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Original Research Article

Impact of monitoring and training on biomedical waste segregation practice in hospitals

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ABSTRACT

Background: It is evident that only 10-20% of the entire hospital waste is hazardous. If waste segregation is done properly at point of generation and immediately, it helps to reduce the waste quantity by around 2-5%. Regular monitoring and training of the staff is of paramount importance in proper segregation of waste. The aim was to find out impact of monitoring and training in waste segregation practice of the hospital.
Methods: The study was done in a 750 bedded teaching hospital at eastern India during 2018. 23 different areas were identified. Each area had equipped with total five (5) bins including one bin for general waste and a total 23×5=115 bins to be monitored daily for segregation deficiency. A structured training programme for all staff were made. A register used to record daily segregation deficiency. Monthly data were used for training need assessment and bio-medical waste segregation deficiency (BMWSD) index was calculated. Simple statistical test in Microsoft excel and t test used.
Results: In the zero month 16 areas found with total 38 deficiencies and the mean BMWSD index was 1.10%. On the third month, only three deficiencies found in three areas with the mean BMWSD index 0.09%. On the sixth month the deficiencies were further reduced to only one area with one deficiency with a BMWSD index of 0.03%.
Conclusions: Regular monitoring along with proper training of the staff improved the biomedical waste segregation practice in the hospital highly significantly over time ($p<0.0001$).

Keywords: Monitoring, Segregation, Waste segregation, Segregation monitoring, Training impact, Training need

INTRODUCTION

Bio-medical waste (BMW) management in India was revamped like anything after the revision of biomedical rule in 2016 and subsequently in 2018 recently. The importance of the proper handling of BMW had been considered by most of the hospital management. The most critical step in the BMW management is the segregation, in specific, segregation at the point of generation.[1,2] If segregation is done properly at source point, half of the work will be done. It also helps to reduce the waste quantity by around 2-5% if segregated immediately.[2-4] WHO has given the fact that only 10-20% hospital waste is hazardous.[4] Proper segregation needs proper training of the staff and a robust monitoring system. The current study was the extension work of the Mondal et al at a teaching hospital at Eastern India, using the same principle to assess how matrix method of monitoring is used for training need assessment and monitoring the segregation for improvement in waste segregation.[2]

The objective of this study was to find out the impact of training and monitoring in BMW segregation practice in a teaching hospital in Eastern India.

METHODS

The cross-sectional descriptive study was done in a more than 750 bedded teaching hospital at eastern India (IQ City Medical College and Hospital) in the year 2018, from March 2018 to September 2018. The study was not involving any human nor any intervention on human subject, ethical approval not required. As described in Mondal et al 23 different areas/departments were identified in the hospital and each 23 areas had equipped with total five (5) bins as per BMW management rules 2016 and including one bin for general waste.[2] There was total 23×5=115 bins to be monitored daily for segregation deficiency if any. Along with this a structured training programme for all staff were started. The programme was of 30 minutes duration and conducted twice daily before starting the shifts from the month of March 2018. Each training session every trainee was assessed using pre and post training assessment. At the same time a register was made to record segregation deficiency at any of those 115 areas daily by Infection control nurse except Sunday and holidays. Monthly report was made for every area and from the matrix of segregation deficiency and pre-post training assessment next month training schedule were made keeping more training for the weaker areas staff. Data were collected for every month and analysed using zero (0), three (3) and six (6) months intervals with simple statistics like t test to test hypothesis using Microsoft excel.

RESULTS

Monthly data for monitoring segregation at the point of generation that was, at all the 115 bins of different areas were collected. The average daily BMW segregation deficiency (BMWSD) index was calculated and all areas were arranged in descending order for the month zero (0), three (3) and six (6) for top deficiency areas (Table 1).[1,2]

Based on number of areas, it was found that on zeroth month there were 16 areas where some deficiency was detected during daily round. Which h is coming down to 10 areas in the next month and in 3rd month it was reduced to only three areas and in sixth month it came down to only one area. Overall, including all 23 different areas, the average daily BMWSD index from starting of the training program shows decreasing trends (Figure 1).

As per the methodology, only three-month data in zero, three- and six-month interval were considered for statistical analysis. The BMWSD index mean and standard value for the zero, three and six months found as below (Table 2).

Table 1: Ranking of the areas based on BMWSD index.

