

Research Article

Assessment of Awareness of Diabetic Patients Regarding Safe Disposal of their Insulin Syringes and Sharps in the UAE

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Received: February 16, 2018; Accepted: April 20, 2018; Published: April 27, 2018

Abstract

The main objective of the present study is to assess the knowledge, attitude and practice of disposal of insulin administration devices and sharps by diabetic patients in United Arab Emirates. A cross-sectional study on diabetic patients was conducted using a questionnaire to assess information on use of devices and methods of disposal of used sharps. A pre-piloted questionnaire written in Arabic and English was distributed to 150 diabetic patients. Most (78, 52%) participants were of age > 46 years, married (100; 66.7%) females (81, 54.0%) and with a university degree (71, 47.3%). Ninety one (60.7%) patients were using insulin syringes or pens and 105 (70%) know how to safely dispose used sharps. However, 83 (55.3%) participants admitted not having a biohazard sharps container at home or never used it before (82, 54.7%). Information about the use of devices was received from pharmacists (103, 68.7%) but only 85 (56.7%) participants were given instructions on safe disposal of sharps. The majority (121, 80.7%) and 128 (85.3%) of respondents showed interest in having a device for disposal of sharps and a system for their collection respectively. Surprisingly, 83 (55.3%) respondents expressed satisfaction with their disposal of sharps by throwing it in general waste. A significant association was observed between age, gender and educational level of the respondents and availability of a biohazard container at home. Age was also associated significantly with the knowledge of how to safely dispose of sharps. There is an urgent need for developing local guidelines and educational programs to increase the awareness of the public especially diabetic patients on how to properly use their devices and safely dispose of sharps.

Keywords: Diabetics; Sharps; Insulin syringes; Pens; Lancets; Knowledge; Disposal

Introduction

Statistics from the International Diabetes Federation (IDF) revealed that, in 2017, 17.3% of the UAE population between the ages of 20 and 79 has type 2 diabetes. There are over 1 million people living with diabetes in the UAE, placing the country 15th worldwide for age-adjusted comparative prevalence [1]. More than 20% of residents suffer from diabetes. Patients with type I diabetes in their routine management of their disorder are using sharps that could cause cuts or puncture wounds. These include needles, hypodermic needles, scalpel, and other blades, knives, infusion sets, saws, broken glass, and nail" [2]. Proper way of disposing sharps is one of the important, but often neglected component of proper injection techniques [3]. Diabetic patients use various kinds of medical devices and instruments like insulin pens, needles, syringes, lancets, etc., at home. Sharps can potentially be contaminated with many different types of microorganisms and the risk from blood borne viruses such as Human Immunodeficiency Viruses (HIV), and hepatitis B and hepatitis C is generally well known [4-7] and increased outbreaks of hepatitis B have been reported in home and assisted living care settings due to improper blood glucose monitoring practices [8].

Throwing sharps in household waste bin is a common practice

among diabetics and the reported proportion vary from slightly less than 50% to as high as more than 90% [9-13] Needle-stick injuries are one of the top three injuries reported by waste management companies [14]. Among the sectors of public who are at risk of exposure to such injuries are sanitation workers and housekeeping staffs at hotels, motels, large entertainment centers, airports, and train stations [14]. Many of users of sharps are unaware of how properly dispose their used needles, lancets and syringes. Some patients simply throw their used needles in the trash or flush them down the toilet. This poses a risk of injury or potential infection from diseases such as hepatitis and HIV to anyone who comes in contact with such a waste [15]. Kids and pets are also at risk of stick-needle injuries therefore patients should be aware that sharps must not be shared, thrown in the garbage or in recycling bins or flushed down the toilet. To reduce the risks of injuries from sharps and transmission of blood -borne pathogens, diabetics in particular and the public in general must be educated on the ideal methods of disposal of used sharps. However, there is no data available on the disposal of syringes, lancets, and other sharps that are used at homes of users in United Arab Emirates (UAE). The present study was undertaken to evaluate the knowledge, attitude and practice among diabetic patients regarding safe disposal of their sharps.

