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RESEARCH ARTICLE

THE INFLUENCE OF ORGANIZATIONAL FACTORS OF MEDICAL WASTE MANAGEMENT PRACTICES AMONG LIBYAN HOSPITALS

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ABSTRACT

In examining the influence of the organizational structure and culture on the medical waste management practice (MWMP) among public hospitals in Libya, this paper depicts a theoretical view to develop several corresponding hypotheses, with the two organizational factors (structure and culture) proposed to draw their effect upon hospital groups who are in charge of medical waste. Therefore, this paper examines the direct relationship between independent variables (structure and culture) and the dependent variable (MWMP). In doing so, previous research noticed that certain organizational factors such as (structure and culture) do influence waste management at the hospitals. Our finding shows that there are some inconsistent findings. We used the questionnaire design to gather the data from the surveyed hospitals located in the southern part of Libya. A total of 210 questionnaires were distributed and 171 usable responses were received, yielding 70% response rate. The two dimensions of the structure examined in this research (centralization and formalization) are found to have a positive relationship and significant influence on the management practice of medical waste. Moreover, the relationship between the organizational culture and MWMP is positive. The findings obtained from this research suggest that in order to improve MWMP among the public hospitals in Libya, nurses and cleaners should consider the structure dimension such as formalization seriously. We seek for our findings to be able to enhance the way medical waste is handled in the Libyan hospitals and complement the existing body of knowledge as well as to contribute to future studies in regards.

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INTRODUCTION

WHO (2011) emphasizes that some of the major and priority needs in primary health care structure and hospitals in Libya are scaling up hygiene standards and health care waste collection, training of selected staff, technical support for the disposal of large amounts of expired drugs, also strengthening and developing medical waste management including waste segregation, collection, treatment and disposal. The basic assumption known by various scholars is that many organizational factors affect medical waste management practice. For instance, the organizational structure is found to be a clear factor influencing healthcare waste management (Tudor, 2005). In the same direction, North (1999) has categorized organizational culture with human interactions and organizational arrangements. Some other previous research suggested that a number of factors will influence the management of medical waste (Manyele and Lyasenga, 2010). It is essential to consider the influence of the system components on each other to arrive at an optimal plan for a hazardous waste management system (Misra and Pandey, 2010). Our findings illustrate that organizational culture does have a significant influence on the adoption of the MWMP. Furthermore, (Souitarris, 2001) declared that centralization may reduce the production of creative solutions and impede the inter-departmental communication as well as the frequent circulation and sharing of ideas. This has a clear impact on healthcare facility when for example, healthcare facility has been known to have expired medications and thus, this issue has to be handled. On the other hand, the decentralized organizational structure seems to support an environment where workers from not being participated in building process

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more spontaneously (Lee and Choi, 2003). The influence of internal and external factors such as the structure, culture and human factors on medical waste management practice have been investigated (Fobil, 2008), the factors that influence MWMP among the Libyan public hospitals have yet to attract considerable attention. This research is very important to the entire group of stakeholders in Libya who are in charge of medical waste management since it was last updated (Sawalem *et al*. 2009). They had recorded that all hospitals surveyed in their study had poor waste management in terms of weak regulation and which concerns with adequate methods of waste handling despite the fact that the disposal did not exist primarily due to poorly educated workers who perform all activities without proper protection, training and guidance. In addition to that, to have proper and adequate medical waste management within hospitals and healthcare institutions we need first, to better understand the antecedents and consequences of the internal and external factors such as the organizational structure and environmental condition. Most of old and recent researches who study medical waste management in Libya have not yet concentrated on the relevant factors that influence this quality.

Tudor *et al*. (2005) mentioned that the main issues and challenges that affect healthcare waste management are organizational structure and infrastructure in the National Health Services (NHS) in Cornwall, UK. We note that their study did not concentrate on environmental factors that were highlighted in previous studies. Additionally, in their study, the waste manager and an administration assistant are responsible for observing the logistic documents along with other Cornwall Healthcare Estates and Support Services functions; this will result in inefficient communication to guarantee dissemination from the Trust management to all employees in which it will also result in the manager having to communicate with each worker from all the Trust. In the study of Tudor *et al* (2005), the authors described the current waste management by Cornwall NHS from the perspective of the organizational structure and barriers to recycling and reusable materials for the internal factors, whereas in this paper the conceptualization is forwarded to include more multi-dimensional factors and approach as presented in the later part of this research. Recently, Botelho (2012) examined the impact of education and training on the compliance behavior and waste generation in European private healthcare facilities. His findings revealed that the compliance with the law is far from ideal, and that the provision of education and training is the strongest policy factor influencing the degree of compliance with proper waste management practices. In the case of Libya, Sawalem *et al*. (2009) conducted a study on the management of hospital waste in three cities in Libya namely Tripoli, Misurata and Sirt. They found that the targeted hospitals transport their containers via uncovered trolleys. Containers however, were placed in poor condition and the final disposal practice of waste was put along with massive local waste in an open place outside the city. They also recorded that 85% of the personnel surveyed (including managers, cleaning staff and environmental workers) were not trained in hospital waste management. The purpose of this paper is to examine the influence of organizational internal factors (namely the structure and culture) on medical waste management practice in Libyan public hospitals. We note that this research differs from Sawalem *et al*. (2009) in two main aspects: First of all, our sample covers more extensive areas covering the fifth state in the southern part of Libyan hospitals. Second of all, they focused only on internal factors (such as the transport, onsite storage, segregation and training).

