ORIGINAL ARTICLE

Medical Waste Management Survey in Primary Health Care Centers, Saudi Arabia

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Abstract

Background & Aims: Primary healthcare services aim to promote health and prevent health problems. However, waste generated from primary healthcare centers (PHC) potentially harmful to public health and the environment. The aim of this study was to assess wastes management of these centers. Methods: The data of this observational – cross-sectional study were collected from the available primary healthcare centers in Al-Baha city, Saudi Arabia (N=15 PHC centers). Data collected using standardized questionnaire and observations. Results: Contaminated sharp and pharmaceuticals pressurized wastes were generated in all PHC centers. About 14(93.3%) and 13(86.7%) of the centers were generating wastes of live attenuated vaccines vials and articles contaminated with blood, respectively. Eight (53.6%) of the centers generated more than 3 kg per day of contaminated sharps, followed by; live and attenuated vaccines' vials. Eleven (73.3%) and 7 (46.7%) of the PHC centers produces 1 to 3 kg of hazardous wastes per day of articles contaminated with blood and waste contaminated with excretion, respectively. All health centers except one were practicing waste segregation properly, and 2 (13.4%) of the centers lacked waste storage method. A total of 5 (33.5%) centers also did not practice any type of dis infection, 7 (46.7%) and 9 (60.0%) of these centers did not have medical waste **plan, nor specification for the collection** and handling procedures of their medical wastes, respec tively. The most common methods used for medical waste packaging were bags (68.8%) and plastic containers (18.8%). Conclusion: Medical waste management practices were found to be deficient and their amendment highly recommended.

Keywords: Biohazards Wastes, Medical Waste, Primary Health Care, Public Health, Saudi Arabia

الملخص

الأهداف: الهدف من هذه الدراسة هو تقييم ممارسات إدارة النفايات الطبية، وتحديد العوامل التي تؤثر في ذلك بين مراكز الرعاية الصحية الأولية في مدينة الباحة. المنهجية: جمعت بيانات هذه الدراسة المقطعية من جملة مراكز الرعاية الصحية الأولية كافة عن طريق المقابلة، الملاحظة باستخدام استبيان موحد. تم تحليل البيانات باستخدام البرنامج الإحصائي للعلوم الاجتماعية.

النتائج: معدل انتاج النفايات في مراكز الرعاية الصحية بالباحة متباين حسب كل مركز. سجلت الأدوات الحادة المعدية أكبر كمية بين النفايات الخطرة المنتجة في مراكز الرعاية الصحية الأولية حيث وجد 8 (56.6٪) من تلك المراكزتنتج أكثر من 3 كجم من هذه الأدوات الحادة يوميا، تليها قنينات اللقاحات 10 (62.6٪) من المراكز تنتج بين 1 إلى 3 كجم. حولي 11 (68.8 ٪) من مراكز الرعاية الصحية الأولية تنتج من 1 إلى 3 كجم من النفايات الخطرة يوميا، 7 (43.8٪) من المراكز تنتج ما بين 1 إلى 3 كجم من من المواد الملوثة بالدم والأدوية الكيميائية وعلب بخاخ الفارغة يوميا. بينما وجد ان جميع مراكز الرعاية الصحية الأولية بالباحة تفتقر إلى عملية فرز النفايات، كان 2 فقط (12.5 في المائة) منها يفتقر الى التخزين الملائم للنفايات. 4 (25 ٪) من مراكز الرعاية الصحيةلا تمارس أي نوع من التطهيرللنفايات الخطرة لقتل جراثيمها، وكذلك وجدت 6 (37.5٪) من هذه المراكز لا يوجد لديها أي خطة ولا مواصفات لجمع ومعالجة نفاياتها. الأساليب الأكثر شيوعاً المستخدمة لحفظ و لتغليف النفايات الطبية في مراكز الرعاية الصحية الأولية بالباحة كانت أكياس 68.8٪ والحاويات البلاستيكية 18.8 ٪ و 12.4 ٪ من هذه المراكز لم تشر إلى أي أسلوب لتغليف وحفظ نفاياتها. الخلاصة: خلصت الدراسة إلى أن، إدارة النفايات الطبية تواجهة عدة مشاكل ومن المحتمل ان تشكل مخاطر جمة على البيئية وقد تؤدي إلى مشاكل صحية وأمراض في منطقة الدراسة