Table 1: Demographic characteristics data of the participants.

Criteria	Frequency N = 150	%
Age		
20-25	23	15.3
26-30	6	4
31-35	11	7.3
36-40	15	10
41-45	17	11.3
46-50	20	13.3
>50	58	38.7
Gender		
Male	69	46
Female	81	54
Educational level		
Illiterate	11	7.3
Elementary school	17	11.3
Secondary school graduate	26	17.3
University degree	71	47.3
Higher degrees(MSC, PhD)	25	16.7
Marital status		
Single	40	26.7
Married	100	66.7
Divorced	10	6.7
Type of Diabetes		
Type 1	78	52
Type 2	72	48

Methods

Study design and settings

A cross-sectional study was used in diabetic patients who agreed to take part in the study in the seven Emirates of the UAE including Sharjah, Dubai, Ajman, Al Fujairah, Ras al-Khaimah, Alain and Abu Dhabi. The study was approved by the ethical committee of the University of Sharjah. Informed consent was also obtained from each participant before conducting this study. Participants' information obtained was kept confidential.

Questionnaire development

A 23 item anonymous questionnaire was designed after reviewing earlier similar studies. The questionnaire was written in both Arabic and English languages and pre-piloted by distributing it to six diabetic patients and their comments and recommendations were considered in the final version. The questionnaire was distributed to 150 diabetics and collected on the site by two of the investigators involved in the study which was carried out during the months of January - March, 2017. The first part of the questionnaire covered demographic characteristics of participants including age, gender, level of education, marital status, diabetes type and current medication. In the second part, "Yes", "No" and "I do not know" answer options were used to gauge responses of the respondents on questions related to their knowledge of how to use sharps, how to dispose

Table 2: Knowledge of diabetics to questions on safely disposal of sharps, having a biohazard container and whether they reuse syringes or lancets.

Question	Frequency N = 150	%
Do you know how to safely dispose your sharps?		
Yes	91	60.7
No	59	39.3
Do you know the danger of throwing sharps in toilet or in the domestic waste?		
Yes	105	70
No	45	30
Do you have a biohazard sharp container at your home to dispose sharps?		
Yes	67	44.7
No	83	55.3
Have you ever reused a syringe or lancet?		
Yes	46	30.6
No	104	69.4

them, having safety disposable containers and the biohazards of the unsafe disposal of sharps in the general waste container. In addition, respondents were asked about their frequency of monitoring their blood glucose level and if they have ever reused sharps. The third part of the questionnaire covered questions or statements related to health care team counseling and providing patients with safety disposable container, how they dispose of used needles/syringes/pens and lancets at home and how often they find themselves without a sharp's container. In addition, respondents were asked to rate their satisfaction with the method they currently use to dispose sharps and their interest to have a device that would help to dispose needles and a method to collect it from home (A copy of the questionnaire is available from the authors on request).

Data analysis

The participants' responses were encoded and the data were analyzed using Statistical Package for the Social Sciences (SPSS, version 20, Chicago, IL, US). Descriptive analysis was used to calculate the proportion of each group of respondents who respond to each statement in the questionnaire. Chi square test was used to identify any significant difference among the responses of the participants regarding certain statements in the questionnaire with a significant level of p value of < 0.05.

Results

A total of 150 surveys were collected with complete information. Table 1 presents the demographic characteristics of the participants. Participants were old of age group of > 46 years (78, 52%), women (81, 54.0%), married (100, 66.7%) and 71 (47.3%) participants were with university degrees. A large number (91, 60.6%) of the respondents were using insulin syringes or pens.

Table 2 shows that 91 (60.7%) respondents know how to safely dispose their used sharps and 105 (70%) of the participants were aware of the hazards of unsafe disposable of sharps by flushing it down the toilet or throwing it in the general waste. However, 83 (55.3%) participants admitted not having a biohazard sharps container at home or never used it before (82, 54.7%). Alarmingly, 46 (30.6%) of diabetics admitted reusing syringes or lancets.

Table 3: Association between demographics and receiving instruction on how to use devices and safely dispose sharps.