To address this research gap, this paper examines the influence of the organizational internal factors (which are the structure and culture) on the medical waste management practice in Libyan public hospitals. The results can help the hospital managers and Libyan authorities to create a better understanding of the kind of structure and culture that has to be encouraged to boost a better waste handling practice within the Libyan hospital context.

This paper is structured as follows. We review the empirical and theoretical backgrounds on organizational structure and culture as the factors influencing the waste management practice among Libyan hospitals. Besides, we develop the research hypotheses. In terms of the methodology, a discussion is driven based on the response rate of 171 respondents coming from all the targeted hospitals, followed by the presentation of the findings and results of the relationship within the constructs. Finally, we discuss the implications of the research in the hope of contributing towards a sound theoretical policy and for future research.

Theoretical Framework and Hypotheses

The criterion as the dependent variable for this research is medical waste management practice whereas the predictor variables are the organizational structure and culture-oriented factors. A discussion will be provided in the following sections to all variables included in this research.

Organizational Structure and Medical Waste Management Practice

According to Skivington and Daft (1991), a good organizational structure could show an enduring configuration of activities and tasks. Organizational structure as being described in the literature refers to an organization's internal way of relationships, communication, and authority (Hage and Aiken, 1967). Organizational structure is defined as the formal allocation of work policies and administrative mechanism for controlling and integrating work activities (Ghani *et al*., 2002; Robbins, 1990). In short, the organizational factors of an organization refer to how activities such as task distribution, management and supervision are heading for the achievement of the organization's aims and goals (Ghani *et al*., 2002; Robbins, 1990). The structural dimensions contain the extent of centralization, formalization as well as specialization. However, the most common dimensions examined and used by scholars in the literature are centralization and formalization (Jantan *et al*., 2003; Kirca *et al*., 2005; Meirovich *et al*., 2007; Katsikea *et al*., 2011). Based on the points above, in this research we examine both the centralization and formalization as the structural dimensions of the organizations among waste management practice in Libyan hospitals.

Centralization

Centralization refers to the concentration of power or decision-making authority in an organization (Schminke *et al*., 2002). This definition has certain disadvantages in terms of communication prevention (Pertusa-Ortega, Zaragoza-Sáez, and Claver-Cortés, 2010) and it reduces essential motivation and employee satisfaction (Zheng, Yang, and McLean, 2010). On the other hand, Matheson (2007) submitted that centralized organizations will enhance work alienation, which will in turn promote employees' workplace friendship (Sias and Cahill, 1998). Friendship at the higher workplace has an implication on the employee's willingness to assist other colleagues (Bowler and Brass, 2006). Since the workplace refers to informal and personal-related interactions in the work place setting (Berman *et al*., 2002), the friendship occurring at the workplace increases the support and resources that help individuals do their jobs. Following the direction of some scholars (Hall, 1999; Fry and Slocum, 1984;Mintzberg, 1979) they define centralization to be in line with the extent to which the right to make decision and evaluate activities is concentrated, with regard to the best practice of healthcare waste management. The purpose of using centralization is to ensure standardization, clear documentations, responsibility with regard to the best practice, minimizing the interested parties who are facing the lack of information or skills; it enables them to utilize the skills of central and specialized experts, and to have a closer control of organizational operations (Katsikea, Theodosiou, Perdikis & Kehagias, 2011). Additionally, when the organization allows individuals to act autonomously, then it can achieve better business opportunities with regard to services or even new products (Nonaka, 1994, 1988). However, centralized organizations may reduce creative solutions, discourage inter-departmental communication as well as hamper the frequent circulation and knowledge sharing (Souitaris, 2001) due to the existence of the long time needed.
From the perspective of waste management, the body in charge practices centralization structures in which only the authority personnel in charge of the decision making and full empowerment lies in the hand of top managers. Therefore, as a result, the benefit of centralization is to prevent staff members or even managers from being flexible and taking the initiative in the course of performing their duties (Katsikea, *et al*., 2011).