Deficiency ranking	Zero month (March 2018)		Third month (June 2018)		Sixth month (September-2018)	
	Areas	BMWSD index	Areas	BMWSD index	Areas	BMWSD index
1st	FSW	7.33	MSW	0.67	MSW2	0.67
2nd	1st Obs Gy	2.67	FMW	0.67		0.0
3rd	MOW	2.67	MMW2	0.67		0.0
4th	FMW	2.00		0.0		0.0
5th	MMW2	2.00		0.0		0.0
6th	ICU	1.33		0.0		0.0
7th	SICU	1.33		0.0		0.0
8th	GFMSW	0.67		0.0		0.0
9th	RICU	0.67		0.0		0.0
10th	HDU	0.67		0.0		0.0

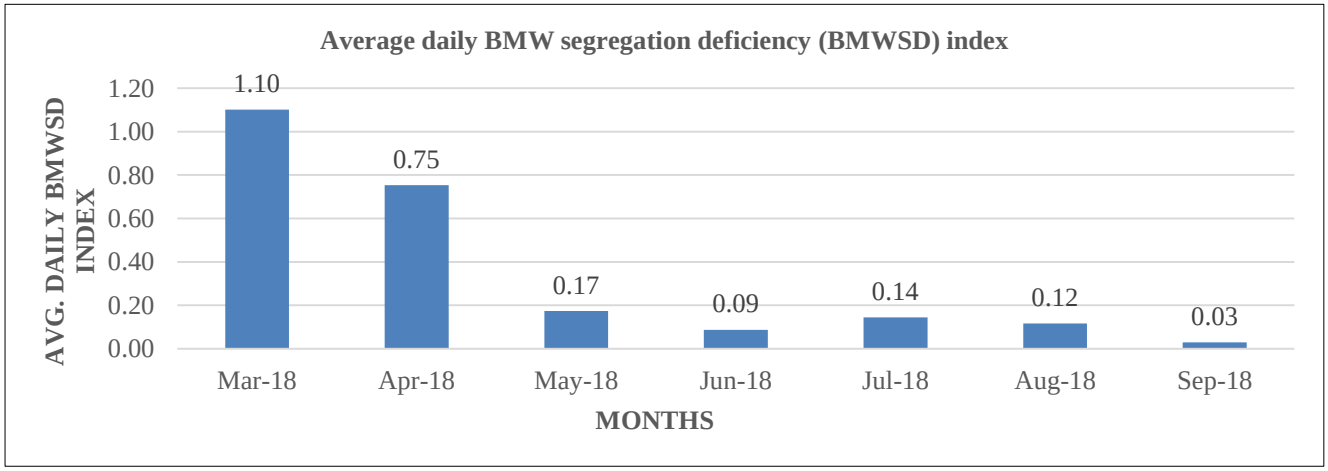

Figure 1: Average daily BMW segregation deficiency index month wise.

Table 2: BMWSD index parameters of zero, three and six months.

BMWSD parameter	Month zero (n=23)	Month three (n=23)	Month six (n=23)
Total deficiencies found	38	3	1
Total opportunities	115×30=3450	115×30=3450	115×30=3450
Average/mean value±SD (%)	1.10±0.07	0.09±0.01	0.03±0.01

DISCUSSION

The current study showed that in the zero month or the base month there were lot of deficiencies in segregation in different areas. Almost 16 areas out of total 23 areas found with total 38 deficiencies in the zero month. The mean BMWSD index was 1.10%. Training started from the zero month and the same way data collection were made in every month. Every month data was analysed and used for preparation of next month prioritization of training schedule preparation. In addition to it on job training was also started from 2nd month onwards. On the third month it was found that only three areas were having deficiencies with total three deficiencies only. The mean BMWSD index was 0.09%. The difference between zero- and three-month using t test were found statistically significant ($p<0.0001$). On the sixth month the deficiencies were further reduced to only one area with one deficiency only with a BMWSD index of 0.03%. When comparing the differences between zero- and six-month data using t test it was also found statistically significant ($p<0.0001$). The change in BMWSD index between three and sixth month was also statistically significant ($p<0.0001$) similar to the study by the author at Hyderabad.[2]As hospitals were mostly service oriented industry and attrition rate was quite high comparing to other industry specially for nursing, housekeeping and doctor, the main pillars of the hospital.[5-7] Continuous monitoring and training will be the main focus for any hospital for providing better and better patient care even in some difficult times also.[8,9]

The limitation of this study were not all the patient care areas were included and only working days data could be captured due to lack of manpower.

CONCLUSION

In the current study, it was found that there were a statistically significant changes ($p<0.0001$) in the BMWSD index from zero to three and to six month which is showing better BMW management. The matrix method monitoring could be the best framework guideline to control or improve the performance along with structured training. Matrix method of monitoring also very useful tool to assess the training need of the weaker staff to improve performance. The application of monitoring and training in other service industry fields also may be tried for better management and improvement of the services.

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