Introduction:

Healthcare services aim to reduce health problems and to prevent potential health risks. However, medical waste is often generated during health-care or diagnostic activities, which are potentially harmful to public health and the environment [1]. Health Care Waste (HCW) is defined as the total waste stream from a health care facility that includes both non-infectious waste materials and infectious waste materials. However, World Health Organization (WHO) estimated that 80% from total healthcare waste is not infectious and only (20%) is infectious or poses risk of harm or hazardous to human beings [2]. In general, infectious wastes include infectious sharps and infectious non-sharp materials (e.g. needles, blades, infusion sets or other items that can cause direct injury, materials that have been in contact with human blood, bandages, swabs, etc). On the other hand, Non-infectious wastes may include materials that have not been in contact with patients such as paper and plastic packaging metal, or other wastes which are similar to household wastes [3].

Most waste generated in healthcare centers consider as general wastes, they are non- infectious and can be treated as regular with municipal waste. But minimum proportion of healthcare wastes which known as "special healthcare waste", need special management. Special healthcare wastes include sharps (e.g. needles, razors, and scalpels), pathological waste, other potentially infectious waste, pharmaceutical waste, biological waste, and hazardous chemical waste [4]. The special healthcare wastes also include all waste generated under certain circumstances, such as in isolation wards and clinical laboratories, have need of special attention for handling [3, 4].

Medical waste mismanagement may expose people inside the healthcare facilities (e.g. staff, employees who handle medical waste, patients and their families), and individuals outside the facility to potential risks.

Moreover, some accidental exposures to these hazardous medical wastes are also probabl [3, 4].

In general, 75% to 90% of wastes produced by healthcare facilities are general or non-risk wastes comparable to domestic wastes. These wastes come mostly from the administrative and housekeeping functions of healthcare daily duties the remaining 10-25% of wastes is

regarded as hazardous, and may pose a variety of health risks [5]. It has been reported that the main reasons for failure of waste management as follow [5]; lack of awareness about the health hazards related to health-care waste, inadequate training in proper waste management, absence of waste management and disposal systems, insufficient financial and human resources and the low priority given to the topic are the most common problems connected with health-care waste. However, many countries either do not have appropriate regulations, or do not enforce them [5].

High-income countries generate on average up to 0.5 kg of hazardous waste per bed per day; while low-income countries generate on average 0.2 kg of hazardous waste per hospital bed per day. However, health-care waste is often not separated into hazardous or non-hazardous wastes in low-income countries making the real quantity of hazardous waste much higher [6].Infectious and anatomic wastes together represent the majority of the hazardous waste, up to 15% of the total waste from health-care activities. Nevertheless, sharps materials represent about 1% of the total waste, yet they are among the main causes of disease transmission. On the other hand, pharmaceuticals and chemicals materials account for about 3% of waste from health-care activities while genotoxic waste, heavy metal content and radioactive matter account for 1% of the total health-care waste [6].

WHO (2011) reported that; injections with contaminated syringes due to unsafe disposing or re-use of disposable syringes and needles for injections is particularly common in African, Asian and Central and Eastern European countries [6]. Additional hazards occur in developing countries, from scavenging at waste disposal sites and the manual sorting of hazardous waste from health-care facilities. The waste handlers are at immediate risk of needle-stick injuries and exposure to their toxic or infectious materials [6]. Many data from developing counties indicates that the range is essentially similar but the figures are lower i.e. 1 to 2 Kg/day/patient (7).

The effective management process of health-care wastes are segregation, packaging and identification [8]. Sorting wastes into color-coded plastic bags or containers is considered the most common and appropriate way of identifying the categories of the healthcare

wastes. However, the recommended color coding of containers are: (a) Yellow-Infectious, highly infectious wastes and sharps; (b) Brown-Chemicals and pharmaceutical wastes; and (c) Black-General healthcare wastes [8].