Formalization

Formalization refers to the extent to which standard policies, formal rules, and procedures manage decisions and working relationships (Fredrickson, 1986). This definition could be negatively criticized where it suffers from a restriction when strict formal rules dominate an organization (Lee and Choi, 2003). On the other hand, formalization can well improve the cooperation and collaboration among the organizational staffal together (Cordon-pozo *et al.,* 2006). Moreover, formalization could shape the interaction structure and scope and provide helpful insights for organizational management improvement (Kern, 2006). Formalization measures the extent to which an organization uses rules and procedures to prescribe behavior (Ghani *et al*., 2002; Robbins, 1990). However, Feldman and Pentland (2003) suggested that formalization and organizational routines possess certain similarities in the sense that both of them symbolize the manner of behavior, action, procedures, or interaction. However, they differ in a very important way, where by while routines make up a form of implicit knowledge, formalization is explicit and codified (Reynaud, 2005). Both formalization and organizational routines could go contrary to feasibility as they can drive organizations to become inflexible, or adhere to the static patterns of action. Organizational routines, according to some theorists are rather of a more dynamic system than static objects (Feldman and Pentland, 2003; Becker *et al*., 2005).

From the point of view of medical waste, medical waste management with proper structure and clear rules and procedures will firstly permit the management to ease the circulation of handling the waste properly in which they are produced in different departments (Cohendet *et al*., 2004), and secondly it will reduce ambiguity (Cordon-pozo *et al*., 2006). Lastly, with formal procedures, employees tend to deal more effectively with contingencies because they include the best practices learnt from experience and which are incorporated into the organizational memory (Adler and Borys, 1996). Thus, in this context, formalization controls and regulates best practices in order to stabilize and disseminate a consistent program that will enable employees to follow it regularly and increase the quality of performance. An example of the positive relationship between formalization and waste management in the literature is the Total Quality Management (TQM). Total Quality Management means the analysis and evaluation of all the activities improved within an organization (pertusa-Otega *et al*., 2010), so that the evaluation may generate ideas and new ways bound to codify in a series of formal documents that lead to the development of the quality in the chain of MWM.

Organizational Culture and Medical Waste Management Practice

Scholars who study organization and other observers recognize that organizational culture has a great impact on the achievement and long-term effectiveness of organizations. The concept of culture has received sufficient attention only at the beginning of the 1980s from the relevant scholars. This is one of the few areas, indeed, in which observers led by practicing managers have identified a critical factor affecting organizational performance. Organizational culture is deemed to be an area in which conceptual work and scholarship have revealed directions and leadership for managers as they have been looking for ways to boost the effectiveness of their organizations (Yildirim and Birinc, 2013). Obviously, there is a number of different kinds or levels of culture that affect individual and organizational behavior. Studies have already reported a clear distinction between continent and countries based on definite key dimensions (Hofstede, 1980; Aiken and Bachrarach, 1980). Organization culture refers to shared assumptions, values, and norms (Schein, 1985). Bass (1993) defines culture as the glue that holds the organization together as a source of identity and distinctive competence. Within the context of organization, culture represents the behavior of human beings who are considered to be a part of an organization and the meaning that people connect or attach to

their actions in the chain of the medical waste management. The relationship between the culture of an organization and its management was clearly stated in the literature (Fey and Denison, 1986).

According to Davies, Mannion, Jacob, Powell and Marshall (2007), organizational culture refers to the assumption, values, attitudes as well as beliefs that a significant group shares among them within the organization. Along with the same line, culture could also be defined as the collective mind program which distinguishes the member of one category or group of people from another (Hofsted, 1991). According to him, this kind of definition is not yet completed, but it covers what he intends to measure. However, culture in his sense, consists of systems of values and values are among the building blocks of culture. Furthermore, culture is to be characterized by specific problems arising from the inexhaustible nature of its components. Therefore, in analyzing the cultural impact on the behavior of the members of any particular sub-culture, we select the dimensions that could most be applied to the particular perspective of the cultural behavior being studied. Four types of organizational cultures have been identified in the literature (Hofsted, 1991).

