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An Assessment of Health Care Supportive Services; Linen and Laundry Management in a Tertiary Care Hospital, Sri Lanka

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Abstract— *Contaminated textiles and fabrics often contain high numbers of microorganisms from body substances, including blood, skin etc. and proper management of linen and laundry is a recognized support service that is vital to ensure prevention of nosocomial infections. The objective of this exercise was to assess the linen and laundry management of a tertiary care hospital and identify existing gaps. Four units of the hospital with frequent complaints were chosen for the assessment which was carried out using the Donabedian model of structure, process and outcome. Both quantitative and qualitative techniques were used to assess gaps in the hospital linen and laundry management. Qualitative techniques included key informant interviews and quantitative methods included a satisfaction survey among nursing officers and minor staff using interviewer administered questionnaires and desk reviews and observations using check lists. Results of assessment showed many gaps in structure, process and outcome. Gaps in structure included inadequate segregation and initial washing facilities as less than 65% of necessary facilities were available. Process showed many deficiencies in the segregation process, washing process, documentation practices, performance of outsourced laundry owners and supervision. Assessment of the outcomes revealed that majority of Nursing Officers (59%) and Health Assistants (57%) perceived dissatisfaction with quality of linen and facilities available. Majority of the nursing officers (61.7%) responded that they received complaints regarding linen from patients.*

Keywords— *Linen, Laundry, Management, Tertiary Care Hospital.*

I. INTRODUCTION

Linen and laundry is a recognized support service that prevents hospital infection and widen the image of the hospital in the eyes of the public by facilitating the patient care process. Contaminated textiles and fabrics often contain high numbers of microorganisms from body substances, including blood, skin etc. When textiles are heavily contaminated with potentially infective body substances, they can contain bacterial loads of 106 –108 CFU/100 cm2 of fabric (Singhe D et al., 2009). The responsibility lies on the Health Care Managers to ensure that relevant legislation and procedures are in place to keep the patients and staff free from the risk of infection from used and infected linen and ensure that staff and laundry contractors responsible for handling or laundering linen are appropriately trained and have documented policies on the collection, transport and storage of waste and linen. (South Australian Government,2017). Operational aspects such as collection, washing etc. need standard guidelines to follow for processing and efficient and effective monitoring and evaluation of the process. (Department of Health,U.K,2016)

Maintaining proper records such as linen stock register, daily transaction register etc. is necessary in order to track any missing items and bring into immediate notice of the relevant authority (Krishna.V, 2014).

A prospective study has been conducted by Singhe and others on quality control practices in the hospital linen and laundry service based on the concept of Donabedian model of structure, process and outcome. The results suggested that though deficiencies in structure and process exist the services provided were satisfactory to the users and further improvements in process and structure was necessary. (Singhe et al., 2009).

The UK policy on linen and laundry management delegates the overall responsibility for implementation, monitoring and review of the policy to the Director of Infection Prevention and Control with the responsibility for implementation vested upon the Ward Sisters/Charge Nurses, Community staff (NHS,2017).

A study conducted in a tertiary care hospital (TCH) on quality management of linen and laundry service found that 90% of staff were satisfied with the linen and laundry services even though found that linen items used by the patients were culture positive (Goudar M, et al., 2016). Furthermore, a study conducted on the importance of structure on the process and outcome of systems revealed that structure is strongly related to the other two aspects. (Kunkel S et al., 2007).

The linen and laundry management of the TCH with an average bed occupancy rate (BOR) of 58.6 is carried out by each unit and the laundry is outsourced to two laundries. The tender procedure is carried out by the line ministry which accounts for approximately Rs.24 Million annually at Rs. 35 per laundry piece.

Current practices of linen and laundry management was based on the instructions of the laundry account and conditions of the tender document for outsourced laundry services and there were no institutional or health system-related guidelines or formal procedures to support the management. There have been many complaints with regards

to the management of linen and laundry at the TCH and frequent conflicts between the management and clinical staff creating tensed situations.

Therefore this assessment is carried out to identify gaps in the current structure, process and outcome of linen and laundry management in selected units of a TCH in Sri Lanka.

