic	Imagery	Dentistry	Pharmacy	Laboratory	Maternity	Pediatry	Urgency	Geneco	Total	%
pharmaceutical	2	2	1	1	0	2	2	2	1	2	15	51.7
infectious	2	2	1	1	0	1	2	1	0	2	12	41.4
anatomic	1	1	0	0	0	1	1	0	0	1	5	17.2
Total service	4	4	3	1	2	4	3	4	1	3	29	100.0

An interview was conducted with 216 workers directly involved in the management of BMWs, namely care staff, surface technicians and incinerator operators (Table 5).

Table 5: Distribution of staff managing BMWs in hospitals

RGH	***BIOMEDICAL WASTE MANAGER***			
	Care staff	*Surface technicians*	*Incinerator Operators*	*Total*
Mangombo	*52*	*9*	*1*	*62*
Lubunga	*46*	*7*	*1*	*54*
Kabondo	*57*	*15*	*1*	*73*
Tshopo	*21*	*6*	*0*	*27*
Total	*176*	*37*	*3*	*216*

Observations made on the management of BMW were made in all departments. Sharps waste and those found in all services except pharmacies, pharmaceutical waste in 20 services, infectious waste in 16 services and anatomical waste in 5 services.

Infectious waste included microbiological culture slides, culture tubes and culture media.

Garbage similar to household garbage (GSHG) was cardboard, paper, plastic bags and pouches, empty mineral water bottles and food scraps.

The anatomical wastes found were umbilical cords, placentas, fetuses, anatomical pieces and teeth. The pharmaceutical waste included empty vials of solutes, antibiotics and various drugs.

The pharmaceutical waste included empty vials of solutes, antibiotics and various drugs.

Other types of waste produced were radiological films, solutions for the fixation and development of radiology films, laboratory dyes, amalgams and medical thermometers. The most common waste items were sharp and sharp waste, followed by blood and fluid waste, pharmaceutical waste, infectious waste and anatomical waste.

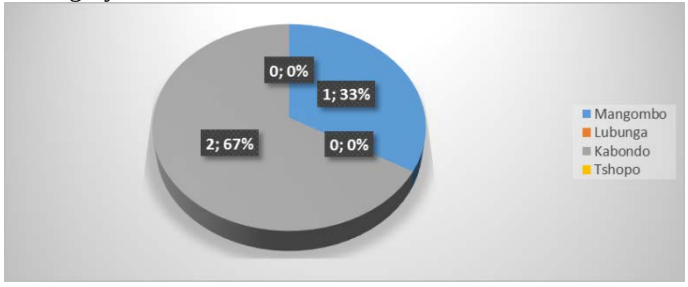
Inadequate sorting of BMWs was 53.3% of all services visited (no separation of BMW and WEHR). This unsuitable sorting involved 37.5% of Kabondo RGH services, respectively 25.0% of Mangombo RGH, 25.0% of Lubunga RGH and 12.5% of Tshopo RGH (Table 6). None of the services visited used systematic TRI of BMWs.

Table 6: Distribution of TRI inadequate Services by Reference General Hospital

RGH	***TRI SERVICES***	***%***
	Effective	
Mangombo	*4*	*25.0*
Lubunga	*4*	*25.0*
Kabondo	*6*	*37.5*
Tshopo	*2*	*12.5*
Total	*16*	*100.0*

The color coding system for the different categories of waste was used in 10.0% of all services and concerned 33.3% of those of the Mangombo RGH and 66.7% of those of the RGH Kabondo. However, this coding system was not used at the Mangombo and Tshopo RGHs (Figure 2).

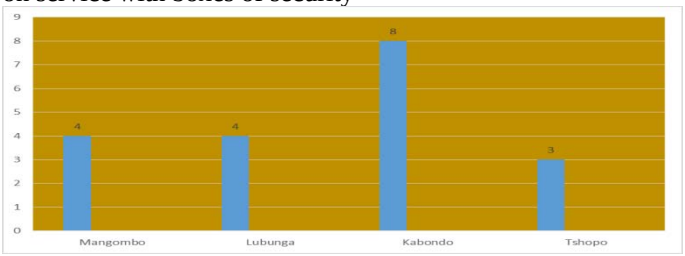
Figure 2: Distribution of Reference General Hospitals by Coding System



Security boxes for the collection of sharps were available in 63.3% of services. This availability was found in 21.1 % of RGH Mangombo services, 21.1% of RGH Lubunga services, 42.1 % of those of RGH Kabondo and 15.7 % of those of RGH Tshopo. (Figure 3)

However, the availability of safety boxes does not exclude its misuse.

