International Business Management 6 (2): 95-98, 2012
ISSN: 1993-5250

Healthcare Waste Reverse Logistics: A Case Study of Brazilian Public Hospitals

Andre Luiz Pereira, Jersone Tasso Moreira Silva and Luiz Antonio Antunes Teixeira
Department of Business Administration, FUMEC University, Belo Horizonte, Brazil

Abstract: The Brazilian Healthcare System (SUS) is the responsible for the Healthcare Waste (HcW) management in the perspective of the reverse logistics chain. So then, the objective of this study is to examine the HcW management practices in the Brazilian public hospitals according to the reverse logistics concept. The HcW management in those hospitals has been fragmented by area (such as Nutrition, Ambulatory or Clinical Laboratory), not encompassing the entire HcW chain. For that matter, it was applied a questionnaire to 127 hospitals Hosp-Pro and was prepared using the ONA accreditation methodology. The data basis was 2010 and 2011. The conclusion that is taken from the study is that HcW management has not taken as a priority issue, patient and employee safety but it is only oriented to remove HcW outside the hospital. Actual waste practices do not achieve Brazilian standardization quality requirements.

Key words: Accreditation, healthcare waste, reverse logistics, public hospitals, Brazilian healthcare system, Brazil

INTRODUCTION

Inherent in today's global economic system is the wasteful use of resources, labor and capital. Because consumption is so central to many economies and even to the current forms of globalization, its effects therefore are also seen around the world. Because of that a large amount of discarded consumed products has increased drastically when reaching its useful needs.

For a long time, nature was able to waste recycle faster than humanity produced them. The generated waste is enormous and its mis-management causes a significant lost of financial resources, environment damage and compromising economic welfare (Cunha and Filho, 2002). A smaller fraction of total urban waste is made up of Healthcare Waste (HcW) which differ by its potential risks. It may contaminate the environment, causing labor accidents, be reused inappropriately and cause other injuries. The Brazilian Healthcare System (SUS) is responsible for matters concerning the HcW management. The SUS at Minas Gerais, a Brazilian state has a program that establishes a partnership between the state and public/philanthropic hospitals service providers for SUS named Pro-Hosp (Gerais, 2006). SUS has a group of public hospitals HcW generators in which is its responsibility to manage safely the HcW.

To comprehend of how HcW may be managed in a waste chain towards a sustainable and health safety point of view and oriented to hospital accreditation, logistics management is necessary to point out the relevant variables. The logistics concept may be used to improve HcW management to minimize risks, such as biological, chemical, sharps and radioactive and also achieve hospital accreditation requirements. In that matter, the objective of this study is to examine the HcW management practices in the Brazilian public hospitals according to the reverse logistics and accreditation concept. Accreditation stated some concepts such as to improve the quality of healthcare services (Bittar, 2000). There are some accreditation methodologies valid in the world.

The most known are ruled by three accreditation agencies: Joint Commission on Accreditation of Healthcare Organizations (JCAHO), Canadian Council on Health Services Accreditation (CCHSA) and Quality Health New Zealand (QHNZ). Besides those accreditation agents, Brazil has its own, named ONA (Organizacao Nacional de Acreditacao) (National Accreditation Organization). ONA is a non-governmental Brazilian accreditation group. Its main goal is to promote the implementation of a permanent evaluation process and certification on health services quality. In the past 4 years, the Minas Gerais state public health tried to achieve the concerns of ONA methodology for the Pro-Hosp hospitals.

The Pro-Hosp hospitals offers a variety of health services and because of that the Minas Gerais state public health decided to apply ONA methodology as a strategic way to achieve health services quality. The Pro-Hosp e a Minas Gerais state program which focus on hospital optimization service efficiency for macro and micro regions of Minas Gerais state.

