

**AN ANALYSIS OF THE STANDARD OPERATING
PROCEDURES AFFECTING DOWNSTREAM SUPPLY CHAIN
MANAGEMENT OF HAZARDOUS PRODUCTS WITHIN
HUMANITARIAN ORGANIZATION IN KENYA
A CASE OF DOCTORS WITHOUT BORDERS, KENYA SUPPLY UNIT**

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Abstract

The study sought to analyze the standard operating procedures affecting downstream supply chain management within humanitarian organization in Kenya with reference to the Doctors without Borders, Kenya Supply Unit. The factors under analysis were Print Guidelines, Implementation of the International Guidelines, Disposal Procedures and Information Sharing. The specific objectives of the study were to determine the influence of print guideline on downstream supply chain management of hazardous products within humanitarian organizations in Kenya, to establish the effect of international guidelines on downstream supply chain management of hazardous products within humanitarian organizations in Kenya, to examine the influence of disposal procedures on downstream supply chain management of hazardous products within humanitarian organizations in Kenya, to determine the effect of

information sharing on downstream supply chain management of hazardous products within humanitarian organizations in Kenya. The research adopted both qualitative and quantitative to do a case study of Doctors without Borders. The result of data analysis showed that print guidelines helps in the safe transportation of hazardous products. It also showed that the implementation of international guidelines, disposal procedures and information sharing enhances the safe mobility of the hazardous products within the Doctors without Borders.

Keywords: Standard Operating Process, International Guidelines, Disposal Procedures, Information Sharing, Downstream Supply Chain Management, Hazardous Products.

INTRODUCTION

Downstream Supply Chains of Hazardous Products in the Humanitarian Organizations involves the flow of products from storage facilities to end users. It helps in the provision of information, guidelines, and procedures for the procurement, storage, transport and disposal of hazardous materials throughout the humanitarian organization (Oluwoye, 2007). According to Northwestern University Office for Research Safety (2014), the supply chain management of Hazardous Products in the Humanitarian Agencies describes ways to reduce, minimize, and/or eliminate the risks of quantity and toxicity of hazardous materials that are used, stored, or disposed by a training program. The supply chain management of Hazardous Products in the Humanitarian Agencies will help humanitarian organization to maintain compliance with the international standards regulatory requirements, increase consistency with the use and provide an opportunity for recognizing innovation for hazardous materials risk management and minimization.

Many actors, like donors, aid agencies, governments, military or non-governmental organizations (NGOs) are involved in humanitarian reliefs (Kovács & Spens, 2007). Each of them has different motives for providing relief (Long & Wood, 1995). Political issues might even prevent a successful conduction of relief actions (Murray, 2005); (Defense Logistics Agency, 2011). The function on humanitarian relief encompasses a range of activities, including preparedness, planning, procurement, transport, warehousing, tracking and tracing, and customs clearance” (Thomas and Kopczak, 2005). In addition the aims and goals are part of the definition: “efficient, effective” and “for t,he purpose of alleviating the suffering of vulnerable people” (Blecken, 2013). When treating with hazardous good environmental aspects considerations about risk reduction have to be taken into account, as well. Publications and initiatives (2013) show that humanitarian logistics has been developed by several actors from

the humanitarian sector, the private sector, researchers and their coordinated initiatives publications, (Hellingrath, 2013).

Humanitarian logisticians have to deal with logistical processes and supply chains in this special environment. Comparable situations occur after explosions of chemical plants or other production plants with hazardous goods. Humanitarian logisticians also have to deal with dangerous goods after accidents with hazardous goods on rail-roads, streets, and other transport modes. Furthermore a variety of dangerous goods are part of humanitarian supply chains: Some medicines, gases and oils are just some examples. The processes of delivery and return, their planning and operation need special consideration. Otherwise risks of destroyed environment or health-risks occur. Because of their health and environmental impacts toxins (BIGCS, 2013) and therewith hazardous goods, cause disasters with enormous implications and need special observance in humanitarian supply chains.

Global Perspective of Downstream Supply Chain Management

A Non-Governmental Organization is a non-profit, voluntary group of citizens (locally, nationally or internationally organized), that contains common interests and focuses on specific issues like human rights, environment, health and disaster relief (Blecken, 2010). Donors are very special actors, as they provide the basis for relief activities, but are not directly linked to the benefits of satisfying demand. Donor expectations however shape the funding structure of humanitarian organizations and are in this respect, often regarded as the real customers of relief organizations, not the aid recipients (Kent, 1987). The military, from a global perspective, is important in delivering communications and logistics capabilities. Host governments are crucial as well, as they typically command and control all operations (Seaman, 1999).

The downstream supply chain in human relief consists of three main steps: supply acquisition and procurement, pre-positioning and warehousing and transportation (Tomasini & Van Wassenhove, 2009). The first stage contains all activities related to procurement of relief items (Balcik, Beamon, Krejci, Muramatsu & Ramirez, 2010), which originate from monetary sources or non-monetary (in-kind) donations. Goods are usually purchased from local or global suppliers by applying various procurement techniques (direct purchasing, e-procurement and tenders). The main challenges are here the reduction of purchasing costs (considering price inflation in local markets after disasters) and lead times by still ensuring availability and the coordination of in-kind donations (Balcik *et al.*, 2010). Most procurement decisions are short-termed, as demand can only be evaluated after needs assessment performed in the affected area. Therefore, relief organizations stockpile ready-to-dispatch inventory in locations with access to disaster-prone regions (Balcik & Beamon, 2008). Most of the downstream supply

chain decisions originate from developed countries which are not limited to the United States of America, the United Kingdom, the Netherlands, Belgium and such other countries which operate organizations that provide emergency relief services to developing countries (Nikbakhsh & Farahani, 2011).