These are
1.Individualism Vs collectivism
2.Large and small power distance
3.Strong and weak uncertainty avoidance
4.Masculinity and femininity

According to the aforementioned dimensions, the first two dimensions (individualism Vs collectivism and power distance) are chosen because of their relevant values for studying the evaluation and management of waste by the leadership style (Hofsted, 1983). Furthermore, they had been recorded and developed through empirical measurement, which was tested for their validity and reliability (Harrison, 1990; Morris *et al*., 1993; Pratt, 1986; Bosland, 1984; Hofsted, 1984). Conversely, some other scholars mentioned that organizational culture does not have any direct influence on organizational effectiveness; it rather influences the behavioural shaping of organizational members in an ambiguous and uncertain world. The most important part of decision-making, however, is to absorb the information from the environment to structure the unknown (Waterman, 1990). Sharing values and belief in an organization has a great influence on waste management (Tesluk *et al*., 1997; Harris, 1998). The current research conceptualizes individualism Vs collectivism and power distance (Hofsted, 1980, 1991) as the two main dimensions in the MWMP so that the management could be incorporated into an organizational memory. The entire process is conditioned by the organizational culture, because according to De Long and Fahey, (2000), the values and behavioral norms held by organizational members serve as a filter in the sense-making and meaning-construction processes.

Individualism Vs collectivism

Individualism-Collectivism (IC) explains relationships among members of the societies and how they perceive and comprehend these relations. It also describes the relationship between the collectivity and the individual that exists in a given group. Individualism means that members of the society look at themselves and seek their own goals more than the group's goals. Their loyalties to organizations tend to be at a low level and they depend on themselves rather than others. In individualistic societies, members are oriented by "I" (Hofstede *et al*., 2005). In collectivistic societies members are oriented by "We". The word collectivist does not necessarily have any political sense. It relates to the power of the group and not the power of the state. In collectivistic societies collaboration and "we" are their slogans and the loyalty to the organization is expected to be high. Individual competition is not preferred in collectivist societies. Members depend on the cooperation with each other jointly as a unit or family. Hofstede (2005, p. 213) stated that "The degree of individualism in an organizations depends, obviously, on other factors in addition to the societal norms, such as employees" educational levels as well as an organization's history and organizational culture". Individualism/ collectivism stands for factors which could be essential and important in an ideal organization such as, challenge, training, physical conditions and the use of skills, according to Hofstede and Hofstede (2005, p. 76). From the perspective of medical waste management, training and education programmes for instance, must be available for all hospital staff, as proper training will enhance the development of the awareness of health, safety and environmental issues (Mohee, 2005). Furthermore, Yong at al (2009) indicated that if the understanding of medical waste disposal methods is increased by the use of skills and advanced technology, the medical waste management will be greatly enhanced.

Power Distance

Power distance refers to the formal way or approach in which a society or organization handles inequality, and subsequently the way people build their institutions and organizations. In addition to that, power distance is divided into parts. These are large distance and small distance. In large distance, an organization or society tends to have an acceptance to a hierarchical order where everybody has a space which does not need any justification. On the other hand, in small power distance, an organization or society tends to strive for power equalization and justification for the existence of those power inequalities (Hofsted, 1980, 1991). An example of this dimension with regard to MWMP is the classification into the administrative and technical aspects (Nemathaga *et al*., 2008).The administrative waste management of healthcare facilities is related to the components affecting the social system and members of the organization, such as the rules, roles, procedures, and structures concerning communication and exchange between the members. The technical part of medical waste management refers to the operating constituent affecting the technical system. Examples of these components are: equipment, also the methods of operation utilized in their production process.

Medical Waste Management Practice

Johannessen *et al*. (2000) suggested that a good management of medical waste can drastically curtail the risks within and

outside health-care facilities, suggesting, as an initial step, the separation of wastes into reusable and non-reusable, harmful and non-lethal components. They recognized other vital measures, such as the institutionalization of an active management system, eliminating or minimizing undue waste manufacture, the evasion of risky substances wherever possible, the act of safeguarding worker's safety, providing secure methods of waste collection and transportation, and setting up a functioning waste treatment and disposal system. Acharya and Singh (2000) on the other hand, declared that the medical waste management process involves 7 steps including handling, segregation, mutilation, disinfection, storage, transportation and final disposal. They argued that these are vital measures or steps that need to be undertaken for the sake of safe and scientific medical waste management in any institution. Other authors have advocated other methods of managing medical wastes, including, appropriate techniques for disposal (Lee *et al*, 2004; Diaz *et al*., 2005), an internal management system and training program for related personnel (Abdulla, 2008; Silva, 2005).

Following WHO (1999; 2005), we define healthcare waste to include all the waste generated by healthcare institutions, laboratories and research facilities. It also includes the waste originating from minor or scattered sources (such as those wastes generated in the course of healthcare undertaken in the homes). The relationships between the aforementioned variables are shown in Fig. 1.