Inadequate and inappropriate handling of health-care waste may have serious public health consequences and a significant impact on the environment [9]. These wastes may enhance environmental pollution and the spread of infectious diseases, including acquired immunodeficiency syndrome (AIDS), hepatitis, tuberculosis, diphtheria, cholera, and many others. Sound management of health-care waste is thus a crucial component of environmental health protection [10]. Hossain et al (2011) reported some accidental exposure to blood (AEB) or to other body fluids are examples of accidental exposure to hazardous medical waste [1].Poor conduct and inappropriate disposal methods exercised during handling and waste disposal of health care waste/ medical care waste (HCW/MCW) is increasing significant health hazards and environmental pollution due to the infectious nature of the waste [11]. It is, therefore, emphasized that even very limited waste-management measures can substantially reduce the health risks of these wastes [12]. In many countries, knowledge about the potential for harm from health-care wastes has now become more prominent to governments, medical practitioners and civil society [12]. Therefore, the aim of this study was to assess the medical waste practices in primary healthcare centers in Al-Baha city, Saudi Arabia.

Material & Methods:

This observational, cross sectional study was carried out to assess the status of management and handling of healthcare wastes in Baha city. All the primary healthcare centers (N=15 PHC centers) were included in this study. The PHCc were visited between April-May, (2012). The permission for data collection was granted from Department of health affairs at Baha city. The head of each PHC centers were visited to clarify the aim of this study and the importance of participation and to seek their permission to be involved.

Observational checklist, modified from the WHO questionnaire on healthcare waste management, was used to determine waste handling, management and compliance with

WHO and World Bank guidelines on health-care waste management [13]. PHCs staffs were interviewed and check list was filled to determine their level of knowledge, practices and following safety measures. Deceptive analysis using frequency tables, bi-chart and par chart were used. Statistical analysis was done using SPSS program.

Results:

Nearly all of the primary healthcare centers in Baha city were generating some various types of hazardous medical wastes as shown in Table 1. All centers (100%) in Baha were producing contaminated sharp and pharmaceuticals pressurized wastes. About (93.3%) of the centers were generating wastes of live and attenuated vaccines vials. Articles contaminated with blood were found in (80%), and wastes contaminated with excretion generated in (80%) of these centers. Liquid blood elements were generated only in (20%) of the PHC centers.

(Table 1, Table 2) showed the type and average quantity kilogram per day of hazard waste generated in Al-Baha Primary Health Care (PHC) centers. Fourteen (93.3%) of these centers produced huge quantity of expired live and attenuated vaccines and vaccines' vials of which (66.7%) produce between 1 to 3 kg/day in average and one of the PHC center produces more than 3 kg/day. Liquid blood elements were produced by 3 (20.0%) of PHC centers and two of these three produced over 1 kg to 3 kg/day. Articles contaminated with blood were produced in 13 (86.7%) of the centers, of which 7 (46.7%) produce 1 to 3 kg/day. Contaminated sharps produced from all PHC centers, of which 8 (53.6%) of these centers were producing more than 3 kg per day. Chemicals were produced in 12 (80.0%) of the centers, 10 (66.7%) of these centers produce 1 to 3 kg per day. All surveyed PHC centers were producing pharmaceuticals pressurized. Also 14 (93.3%) of these centers were producing waste articles contaminated with excretion; which included cultures and stocks; tissues; dressings, swabs or other items soaked with blood; syringe needles; scalpels; diapers; blood bags. These quantities of different medical waste were generated as a result of diagnosis, treatment, and immunization.

(Table 3) shows some deficiency of man-

agement measures for the basic elements of healthcare waste program; that (6.7%) of PHC centers in Al-Baha city lacked segregations, 2 (13.4%) without waste storage room, 5 (33.5%) of the centers did not practice any type of disinfection. Considering wastes handling, all responsible personnel or workers of waste handling were using personnel protective equipment's, except one center. Employees in 14 (93.3%) centers were involved and had some level of responsibility in the collection of the medical waste. The majority (60.0%) of the PHC centers of Al-Baha were lacked defined collection coding and handling procedures for their hazard waste.