Transportation is the next stage in the supply chain and it involves downstream movement of goods, it includes the movement of personnel, equipment and necessary items. First, the goods are brought to central distribution centres, go down, distribution intermediary points or local distribution centres and finally transported to the regions affected by the disaster (Nikbakhsh & Farahani, 2011). Although each supply chain structure differs depending on the type of disaster and organizations involved, a common design, composed of procurement, inventory and transportation management exists. This is the acceptable and generally practiced supply chain management activity almost in every part of the world.

Local Perspective of Downstream Supply Chain Management

Médecins Sans Frontières (MSF)/Doctors without Borders is an international medical humanitarian organization created by doctors and journalists in France in 1971. MSF delivers emergency medical assistance to people affected by armed conflict, epidemics, malnutrition, natural disasters, or exclusion from health care in nearly 60 countries many of which are in Sub-Saharan Africa and this involves downstream flow of goods. MSF offers assistance to people based on need, irrespective of race, religion, gender or political affiliation. In 1999, when MSF was awarded the Nobel Peace Prize the organization announced the money would go towards raising awareness of and fighting against neglected diseases. MSF offers basic healthcare, perform surgery, fight epidemics, rehabilitate and run hospitals and clinics, carry out vaccination campaigns, operate nutrition centres, and provide mental healthcare which are all enshrined in downstream supply chain management.

MSF activities include the treatment of injuries and disease, maternal care and the provision of humanitarian aid. Where necessary, it sets up sanitation systems, supply safe/treated drinking water, and distribute relief to assist survival. The headquarters is based in Geneva. The organization runs 19 main offices all over the world (MSF, 2011). In order to access and assist people in need appropriately, MSF's operational policies emphasize the importance of being independent of governmental influence. Hence, the organization does not accept funds from governments or other parties, who are directly involved in the conflicts MSF is responding to. Therefore, MSF relies on the generosity of private individuals for the majority of funding (MSF, 2011).

Nairobi, the capital of Kenya, is referred as regional logistics hub for the whole East Africa region. The location and the development of the infrastructures have contributed for the important role in the connection of supply axis with Southern Africa in the south and Dubai in the north. The impact of globalization in the local market has presented an opportunity to MSF operational sections to explore the availability of supplies for the projects not only in Kenya but also to the neighbor countries of Uganda, DRC and Sudan (KSU, 2011).

Currently, Kenya Supply Unit offers procurement and logistics linked services to MSF missions in the region and carries out the following activities as it helps the movement of goods and people from go-downs to affected areas: Local procurement of medical and non-medical items, warehousing and inventory management which include management of the Transit Go down (TGD) for missions like Somalia and South Sudan, pharmacy inventory, logistical stocks of Kenya mission and emergency preparedness, transportation which involves mainly in two modes being road and air to the missions of Kenya, Somalia and South Sudan and ad-hoc transportation to other mission in the region where the service of monitoring of transit freights coming from MSF Supply (Belgium) or MSF Logistique (France) to their final destination within the region and customs clearance and handling of all international order for MSF missions in the region as this includes the management of transit freights (KSU, 2011). Several national and international humanitarian organization operating in Kenya handle hazardous products in their daily activities and MSF is not an exceptional. However, until now little information has been available on the downstream supply chain management of hazardous products within the humanitarian organization. Yet being unfamiliar with the regulations in effect, the risks presented by hazardous products and the measures for preventing and reducing these risks can have serious human, material and environmental consequences (WB, 2013). Even if the standards international standards procedures are in place, each country might have specific regulations with regards to the hazardous products procurement.

Statement of the Problem

Downstream supply chain management of hazardous products has been a subject of intense study because of the dangers they pose to human handlers, the environment and life in general in the world today (Nikbakhsh & Farahani, 2011). According to Blecken (2010), notes that since 1999, high-risk chemical plants have reported 1,844 accidents in the United States alone. This includes the incidents that have occurred due to roadway transportation, rail transportation, and the storage of hazardous materials (mostly involved hazard class 8 corrosive and 5.1 Oxidizing substances). This has been too high compared to major accidents of 8.3 per year from 1970 to 1979 and 122 cases per year reported from 2010 to 2013. In the United States alone, 50 billion

pounds of toxic and flammable chemicals are stored at 12,761 facilities nationwide, and this has triggered a sense of concern as it is a 400% increase which will have a direct proportion of accidents if not mitigated.

According to UNEP (2007), Kenya is not an exception, the Dandora waste dumpsite located Nairobi Kenya receives more than 2000 tons per day of all the type of garbage (Industrial, agricultural, and hospital waste) generated by 3.5 million inhabitants of Nairobi. Dandora is an unrestricted dumping site that contains many hazardous materials. Studies (UN, 2007) revealed that Dandora dumpsite poses serious dangers related to the health environment: heavy metals such as lead and mercury and organic pollutants such as DDT and PCBs get into the air and soil in the area. Used syringes are also dumped in Dandora. According to UNEP (2007), for more than 300 schoolchildren near Dandora, about 50% of them had respiratory problems. Also, 30% had blood abnormalities that signaled heavy-metal poisoning. According to Daily News (2009), several people have died while siphoning fuel from oil tanker in Kericho and Cherangwany. Thus, the world has witnessed disasters from all spheres especially on the handling of hazardous products especially on organizations that are geographically dispersed globe. This study assessed whether the humanitarian organizations operating in Kenya followed or not the implementation of guidelines with regards to the management of hazard products. Lack of compliance with Hazard Products Guidelines and sharing information on the disposal procedures between humanitarian organization and the client missions could be one of the biggest challenges affecting the downstream supply chain management which impact negatively on the environment health. Karanja (2009) and Mwangi (2000), reports that Lack of effective solid waste management has made towns to lose accolade of cleanliness, a study carried out by Njoroge (2007) on 328 children between the ages of 2 and 18, revealed a link between environmental pollution and public health issues these studies did not address factors affecting downstream supply chain management of hazardous products within humanitarian organizations in Kenya.