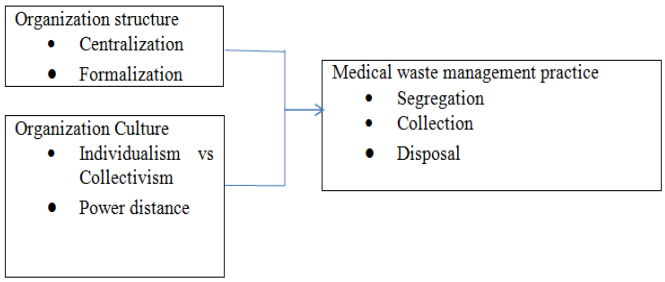

Fig. 1. Theoretical framework

We therefore hypothesize that:

H1: There is a significant relationship between organizational structure and medical waste management practice in Libyan public hospitals.
H1 (A): There is a significant relationship between centralization and medical waste management practice in Libyan public hospitals.
H1 (B): There is a significant relationship between formalization and medical waste management practice in Libyan public hospitals
H2 :There is a significant relationship between organizational culture and medical waste management practice in Libyan public hospitals.
H2 (A): There is a significant relationship between individualism vs collectivism and medical waste management practice in Libyan public hospitals.
H2 (B): There is a significant relationship between power distance and medical waste management practice in Libyan public hospitals

MATERIALS AND METHODS

Sample and Data Collection

The questionnaire was distributed among the five southern states in Libya from 20 January and the survey has taken 5months to be completed. The population (respondents) for the current research included different levels of respondents who have had to deal with medical waste (Top management, heads of departments and doctors). The sample frame consisted of names and addresses of hospitals obtained from (www.health.gov.ly) published in 2010. We physically sent out 210 questionnaires to all selected hospitals and received back 171 questionnaires which yielded about70% response rate. The Cronbach's coefficient alpha was used to determine the reliability of the various items used in this study. All the Cronbach's coefficient alpha values gained in this research were above 0.65 consistent withthe minimum acceptance values recommended by Nunnally (1978).

Measurement of variables

The organization structure was measured using a fourteen-item instrument adopted from Kholi and Jaworski (1993). It was also conceptualized as the centralization and formalization. Centralization refers to the top management making the decisions, whereas formulation refers to the degree to which written policies and procedures that guide the actions of employees in an organization. Our respondents at the surveyed hospitals were asked to indicate the intensity of centralization and formalization on a five-point Likert scale or in detail, 1= "strongly disagree," 2= "disagree, " 3= "neutral, " 4= "agree, " 5= " strongly agree. Organization culture was measured by an eighteen-item instrument adopted fromHofstede (1980, 1991); and also conceptualized as the Individualism vs collectivism and power distance. While Individualismmeans that members of the society look at themselves and seek their own goals more than the group's goals and collectivism refers to the fact that members depend on the cooperation with each other jointly as a unit or family, power distance deals with the level of the inequality in the society and how to handle the fact that members of the society are unequal. The aim of using organization culture is to assess the extent of individualism vs collectivism and power distance among Libyan public hospitals on a five-point Likert scale with the order of 1= "strongly disagree," 2= "disagree, " 3= "neutral, " 4= "agree, " 5= " strongly agree . Medical waste management practice was measured by a twelve-item instrument adapted from Vorapong Manowan (2009); WHO (199; 2005). The respondents were asked to indicate the intensity of medical waste management practice among the Libyan public hospitals on a five-point Likert scale with these representations: 1= "strongly disagree," 2= "disagree, " 3= "neutral, " 4= "agree, " 5= " strongly agree.

RESULTS AND DISCUSSION

Data analysis

Following (Sonmez and Sirakaya, 2002), the factor analysis was performed to all variables: organizational structure,

organizational culture, organizational internal factors and medical waste management practice. In addition, a reliability test was conducted to all constructs to determine the data reliability.

Organization Structure

The measurement scales for organizational structure consisted of 14-items. The Varimax rotated principal components factor analysis was conducted. Prior to performing the principal components analysis (PCA), the suitability of the data for the factor analysis was assessed. The correlation matrix indicated that the item coefficients were 0.3 and above. There was a total of two statistical measures to assess the factorability of the data conducted through 1) Kaiser-Meyer-Olkin (KMO) to determine the "measure of sampling adequacy" value. The value reported was 0.843, exceeding the recommended value of 0.6 (Kaiser, 1970, 1974); 2) Barlett's test of sphericity (Barlett, 1954) is significant at $p<0.001$. Since the KMO value is reported to as 0.843, it is interpreted as in the range of "great" (Hutchinson &Sofroniou, 1999). Therefore the sample size here is adequate for the factor analysis. The total variance explained is reported as 47.69%. Only factors with a loading value of 0.40 and above were considered. One item was deleted prior to the anti-image analysis. Factor loading accepted all two factors based on the original items. **Table 1** shows the factor loading value for this scale. It ranges from 0.468 to 0.784.The reliability test was performed after the factor analyses for items measuring the organizational structure. Based on the Cronbach coefficient alpha of the variables, all the variables in this research have values more than 0.65.