Question	Frequency (%) , n= 150			X ²
	Yes	No	I do not know	
Have you received instruction from your health care provider on how to use insulin syringe/pen/pump?				
Age				
20-25	22 (14.7)	1 (0.7)	0 (0)	0.051
26-30	5 (3.3)	0 (0)	1(0.7)	
31-35	9 (6)	1 (0.7)	1 (0.7)	
36-40	10 (6.7)	5 (3.3)	0 (0)	
41-45	10 (6.7)	7 (4.7)	0 (0)	
46-50	14 (9.3)	4 (2.7)	2 (1.3)	
>50	33 (22)	19 (12.7)	6 (4)	
Gender				
Male	25 (16.6)	42 (28)	2 (1.3)	0.039
Female	42 (28)	33 (22)	6 (4)	
Educational level				
Illiterate	11 (7.3)	0 (0)	0 (0)	0.022
Elementary School	10 (6.7)	7 (4.7)	0 (0)	
Secondary School	21 (14)	4 (2.7)	1 (0.7)	
University Degree	50 (33.3)	15 (10)	6 (4)	
Higher Degree (MSc, PhD)	11 (7.3)	11 (7.3)	3 (2)	
Have you been instructed on how to safely dispose your sharps?				
Age				
20-25	19 (12.7)	3 (2)	1 (0.7)	0.002
26-30	2 (1.3)	3 (2)	1 (0.7)	
31-35	9 (6)	2 (1.3)	0 (0)	
36-40	11 (7.3)	4(2.7)	0 (0)	
41-45	9 (6)	8 (5.3)	0 (0)	
46-50	15 (10)	3 (2)	2 (1.3)	
>50	20 (13.3)	31 (20.7)	7 (4.7)	
Educational level				
Illiterate	9 (6)	2 (1.3)	0 (0)	0.003
Elementary school	5 (3.3)	12 (8)	0 (0)	
Secondary school	18 (12)	6 (4)	2 (1.3)	
University degree	33 (22)	31 (20.7)	7 (4.7)	
Higher degree (MSc, PhD)	20 (13.3)	3 (2)	2 (1.3)	

Interestingly 124 (82.7%) participants reported that they were regularly checking their blood sugar level and when they were asked about counseling services provided by health care professionals regarding how to use insulin syringes, pens and pumps, more than two thirds (103, 68.7%) of them reported that they acquired information about the use of their devices from pharmacists. However, only 85 (56.7%) participants reported that they were given instructions on how to safely dispose sharps (Table 3). There was strong statistical association between age, gender and educational level and receiving instructions from pharmacists on how to use diabetes devices and how to dispose sharps (Table 3). However, only age was statistically

Table 4: Influence of age, gender and educational level on how to safely dispose of sharps.

Question	Frequency (%) , n=150			X ²
	Yes	No	I do not know	
Do you know how to safely dispose of used needles, syringes, pens and lancet at home safely.				
Age				
20-25	21 (14)	1 (0.7)	1 (0.7)	< 0.01
26-30	1 (0.7)	2 (1.3)	3 (2)	
31-35	6 (4)	4 (2.7)	1 (0.7)	
36-40	12 (8)	2 (1.3)	1 (0.7)	
41-45	9 (6)	7 (4.7)	1 (0.7)	
46-50	19 (12.6)	1 (0.7)	0 (0)	
>50	23 (15.3)	26 (17.3)	9 (6)	
Gender				
Male	43 (28.6)	18 (12)	8 (5.3)	0.796
Female	48 (32)	25 (16.7)	8 (5.3)	
Educational level				
Illiterate	8 (5.3)	2 (1.3)	1 (0.7)	0.255
Elementary school	6 (4)	8 (5.3)	3 (2)	
Secondary school	19 (12.6)	6 (4)	1 (0.7)	
University degree	41 (27.3)	23 (15.3)	7 (4.7)	
Higher degree (MSc, PhD)	17 (11.3)	4 (2.7)	4 (2.7)	

Table 5: Association between age, gender and educational level and having a biohazard container at home.