METHODOLOGY

The study employed descriptive research design with an illustration of a case study. According to Bryman and Bell (2007), a descriptive research design uses both qualitative and quantitative to describe the state of affairs as it exists at the present. A descriptive research design is appropriate as the study involves fact finding to investigate downstream supply chain management of hazardous products within humanitarian organization in Kenya: – A case of Doctors Without Borders, Kenya Supply Unit.

Target Population and Sample Size

The study focused on the Supply Chains of Hazardous Products at MSF Kenya Supply Unit: Procurement – Storage & Warehousing– Transport & Logistics – Disposal – Human Resource and the Clients Missions (Health facilities) supplied by MSF Kenya Supply Unit. The study will be based on the guidelines, books and other documents already published about the management of hazardous substances at MSF. Management staff from different departments within MSF Kenya Supply unit and employees of the Client Missions (Health facilities) supplied by MSF Kenya Supply Unit were interviewed.

This study targeted a population of Four Hundred and Fifty (450), where Three Hundred Fifty (350) were employees of Doctors without Borders MSF Kenya Supply Unit and One Hundred (100) were employees of Client missions (Health facilities) supplied by MSF Kenya Supply Unit. According to Best and Khan (1993) a sample refers to a small proportion of a population selected for observation and analysis this research study, the sampling processes was carried out at Doctors without Borders MSF Kenya Supply Unit.

Table 1: Target Population

	Number	Percentage
Procurement	115	26
Storage & Warehousing	85	19
Transport & Logistics	55	12
Disposal	45	10
Client missions (Health facilities)	100	22
Human Resource	50	11
Total	450	100

Sampling Design

Stratified random sampling was used in this study. Stratified random sampling technique is suitable as it gives each respondent in every department a chance of being selected and also ensures that all sections are represented that deal with hazardous products. According to Bryman and Bell (2007) an optimum sample is the one that fulfills the requirements of efficiency, representativeness, reliability and flexibility. In arriving at adequate sample size, Yamane (1967) formula was used as follow:

$$n = \frac{N}{1+N(e)^2}$$

where

N= Population;

e = margin of error or significance level at 0.05,

n = sample size

Therefore,

$$= 450/[1+450(0.05^2)]$$

= 212 Response

Table 2: Sample and Sampling Techniques

Sector	Number	Percentage	Sample Size	% of sample size
Procurement	115	26	55	26
Storage & Warehousing	85	19	40	19
Transport & Logistics	55	12	25	12
Disposal	45	10	21	10
Client missions	100	22	47	22
Human Resource	50	11	23	11
Total	450	100	212	100

ANALYSIS AND FINDINGS

Response Rate

The study targeted a sample of 212 respondents from Doctors without Borders Kenya Supply Unit. However, out of 212 questionnaires distributed 151 respondents completely filled in and returned the questionnaires, this represented a 71% response rate. This is a reliable response rate for data analysis as Mugenda and Mugenda (2003) pointed that for generalization a response rate of 50% is adequate for analysis and reporting, 60% is good and a response rate of 70% and over is excellent. However, 29% of the respondents were reluctant to fill the questionnaire this was due to reasons like, the respondents were not available to fill them in at the required time and even after persistence follow-ups there were no positive responses from them. The response rate demonstrates enthusiasm of the respondents' to partake in the survey that the study sought.

Table 3: Response Rate

Response	Frequency	Percentage (%)
Filled in questionnaires	151	71
Unreturned questionnaires	61	29
Total	212	100

Print Guidelines

Existence of Print Guideline

Table 4 illustrates the summary of the findings on the existence of print guideline. According to the findings, majority (66%) of the respondents alleged that there were set print guideline within the organization while the rest (34%) opposed the opinion of majority. This supported the University of New Hampshire (2010) research which says that print guideline on hazardous products involves hard copy manuals, handbooks and guide books for reading, providing safety directions and for training. This implies that the organization had print guidelines that were adhered to as they were more recognized by the health institutions and worldwide.

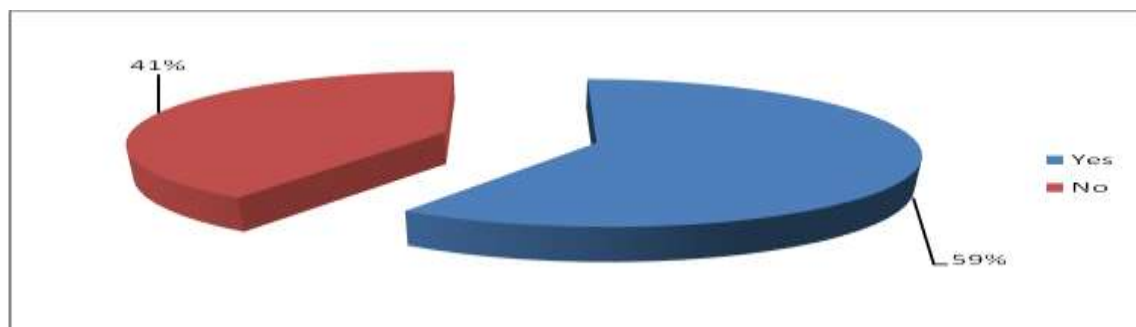
Table 4: Existence of Print Guideline

	Frequency	Percent
Yes	100	66
No	51	34
Total	151	100

Training of Capacity Building Courses

Figure 2 shows the result of the findings on training courses offered by the organization. Majority (59%) pointed that the organization offered training courses while the rest 41% indicated that there were no training courses offered in their organization. Hazardous Materials Management Training as suggested by the University of New Hampshire (2010) are intended to help participants of each NGO to understand the goals and objectives of the Hazardous Materials Management plan and provide guidance on how to follow the policies and procedures contained in the print guideline and this is in line with the outcome of the research findings. This implies that most of the employees of the organization recognize the need of training on hazardous product as key in providing guidance on how to follow the policies and procedures contained in the print guideline.

