

Knowledge, Attitudes and Practices Regarding Sharps Disposal among Diabetic Patients using Insulin at Steve Biko Academic Hospital

S. Mabunda. School of Health Systems and Public Health, University of Pretoria, South Africa.
sindile.mabunda@gmail.com

P. Rheeder. School of Health Systems and Public Health, University of Pretoria. paul.rheeder@up.ac.za

ABSTRACT

An unknown but substantial number of diabetic patients are reliant on insulin for the control of their chronic condition, diabetes mellitus. It is therefore evident that large quantities of household sharp medical waste are generated daily by diabetic patients in South Africa. Improper disposal of these used sharps is associated with an increased risk of acquiring blood borne infections. Education about appropriate household sharp medical waste disposal as well as risks and consequences of inappropriate household sharp medical waste disposal must form an integral part of diabetic education. Furthermore, facility based return programs which will enable patients to either return their household sharp medical waste to the dispensing health facility or to drop-off their household sharp medical waste to any other nearest health facility must be considered.

1. INTRODUCTION

Diabetes mellitus poses a major public health and socioeconomic challenge globally "(Pruss et al. 1999)". Diabetes mellitus is a chronic disease characterised by hyperglycaemia; the most frequent form is type 2 diabetes, other forms are Type 1 diabetes and gestational diabetes "(Mbanya et al. 2010)". Diabetes mellitus was once thought to be a disease of developed countries"(Pruss et al. 1999)", however it is becoming an increasing problem in developing countries including sub-Saharan Africa; affecting mostly those who live in the urban areas.

The estimates from 2009 by the International Diabetes Federation suggest that the total number of adults with diabetes worldwide will increase by 54%, from 284.6 million in 2010 to 438.4 million by the year 2030. In sub-Saharan Africa the prevalence of diabetes is estimated to increase by 98% from 12.1 million in 2010 to 23.9 million by the year 2030.

According to Motala et al. 2003 about 4 million South Africans suffer from Diabetes Mellitus; furthermore, all patients who have type 1 diabetes and up to 40% of type 2 diabetic patients require insulin therapy. As the prevalence of diabetes is growing worldwide, with the greatest increase occurring in developing countries "(Pruss et al. 1999)", it is highly likely that the number of South Africans living with diabetes is higher than the estimated 4 million. Thus, there is a large quantity of household sharp medical waste generated daily by diabetic patients. Improper disposal of these used sharps is associated with an increased risk of acquiring blood borne infections such as Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV) or Hepatitis C Virus (HCV) "(Mallin et al. 2003)".

Various laws, guidelines and policies have been developed over the years to protect the general public against the adverse health effects of health care waste. These laws, guidelines and policies exist at different levels. At the international level for instance, the WHO has developed a manual on safe management of waste from health care activities "(Pruss et al. 1999)".

In South Africa an important piece of legislation has been developed to address issues related to healthcare waste, the Environment Conservation Act (1989). In addition to this Act, the Gauteng Provincial Department developed more documents to address issues related to healthcare waste and these include: the Provincial Gauteng Health Care Waste Management Policy, the Provincial Gauteng Health Care Waste Management Regulation and the Provincial Gauteng Department of Health Code of Practice for Health Care waste management.

All these pieces of legislation define waste and the various ways for collection, transport, storage and disposal, however, these were specifically developed for the management of medical or healthcare waste. In South Africa, household medical waste management has been neglected as there are no policies, laws or guidelines which have been developed specifically for the management of household medical waste. Because household medical waste is not regulated in South Africa the responsibility currently lies with the individuals who are generating household medical waste to ensure that household medical waste is safely disposed of.

There is limited published data on household sharp medical waste management in South Africa. A study was conducted in Wentworth District Hospital between October and December 2010 in Durban; with the aim to investigate current methods of sharps disposal by a sample of 132 diabetic patients attending Wentworth Hospital (WWH)'s outpatient department "(Govender et al. 2012)".

2. METHODOLOGY

2.1 STUDY SETTING AND STUDY POPULATION

Steve Biko Academic Hospital (SBAH); formerly known as the Pretoria Academic Hospital and before 1994 called H F Verwoerd Hospital is a central hospital in Gauteng province. The hospital renders specialized and highly specialized services to patients that have been referred from their local hospitals and clinics. The study population consisted of all patients who were seeking diabetic care at the SBAH's' diabetic clinic. All patients were considered eligible if they were 18 years of age and older, were willing to give consent and if they were currently on insulin (had been on insulin treatment for 3 months or longer at the time of the study).

2.2 STUDY DESIGN

The study was undertaken as a descriptive cross-sectional survey (between November 2012 and January 2013).

2.3 SAMPLING AND DATA COLLECTION

Convenience sampling was employed and to minimize bias consecutive subjects were approached and recruited to participate in the study. The sample size calculation was based on Cochran's formula

$(N = z^2 pq / d^2)$ and the following assumptions;

N= sample size

z= desired confidence level of 95%, (1.96)

d= error allowance (0.05)

p= proportion of respondents who practice safe household disposal

q= proportion of subjects who do not practice safe household disposal (1-p)

Assuming that the prevalence of unsafe disposal of household sharp medical waste is 90%; and making allowance for non-response rate of 20%, the minimum sample size required was: $N = 138 / 0.8 = 172$

Response rate was 92%, however, only 130 were both eligible for, and consented to participation in the study, and these patients were administered a structured questionnaire. Data on socio-demographic factors; knowledge; attitudes and practices of patients regarding household medical waste disposal; and factors influencing these practices was obtained from respondents.

