

# KNOWLEDGE ATTITUDE PRACTICE STUDY ON BIO-MEDICAL WASTE MANAGEMENT AT DISTRICT HEAD QUARTERS HOSPITAL, DHENKANAL, ODISHA

Dr.Chinmayee Swain

Consultant-Quality Improvement

National Health systems Resource Centre (NHSRC), NIHFWS Campus, Baba Gang Nath Marg, Munirka, New Delhi,  
India-110067

---

**Abstract:** The Knowledge, Attitude & Practice Study were conducted at DHH, Dhenkanal ,a secondary care hospital in Odisha from July-2017 to Feb-2018.The major objective for this study was to know the current level of knowledge of all the categories of staffs regarding bio-medical waste management particularly segregation & disinfection.

Also the aim of the study was find out the gaps & taking further corrective measures for implementation of revised BMW Rule. The 4 major research questions were:-

- What is the present knowledge, attitude & practice level of staffs of DHH, Dhenkanal towards proper Bio-Medical Waste Management?
- How KAP analysis will be helpful in implementation BMW New Rule 2016?
- How this study will helpful for decrease of Surgical Site Infection Rate?
- Which category of staff will be given emphasis (those having more gaps) for better practice of BMW Rules & its implementation?

Accordingly KAP questioners were prepared & data collection was done from all the categories of staffs (doctors, staff nurses, pharmacists, Laboratory Technicians, Radio graphers, sweepers, and attendants) randomly & with convenient sampling.

The entire study was done through Deming's PDCA cycle & all the datas were analysed by using following quality tools in Minitab.

- Pareto Analysis
- Control Chart
- Run Chart
- Co relation

Finally, it was observed that Bio-Medical Waste Management Practice among staff nurses & sweepers were not upto the mark & it needed to be strengthened.

*The interesting observation during this study was doctors were highest in all the aspects i.e. Knowledge, Attitude & Practice, which is very rarely seen in other studies.*

But the staff nurses are called as the heart & soul of Bio-Medical Waste Management Practices & IMEP. So as far as their knowledge was not up gradated, it will be very tough for proper implementation of BMW New Rule-2016.

This study will be very much helpful for need base training & implementation of BMW New Rule 2016.

**Keywords:** KAP, Pareto Analysis, Control Chart, Run chart.

---

## 1. INTRODUCTION

Medical care is vital for our life, health and wellbeing. But the waste generated from medical activities can be hazardous, toxic and even lethal because of their high potential for diseases transmission, the hazardous and toxic parts of waste from health care establishment comprising infectious, bio-medicals and radio-active material as well as sharps (hypodermic needles, knives, scalpels etc.) constitute a grave risk, if these are not properly treated/disposed or is allowed to get mixed with other municipal waste. Its propensity to encourage growth of various pathogen and vectors and its ability to contaminate other nonhazardous/non-toxic municipal waste jeopardizes the efforts undertaken for overall municipal waste management. The rag pickers and waste workers are often worst affected, because unknowingly or unwittingly, they rummage through all kinds of poisonous material while trying to salvage items which they can sell for reuse. At the same time, this kind of illegal and unethical reuse can be extremely dangerous and even fatal. Diseases like cholera, plague, tuberculosis, hepatitis (especially HBV), AIDS (HIV), diphtheria etc. in either epidemic or even endemic and form, pose grave public health risks. Unfortunately, in the absence of reliable and extensive data, it is difficult to quantify the dimension of the problem or even the extent and variety of the risk involved.

The ministry of Environment and Forests, Govt. of India notified the first bio-medical waste (management and Handling) Rules on 27<sup>th</sup> July, 1998, under the provisions of Environment Act 1986. Newer version of these rules were notified on 27<sup>th</sup> March 2016 known as bio-medical waste management rules, 2016, B (see Annexure 4)

These rules have been framed to regulate the disposal of various categories of bio-medical waste as envisaged there in; so as to ensure the safety of the staff, patients, public and the environment.

From the above mentioned issues, it is clear that the success of the biomedical waste management (within the health care establishment) and co-ordination and co-operation amongst the various establishment themselves as well as with the civic authority.

## 2. BACKGROUND OF BMW KAP STUDY AT DHH, DHENKANAL

KAP study is needed at DHH, Dhenkanal due to the following reasons.

- Improper BMW Management.
- Since the implementation of the biomedical Waste Management Rules 1998, every concerned health personnel is expected to have proper knowledge, practice and capacity to guide others for waste collection and management, and proper handling techniques. Hospital generates a number of hazardous wastes that can be detrimental to the environment if not properly managed. With this background, the study was conducted to assess the knowledge, attitude and practice of biomedical waste management among health care personnel in DHH, Dhenkanal, Odisha
- SSI is avg-2% as reported.
- DHH, Dhenkanal is a Secondary care Hospital in Odisha having 198 Staff.
- During the Daily round towards since June 2017 it observed that there is gap in BMW Practice as per the BMW New Rule 2016.
- During Primary interaction with staffs it was also observed that knowledge up gradation in Staffs are lacking & it was also observed that BMW is not followed properly & infection prevention measures were not followed upto the mark causing Surgical Site Infection.
- And also few of them were reluctant to accept the fact that how it is hazardous.

So it was decided to do KAP Survey on BMW, so that proper corrective measures could be taken for implementation of BMW new Rule 2016 & for capacity building of all categories of staffs.