(Table 4) shows the some personal development measures and other management process in the field of medical wastes, which available at PHC centers in Al-Baha City. Most of the concerned people were had had training sections in the field of medical wastes management, only in 3 (18.8%) of these centers had no sort of worker training regarding medical wastes. Only 10 (66.7%) of these centers were having clear job description for medical wastes workers. Indication check list were used to measure the awareness toward medical wastes, which reveal that; in 5 (31.2%) of these centers the medical wastes staff were at poor level of knowledge and they also lack awareness about medical wastes hazards and proper medical waste handling. Guideline manuals for medical wastes handling were available in (86.7%) of the PHC centers. (Table 4) shows that nearly half (46.7%) of the centers lacked medical waste management plan; i.e., there were no clear specification for collection, handling and storage procedures of their wastes.

(Figure 1) shows the types of personal protection equipment (PPE) which used by the Handler of medical wastes at (PHC) centers in Al-Baha. Gloves, Masks, Eye Glass, boots and overall were available in all centers, only one of healthcare centers lacked all these types of personal protection equipment (PPE). Gloves were not used in 2 (13.4%) of the PHC centers. Although, masks were present in (93.3%) of the centers but used only in 5 (43.3%) centers. Eye Glass was available in (66.7%) of the centers and although present but not used in (26.8%) of these centers.

The duration of medical waste storage as highlighted in (Figure 2), about 94% of Al-Baha

PHC centers kept their medical wastes for one week inside their building; this reflects the frequency of waste collection from this centers. Except in (6%) of the studied centers due to long period of storage the medical wastes expected to accumulate and create a suitable condition for microorganisms' growth, resting area and breeding sites of vector borne diseases.

Almost all the PHC centers stored their wastes out of the recommended levels of temperatures (Figure 3). Moreover, about 46.7% of the PHC centers have control the temperature level of medical waste storage within 24°C to 32°C, while more than 20% of the centers stored the waste at less than 8°C to 24°C and the same number of the centers their waste at 32°C to 40 °C or even more.

(Figure 4) shows that the most common methods used for medical waste packaging in Baha primary healthcare centers were bags 68.8% and plastic containers 18.8% and about 12.4% of these centers did not determine their method of waste packaging or types of storage containers.

Tables (1): Type of Medical Waste Available at the primary healthcare (PHC) centers in Al-Baha City Saudi Arabia

Type of the waste	N. of PHC	%
Live and attenuated vaccines vials	14/15	93.3 %
Liquid blood elements	3/15	20.0 %
Articles contaminated with blood	13/15	86.7 %
Contaminated sharp	15/15	100 %
Chemicals	12/15	80.0 %
Pharmaceuticals Pressurized	15/15	100 %
Waste contaminated with excretion	12/15	80.0 %

Table (2): Proportional quantity kilogram per day/visitors of hazard waste generated in Al-Baha Primary Health Care (PHC) centers, Saudi Arabia

Type of the waste	Number of PHC with regard to the average quantity of hazard waste/kg/day/visitors				
	None	Less than 1 kg/day	1 to 3 kg/ day	More than 3 kg/day	Total
Live and attenuated vaccines vials	1(06.7)	3(20.0%)	10 (66.7%)	1 (6.7 %)	15(100)
Liquid blood elements	12 (80.0)	1 (06.7%)	2 (13.4%)	0.0	15(100)
Articles contaminated with blood	2 (13.4)	6(40.0%)	7 (46.7%)	0.0	15(100)
Contaminated sharp	0.0	1 (06.7%)	6 (40.0%)	8 (53.6%)	15(100)
Chemical	3(20.0)	2(13.4%)	10 (66.7%)	0.0	15(100)
Pharmaceuticals Pressurized	0.0	14(93.3.0)	1 (06.7%)	0.0	15(100)
Waste contaminated with excretion	3 (20.0)	1(6.7%)	11(73.3%)	0.0	15(100)