Organization Culture

The measurement scales for organizational culture consisted of eighteen-items. The Varimax rotated principal components factor analysis was conducted. Prior to performing the principal components analysis (PCA), the suitability of the data for the factor analysis was assessed. The correlation matrix indicated that the item coefficients were 0.3 and above. There were a total of two statistical measures that assess the factorability of the data conducted through i) Kaiser-Meyer-Olkin (KMO) to determine the "measure of sampling adequacy" value. The value reported was 0.887, exceeding the recommended value of 0.6 (Kaiser, 1970, 1974); ii) Barlett's test of sphericity (Barlett, 1954) is significant at $p<0.001$. Since the KMO value is reported as 0.887, it is interpreted as staying in the range of "fair" (Hutcheson & Sofroniou, 1999). Therefore, the sample size here is adequate for the factor analysis. The total variance explained is reported as 49.43%. Only factors with a loading value of 0.40 and above were considered. Therefore, no items were deleted. The factor loading accepted all two factors based on the original items.

Table 2 below shows the factor loading value for this scale. It ranges from 0.433 to 0.749.The reliability test was performed after the factor analyses for items measuring organizational culture. Based on the Cronbach coefficient alpha of the variables, all the variables in this research have values more than 0.65.

Table 1. Factor Analysis of the Organisational Structure

Factor/Item	Loading	
	1	2
Factor 1: Formalization		
b1b	.702	
b2b	.646	
b3b	.701	
b4b	.543	
b5b	.606	
b6b	.784	
b7b	.612	
b8b	.638	
Factor 2: Centralization		
b1a		.585
b3a		.472
b4a		.482
b5a		.468
b6a		.750
Eigenvalues	4.81	1.33
Percentage	37.06	10.23
KMO	0.843	
Barlett's test of sphericity	683.97	
Sig.	0.000	

Table 2. Factor Analysis of Organisational Culture

Factor/Item	Loading	
	1	2
Factor 1: Power Distance		
c1b	.749	
c2b	.684	
c3b	.686	
Factor 2: Individualism & Collectivism		
c1a		.615
c2a		.553
c3a		.493
c4a		.433
c5a		.588
c6a		.660
c7a		.692
c8a		.743
c9a		.702
c10a		.716
c11a		.669
c12a		.504
c13a		.570
c14a		.770
Eigenvalues	6.75	1.65
Percentage	39.71	9.72
KMO	0.887	
Barlett's test of sphericity	1195.47	
Sig.	0.000	

Medical Waste Management Practice

The measurement scales for MWMP consisted of 14-items. The Varimax rotated principal components of the factor analysis was conducted. Prior to performing the principal components analysis (PCA), the suitability of the data for the factor analysis was assessed. The correlation matrix indicated that the item coefficients were 0.3 and above. There were a total of two statistical measures that assess the factorability of the data conducted through 1) Kaiser-Meyer-Olkin (KMO) to determine the "measure of sampling adequacy" value. The value reported was 0.788, exceeding the recommended value of 0.6 (Kaiser, 1970, 1974); 2) Barlett's test of sphericity (Barlett, 1954) is significant at $p<0.001$. Since the KMO value is reported as 0.788, it is interpreted as staying in the range of "fair" (Hutchinson & Sofroniou, 1999). Therefore, the sample

size here is adequate for the factor analysis. The total variance explained is reported as 55.01%. Only factors with a loading value of 0.40.5 and above were considered. Two items were deleted prior to the anti-image analysis. The factor loading accepted all two factors based on the original items. **Table 3** shows the factor loading value for this scale. It ranges from 0.523 to 0.793.The reliability test was performed after the factor analyses for items measuring the medical waste management. Based on the Cronbach coefficient alpha of the variables, all the variables in this research have values more than 0.65.