Corresponding Author: Jersone Tasso Moreira Silva, Department of Business Administration, FUMEC University. Av. Afonso Pena, 3880-Cruzeiro-Belo Horizonte, 30310.009, Minas Gerais, Brazil

Literature review: The logistics approach integrating the entire supply chain from raw material to the point of consumption was one of the most important corporative issues of the 20th century (Christopher, 1997; Ballou, 2001). Logistics main goals are based in three main areas: Transportation, inventory and location. Organizations must consider the relationship between cost/benefit decisions in providing best service level to their customers. Logistics management is an integrating function which coordinates and optimizes all logistics activities with other functions including marketing, sales, manufacturing, finance and information technology (CSCMP, 2010). Rogers and Tibben-Lembke (1999) point out that some factors are important for the development of an efficient logistics chain as follows:

- Gatekeeping
- Compacting disposition cycle time
- Reverse logistics information systems
- Centralized return centers
- Zero returns
- Remanufacture and refurbishment
- Asset recovery
- Negotiation
- Financial management
- Outsourcing

Reverse logistics and product life cycle are systemic issues. Then, the sellers assume to themselves the responsibility for managing the product life cycle from sales to final disposal, reuse or provide third-party services. Even when it comes to a no recyclable products, there is an adequate reverse logistics management (Oliveira and Silva, 2005). Part of the urban waste is composed by Healthcare Waste (HcW) representing a smaller percentage of it. Despite the small percentage, HcW represents potential risks to society.

The Brazilian Board Resolution (RDC) numebr 306/2004, Chapter II, defined by National Health Surveillance Agency (ANVISA) rules that for purposes of technical regulation HcW generators are all organizations that offers specific services including home care services; analytical laboratories of health products; morgues, funeral houses and serviceswhere activities are carried out embalming and corpse/body conservation, forensic activities; drugstores and pharmacies handling; human health education and research; animal disease control centers; pharmaceutical distributors, importers; distributors and producers of diagnosis materials and *in vitro* control; health care services mobile units; acupuncture; tattooing; among other similar ones. DC No. 306/2004-Appendix I, lists the HcW groups in which:

- Group A waste represents the possible presence of biological agents, generating infection
- Group B are chemicals that may represent a risk to public health or environment, according to their flammability, corrosivity, reactivity and toxicity characteristics
- Group C are materials resulting from human activities containing radionuclides in quantities exceeding the border limits specified by Nuclear Energy National Commission (CNEN) rules and for which reuse is inappropriate or not available
- Group D waste is non hazardous biological, chemical or radiological to human/animal health or the environment and may be treated as the same way as common urban waste and sharps or materials that may scarify are part of group E

The National Environment Council (CONAMA) set the Resolution No. 358 which determines that the HcW generator is the legal responsible for it including how its waste will be managed from generation to final destination. The practices, resources and all concerning in the prior sentence must be defined by the HcW Management Plan (PGRSS).

MATERIALS AND METHODS

This research had a qualitative and quantitative approach. When collecting data, the prevalence of conformity and non-conformity had aquantitative character. The otherissues concerning reverse management were eminently qualitative.

Minas Gerais State Public Health Secretariat data basis were analyzed in special the accreditation diagnostic instrument applied to public hospitals. It was analyzed 127 hospitals Hosp-Pro and it was prepared using the ONA Accreditation Methodology. The data basis was 2010 and 2011.

RESULTS AND DISCUSSION

The reverse logistics chain of a HcW can be seen by the Fig. 1. The darker lines represent the most common aspects in the references used in this study. The lighter lines represent the reverse logistics in a systemic point of view. The chain begins with the supplier receiving the residues back or has to deal with storage generation problems, transport or delivery rejection as well as other factors that would ruin the original delivery schema. The larger rectangle in the top part of the Fig. 1 shows the Health Services Organizations and the bottom rectangle represents the HcW generators that not provide health