Table (3) Medical waste management parameters practiced in Al-Baha Primary Health Care (PHC) centers, Saudi Arabia

Parameter	Yes	No	Total
Segregations	14 (93.3%)	1 (6.7%)	15(100)
Storage	13 (86.7%)	2 (13.4%)	15(100)
Disinfection	10 (66.7%)	5 (33.5%)	15(100)
Final treatment at PHC	2 (13.4%)	13 (86.7%)	15(100)
Handler use PPE	14 (93.3%)	1 (6.7%)	15(100)
Collection (Involvement) responsibility	14 (93.3%)	1 (6.7%)	15(100)
Defined collection CODING & handling procedures	6 (40.0%)	9 (60.0%)	15(100)

Table (4): Personal development and other management process available at (PHC) centers in Al-Baha City Saudi Arabia

Parameter	Number of PHC		
	Yes Available	Not Available	Total
Training of worker	12 (80.0%)	3 (18.8%)	15(100)
Present of job description	10 (%66.7)	6 (37.5%)	15(100)
MW Staff awareness	11 (73.3.8%)	5 (31.2%)	15(100)
Present guideline manual	13 (86.7%)	3 (20.0%)	15(100)
Present of MWM plan	8 (53.3%)	7 (46.7%)	15(100)

(Table 2), The least produced hazardous wastes was liquid blood elements which was pro

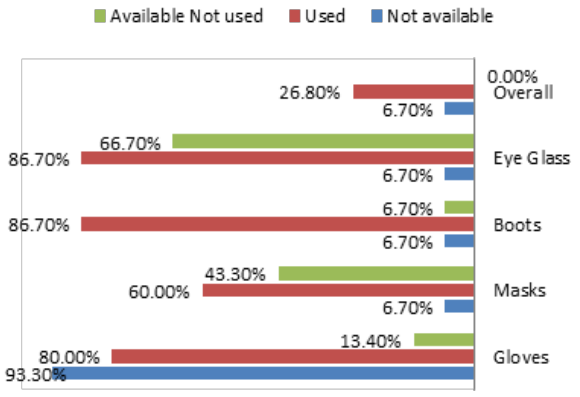


Figure (1): Types of Personal Protection Equipment (PPE) which the Medical Wastes Handler

were using at (PHC) centers in Al-Baha City Saudi Arabia



Figure (2) Duration of medical waste storage per day/s in Al-Baha Primary Health Care (PHC) Centers

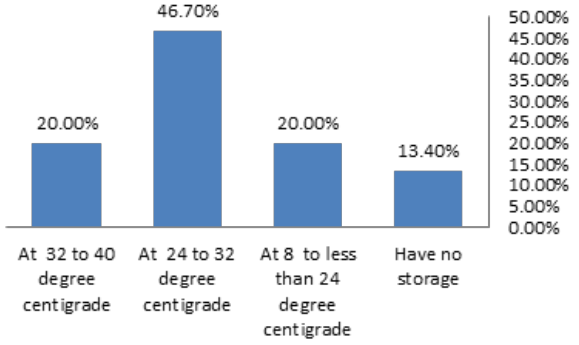


Figure (3) Temperature levels of the storage at which medical wastes were stored in Al-Baha Primary Health Care (PHC) Centers



Figure (4) Methods used for medical waste packaging in Al-Baha Primary Health Care (PHC) Centers

Discussion:

Primary Healthcare Centers in Baha city generate high quantity of various hazardous medical wastes as shown in (Table 1 and Table 2). Compositions of hazardous waste and the rate of production of the various types of these wastes in Al-Baha primary health care (PHC) centers were the same as those estimated in many research reported by; Pruss et al., (1999) [5] and World Health Organization (2014) [3], and also similar to what reported by Lars (2000) [4] and International Committee of the Red Cross (2011) [1].