Figure 2: Training of Capacity Building Courses



Frequency of Capacity Building Courses

The researcher also requested respondents to indicate how frequency the organization offers capacity building courses. From the findings, 55% indicated that the organization offers capacity building courses once a year, 16% pointed that the organization offers training every six months and every three years as shown in each case while 13% indicated that the organization offers capacity building courses every five years. This confirms the University of New Hampshire (2010) research as it points out that personnel who are training in hazardous product must complete the training within reasonable time of employment or assignment to a location where hazardous materials are used or stored and every after stipulated time thereafter. This should be attained through setting aside reasonable time that the personnel should cover the critical areas the involves understanding the definition of a hazardous material, rules and responsibilities

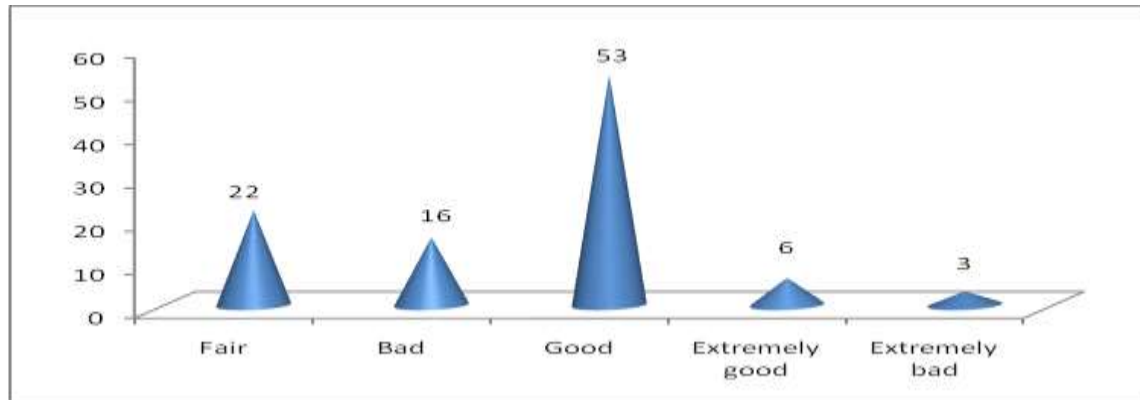
Table 5: Frequency of Capacity Building Courses

	Frequency	Percent
Every six months	24	16
Once a year	84	55
Every three years	24	16
Every Five years	19	13
Total	151	100

Handling of Hazardous Products

The researcher requested respondents to indicate whether the organization familiarize staff on handling of hazardous products. Majority (53%) of the respondents pointed that there is good communication on familiarizing the staff and consumers on the handling of the hazardous products, 22% felt that there is fair campaigning of handling hazardous products, 16% felt it is bad, 6% felt there is extreme communication on handling of hazardous products while 3% felt the communication is extremely bad. This research agrees to the research by University of New Hampshire (2010) which suggests that Hazardous Materials Management by organization should have a clear and understandable guidelines for handling, materials management, ways to minimize quantity and toxicity of hazardous materials, ways to minimize hazardous materials usage and waste generation, procedures for maintaining an inventory of hazardous materials, health and safety requirements for use and storage of hazardous materials and procedures for completing the Hazardous Materials Management Plan forms.

Figure 3: Handling of Hazardous Products



Print Guideline and Supply Chain Management of Hazardous Products

Table 6 summarizes the extent to which print guideline affects downstream supply chain management of hazardous products. Most of the respondents agreed that organization facilitates interpretation and implementation of the print guidelines as depicted by mean score 4.44, respondent also agreed that conformity to print guidelines reduces complexities and costs relating to hazardous materials management and that the print guidelines helps to follow the policies and procedures on hazardous materials management as shown by mean score of 3.48 and 3.47 respectively. The print guidelines provide adequate labeling, diagrams and enough references for further information and that the Print guidelines provide the perceived adequate information as illustrated by mean score of 3.28 and 3.17. It is the responsibility of Hazardous Material Coordinator to ensure that Hazardous Material human Handlers, from employees to users, all obtain appropriate training and receive the guidance necessary to follow the procedures outlined in the Hazardous Materials Management manual or print guide if any (University of New Hampshire, 2010) confirms this as a fact in their research.

Table 6: Print Guideline and Supply Chain Management of Hazardous Products

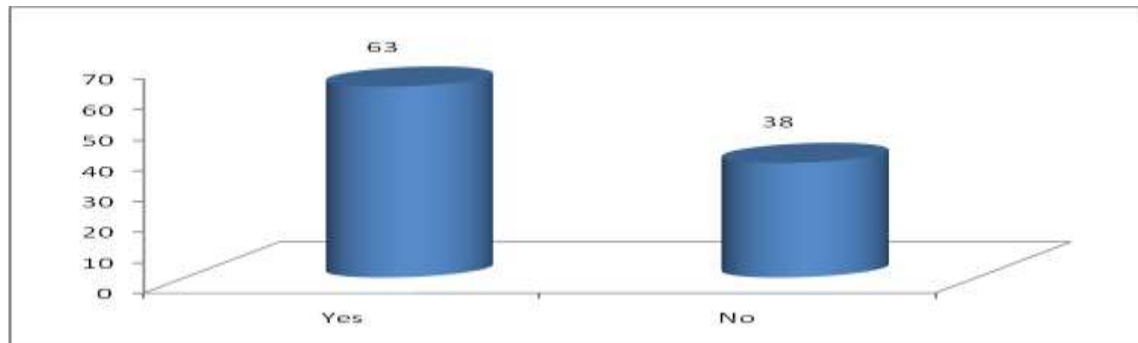
	Mean	StDev
The Print guidelines provide the perceived adequate information	3.17	1.062
The print guidelines provide adequate labeling, diagrams and enough references for further information.	3.28	1.133
Organization facilitates interpretation and implementation of the Print guidelines.	4.44	0.306
The print guidelines helps to follow the policies and procedures on hazardous materials management	3.47	1.208
Conformity to print guidelines reduces complexities and costs relating to hazardous materials management	3.48	1.155

International Guidelines

Implementation of International Guidelines

Figure 4 shows the finding of the study on whether the organization complies with international print guidelines. Majority (63%) of the respondents indicated that their organization comply with international print guidelines while the rest 38% indicated that the organization does not comply with the international print guidelines. According to the study by Nikbakhsh & Farahani (2011) confirms this assertion that international or global procurement is primarily done to access larger quantities, get lower prices and keep consistent quality as a factor in fulfilling the need to implement international guidelines.

