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## Evaluation of Laundry process applied to bed linen in selected hospitals of Karachi

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### ABSTRACT

Hospital laundry is associated with infection control. Adequate linen supply and general health and safety of patients are interrelated. The purpose of this study was to find out the appropriateness of laundry processes applied to bed linen, specifically bed sheets in selected hospitals of Karachi. The sample consisted of 12 hospitals of Karachi. The information was gathered using a questionnaire assisted interview of relevant managers and the evaluations are based on comparison of the respondent's reports with the recommendations of the laundry standards of International Standard Organization (ISO). The findings revealed that most of the hospitals do not follow ISO's laundry standards but apply their self-made standards. When these standards were compared with ISO's laundry standards they were found to be insufficient for example regarding the washing temperature and the use of disinfectants. The reasons to use the own standards instead of those of ISO's were the lack of space, the lack of funds and the lack of the awareness of ISO's standards. It is recommended that government should take measures to make the application of ISO's laundry standards compulsory for bed sheets in the hospitals of Karachi

*KEY WORDS: Infection control, bed linen, standards.*

### INTRODUCTION

The bed linen used in the hospitals requires great care because it affects patients' well-being (Larsson, 1991) and also because of its special nature of utility, in order to provide health and safety to patients and to control the probability of exposing the patients and other people to infection.

Generally laundering means cleaning and ironing but hospital laundry also has to fulfill the purpose of infection control. Textiles sent to hospital laundries contain many types of pathogenic organisms and it is important that laundering not only has an appropriate cleaning effect but also has a satisfactory disinfecting effect. (Fijan, Soaster & Cencic, 2005).

Threats from unhygienic bed linen have been observed. It has been noticed that in some cases after laundry process *Bacillus Cereus* was still found on the hospital's linen. (Barrie, Hoffman, Wilson & Kramer, 1994). Hence, the importance of infection control measures at all stages of the laundering processes from bagging, transporting and sorting to washing, disinfecting, handling and storage are highlighted. (Cullen, 1996)

For this purpose ISO (International Standards Organization) launched laundry standards to

protect the patients and related people from the harmful effects of infected bed sheets. The standard gives means to produce linen free from pathogenic organisms and free from soil and stains and thus to provide high quality care to patients (AKU 2005).

The objectives for this study was to find out the appropriateness of laundry processes applied to bed linen in the selected hospitals of Karachi

### METHODOLOGY

According to the Wikipedia encyclopedia (2008) there are a total of 113 hospitals in Karachi but according to the NED university of Engineering and Technology (2005) only 64 hospitals have been registered by the Government of Pakistan (Pakistan medical center) in Karachi. Among these 64 registered hospitals 4 Federal Government ones, 6 dental surgeries, and 5 Eye hospitals were excluded from the population and so the total population considered for this study was 49 hospitals of Karachi. Therefore the sample size was drawn from a total of 49 hospitals and one fourth of them were included in the sample. The selection of 12 hospitals took place on the basis of the positive response and co-operation of the

management.

The data was collected using a questionnaire. Questions regarding the laundry process were formulated according to the Aga Khan University Manual of ISO standards of laundry process (2005). The questionnaire was filled by the laundry managers or laundry coordinators of the selected hospitals. The questionnaire was based upon the variables which included details of ISO laundry standards, in-built standards for laundry, reasons for not to apply ISO laundry standards, the various processes involved, and to which extent they are applied on bed linen. The data was first entered on Epi data and then it was imported on SPSS for analysis.

## RESULTS

### *Application of ISO Standards*

As given in the figure 1, nine hospitals (75.0%) were following their own laundry standard and only three (25.0%) were following ISO's recommended laundry standards and they are ISO certified. Seven hospitals (58%) performed laundry services inside the hospitals while five (41%) had contracted out their laundry. Reasons given by respondents for non application of ISO's laundry standards were lack of space (22%), lack of funds (44%) and lack of awareness (33%).

