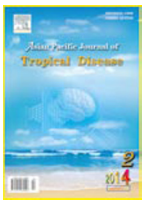
Asian Pac J Trop Dis 2014; 4(Suppl 2): S712-S716

Contents lists available at ScienceDirect

Asian Pacific Journal of Tropical Disease

journal homepage: www.elsevier.com/locate/apjtd



Document heading doi: 10.1016/S2222-1808(14)60712-X

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Repeated reuse of insulin injection syringes and incidence of bacterial contamination among diabetic patients in Jimma University Specialized Hospital, Jimma, Ethiopia

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ARTICLE INFO

Article history:
Received 28 Jul 2014
Received in revised form 14 Aug 2014
Accepted 7 Sep 2014
Available online 19 Sep 2014

Keywords:
Diabetes mellitus
Subcutaneous insulin injection
Syringe reuse
Ethiopia

ABSTRACT

Objective: To determine the level of bacterial contamination of reused insulin syringes among diabetic patients.

Methods: A facility based cross sectional study was conducted among diabetic patients. Data on socio-demographic variables, history of injection syringe reuse, and frequency of reuse of syringes were collected using predesigned questionnaire. Finally, the samples from the syringes were cultured according to standard microbiological techniques.

Results: Eighteen diabetic patients at Jimma University Hospital participated. A total of 83.3% of participants reused a single injection syringe for >30 consecutive injections, while 16.7%, reused for ≤30 injections. Our results showed 22.2% of syringes were contaminated with methicillin resistant *Staphylococcus aureus*.

Conclusions: We conclude reuse of syringes is associated with microbial contamination. The findings that 4/18 syringes being contaminated with bacteria is an alarming situation. A mechanism should be designed for patient's to get injection syringes with affordable price. If reusing is not avoidable, reducing number of injections per a single syringe and avoiding needle touching with hand or other non-sterile material may be an alternative to reduce the risk of contamination.

1. Introduction

Diabetes mellitus (DM) is diverse group of hyperglycemic disorders with different etiologies and clinical pictures. The hyperglycemia observed in DM is caused by either a lack of insulin or insulin insensitivity by the tissue[1].

The health impact of DM is considerable and as assessed overtime, the morbidity and mortality associated with it was related to both short and long term complications[2]. Globally (as of 2000), an estimated 285 million people had diabetes, with type 2 making up about 90% of the cases. Its incidence is increasing rapidly, and by 2030 this number is estimated likely to double[3], while type 1 diabetes, causes an estimated 5%-10% (11-22 million) of all diabetes cases[4,5].

The management concentrates on keeping blood sugar levels as close to normal as possible, without causing hypoglycemia. This can usually be accomplished with diet, exercise, and use of appropriate medications[6]. Type 2 diabetes is treated with metformin, while type 1 diabetes with a combination of regular and neutral protamine hagedorn insulin, or synthetic insulin analogs[7,8].

Insulin is most commonly administered by injection at periodic intervals several times per day, though other options, such as insulin pumps exist. Insulin is usually

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Foundation Project: Supported by Jimma University Student research project.

given as a shot into the skin, a subcutaneous injection[7,8]. Diabetic patients are traditionally taught to discard plastic syringe/needle units after a single use and to employ aseptic technique for administering insulin injections. Moreover, recent advice from insulin needle manufacturers states that insulin needles should only be used on one occasion[9,10]. Use of a new, single-use syringe and needle is thought to provide the highest level of safety to the recipients[9].

However, repeated use of insulin needles by DM patients is not rare, rather it is the common practice in many countries, particularly in resource limited countries. Mainly unreliable and insufficient supplies and cost might lead to the syringe/needles being reused[11]. There are a number of controversial body of evidence on the repeated reuse of the syringe/needles. Some evidences suggest that repeated use of insulin needles increases the risk of infection[11-13]. Once the syringe gets contaminated, reusing it opens the way for microorganisms to cause infection at the repeated injection site. Others argued that most patients using disposable syringes, reuse them until the needle is blunt, could be a practice which is safe and economical[14,15].