Question	Frequency (%) , n=150			X ²
	Yes	No	I do not know	
Do you have biohazard sharp container at your home to dispose sharps?				
Age				
20-25	15 (10)	7 (4.7)	1 (0.7)	0.002
26-30	1 (0.7)	3 (2)	2 (1.3)	
31-35	3 (2)	8 (5.3)	0 (0)	
36-40	11 (7.3)	3 (2)	1 (0.7)	
41-45	10 (6.7)	6 (4)	1 (0.7)	
46-50	10 (6.7)	9 (6)	1 (0.7)	
>50	17 (11.3)	39 (26)	2 (1.3)	
Gender				
Male	25 (16.6)	42 (28)	2 (1.3)	0.039
Female	42 (28)	33 (22)	6 (4)	
Educational level				
Illiterate	6 (4)	5 (3.3)	0 (0)	0.014
Elementary school	3 (2)	13 (8.7)	1 (0.7)	
Secondary school	11 (7.3)	14 (9.3)	1 (0.7)	
University degree	31 (20.7)	38 (25.3)	2 (1.3)	
Higher degree (MSc, PhD)	16 (10.7)	5 (3.3)	4 (2.7)	

associated with knowledge of diabetic patients on how to safely dispose of used syringes, pens and lancets at home (Table 4). On the

other hand, having a biohazard sharps container at home was again associated with age, gender and level of education where about 67 (44.7%) of patients have sharps container at home. More female diabetics and those with high educational levels were owners of sharp containers (Table 5).

The majority (121, 80.7%) of the respondents showed interest in having a device that can help them safely disposing their used syringes, pens and lancets, and 128 (85.3%) participants positively responded to having a system for the collection of such biohazard waste to save the environment and minimize hazards to others. Surprisingly, 83 (55.3%) respondents reported that they were satisfied with their way of disposal of sharps by throwing it in general waste.

Discussion

Improper disposal of devices and sharps used by diabetics is a major concern and source of hazards to the health of the public and sustainability of the environment. Lack of information on how to safely dispose of sharps is a problem that can be corrected by health care professionals providing diabetic patients with adequate information and by developing awareness programs that target the public in general and diabetics in particular. In the present study, participants either have no biohazard sharps container at home or never used one before. Almost 60% of patients know how to dispose of their used sharps and 70% are aware of the hazards of unsafe disposal of sharps. However, despite such knowledge, slightly more than 50% of participants expressed satisfaction with their method of disposal of sharps by throwing in general household waste. This pattern is consistent with that reported for patients in Europe [16-18] and Pakistan [12] but less than that for India where throwing used sharps in household waste is followed by about 84% of patients [13]. Our results indicated a lack of proper counseling with health care professionals with regard to both the proper use of diabetes devices and disposal of used sharps. However, in our study patients receiving information (56.7%) on safe disposal of sharps were more than those (14.2%) reported for India [13]. Both the physician and the pharmacist have important roles to play in this respect. They are the front line of contact with the diabetic patient and their duty necessitates informing their patients on such important issues. Disposal of sharps in household waste exposes family members, children, municipality's waste collectors and pets to sharps stick injuries and possible consequent transmission of blood-borne pathogens [4-7]. Low rate of educational instructions by physicians in India has been suggested to be lack of time, poor knowledge of what instructions to give, and the severe shortage of diabetic educators [19].

Alarming results in the present study arise from the observations that a sizable proportion of diabetics reused syringes and lancets and more than half the participants expressed satisfaction with throwing used sharps in domestic waste or flushing them in toilet. Considering the high prevalence of diabetes in UAE, such findings call for the urgent need to establish a national sharp disposal awareness program targeting the public in general and diabetics in particular. Health care providers should also be trained on how to properly educate diabetics of safe use and disposal of diabetic devices and sharps.

Conclusion

Diabetic patients must be educated on how to safely use their

diabetes devices and how to dispose of used sharps in order to reduce risks of health hazards and to preserve the environment. Physicians and pharmacists being the front line health care providers in contact with diabetics can greatly contribute to efforts directed to improve such practices.