Figure 3: Distribution of Reference General Hospitals based on service with boxes of security



Exception of RGH Lubunga, these safety boxes were filled on board with overflows in other hospitals where plastic buckets or bins were used for picking sharps (Figure 4).

Fig. (4) Plastic bucket, safety box and cardboard used as BMW garbage bin with inadequate sorting

The color coding system uses red for anatomical waste, orange for animal waste and yellow for blood and fluid waste, sharp and sharp waste and laboratory waste was not applied to any in hospital. And the anatomical waste was packaged in plastic bags placed in plastic bins with lids at all hospitals, except in the RGH Kabondo where they were placed in plastic bins without lids.

Infectious Hazardous Health Care waste (IHHCW) was packaged in bags while liquid (waste from infectious risk care activities, WIRCA) was diluted in bleach. BMW collection was daily in all hospitals.

The transport of BMWs to the central storage is generally carried out by no other means of transport than 73.3% (22) hands, the trolleys occupy 10.0% (3) and 16.7% (5) for the wheelbarrow (Table 7)

Table 7: Distribution of services by BMW's means of transport

Means of transport	***SERVICES*** *Effective*	***%***
Hands	*22*	*73.3*
Trolleys	*3*	*10.0*
Wheelbarrow	*5*	*16.7*
Total	*30*	*100.0*

Exception of RGH Lubunga, which has a good incinerator and a secure storage facility, in the other three hospitals, the incinerator was no longer functioning and the central storage area was unsecured, open pit with BMWs lying on the ground (Figure 6).

Fig. 6: Incinerator down next to an unsecured and open DBM storage facility

To evacuate fluid waste, these hospitals diluted them first in bleach and then dumped them in the sewer system. The glass slides were recovered and reused after disinfection and autoclaving.

Working conditions were rated as poor by 84.7% (n = 183) of workers surveyed and good by 15.3% (n = 33) (Table 8).

Table 8: Distribution of personnel managing BMWs according to their safety

Security	***Effective***	***%***
No	*183*	*84.7*
Yes	*33*	*15.3*
Total	*216*	*100.0*

Personal protective equipment (PPE) was available in 49.1% (n = 15) of services, of which 83.3% (n = 25) of services with rubber protective gloves in all these services, masks in 43.3% (n = 13) of them, aprons in 30.0% (n = 9) and boots in 36.6% (n = 11) (Table 9).

Table 9: Distribution of PPE according to all services

PPE	***Effective***	***%***
Protective gloves	*25*	*83.3*
Masks	*13*	*43.3*
Aprons	*9*	*30.0*
Boots	*11*	*36.6*
Total	*59*	*49.1*

The BMW management knowledge assessment of BMW management personnel shows that 61.6% (n = 133) workers have low management knowledge of DBM and only 38.4% (n = 83) workers can better manage DBMs (Table 10). Only HGR Mangombo workers were trained to manage BMW.

Table 10: Hospital staff distribution based on BMW's management knowledge

Knowledge	**Effective**	**%**
No	133	61.6
Yes	83	38.4
Total	216	100.0

Discussion

The low proportion of anatomical waste observed in our survey is no different from that of similar earlier studies where these types of waste were the most important [10]. It should also be noted that the inhabitants of Kisangani are influenced by a Muslim culture where anatomical waste such as umbilical

cords, placentas, fetuses, amputated limbs and teeth are often recovered by the family for burial in a cemetery.

BMW sorting is unsuitable in the majority of surveyed hospital services (60% of Kabondo RGH services, 66.7% of Mangombo RGH, 57.1% of Lubunga RGH and 28.6% of Tshopo RGH services). The Congolese state gives no funding for the operation of these hospitals that need the entire population of Kisangani. This situation contributes a lot to the weakness of the biomedical waste management of its health structures.

The absence of use of the coding system in 90.0% of hospital services is justified by the same explanations provided in the field of sorting. This coding, by allowing the identification and separation of BMWs, significantly reduces the amount of waste requiring special treatment and the cost of this treatment [11-13].

In a study conducted in Mali, sorting based on the separation of waste into two categories, with red bins for BMW and black for WEHR, had led to an improvement in the management of BMW [14].

An Indian study proposes a sorting system in three categories with separation of domestic waste, sharp and sharp waste, and infectious waste [15].