Table 3. Factor Analysis of Medical Waste Management Practice

Factor/Item	Loading		
	1	2	3
Factor 1			
e10	.523		
e11	.530		
e12	.711		
e14	.635		
Factor 2			
e5		.757	
e6		.793	
e7		.725	
e8		.604	
Factor 3			
e1			.704
e2			.672
e3			.528
e4			.701
Eigenvalues	1.837	1.696	1.069
Percentage	31.976	14.130	8.906
KMO	0.788		
Barlett's test of sphericity	533.202		
Sig.	0.000		

Table 4 demonstrates the demographic statistics of respondents' background at the hospitals surveyed. Out of 171 respondents who returned the completed questionnaires, 70.7% of the participants were from the District General Hospital, while 7.0 % came from teaching hospitals and 5.7 % were from specialist hospitals. They held various positions in the hospital. The majority of them was heads of the department (41.1%) and doctors (12.5%). 55.2 % of the respondents were male compared to 44.8 % female. Most of the participants had finished their tertiary education and had more than 8 years of experience. It could also be found that most of the hospitals were old hospitals, and they were established for more than 20 years. According to the number of employees, the majority of the participants were from the hospital with 300 employees.

Correlation between Medical Waste management Practices, Structure and Culture

It was found that there was a significant relationship between both variables (r=0.609, p<0.01). However, there was also an indication of the significant relationship between centralization and collection (r=0.525, p<0.01) and disposal (r=0.193, p<0.05). Another significant relationship can also be found between formalization collection (r=0.486, p<0.01) and disposal (r=.208, p<0.01). Centralization and formalization were found to have no significant relationship with separation. The outcomes then, provide the statistical proof to support H1-H6.

Table 4. Background of the Respondents

	Frequency	Percentage
Type of the Hospital		
Teaching Hospital	11	7.0
Specialist Hospital	9	5.7
District General Hospital	111	70.7
Others	26	16.6
Position		
Head Of Hospital	3	1.8
Hospital Manager	8	4.8
Head Of Hospital Department	69	41.1
Inflection Control Officer	11	6.5
Hospital Engineer	6	3.6
Chief Pharmacist	13	7.7
Radiation Officer	7	4.2
Senior Nursing Officer	11	6.5
Financial Controller	6	3.6
Waste Management Officer	3	1.8
Doctor	21	12.5
Others	10	6.0
Gender		
Male	74	55.2
Female	60	44.8
Education		
High School	5	3.6
High Diploma	49	35.8
University	83	60.6
Experience		
1-3 years	17	11.4
4-7 years	32	21.5
>8 years	100	67.1
Years of Established		
<10	24	14.0
10-20	15	8.8
21-30	88	51.5
31-40	43	25.1
>40	1	.6
Number of Employees		
<100	9	5.3
100-200	13	7.6
201-300	18	10.5
301-400	45	26.3
401-500	54	31.6
>500	32	18.7

Table 5. Presents the correlation between medical waste management practices and Structure

	MWNP	Separation	Collection	Disposal	Organisational structure	Centralization	Formalization
WMP	1						
Separation	.485**	1					
Collection	.643**	.272**	1				
Disposal	.699**	.319**	.180*	1			
Organisational Structure	.609**	-.001	.549**	.220**	1		
Centralization	.548**	.016	.525**	.193*	.879**	1	
Formalisation	.563**	-.013	.486**	.208**	.940**	.663**	1

Also, **Table 6** demonstrates that there was a significant relationship between organizational culture and medical waste management practice. (r=0.739, p<0.01). In addition, another

significant relationship appears between individualism and collection (r=0.506, p<0.01) and disposal (r=0.374, p<0.05); and between power distance collection (r=0.282, p<0.01) and disposal (r=.436, p<0.01). The outcomes then, provide the statistical evidence to support H_A1 (8), H_A1 (9).

Relationship between Waste Management Practices and Organisational Culture

	WNP	Separation	Collection	Disposal	Organizational Culture	Individualism & Collectivism	Power Distance
WMP	1						
Separation	.485**	1					
Collection	.643**	.272**	1				
Disposal	.699**	.319**	.180*	1			
Organisational Culture	.739**	.102	.491**	.414**	1		
Individualism & Collectivism	.697**	.086	.506**	.374**	.985**	1	
Power Distance	.672**	.130	.282**	.436**	.751**	.623**	1

Table 7 shows the results of the regression analysis which examines the effect of organisational structure on medical waste management practices. It was found that Organizational structure explained 37.1 percent of MWMP (R^2=37.1, F=49.03, p<0.01). Both dimensions significantly predicted the MWMP in public hospitals in Libya as follows: Centralisation (B=0.313, t=3.805, p<0.01) and formalisation (B=0.355, t=4.316, p<0.01).