II. METHODOLOGY

The assessment was based on the Donabedian model of structure, process and outcome. Structural components included human resources, available infrastructure facilities, availability of linen and availability of necessary documents. Process included the linen and laundry management process carried out in each unit summarised into a whole process. Outcome included satisfaction of staff handling linen and laundry procedures including Nursing Officers (NO) and Health Assitants (HA) and complaints received regarding linen and laundry management.

The study setting included a Medical ward, a labour room with prenatal ward, operating theater and the Central Sterile Services Department (CSSD) of the TCH. Data collection instruments were developed by the Principal investigator (PI) with expert opinion. Data collection was carried out by both quantitative and qualitative research methods.

The structure and process of linen and laundry services management were assessed using an observation sheet. Interviewer Administered Questionnaires (IAQ) that were pretested were used to assess the satisfaction on linen and laundry management of NO and Health Assistants HA of the selected units. The above questionnaires were prepared in English and translated to Sinhala with back translations to ensure consistency.

A five-point Likert scale considering scores > 3 as Satisfied(S) and $\leq$3 as Dissatisfied (D) was used to dichotomize responses for the elements, Quality of linen, Documentation, Role played by subordinates, Supervision received and Facilities provided. Key informant interviews (KII) were held with the following stakeholders using a structured interviewer guide. The participants included were the Administrative Officer, Sisters in Charge of each unit, Nursing Officer in Charge of CSSD and outsourced laundry owners.

Secondary data relevant to laundry management in records of laundry accounts of the relevant units and laundry complaint file and personal records kept by ward sisters were reviewed.

Analysis of qualitative data was carried out using the thematic analysis method. Quantitative data was analyzed using Excel.

Ethical approval was granted from the Research Ethics Committee, Post Graduate Institute of Medicine, University of Colombo.

III. RESULTS

The linen and laundry services management of the four selected units of the TCH was assessed based on the Donabedian model of structure, process and outcome.

TABLE 1. Summary of the assessment of structural components

Structural components	Medical ward (%)	Operation Theater (OT) (%)	Labour room (%)	CSSD (%)	Average in all units (%)
Human resources	100%	100%	100%	55%	89%
Facilities for segregation	50%	30%	80%	50%	52%
Facilities for washing	78%	56%	89%	33%	64%
Linen availability	22%	50%	100%	100%	68%
Documentation	100%	100%	100%	100%	100%

The average availability of facilities for segregation were only 52% and facilities available for washing were 64% (Table 1). The overall availability of linen was around 68% and the medical ward had the least supply (22%).Therefore, these areas were identified for improvement for designing interventions. All units had the documents recommended to maintain management of linen and laundry.

Issues identified in the process:

1. Poor segregation practices as infected linen were not properly placed in bins.
2. Washing in tanks by dipping into 0.1% Sodium hypochlorite directly and soaking for more than 12 hours which causes damage.
3. Laundry was handed over by noting on a personal book but not updating the laundry account and a copy not given to the "Dhobi" (person collecting soiled linen for the outsourced laundry).
4. The collection and delivery of laundry by the "Dhobi" was irregular and delayed.
5. The outsourced laundry used strong chemicals and high concentrations of Oxalic acid, sodium hypochlorite for washing.
6. When washed laundry was received, missing linen was not noted in the laundry account.
7. Laundry account been filled once a month for payments but not filled daily with counter copies.
8. The CSSD practiced inadequate separation between sterile and non-sterile areas and areas not clearly demarcated.
9. Linen audits not been undertaken in the institution
10. Supervision of outsourced laundry had not been conducted regularly by an official from the institution.
11. A guideline for laundry management was not available and no formal comprehensive training on laundry management was given to the staff members especially supervisors.

Majority of NOs perceived dissatisfaction with quality of linen, documentation, facilities provided but were satisfied with the role played by the subordinates. Majority of HAs perceived dissatisfaction with quality of linen and facilities provided but were satisfied with the supervision received (Table 2).