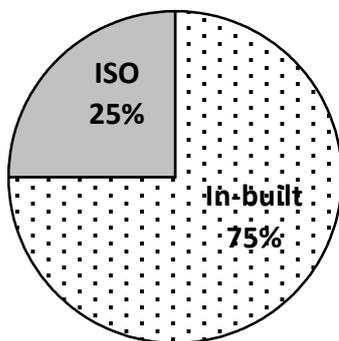


Figure .1 Types of Laundry Standards followed  
*Laundry process in hospitals using their own standards*

Frequency of using selected appropriate or inappropriate practices was assessed among those hospitals that used their own standard (table 2). All the hospitals sorted medium and heavily soiled bed sheets separately and majority of them (55%) were following correct procedure

of taking heavy soiled sheets in plastic hampers to laundry room. Three hospitals used to take it in an open trolley which is not recommended. None of them weigh dirty bed sheet in order to meet the laundry weight range of the washer.

Majority (88%) soak line before washing and all of them soak the linen in hot water for 2 minutes. Though the type of washing machine differs from hospital to hospital most commonly simple washers (77%) are used for washing. All hospitals add detergents in hot water and majority of them (88%) washed bed sheets for 15 minutes or more. However, in most of the hospitals the temperature of washing was lower than that ISO recommends (i.e.75-80°C) (AKU 2005).

Two third of these hospitals (66%) bleach the fabric after washing and most of them use chlorine bleach. Quantity of bleach used was less than 5 grams by 44% of hospitals whereas ISO recommends using 6.25 grams of Chlorine bleach per single bed sheet (AKU 2005).

More than three fourth of these hospitals (77%) did not use any bacteria killer, while according to ISO using bacteria killer after washing is necessary for bed sheets

According to ISO, ironing and folding of bed sheet should be done through machines (AKU 2005). This practice was being followed by only 44% of these hospitals.

## DISCUSSION

According to the results of the surveyed hospitals it is apparent there is need for monitoring and control of laundry procedures being followed by hospitals in Karachi. Observations that many hospitals took heavy soiled linen in an open trolley to the laundry room, used low washing temperature and did not use bacteria killers indicates high level of threats of infection form hospital stays.

Hospitals may know that ISO standards are helpful in infection control, but they would need motivation to assure application of those standards. Government can play a very effective role in this regard by better monitoring and control of laundry processes in hospitals.

**Table 2 Laundry Procedure being followed by Non ISO-Certified hospitals**

Procedure	n	%
Sorting of medium and heavily soiled linen separately*	9	100
Transfer of heavily soiled bed sheet to laundry room in:		
• paper hampers	1	11
• plastic hampers*	5	55
• open trolley	3	33
Weighing of bed sheets <sup>x</sup>	0	0
Soaking technique:		
• in hot water for 2 minutes*	8	88
• in cold water for 2 minutes <sup>x</sup>	1	11
Time of washing		
• 15 minutes	1	11
• 12 minutes*	8	88
Temperature of washing		
• 50-60 OC <sup>x</sup>	2	22
• 60-75 OC <sup>x</sup>	5	55
• 75-80 OC*	2	22
Bleaching*	6	66
• using chlorine bleach*	5	55
• using other bleach <sup>x</sup>	1	11
Amount of chlorine bleach used per bed sheet		
• less than 5 grams <sup>x</sup>	4	44
• 6.25 grams*	1	11
• 7.50 grams <sup>x</sup>	1	11
Use of Disinfectant		
• Yes*	2	22
• No <sup>x</sup>	7	77
Inspection procedure		
• applying*	8	88
• not applying <sup>x</sup>	2	22
Ironing		
• by hand <sup>x</sup>	5	55
• by machine*	4	44
Folding of bed sheets		
• by hand <sup>x</sup>	9	100
• by machine*	2	22

\*=appropriate methods, X=Inappropriate methods

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