Table 7. Effect of Organisational Structure on Medical Waste Management Practices

	B	t	Sig.
Centralisation	.313	3.805	.000
Formalisation	.355	4.316	.000
R^2	0.371		
F	49.03		
Sig.	0.000		

Table 8 shows the results of the regression analysis which examine the effect of organizational culture on medical waste management practices. It was found that the organizational Culture explained 57.8 percent of MWMP (R^2=0.578, F=113.655, p<0.01). Both dimensions had also significantly predicted MWMP in public hospitals in Libya as follows: individualism and collectivism (B=0.455, t=7.508, p<0.01) and power distance (B=0.388, t=6.018, p<0.01).

Table 8. Effect of Organisational Culture on Medical Waste Management Practices

	B	t	Sig.
Individualism and Collectivism	.455	7.058	.000
Power Distance	.388	6.018	.000
R^2	0.578		
F	113.655		
Sig.	0.000		

Conclusion

This research examines the relationship between the organizational structure, culture and MWMP among Libyan public hospitals. The research however, tries to answer this research question: What is the influence of organizational structure, culture on medical waste management practice among Libyan public hospitals? The population for the current research is the southern Libyan public hospitals. Simple stratified random sampling was utilized for the hospitals selected because it is the most efficient among all sampling probability designs. Also, self-administrated structured questionnaires were physically distributed to 210 selected hospitals in the five states followed by some phone calls and reminders, with the aim to get back a good feedback. A total of 171 respondents were returned. The data were then analysed using different analyses with the assistance of the Statistical Package for Social Science program for Windows (Version 20.0).The results of the reliability analysis suggest that all of the variables are reliable for this research by checking the Cronbach's alpha coefficient which has held values more than 0.65 to variables. The regression analysis illustrated that all of the variables (organizational structure and culture) significantly predicted medical waste management practice in the Libyan public hospitals. In addition, the results of the correlation analysis demonstrated that there is a significant relationship between organizational structure and organizational culture. The results of the descriptive analyses for the mean score ranged from 1.6 to 4.7 and all the standard deviations were low except for Q6 about segregation the waste and Q14 about penalizing for failing to follow the Standard Operation Procedures (SOP) on medical waste, suggesting that the perception of the current medical waste management practices in Libya is low and that there is a variability on the data. Generally, the current practice of the medical waste management within the Libyan hospitals provides an indication on what has been mentioned early by WHO (2011) where there was an emphasis on some of the major and priority needs in the primary healthcare structure and hospitals in Libya. These include scaling up the hygiene standards and healthcare waste collection, disposal, training of selected staff, technical support for the disposal of large amount of expired drugs, the development of the medical waste segregation, treatment and disposal. In another study consistent with this research conducted by Alagoz and Kocasoy (2007) it is determined that in most of the healthcare facilities surveyed in Turkey, top management, managers of the hospitals also the senior nurses did not pay any attention to hospital waste, due to their insufficient knowledge and the significance of medical waste and their lack of interest. From the practical point of view, the findings of this research suggest that to improve the practice of medical waste management among Libyan hospitals, all of the interested parties in the field of safe management of healthcare facilities including managers of hospitals, medical staff, nurses, environmental officers, waste management officers need to seriously give more attention to factors such as the organizational structure (centralization and formalization). For instance, previous studies have illustrated that centralization may reduce the creative solutions and impede interdepartmental communication as well as the frequent circulation and sharing of ideas (Souitarris, 2001) because of the existence of time-consuming formal communication channels. This may clearly be noticed when a healthcare facility has accumulated expired medications and it has to be handled. In a similar vein with formalization, the

medical waste management with proper structure and clear rules and procedures will firstly permit the management to ease the handling of the waste properly where they are produced from varying departments (Cohendet *et al*., 2004), and secondly it reduces the ambiguity (Cordon-pozo *et al*., 2006). Lastly, with formal procedures, employees tend to deal more effectively with contingencies because they include the best practices learnt from experience and which are incorporated into the organizational memory (Adler and Borys, 1996). Furthermore, this research plays an essential role which is important to whomever in charge of medical waste management such as the Ministry of Health, Ministry of Environment, healthcare facilities managers to the lower level staff. In addition, the findings of this research are perceived to be capable to contribute to future studies in the area of medical waste management. To sum up, in gathering all relevant information for this research, we used a single respondent to capture the data at the organizational level; and the use of survey method as two main limitations arising from this research. Thus, our future directions in this field of research should consider multiple respondents for gathering the relevant data. Additionally, an attention should lean on the influence of moderating variables such as hospital location and type of services offered on the relationships between organizational factors and medical waste management practices.

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