Figure 4: Implementation of International Guidelines



Level of implementation of the International Print Guideline

The study requested the respondents to indicate the level of implementation of the international print guideline. Most (39%) of the respondents indicated that their organization purchases environmentally friendly products, 36% pointed that organization purchases biodegradable products only while 25% indicated that their organization organization carries regular audit on green purchasing policy implementation. If local procurement is applied, the economy of the affected region is stimulated as well. Nevertheless, local procurement usually faces quality problems and might lead to supply shortages. In addition, local purchasing can generate competition between organizations, which results in high prices for the relief items.

Table 7: Level of Implementation of the International Print Guideline

	Frequency	Percent
Your organization purchases environmentally friendly products	59	39
Your organization purchases biodegradable products only	54	36
Your organization carries regular audit on green purchasing policy implementation.	38	25
Total	151	100

International Guideline and Supply Chain Management of Hazardous Products

Table 8 shows the finding of the study on the influence of print guideline on downstream of supply chain management of hazardous products. Most of the respondent agreed that organization is concerned on the reduction of carbon blue prints on the transportation of goods as children as indicated by the mean scores of 3.91. The Guideline provides practical guidance and advice how to comply with hazardous products management and that organization offers capacity building programs on the implementation of green supply chains as depicted by mean score of 3.66 respectively. On the other hand repondent were neutral that organization's employees are always on protective gear when handling hazardous products as shown by mean score of 3.16. This is confirmed by the fact that hhumanitarian organizations often purchase relief items from global suppliers through competitive bidding processes in order to provide equal opportunities to all firms interested. However, in cases of huge disasters, when providing goods quickly in large amounts is crucial, tendering techniques are not applied (Balcik & Beamon, 2008).

Table 8: International Guideline and Supply Chain Management of Hazardous Products

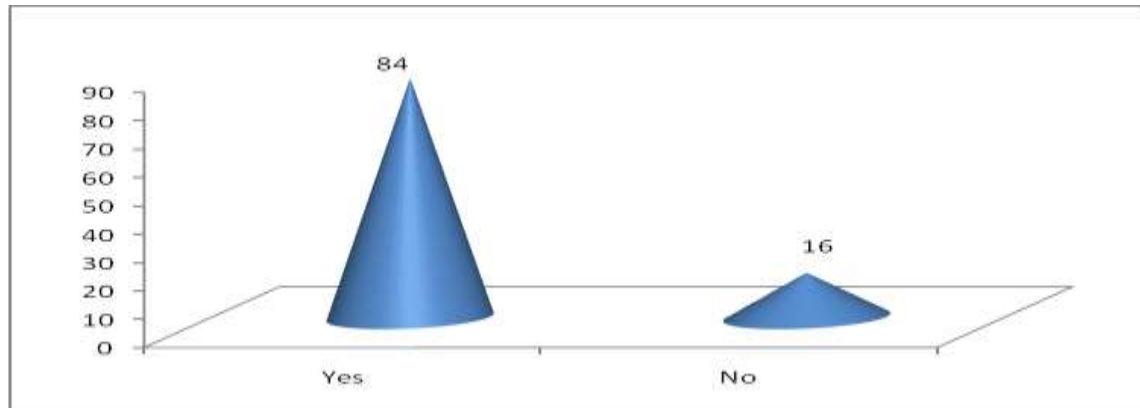
	Mean	StDev
Your organization's employees are always on protective gear when handling hazardous products	3.16	1.158
The Guideline provides practical guidance and advice how to comply with hazardous products management	3.72	1.240
Your organization is concerned on the reduction of carbon blue prints on the transportation of goods.	3.91	1.137
Your organization offers capacity building programs on the implementation of green supply chains.	3.66	1.394

Disposal Procedures

Existence of Disposal Plan in the Organization

The study requested the respondent to indicate whether the organization have disposal plan. From the findings, 84% of the respondents pointed out that their organization have disposal plan while the rest (16%) indicted that the organization had no disposal plan. When the organization has to buy, store, package and transport hazardous products in any country, it will have to apply complex specifications to comply with various regulations. This is confirmed by Panwar & Samina (2000) research that these are not always easy to apply in the different contexts where the organization works.

Figure 5: Existence of disposal plan in the organization



Disposal Procedures on Supply Chain Management of Hazardous Products

Table 9 shows respondents' level of agreement on the influence of disposal procedures on the downstream supply chain management of hazardous products. From the findings, most of the respondent indicated that returning to supplier is the main disposal means used by their organization to drain used motor vehicle oil as depicted by mean score of 3.734, likewise, respondents agreed that returning to supplier is the disposal solution in organizations use for motor vehicle used batteries and used tyres and that organization deal with disposal of the print cartridges as indicated by mean score of 3.672 and 3.625 respectively. Further respondents were neutral that organization use dispose needles and syringes through implimentation of certificate of destruction as shown by mean score of 3.344. Disposal solution used by organization for the cytotoxic products to cure cancer was used as indicated by mean score of 3.094. On other hand respondents disagreed that certificate of destruction was used as disposal means for expired drugs as indicated by mean score of 2.125. On the same note, Zhu & Sarkis (2006), pointed that there are several sets of regulations covering aspects of the disposal of hazardous substances and this is in agreement with this research. These policies describe the general requirements of legislation with respect to the transportation of hazardous materials. Where the transport of specific substances is regulated by specific legislation, the requirements of that legislation must be complied with for example, transport of radioactive substances and this can be a very important aspect on disposal procedures. The same is in agreement with Alain Grall (2010) research which indicated that certain disposal procedures for this type of products are known to MSF, but they are not always implemented as frequently the technology available in the countries in which MSF is present is not accessible and therefore not employed.