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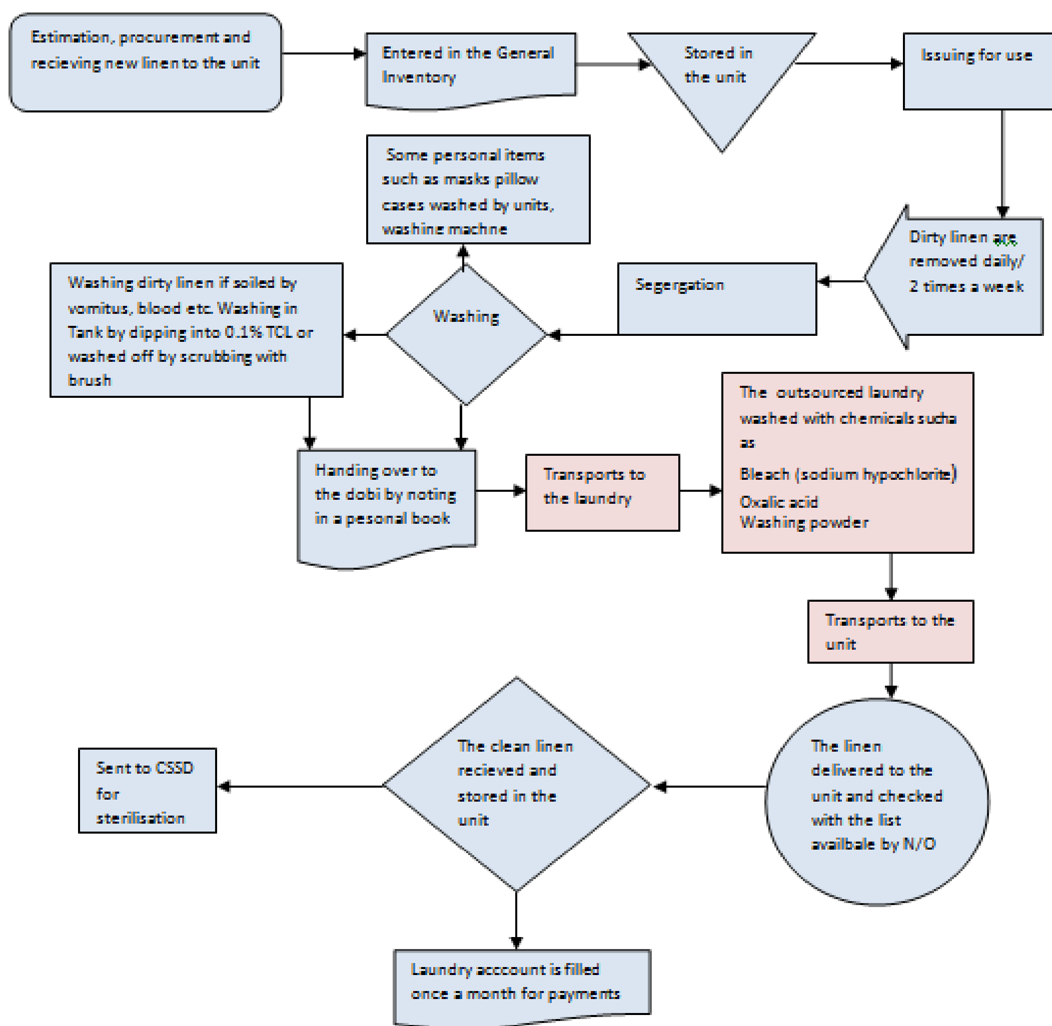

	Process in the hospital
	Process in the outsourced laundry

Figure 1. The summarized process map of linen and laundry management.

TABLE 2. Distribution of perceived satisfaction with linen and laundry management in the pre-intervention phase

Element of Satisfaction	Nursing officers		Health Assistants	
	Number (n)	%	Number(n)	%
Quality of linen				
Dissatisfied	56	65.9	37	67.3
Satisfied	29	34.1	18	32.7
Total	85	100.0	55	100.0
Documentation				
Dissatisfied	62	72.9	32	58.2
Satisfied	23	27.1	23	41.8
Total	85	100.0	55	100.0
Supervision received				
Dissatisfied	53	62.4	19	34.5
Satisfied	32	37.6	36	65.5
Total	85	100.0	55	100.0
Facilities available				
Dissatisfied	54	63.5	54	98.2
Satisfied	31	36.5	1	1.8
Total	85	100.0	55	100.0
Subordinates role				
Dissatisfied	9	10.6		
Satisfied	76	89.4		
Total	85	100.0		