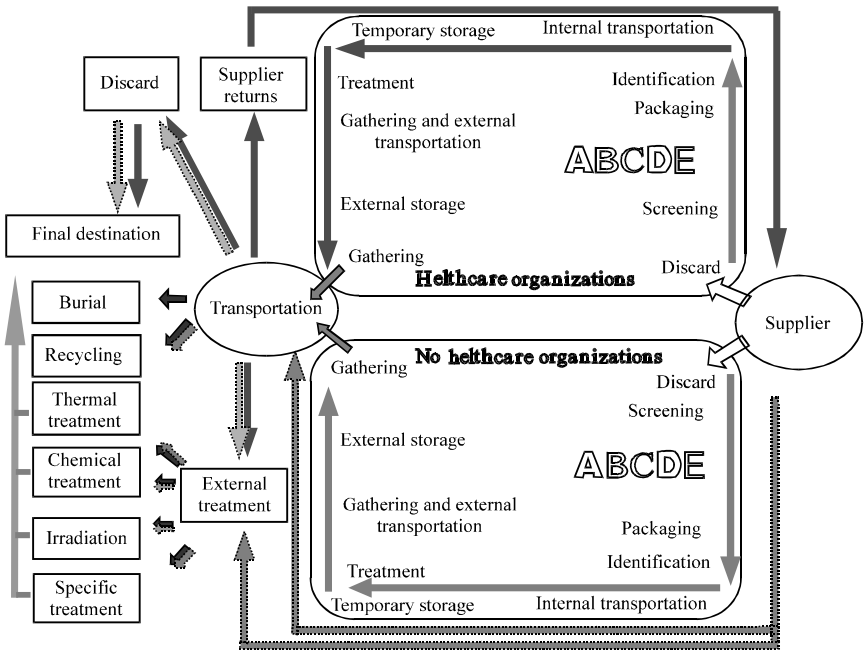

Fig. 1: HcW reverse logistics chain

services. The flow starts at the supplier which sends the inputs required for organizations and ends in the final destination. Each residue has its own characteristics such as being reusable or not or representing a type of risk. Segregation is classified as a major group A (biohazard-ad its sub-groups A1-A5), group B (chemical risk), group C (radiation risk), group D (common waste) and E (sharps waste).

The HcW is packed insafe containers that do not offer leakage risk or perforation and also the proper identification. HcW is transported within the organization at a temporary site. The waste receives the proper treatment for risks minimizing if not treated on origin site according to safe guidelines. It is then collected and sentto an external storage where the waste vehicle will come and pick it up. At this stage of there verse logistics chain, the appropriate vehicle (which achieves law structure requirements such as rounded corners, vehicle only to collect waste for example) taking the wastes collected for disposal. Human parts follow to burial. Organics, paper, plastic, wood, metal and glass go to recycling or composting.

In six hospitals areas with a large HcW generation had their practices evaluated according to the Infection Control Committee (CCI) routines. The areas with best practices were in patient medical-surgical (94.21%), obstetrics (92.73%) and pediatrics (91.23%). The surgical center and ambulatory have closer values (88.33 and 86.11%, respectively).

When referring to the employees safety in general, the immunization program is one way to prevent accidents involving HcW contaminated with hepatitis B, tetanus and rubella. The monthly average of accidents with sharps is 4.08 accidents month^{-1} in professionals that directly deal with health services procedures. The maintenance professional rate is 1.04 accidents month^{-1}, illustrating the risk described by Zamoner. Once 100% of employees are not properly immunized, there is a risk that an accident with contaminated material may become a health problem for the victim. Some hospital instruments require disinfection. For hospitals that use chemical methods, it is necessary that the resulting chemical residue (Group B) be safely neutralized. Some chemical disinfection methods are prevalent: glutaraldehyde used by 43.33% of the hospitals and sodium hypochlorite (18.33%). When analyzing the risks of disinfection methods, 43.33% of the employees are exposed to moderate risk to health (glutaraldehyde) and 31.33% at severe risk (resulting from glutaraldehyde and hypochlorite combined). Questionnaires applied in this research showed that 13.77% of hospitals have adopted also the formaldehyde (with severe health risk). The xylene, equally severe is adopted by 0.7%. Thus, only 0.7% of hospitals use chemical disinfection, requiring incineration (xylene). The mercury equipments which represent risks to public health and the environment are still used in 13.04% of hospitals Pro-Hosp. This compound presents a risk of extreme damage to health.