References

1. International Diabetes Federation. IDF DIABETES ATLAS - 8TH EDITION.
2. World Health Organization. "Status of health-care waste management in selected countries of the Western Pacific Region." 2015.
3. Majumdar A, Sahoo J, Roy G, Kamalanathan S. Improper sharp disposal practices among diabetes patients in home care settings: Need for concern? *Indian J Endocr Metab.* 2015; 19: 420-425.
4. Antonelli A, Ferrari SM, Giuglioli D, Di Domenicantonio A, Ruffilli I, Corrado A, et al. Hepatitis C virus infection and type 1 and type 2 diabetes mellitus. *World J Diabetes.* 2014; 5: 586-600.
5. Memon MS, Arain ZI, Naz F, Zaki M, Kumar S, Burney AA. Prevalence of type 2 diabetes mellitus in hepatitis C virus infected population: A Southeast Asian study. *J Diabetes Res.* 2013; 539361.
6. Schillie SF, Xing J, Murphy TV, Hu DJ. Prevalence of hepatitis B virus infection among persons with diagnosed diabetes mellitus in the United States 1999-2010. *J Viral Hepat.* 2012; 19: 674-676.
7. Tien PC, Schneider MF, Cox C, Karim R, Cohen M, Sharma A, et al. Association of HIV infection with incident diabetes mellitus: Impact of using hemoglobin A1C as a criterion for diabetes. *J Acquir Immune Defic Syndr.* 2012; 61: 334-340.
8. Healthcare-Associated Hepatitis B and C Outbreaks Reported to the Centers for Disease Control and Prevention (CDC) in 2008-2013. CDC, Atlanta.
9. Bouhanick B, Hadjadj S, Weekers L. What do the needles, syringes, lancets and reagent strips of diabetic patients become in the absence of a common attitude? About 1070 questionnaires in diabetic clinics. *Diabetes Metab.* 2000; 26: 288-293.
10. Costello J, Parikh A. The sticking point: Diabetic sharps disposal practices in the community. *J Gen Intern Med.* 2013; 28: 868-869.
11. Govender D, Ross A. Sharps disposal practices among diabetic patients using insulin. *S Afr Med J.* 2012; 102: 163-164.
12. Ishtiaq O, Qadri AM, Mehar S, Gondal GM, Iqbal T, Ali S, et al. Disposal of syringes, needles, and lancets used by diabetic patients in Pakistan. *J Infect Public Health.* 2012; 5: 182-188.
13. Singh AP, Chapman RS. Knowledge, Attitude and Practices (KAP) on disposal of sharp waste, used for home management of type-2 diabetes mellitus, in New Delhi, India. *J Health Res.* 2011; 25: 135-140.
14. Gold K. Analysis: The Impact of Needle, Syringe, and Lancet Disposal on the Community. *J Diabetes Sci Technol.* 2011; 5: 848-850.
15. CDC. Healthcare-Associated Hepatitis B and C Outbreaks Reported to the Centers for Disease Control and Prevention (CDC) in 2008-2013, CDC, Atlanta, Ga, USA.
16. Olowokure B, Duggal H, Armitage L. The disposal of used sharps by diabetic patients living at home. *Int J Environ Health Res.* 2003; 13: 117-123.
17. Causse X, D'Alteroche L, Si Ahmed SN, Giraudeau B, Metman EH. Hepatitis C Network of the Centre Region. Disposal of injection material used for the treatment of hepatitis C: comparison with insulin-dependent diabetes and thromboembolism. *Gastroenterol Clin Biol.* 2005; 29: 63-68.
18. Bouhanick B, Hadjadj S, Weekers L. What do the needles, syringes, lancets and reagent strips of diabetic patients become in the absence of a common attitude? About 1070 questionnaires in diabetic clinics. *Diabetes Metab.* 2000; 26: 288-293.
19. Majumdar A, Sahoo J, Roy G, Kamalanathan S. Improper sharp disposal practices among diabetes patients in home care settings: Need for concern? *Indian J Endocr Metab.* 2015; 19: 420-425.