TABLE 3. Distribution of responses on complaints made about linen and laundry to staff

Elements relevant to Complaints	NOs	HAs
Complaints received from patients	61.7%	33.4%
Bad odor	0%	36.3%
Torn	38.9%%	27.1%
Stains	38.7%	27.2%
Others	9%	8.1%

According to the above table 61.7% of the NOs responded that they received complaints from patients on linen but only 33.4% of HAs acknowledged receiving complaints on linen. Majority of NOs received complaints regarding damaged and stained linen and health assistants received more about bad odor.

Complaints regarding linen and laundry were further assessed by perusing records in the complaint book, laundry accounts and personal records of sisters in charge as shown below.

TABLE 4. Issues identified regarding laundry management in the pre-intervention phase

Indicator	Value
Percentage of missing linen	8.36%
Percentage of damaged linen	12.2%
The average number of complaints received per month	12

Table 4 shows that the missing linen is around 8% and the percentage of damaged linen is 12%. Average number of complaints received per month is 12.

IV. DISCUSSION

This study was conducted to improve the linen and laundry management of selected units which was the operation theater, CSSD, labor room and a selected medical ward at a TCH in Sri Lanka. Aim was to identify gaps in the structure process and outcome in order to plan improvements to overcome the many complaints and disputes that arose to the hospital management.

Gaps were assessed based on the Donabedian model of structure, process and outcome similar to a study conducted by Singhe and others on quality control practices in the hospital linen and laundry service. (Singhe D et al., 2009).

Structure

Structure was assessed by using an observation sheet and the results showed that human resources were satisfactorily available in all units except the CSSD. Facilities for segregation and washing showed deficiencies as overall facilities quantified had only less than 65% required for both. Overall availability was 52% for segregation and 64% for washing. There were deficiencies in availability of linen in OT (50%) and Ward (22%). All documentation formats were available in each unit (Table 1).

Process

The processes were assessed by carrying out process mapping following observations and discussions in each unit. A summarized map was made (Figure 1). Main weaknesses of the practices within the units were identified which were segregation practices, incorrect washing practices, improper handing over and taking over, poor documentation, poor monitoring and supervision, and poor performance of outsourced laundry. There was no guideline or written instructions to follow for linen and laundry management. CSSD had poor separation between the sterile and nonsterile areas and were not clearly demarcated. Decontamination of soil linen is initially conducted in each unit before handing over to the laundry. Even though the outsourced laundry was blamed for the poor quality of washed laundry, by process mapping and discussions it was understood that the washing process in the hospital too contributed partly to it.

Outcome

Outcome component included assessment of satisfaction of NOs and the HAs of each unit who mainly handled the linen and laundry. Satisfaction results showed that NOs were dissatisfied with the quality of linen, documentation that was carried out, and facilities provided but were satisfied with the role played by the subordinates. HAs were dissatisfied with the quality of linen and facilities provided but were satisfied with the supervision received (Table 2).

Results further showed that majority of NOs responded that they received complaints on linen (62%) than the HAs (33%) and majority of complaints were pertaining to poor quality (Table 3). Substantial amounts of linen were missing (8.36%) and damaged (12.2%) which was a concern noted especially in shortage of stocks (Table 4).

V. CONCLUSION AND RECOMMENDATIONS

Many Gaps were identified in structure, process and outcome of linen and laundry management in the selected TCH. The structural gaps were mainly in facilities for segregation and washing. Process gaps were in documentation, poor performance of the outsourced laundry, inadequate supervision and lack of a guideline. Outcome gaps were poor satisfaction among the staff handling linen and laundry and receiving many complaints from the patients and staff on linen and laundry. Therefore it is evident that a guideline and written institutionalised policy need to be available in order to facilitate the process of linen and laundry management. Furthermore, it is important to improve infrastructure and availability of linen as well as provide training for those directly involved in handling these services in order to ensure a safe health care setting.

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