Table 9: Disposal Procedures on Supply Chain Management

	Mean	STDev
How does your organization dispose used needles and syringes?	3.34	1.394
Which disposal solution does your organization use for motor vehicle used batteries and used tyres?	3.67	0.892
Which disposal means used by your organization for the drain (used) motor vehicle oil?	3.73	1.263
How does your organization deal with disposal of the print cartridges?	3.63	1.175
Which disposal solution used by your organization for the cytotoxic products (to cure cancer)?	3.09	0.849
Which disposal means used by your organization for expired drugs?	2.13	0.655

Information Sharing

Information Sharing Procedures

The study requested respondents' whether their organization have information sharing procedure. From the findings, majority (66%) were of the opinion that their organization has laid down information sharing while 34% alleged that no information sharing procedures. This confirms Dunn and Young (2004) who posited that organization encourage information exchange as an importance tool in successful supplier development processes. This conferred that for effective supply chain management practices departments should be involved in giving out the information that derives to the quantity and quality of the material needed as well as the previous material. On the same note, Alain Grall (2010) agreed that certain disposal procedures for this type of products are known to MSF, but they are not always implemented as frequently the technology available in the countries in which MSF is present is not accessible and therefore not employed. This was also pointed out by Steed Kenlee Stagnolia (2007) who agreed that system that provides a mechanism for information flow in case of the acid spill, control and damages to the environment can be avoided, coordination and display of that information improves information flows and helps reduce uncertainty and risk and the data analysis confirms this notion. The use of IT enables far greater information to be more widely distributed, and in terms of the ability to offer access to large catalogues of people on a wide range of hazardous products.

Table 10: Information Sharing Procedures

	Frequency	Percentage
Yes	100	66
No	51	34
Total	151	100

Information Sharing on Supply Chain Management of Hazardous Products

The researchers requested the respondent to indicate their level of agreement on the statement relating to information sharing on supply chain management of hazardous products. From the findings most of the respondents agreed that organization provide every information both oral and electronic on hazardous products within the supply chains, organization share enough information on product compositions, organization share information regarding the disposal procedures and solution of hazardous product and organization share enough information on dangers inherent to the transportation of hazardous product and provide recommendations as shown by mean score of 3.97, 3.84, 3.81 and 3.78 respectively. Further respondents agreed that organization share information with other missions and health facilities on hazardous product classification, organization share enough information on risks and issues affecting our downstream supply chains on hazardous products and that organization share enough information on inventory levels of the hazardous products/raw materials 3.69, 3.61 and 3.55 respectively. Information sharing is about the information flow, the timeliness of information availability, and the openness and transparency in giving accurate information. This is in agreement with Panwar & Samina (2000) research which says that it will affect safety apparently and reduce risks.

Table 11: Information Sharing on Supply Chain Management of Hazardous Products

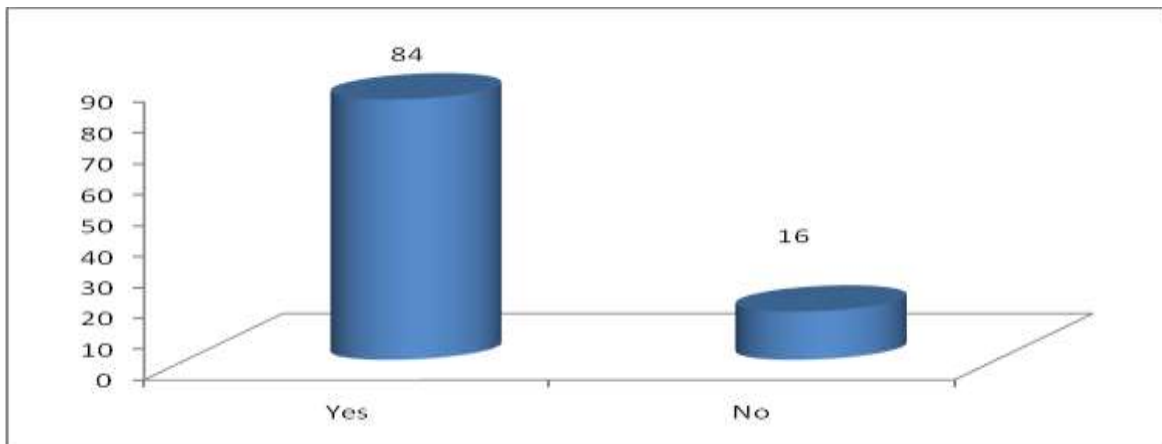
	Mean	STDev
Your organization provides information both oral and electronic on hazardous products within our supply chains.	3.97	0.083
Your Organization share enough information on forecasted demand for hazardous products	3.67	1.235
Your organization share enough information on product compositions	3.84	0.224
Your organization shares enough information on research and development on hazardous products (e.g. new products, new technology).	3.56	1.111
Your organization share enough information on dangers inherent to the transportation of hazardous product and provide recommendations	3.78	1.091
Your organization share information with other missions and health facilities on hazardous product classification	3.69	1.052
Your organization share enough information on risks and issues affecting our downstream supply chains on hazardous products	3.61	0.970
Your organization share information regarding the disposal procedures and solution of hazardous product	3.81	1.271
Your organization shares enough information on inventory levels of the hazardous products/raw materials.	3.55	1.053

Downstream Supply Chain Management of Hazardous Products

Print Guideline Offers Downstream Supply Chain of Hazardous Products

The study requested the respondents whether the print guideline offers downstream supply chain of hazardous products. From the findings, majority (84%) were of the opinion that print guideline offers downstream supply chain of hazardous products while 16% alleged that print guideline offers downstream supply chain of hazardous products.