2.4 DATA ANALYSIS

2.4.1 Knowledge

Ten (10) questions were asked regarding household sharp medical waste disposal and management. Each correct answer was awarded a score of 1 point and 0 point for an incorrect answer. Vice versa scoring was used for negative statements. Therefore possible scores ranged between 0-10. The data was not normally distributed as a result the knowledge score of respondents was converted in terms of score level and the median was used; and respondents were categorized into the following two groups:

- Good level knowledge (scores above median)
- Low level knowledge (scores below median)

2.4.2 Attitude

A 4 point Likert scale that gives the attitude of diabetic patients regarding household sharp medical waste disposal was used. The scale ranged from 1 which is strongly disagreeing to 4 which is strongly agreed; and vice versa scoring was used for negative statements. The scoring criterion used for this section was as follows:

Strongly agree	4 points
Agree	3 points
Strongly disagree	2 points
Disagree	1 point

The data was not normally distributed as a result the attitude score of respondents was converted in terms of score level and the median was used; and respondents were categorized into the following two groups:

- Favourable attitude (scores above median)
- Unfavourable attitude (scores below median)

2.4.3 Practices

This section had mixed set of questions including open ended questions.

2.4.4 Influencing factors

The influencing factors were evaluated by 10 questions with a yes or no response

2.4.5 Associations

Pearson's Chi Square Test was used to determine associations between categorical variables, knowledge and attitude outcomes. However, where individual cells in the contingency tables were less than five (5), Fisher's Exact Test was used.

2.5 ETHICAL CONSIDERATION

The study was conducted after authorisation was granted by the Chief Executive Officer at SBAH; and ethical clearance was granted by the University of Pretoria's ethics committee. Written informed consent was obtained from the potential participants before they could participate in the study.

3. RESULTS

3.1 GENERAL CHARACTERISTICS OF PARTICIPANTS

Majority 74(59%) of the respondents were female. Just over half 67(52%) of the respondents were Black, (42)32% White, (12)9% Coloured and only 9(7%) were Indians. Only (35)28% of the respondents indicated that they had been diagnosed with diabetes mellitus less than eight years prior to the study; and (33)26% indicated that they had been on insulin for less than 4 years. About twenty percent 13(20%) had secondary level of education, 53(41%) attended high school and 30(23%) had attained higher level education. The results further show that 39(30%) respondents were employed; 37(28%) respondents were unemployed; 45(34%) respondents had retired, and 9(7%) were still studying.

3.2 KNOWLEDGE

Table 1. Level of knowledge.

Level of knowledge	Frequency	%
Low level (below median)	48	38
High level (above median)	80	62

3.3 ATTITUDE

Table 2. Level of attitude.

Level of attitude	Frequency	%
Unfavourable (below median)	64	49
Favourable (above median)	66	59

3.4 PRACTICES

Of the 130 respondents, 112(86%) reported that they recap or bend their used needles before disposing of it, while 18(14%) do not. Majority 76(58%) of the respondents throw their needles in the general waste. About twenty five percent of the respondents 32(25%) collect their household waste in special containers, however, 14(44%) of these reported that they throw the containers in the general waste and the rest take their full containers to a health facility.

The remaining 22(17%) of the 130 respondents used other methods of disposing of their household medical waste when at home including burning , flushing down the toilet and respondents indicated that they throw their household medical waste inside pit latrines.

The results further show that of 42(33%) of the respondents when away from home (restaurant, visiting, partying etc.) they throw their used medical waste in the general waste.

4. DISCUSSION

This was a facility based cross sectional study. The study aimed to evaluate the knowledge, attitudes and practices regarding disposal of household sharp medical waste of diabetic patients currently on insulin treatment at Steve Biko Academic hospital

4.1 KNOWLEDGE

The results showed a deficiency in the knowledge towards household sharp waste disposal. The overall percentage of respondents who had high level of knowledge was 62%; while 38% of respondents had low level knowledge towards household sharp medical waste disposal.

The reported low level of knowledge is of concern as studies have shown that patient knowledge is a likely factor influencing medical waste disposal practices "(Govender et al. 2012, Gold et al 2007, Olokuwure 2003, McConville et al. 2002)". This low level of knowledge could indirectly be placing the patients' families, municipal waste handlers, scavengers and the general public at risk of needle stick injuries.

There are no policies, laws or guidelines which have been developed specifically for the management of household medical waste in South Africa; consequently such documentation does not exist in the healthcare facilities.