However, there is currently inadequate data regarding the frequency and type of micro-flora contamination seen on syringes/needles after repeated use. This is especially true in our study area (Jimma) in particular and our country (Ethiopia) in general, where DM is one of the major causes of hospitalization in different health institutions[16].

By the time this study was conducted, diabetic patients at Jimma University Specialized Hospital (JUSH) were received only two injection syringes from the diabetic clinic until they returned for the next follow up mostly for a month. Patients think how effectively they should use the two syringes until they receive the other two during their next visit to the diabetic clinic. Some patients only discard the syringe only if the needle shows visible bends, and makes injection painful. There was and still is an awareness by health care professionals that patients reuse disposable syringes. Despite syringe labels that advise single-use only, this perception appears to have resulted in health care professionals developing occasional "unofficial" guidelines ranging from "use each syringe for no more than one or two days" to "use a syringe until it is no longer comfortable"[17].

Thus, the purpose of this study is to determine the level of bacterial contamination of reused syringes by DM patients on regular follow-up at diabetic clinic of JUSH.

2. Materials and methods

2.1. Study area and period

The study was conducted in JUSH, diabetes clinic, one of the chronic diseases clinics of the hospital, rendering service twice weekly on Monday and Tuesday. JUSH is a teaching and referral hospital found in Jimma town, and located at south west of Ethiopia, about 352 km from Addis Ababa, the capital of Ethiopia. The town has a characteristic of tropical highland climate condition, heavy rain fall, warm temperature, and long wet period[18]. The hospital serves a total of five million populations in southwest Ethiopia.

2.2. Study design and subjects

A facility based cross sectional study was conducted from February-June, 2008 among diabetic patients. A total of 18 diabetic patients who have been active in follow-up for their diabetes for more than one year at JUSH diabetic clinic, willing to participate in this study, and who uses insulin injection medication were included in this study. Data on socio-demographic variables (like age, sex, occupation, marital status), history of injection syringe reuse, and frequency of reuse of insulin injection syringes were collected using predesigned questionnaire by trained nurse. Printed forms were supplied to the nurse to record the following retrospective data's: duration of previous insulin therapy, number of injections, location of the injection sites, frequency of needle reuse and complications associated with the injection procedure and injection sites. Generally, three approaches were used to collect the required data: (i) interview/questionnaire, (ii) examination of injection sites, and (iii) culturing of samples from insulin syringes (Table 1).

Table 1
Distribution of demographic characteristics and methicillin resistant *Staphylococcus aureus* (MRSA) study participants.

Variables		Number (*n*)	Frequency (%)	MRSA		
				Positive	Negative	Percentage (%)
Gender	Female	7	38.9	2	5	28.6
	Male	11	61.1	2	9	18.2
Age group (years)	15-30	4	22.2	0	4	0.0
	31-45	6	33.3	3	3	50.0
	46-65	8	44.4	1	1	12.5
Occupation	Farmer	8	44.4	2	6	25.0
	Housewife	7	38.9	2	5	28.6
	Merchant	1	5.6	0	1	0.0
	Student	2	11.1	0	2	0.0
Marital status	Married	15	83.4	4	11	26.7
	Single	2	11.1	0	2	0.0
	Divorced	1	5.6	0	1	0.0
Frequency of reusing a single syringe	<30 times	3	16.7	0	3	0.0
	>30 times	15	83.3	4	11	26.7
Habit of recapping the needle	Yes	18	100.0	4	14	22.2
	No	0	0.0	0	0	0.0
Awareness on the risk of reusing injection syringe	Yes	5	27.8	1	4	20.0
	No	13	72.2	3	10	23.1
Skin lesion on injection site	Yes	4	22.2	3	1	75.0
	No	14	77.8	1	13	0.8
Total		18	100.0	4	14	22.2

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