Despite their availability in 63.3% of the services, the security boxes are not correctly used in the majority of services. This is explained by the observation of filled or overflowed boxes, the use of buckets or plastic bins for the collection of waste (the non-compliance with the instructions of the management of BMW) by the staff and especially the existence breaks in the supply of this material.

The transport of BMWs within the services and to the central storage site is a risky step as it is usually carried out by manual handling or with trolley, rolling table and wheelbarrow [14]. Indeed, this transport should follow a circuit away from areas frequented by patients and visitors and be carried out with maximum safety using adjustable sanitary trolleys. The disastrous situation noted in the collection and transport of BMW generates occupational risks (accident at work, occupational disease, premature wear at work) and infectious risks for patients, visitors and animals. The storage of hazardous waste requires special conditions, namely secure premises, locked, easy to clean, well lit, ventilated and denied access to anyone outside the service [16].

If, in our study, central storage sites exist, but not secured in all hospital structures; it should be noted, however, that in Daoudi's study [17] conducted at Hassan II hospital in Agadir, where there was a total absence of storage facilities.

Burning in a traditional oven is an old model of incineration, it is a method of treatment of hazardous waste most used in our structures, except HGR Lubunga where incineration is practiced. During incineration activities, fumes containing heavy metals, harmful gases and organochlorine particles that pollute the air and generate risks of degradation of the environment, contamination of water and soil and poisoning of populations and animals are released. [18].

A study of BMW management at the Ziguinchor regional hospital in southern Senegal also showed unsafe conditions with the use of trolleys and bins on the back or head [19]. At the hospital level in Bamako, transport to the storage areas entrusted to economic interest groups (GIE) is done by manual handling, trolley and donkey cart [14].

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PPE is available in 49.1% of services only. According to the WHO, more than 100,000 cases of care-related infections occur each year in England, while in developing countries these cases are increased from 2 to 20 [8]. Similarly, the handling of HIV-infected sanitary waste is responsible for 0.2% of global transmission cases according to statistics from 2003 [20].

Working conditions, judged to be bad by 84.7% (183) of the workers surveyed, create stress, a factor aggravating the risks associated with BMW, and a climate of insecurity that is a source of social conflict.

Working conditions, judged to be bad by 84.7% (183) of the surveyed workers, create stress, a factor aggravating the risks associated with BMW, and a climate of insecurity that is a source of social conflict.

The low level of knowledge on DBM management, noted by 61.6% of the workers interviewed, explains the mismanagement noted in four of the surveyed structures and highlights the need to create occupational health services and train staff. . This training must be adapted to the reality experienced at the level of each hospital, but especially based on the correction of risky behaviors and the judicious use of existing equipment.

Similarly, awareness-raising should be directed towards hospital officials for the effective application of legislation and the creation of occupational health services, which are essential structures in the knowledge and prevention of occupational risks [20].

CONCLUSION

The Democratic Republic of Congo has no legal text that explicitly and concretely clarifies the roles, responsibilities and mechanisms of ecological management of biomedical waste. The Code of Health Legislation of the Belgian Congo and Ruanda-Urundi, which deals with hygiene and public health, does not provide any specific case for the management of infectious waste [21].

However, it must be recognized that this obsolete legislation remains unenforceable by public health officials and professionals. In light of this study, we recommend:

- That the Congolese Government legislate the laws explicitly and concretely on the roles, responsibilities and mechanisms of ecological management of the BMW;
- sensitization of hospital officials investigated for the effective application of legislation on the management of BMW, occupational medicine, the adoption and implementation of adapted, feasible and regularly evaluated BMW management programs;
- appropriate and continuous training of health professionals to hope for sustainable change in risky behavior and the establishment of a culture of occupational risk prevention.

The defective management of BMWs is a reality at the hospital structures of Kisangani where dysfunctions are noted at all stages. This situation poses risks to the health and safety of health personnel, patients, populations and environmental degradation.

The answer to this faulty management is the effective application of legislation on the management of BMW, occupational medicine, the adoption of BMW management programs and the training of personnel.

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Citation: OLEKO WA OLEKO. et al. (2018). Profile of Anemia in Children Aged 0 to 59 Months Treated at Kabondo Reference General Hospital of Kisangani City, R. D. Congo, D. R. Congo. J. of Advancement in Medical and Life Sciences. V7I2.02. DOI : 10.5281/zenodo.1478964