Figure 6: Print Guideline on Supply Chain of Hazardous Products



Aspects of downstream Supply Chain Management of Hazardous

The study requested the respondent to indicate their level of agreement on aspects of downstream supply chain management of hazardous product. Most of the respondent agreed that organization has a strategic plan for risk coordination and regulatory frameworks for handling downstream supply chain of hazardous products, the chemical safety data sheet and other labeling are used for the delivery of hazardous product to the client missions, the hazardous products are classified and labeled during the storage and that organization has an occupational health and safety officer in all its downstream supply chain as depicted by mean score of 3.66, 3.57, 3.52 and 3.46 respectively. On the other hand respondent were neutral that organization has fitted all its vehicles and premises with safety gadgets like fire extinguishers, first aid kits and alarms, organization has adequate monitoring standards for safety including ISO1400, 9000 and other related standards on downstream and that that their organization complies always to the IATA regulations 3.41, 3.38 and 3.33 respectively. Through supply chain analysis, organizations are able to check whether supply chain issues can be incorporated into industrial transformation processes as Green et al., (1996) confirms.

Table 12: Print Guideline and Supply Chain Management of Hazardous Product

	Mean	STDev
Organization has adequate monitoring standards for safety including ISO1400, 9000 and other related standards on downstream supply chain management of hazardous products.	3.38	1.087
Organization has an occupational Health and Safety officer in all its downstream supply chain.	3.46	1.446
Most organization, air transportation, the packaging of hazardous products complies always to the IATA regulations.	3.33	0.959
The Chemical Safety Data Sheet and other labeling are used for the delivery of hazardous product to the client missions	3.57	1.229
The hazardous products are classified and labeled during the storage	3.52	1.133
Your organization has fitted all its vehicles and premises with safety gadgets like fire extinguishers, first aid kits and alarms.	3.41	1.377
Organization has strategic plan for risk coordination and regulatory frameworks for handling downstream supply chain of hazardous products.	3.66	0.963

Inferential Analysis

Coefficient of Correlation

To compute the correlation (strength) between the study variables and their findings the researcher used the Karl Pearson's coefficient of correlation (r). From the findings, it was clear that there was a positive correlation between supply chain management and print guidelines as shown by a correlation figure of 0.523, it was also clear that there was a positive correlation between supply chain management and international guidelines with a correlation figure of 0.6140, there was also a positive correlation between supply chain management and disposal procedures with a correlation value of 0.7460 and a positive correlation between supply chain management and information sharing with a correlation value of 0.5210. This shows that there was a positive correlation between supply chain management and print guidelines, international guidelines, disposal procedures and information sharing.

Table 13: Coefficient of Correlation

		Supply Chain Management	Print Guidelines	International guidelines	Disposal Procedures	Information Sharing
Print Guidelines	Pearson Correlation	1				
	Sig. (2-tailed)					
International guidelines	Pearson Correlation	.523	1			
	Sig. (2-tailed)	.0032				
Disposal Procedures	Pearson Correlation	.6140	.3421	1		
	Sig. (2-tailed)	.0021	.0014			
Information Sharing	Pearson Correlation	.7460	.1240	.0621	1	
	Sig. (2-tailed)	.0043	.0120	.0043		
Supply Chain Management	Pearson Correlation	.5210	.3420	.0000	.1660	1
	Sig. (2-tailed)	.0172	.0031	1.000	.0031	

Coefficient of Determination

Further the researcher conducted a multiple regression analysis so as to determine factors influencing implementation of risk management strategies. The researcher applied the statistical package for social sciences (SPSS) to code, enter and compute the measurements of the multiple regressions for the study.

Coefficient of determination explains the extent to which changes in the dependent variable can be explained by the change in the independent variables or the percentage of variation in the dependent variable (Supply Chain Management) that is explained by all the four independent variables (print guidelines, international guidelines, disposal procedures and information sharing). The four independent variables that were studied, explain only 83.4% of the supply chain management as represented by the adjusted R^2 . This therefore means that other factors not studied in this research contribute 16.6% of the supply chain management. Therefore, further research should be conducted to investigate the other factors (16.6%) that influence supply chain managements.

Table 14: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.913	0.834	0.751	0.4538

Regression Coefficients

Multiple regression analysis was conducted as to determine the relationship between supply chain management and the four variables. As per the SPSS generated table 4.14, the equation ($Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \epsilon$) becomes:

$$Y = 1.308 + 0.558X_1 + 0.731X_2 + 0.785X_3 + 0.620X_4$$

The regression equation above has established that taking all factors constant (print guidelines, international guidelines, disposal procedures and information sharing) constant at zero, supply chain management will be 1.308. The findings presented also shows that taking all other independent variables at zero, a unit increase in print guidelines will lead to a 0.558 increase of supply chain management; a unit increase in international guidelines will lead to a 0.731 increase of supply chain management; a unit increase in disposal procedures will lead to a 0.785 increase in supply chain management and a unit increase in information sharing will lead to a 0.620 increase in supply chain management. This infers that disposal procedures contribute most to supply chain management followed by international guidelines then information sharing while print guidelines contributed the little to supply chain management within humanitarian organization in Kenya.