In general, 83.06% of the hospital storage the CAT forms. However, the laundry (82.73%) was the hospital area that was closest to the hospital average. The UAN (78.95%) and clinical laboratory (70.21%) were below average overall. The area that more deals with chemical, biohazard and sharps materials is precisely the one that less register injuries in CAT forms. Only 63.44% of the hospitals met the necessary safety regulations, outlined in the biosafety manual which is present in 52.33% hospitals. Only 34.41% of the hospitals had a biosafety training record, necessary to verify if the safety goals were achieved. When performing procedures that require prior administration, orally or parenterally, the substances or medicines control that require medical monitoring during their execution processes were prevalent in 47.06% of the hospitals. It was also observed that 51.58% of the hospitals sharps waste from the pharmacy relied on a rigid container for disposal which increases the employees safety. About 62.37% clinical laboratories, 65.35% pharmacies and storeroom 84.87% had an inventory control.

The PGRSS have been fragmented in areas without including the entire HcW chain. The clinical hospital laboratory was the area that less presented a PGRSS: 69.39% had one. It was also observed that many hospitals have a general PGRSS and one for each outsourced department. According to ONA accreditation, PGRSS should be a single document for all hospitals, covering all areas, outsourced or not. The existence of an outdoors exclusive waste container is one of the ways to prevent contact or contamination with HcW when they are removed form inside. The area which there is higher prevalence of outdoor waste is the UAN with 41.80% followed by laundry room 39.47%. The less prevalent area is the clinical laboratory with 33.67%.

CONCLUSION

The present study described andanalyzes the current HcW Reverse Logistics Chain structure of the public Brazilian hospitals. The purpose of the study was to observe if the reverse management of solid residuals achieved the ONA accreditation requirements. The results have shown that hospitals waste management is not as a priority issue when considering patient or employees safety. The analyzed data indicated that this service is often oriented to the removal of the solid waste from the interior of hospital to outside and not considering its safety transportation.

In order to obtain the accreditation, the waste management must be oriented to risk management. The public Brazilian hospitals may get serious problems when been evaluated by the specific item of ONA accreditation manual-5MA-Supply and Logistics support. The failure to complythis item is an obstacle tohospital accreditation by ONA methodology.

REFERENCES

Ballou, R.H., 2001. Supply Chain Management: Planning, Organization and Logistics. Bookmann Publisher, Porto Alegre, Brazil.

Bittar, O.J., 2000. Process management and health quality certification. J. Braz. Med. Assoc., 46: 70-76.

CSCMP, 2010. Supply chain and logistics terms and glossary. Council of Supply Chain Management Professionals (CSCMP). http://cscmp. org/ digital/ glossary/document.pdf.

Christopher, M., 1997. Supply Chain Management: Strategies for Cost Reduction and Services Improvement. Pioneira Publisher, Sao Paulo, Brazil.

Cunha, V. and J.V.C. Filho, 2002. Urban solid residual management: Non-linear goal programming application and framework. Prod. Manage., 9: 143-161.

Gerais, M., 2006. Manual program for improvement e quality enhancement of SUS/MG hospitals (Pro-Hosp). Secretary of State Saude, Belo Horizonte, Brazil.

Oliveira, A.A. and J.T.M. Silva, 2005. Reverse logistics for manufacture goods revaluing. REA, Franca, Brazil.

Rogers, D.S. and R.S. Tibben-Lembke, 1999. Going backwards: Reverse logistics trends and practice. Reverse Logistics Executive Council. http:// www. rlec.org/reverse.pdf.