Most of HCW in the surveyed centers have the potential of transmitting infectious agents to humans (Table 1 and Table 2). Also the rate of daily production exceeding which reported by Al-Zahrani et al, (2000), that; the minimum recorded rate was 0.005 kg/visitor/day, and the maximum was 0.34 kg/ visitor/day. The mean rate of generation was 0.08+ kg/visitor/day. The estimated mean amount of all healthcare risk waste generated in the King dom of Saudi Arabia is 25,207 tons/year [14].

Table 2, revealed that the least produced hazardous wastes were liquid blood elements which were produced by only by three centers with rate of production between less than one kg to 3kg. Chemical waste was the second least hazard waste after liquid blood elements produced by 12 centers with the same rate.

Contaminated sharps were the highest type among the hazardous wastes produced in the surveyed centers, that was produced from all centers and 8 (53.6%) of those centers produced high rate more than 3 kg/day all these results were within World Health Organization (WHO) estimation that that 80% from total healthcare waste is not infectious and only (20%) is infectious or poses risk of harm or hazardous to human being (2).

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(Table 2), also reported that; Fourteen (93.3%) of these centers produced huge quantity of expired live and attenuated vaccines and vac-

cines' vials of which 66.7% produce between 1 to 3 kg/day in average and one of the PHC center produces more than 3 kg/day. Liquid blood elements produced only by 3 (20.0%) of PHC centers two of these three produced over 1 kg to 3 kg/day. These situation regulating the monitoring of these wastes category as Oke (2008) concluded that; hazardous immunization wastes require proper monitoring for an effective tracking at all times [16]. The results of this study also showed that there was lack of some management measures for the basic elements of healthcare waste program as presented in (Table 3). Segregations were practiced in all the PHC centers except one (6.7%) This was similar to what Taghipour, reported in 2009 that; segregation and minimization of waste are not carried out correctly in any of the northwest Iran-Tabriz hospitals [17]. (Table 3), also revealed that; 5 (33.5%) of PHC centers did not practice any type of disinfection. Disinfection as Soares et al (2013) reviewed is an efficiency method to inactivation and control Escherichia coli, Pseudomonas aeruginosa and Staphylococcus aureus bacteria, which are representative of the microorganisms found in HCW [18]. Similar study from Saudi Arabia conducted by Zahrani, *et al*, (2000), reported much care is given by the responsible authorities for the management of that type of waste.

(Table 4), shows some important management process to improve personal aware of medical wastes handler were not available at some of PHC centers in Al-Baha city. Indication of knowledge check list revealed the poor awareness among medical wastes regarding its hazards and handling. These situations will definitely magnitudes the problems of healthcare wastes and increase the exposures of peoples to their hazardous. (Table 4), presented that, 5 (31.2%) of the medical wastes staffs were at poor level of knowledge and neither aware about medical wastes neither hazards nor handling. The lacked of awareness was reported by Alago and Kocasoy (2013), as one of the main reason for the mismanagement of these wastes with other reasons such as the lack of appropriate legislation and effective control; and financial strains [19]. Hossain (2011) also reported that; in most cases, the main reasons of the mismanagement of CSW are the lack of appropriate legislation, lack of specialized clinical staffs, lack of awareness and effec-

tive control [11]. Gupta et al also recommended that, there is also a need to create awareness among all other stakeholders about the importance of biomedical waste management and related regulations [20].

The result in (Table 4) reported that 7 (46.7%) of the health centers lacked any MWM plan, the same result was reported by Moreira and Gunther in Brazil (2013); they reported that; although it was mandatory to implement the Medical Waste Management Plan (MWMP) according to Brazilian law, but evaluation revealed that such implementation not implemented [21]. About 5 (31.2%) of the health care centers staff lacked some knowledge and not fully aware about medical wastes management as reported in (Table 4). Hakim *et al* (2014) in their study reported some lacked of knowledge among physician, nurses and housekeepers towards waste disposal management [22]. (Table 4) also show that; guideline manual was not available in 3(20.0%) plus the lack of MWM plan in about 7(46.7%) of Al-Baha PHC centers. The previous results reveal similar to what Mohamed et al (2009) observed in Kingdom of Bahrain that; despite the magnitude of the problem, practices, capacities and policies in dealing with healthcare waste disposal, was inadequate and requires intensification [23].