Table 15: Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.308	1.342		1.623	0.357
Print Guidelines	0.558	0.310	0.172	4.342	.0276
International guidelines	0.731	0.156	0.210	3.532	.0285
Disposal Procedures	0.785	0.322	0.067	3.542	.0202
Information Sharing	0.620	0.245	0.148	3.458	.0249

SUMMARY OF THE FINDINGS

The objectives of this study were to determine the influence of print guideline on downstream supply chain management of hazardous products within humanitarian organizations in Kenya, to assess the effect of international guidelines on downstream supply chain management of hazardous products within humanitarian organizations in Kenya, to examine the influence of disposal procedures on downstream supply chain management of hazardous products within humanitarian organizations in Kenya and to determine the effect of information sharing on downstream supply chain management of hazardous products within humanitarian organizations in Kenya.

From the study findings most of the organization had set print guideline this has forced the organization to offer training in capacity building courses which was offered once a year. Organizations ensure that there is good information on familiarizing the staff and consumers on the handling of the hazardous products. Organizations facilitates interpretation and implementation of the print guidelines where conformity to print guidelines reduces complexities and costs relating to hazardous materials management and that the print guidelines helps to follow the policies and procedures on hazardous materials management.

On the implementation of international guidelines, the study found that most organizations comply with international print guidelines. Most organizations purchase environmentally friendly products and biodegradable products. Organizations are concerned on the reduction of carbon blue prints on the transportation of goods. The guideline provides practical guidance and advice how to comply with hazardous products management and that organization offers capacity building programs on the implementation of green supply chains.

To the disposal plan, the study found that most organizations have disposal plan where returning drain used motor vehicle oil, motor vehicle used batteries and used tyres to supplier is the main disposal means used by organizations. Organization dispose needles and syringes through implementation of certificate of destruction where disposal solution was used by organizations for the cytotoxic products to cure cancer.

On information sharing, the study established that organizations have information sharing procedure. Organizations encourage information exchange as an importance tool in successful supplier development processes. Organizations provides every information both oral and electronic on hazardous products within the supply chains, organization share enough information on product compositions, organization share information regarding the disposal procedures and solution of hazardous product and organization share enough information on dangers inherent to the transportation of hazardous product and provide recommendations.

To the downstream of supply chain management of hazardous products, the study established that most organizations have a strategic plan for risk coordination and regulatory frameworks for handling downstream supply chain of hazardous products. Organizations also use the chemical safety data sheet and other labeling in delivery of hazardous product to the client missions where they are classified and labeled during the storage. Organizations have an occupational health and safety officer in all its downstream supply chain that ensures they comply with standards of standard operating procedures set.

CONCLUSION

The study aimed at finding out standard operating procedures affecting downstream supply chain management of hazardous products within humanitarian organization in Kenya. Based on the findings the study concluded that most of the organizations had set print guideline this has forced the organizations to offer training in capacity building courses which was offered once a year. Organizations ensure that there is good information on familiarizing the staff and consumers on the handling of the hazardous products. Organizations facilitates interpretation and implementation of the print guidelines where conformity to print guidelines reduces complexities and costs relating to hazardous materials management and that the print guidelines helps to follow the policies and procedures on hazardous materials management.

On the implementation of international guidelines, the study concluded that most organization complies with international print guidelines. Most organization purchases environmentally friendly products and biodegradable products. Organizations are concerned on the reduction of carbon blue prints on the transportation of goods. The guideline provides practical guidance and advice how to comply with hazardous products management and that organization offers capacity building programs on the implementation of green supply chains.

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RECOMMENDATIONS OF THE STUDY

Hazardous materials should not be stored in the same place as products meant for human consumption. The person in charge of the warehouse must become familiar with the standards and regulations for identifying, handling, transporting and storing these substances. Products of this type should be identified with standard warning labels, and product compatibility should be checked before storing any types of hazardous materials together. Organizations receiving

supplies must coordinate their efforts, particularly with government agencies responsible for health care, such as the ministry of health. This calls for the development of an information system that records the number of people affected, the health problems that require care, current stocks in each of the warehouses or storage facilities, and the deliveries that have been made or are expected in the near future. Supplies must be distributed based on the demand for them and on the existing stock.

Humanitarian supply logistics cannot be improvised at the time of the emergency. Humanitarian organizations must see it as a cornerstone of emergency planning and preparedness efforts. Employing resources appropriately and being able to secure those that are not at hand, depends on first identifying their availability and location, as well as establishing the sources of hazardous product to scrub them. All those activities are demanded by logistical deployment during distribution of such products the mechanisms for standardizing the various processes and all the necessary documents for recording information and controlling, monitoring and following up on the flow of supplies must be prepared, understood and tested in advance.

Those who participate in emergency supply transport and storage must have access to these guidelines, which also describe the composition of the products, their mutual incompatibilities, and procedures to follow in the event of an accident. Knowledge of these standards ensures the proper handling of hazardous materials. Hazardous product supplies will have to follow a route and a series of stages from the point of entry or reception until they are handed over to the end users, the affected population. To prevent losses or diversions, and ensure a more efficient use of resources, an instrument is required to certify the progress of the supplies through the various stages and identify the next stage in the process. These controls should indicate what types of supplies have been mobilized, in what quantity and in what condition. They should also identify the parties that have intervened in the process.

There must be clear, explicit rules for the transmission of information. For instance, when the radio equipment in use is such that transmissions can be heard by anyone with a receiver, it is essential to make this clear to those who will be sending information. They must understand which information is confidential and should not be transmitted, or should be transmitted using code words or any other appropriate vocabulary. In situations of heightened security, it is useful to have pre-established times for the various stations to communicate with each other, as well as code names and passwords. In all cases, a log must be carefully kept of all contacts established, all issues discussed, and all messages received.

AREAS OF FURTHER STUDY

This study investigated on the Standard Operating Procedures affecting downstream Supply Chain Management of Hazardous Products within Humanitarian organizations in Kenya. The study suggests that further research to be done on challenges affecting implementation of international guideline and downstream supply chain management in non-government organization to depict reliable information that cut across all the sectors pertaining to humanitarian services. The study also suggests that further study be done on the impacts of Standard Operating Procedures on Supply Chain Performance.

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