4.2 ATTITUDE

One of the significant findings of this study was that about half 64 (49%) of the respondents had unfavourable attitude towards household sharp waste disposal. Again, this is of concern because attitude has also been identified as an important determinant of good household sharp medical waste disposal practice. A study conducted in the USA established that a positive attitude significantly correlated with the likelihood of proper syringe disposal, and those who had received previous information were more likely to dispose of syringes properly "(McConville et al. 2002)". These findings of high levels of unfavourable attitude in our study could be attributed to the lack of knowledge of the respondents regarding household sharp waste disposal and the consequences of improper disposal used sharps.

4.3 PRACTICES

Majority of the respondents in this study including those who collect their needles in special containers, dispose of their household medical waste inappropriately. Previously, studies have identified knowledge and attitude as likely factors that influence medical waste disposal practices "(Gold et al 2007, Olokuwure 2003, McConville et al. 2002)"

It is therefore not surprising that majority of respondents in this study dispose of their household sharp medical waste inappropriately given the low levels of knowledge and the high levels of unfavourable attitude found in this study. These poor practices directly pose serious health implications for, the patients' families, housekeepers, municipal waste handlers, scavengers and the general public.

4.4 INFLUENCING FACTORS

A significantly higher proportion 122(94%) of respondents had received diabetes education on and counselling regarding insulin use. Only 39(30%) of the respondents recalled ever receiving education or information regarding household sharp medical waste disposal, this is however significantly higher than in studies conducted elsewhere in South Africa. A study conducted in 2011 at Wentworth district Hospital in Durban showed that 120/132(91%) of their respondents had received diabetic education while 4/132(4%) had received any counselling regarding household medical waste disposal which is much lower than our study found (Govender et al 2012)".

Similar to the Wentworth district hospital study, our study results are a clear indication that emphasis is placed on management of diabetes mellitus and little information and counselling is provided on the disposal of sharp household medical waste.

Of concern is that twelve respondents 12(9%), reported experiencing a needle stick injury from their own household sharp medical waste after they had disposed of it. One would expect that such an incident might influence change in disposal practices however, none of these twelve patients reported any changes in the way they dispose of their household sharp medical waste after the needle stick incidence.

The study further established that cost is an important factor as seventy one percent 92(71%) of the respondents reported that they would like to participate in a program where they could drop off their household sharp medical waste, however, of these 45(49%) indicated that they would participate only if the program was free. It is however not guaranteed that having a program will influence the practices of patients as studies show that countries who have had various household sharp medical waste disposal options and who have been enforcing the law for a number of years are still yet to achieve desired standards for household medical waste management "(Gold et al 2007, Olokuwure 2003, McConville et al. 2002)".

4.5 ASSOCIATION BETWEEN SOCIO-DEMOGRAPHIC CHARACTERS AND KNOWLEDGE AND ATTITUDE

Association between There was no statistical significance noted between most of the socio-demographic characteristics and either knowledge or attitude. There was a statistically significant association between employment status and knowledge; and employment and attitude of respondents' regarding household sharp medical waste($p=0.019$; $p=0.03$). However the association between level of education and knowledge; and level of education and attitude was not statistically significant ($p=0.177$; $p=0.318$). This is surprising as those who are employed are expected to have a higher level of education and possibly be better educated about safe disposal of household sharp medical waste. In addition, the employed could be expected to have a more favourable attitude towards appropriate disposal of used household sharp medical waste.

4.6 LIMITATIONS OF THE STUDY

There were several limitations to this study that should be considered:

This was a facility based study and it was limited to Steve Biko Academic Hospital. Although the response rate achieved was high, the results of this study cannot be generalised to the population where this facility is located or to any population that this facility services.

In addition, it is likely that those who chose to participate in the study are not similar to those who did not participate and could have responded differently with respect to household sharp medical waste disposal.

Recall bias cannot be overruled as the study is self-reported and patients were expected to respond to some events that took place in the past (e.g. date first diagnosed with diabetes and duration of insulin treatment etc.).

The researcher could not observe the waste disposal practices and relied on the response to the questionnaire hence deliberate misreporting may have affected the accuracy of the self-reported data.

4.7 CONCLUSION AND RECOMMENDATIONS

The study showed a marked deficiency in knowledge, unfavourable attitude and poor practices among diabetic patients at SBAH regarding household sharp medical waste disposal. Several studies have identified attitude, patient knowledge and in some cases disposal options as some of the likely factors that influence medical waste disposal practices "(Govenderet al.2012, Gold et al 2007, Olokuwure 2003, McConville et al. 2002)". Hence it is recommended that emphasis be placed not only in insulin storage and administration but on storage and safe disposal of used sharps as well. It is also recommended that household sharp medical waste guidelines be development and implemented. In addition the hospital should consider implementing a well-organized household sharp waste disposal program which will offer various disposal options for diabetic patients. For the program to be effective it is important to involve all relevant stakeholders including the patients, nurses, physicians, pharmacists, local clinics, private pharmacies etc. This program must focus on the following:

- Introduction of sharp containers which patients could use at home to store used medical sharps; these could be patient sourced (provided they are puncture proof) or they could be provided by the health facility.
- Initiate a facility based return program which will enable patients to return their full containers to SBAH or any other health facility nearest to them.
- A follow up survey must be conducted in order to monitor and evaluate the effectiveness of the program.

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