(Table 4), three of the healthcare centers the workers did not had any training regards medical wastes management. Gupta et al highlight the needs of training that he reported that, it was found that, although the Polyclinic in general abides by the prescribed regulations for the treatment and disposal of biomedical waste, there is a need to further build the capacity of the Polyclinic and its staff in terms of providing state-of-the-art facilities and ongoing training in order to develop a model biomedical waste management system in the Polyclinic [20].

(Figure 1) shows that although personal protection equipment (PPE) was available in nearly all centers, but unfortunately some of them were not used. As presented in (Table 4), nearly all workers and employees in more than (31.2%) of the centers lacked any awareness of medical waste's hazards and handling precautions. Taghipour, (2009) reported the same results that the use of protective measures by staff and temporary storage areas was not in agreement with standards in 70

and 60% of the hospitals in the present study, respectively [17]. Carmen et al (2005) reported that; biomedical waste segregation has a direct impact on type and cost of biomedical waste treatment [24].

The duration of medical waste storage as shown in (Figure 2), almost was too long in most of the PHC center facilities, which indicates minimum frequency of collection for these wastes. This condition is expected to flourish microorganism growth and encouraging the presence and breeding of rodents and vectors. Levels of temperature control as shown in (Figure 3), were within the dangers zone and suitable for microbial growth**.** These entire situations are regarded as hazardous and may create a variety of health risks**,** may have serious public health consequences and a significant impact on the environment. Add to that the poor management of these wastes increasing the levels of accidents caused by sharps and compromises the healthcare services. These confirm the arguments of Carmen et al (2008) [24]; that the health care waste management (HCWM) is a process that helps to ensure proper hospital hygiene and safety of health care workers and communities. Health care workers have an important opportunity to manage the environmental effects of their practice. Their efforts may seem small, but each step builds a base of sound behavior and thinking that are necessary for the success of the whole as it has been reported [25].

(Figure 4), shows the methods used for medical waste packaging in most of Al-Baha primary healthcare centers were not clearly determined and most are neither suitable and nor properly managed. Some of necessary primary containment vessels for sharps medical waste packaging such as sharps containers (puncture-proof) and metal containers were lacked. The situation of waste storage and packaging might encourage the growth and proliferation of microorganisms which may be present in these wastes, and can increase the risks of the hazardous waste that cause diseases, injuries or contamination to the healthcare center's environment. However, (WHO) published a document entitled: Management of solid health-care waste at primary health-care centers: a decision-making guide. The guide covers the "waste stream" from its generation to its final disposal (e.g. waste minimization, segregation, codification, handling, transpor-

tation, treatment and disposal) [2]. The results of our study implies that hazardous medical wastes from these centers may compromise the quality of patient care, the wastes also can present occupational health risks to workers and employees of these healthcare centers at handle, package, store, transport, treat, and dispose of them. Add to that these hazardous wastes may enhance environmental pollution and increase the spread of infectious diseases among the workers, customers and community around these centers.

Conclusion:

Primary Health Care Centers face a lot of problems with regards to medical waste management such as lacked segregations, some essential method of waste storage and lack of disinfection (e.g. pre-treatment) for their waste. The current situation of medical waste handling in these healthcare centers can cause environmental pollution and expose healthcare workers, patients, waste handlers, waste pickers, and the general public to health risks from infectious waste particularly from sharps wastes. Therefore, effective interventions are needed to solve these problems of medical waste poor management in the primary healthcare centers. The primary health care center staff must be well trained regarding waste hazards and management. Inadequate management of waste generated from Al-Baha PHC centers activities can have a negative impact on the health of community and environment. As it has been concluded a comprehensive guideline on hazardous waste management is needed, other than what is currently in existence. Further research to investigate medical waste management and related factors is required to improve the situation.

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