Since the implementation of the Biomedical Waste Management New Rule 2016, every concerned health personnel is expected to have proper knowledge, practice, and capacity to guide others for waste collection and management, and proper handling techniques.

DHH, Dhenkanal is a secondary care hospital. This study was undertaken to assess the knowledge, attitude, and practices (KAP) of the employees of our hospital

This cross-sectional study was carried out since the month of June-2017. A total of 198 employees were surveyed.

A pretested, self-administered questionnaire containing questions on KAP regarding bio-medical waste management was used. Before administering the questionnaire the purpose of the study was explained to all participating employees.

✓ For statistical analysis, I have used Minitab. We calculated percentages and applied the Pareto chart, Control Chart. Run Chart. Anonymity of the participants was maintained throughout the study

✓ The entire process was divided into 4 stages as per Deming's cycle PDCA.

✓ **Research questions for this study were:**

- What is the present knowledge, attitude & practice level of staffs of DHH, Dhenkanal towards proper Bio-Medical Waste Management?
- How KAP analysis will be helpful in implementation BMW New Rule 2016?
- How this study will helpful for decrease of Surgical Site Infection Rate?
- Which category of staff will be given emphasis (those having more gaps) for better practice of BMW Rules & its implementation?

This study will help me to improve my knowledge for planning, better co-ordination for implementation of Bio-Medical Waste Management. In addition to this the research findings will help our hospital to develop & organise training programmes by identifying the gaps towards proper segregation of bio medical wastes along with prevention of surgical site infection.

### 3. OBJECTIVES

**My main objective for this study is described as follows:**

- To know the knowledge, attitude and practice among health care personnel (including doctors, nurses, laboratory technicians, and sanitary staff regarding biomedical waste management )working in DHH,Dhenkanal,Odisha,which is a Secondary Care Hospital..
- The objective was to assess knowledge, attitude, and practices of non-medico staffs including kitchen,laundry staffs etc.
- To study the post BMW implication in reducing SSI(Surgical Site Infection Rate) & HAI(Hospital Acquired Infection Rate) at DHH,Dhenkanal.
- For assessment of need based training

**Other objectives:** To implement the bio- medical waste management policy with the following points:-

- Segregation of various categories of waste in separate colour coded containers at the site of generation, so that each category is treated in a suitable manner to render it harmless along with Disinfection/ decontamination of infected items at the site of generation immediately after use.

### 4. METHODOLOGY, DATA COLLECTION & ANALYSIS

**PLAN:**

- It was decided to do the KAP survey during the morning session & afternoon session, daily 2hrs were dedicated to it.
- Myself while conduct during my round in morning & Evening along with few staffs of DQT committee & Help Desk Staffs were conducted the survey.
- Though there was 198 staffs, the Sample size for KAP survey was 50 consisting of all categories of staffs on convenient sampling technique, but for pareto analysis all the 198 staffs were surveyed.
- Questions = total 25 out of which knowledge related questions are 9 Attitude related Questions are 6 & practice related Questions were 10

DO:

TABLE 1: (PRE TRAINING KAP SURVEY RESULT)

KAP STUDY-QUESTION WISE ANALYSIS OF ALL STAFFS		SCORE		PERCENTAGE	
		KNOWLEDGE			
Sl.No	KNOWLEDGE BASED QUESTIONS:- 9	CORRECT	IN CORRECT	CORRECT	IN CORRECT
1	Are all health care wastes are hazardous?	11	39	22%	78%
2	Are you aware that Bio Medical waste management rules are applicable to you?	46	4	92%	8%
3	Can any plastic Bags be used for waste Disposal	29	21	58%	42%
4	Have you had any training in BMW?	49	1	98%	2%
5	According to BMW guidelines, what is the maximum time limit for which waste can be stored ?	16	34	32%	68%
6	How many times of waste are collected from wards /units?	41	9	82%	185%
7	What is the cost incurred to Hospital?	0	50	0%	100%
8	which of the following is the universally accepted symbol for Bio-Hazard	17	33	34%	66%
9	Who is the controlling authority BMW rule in State/ Control pollution Control Board	48	2	96%	4%
ATTITUDE BASED QUESTIONS-6		ATTITUDE			
1	Are you aware of any legislation application to Hospital Waste management?	34	16	68%	32%
2	If yes, give name of the Document?.....	0	50	0%	100%
3	BMW is team work/no single class of people is responsible for safe management?	45	5	90%	10%
4	Do you agree that BMW Should segregated in to different categories	50	0	100%	0%
5	Do you feel that BMW should be made part of Dental undergraduate curriculum	46	4	92%	8%
6	Do you think Knowledge on BMW Rule - 2016& implementation is adequate	0	50	0%	100%
PRACTICE BASED QUESTION:-10		PRACTICE			
1	Does your Hospital tied up with BMW/ outsourcing	48	2	96%	4%
2	Do you Dispose all kinds of waste into general garbage	45	5	90%	10%
3	Do you segregate BMW according to different categories	47	3	94%	6%
4	where do you dispose cotton, gauze, any other item contaminated blood	43	7	86%	14%
5	Where do you dispose Expired Medicine	2	48	4%	96%
6	where do you dispose sharp waste	42	8	84%	16%
7	Where do you dispose excess mercury /Spillage	50	0	100%	0%
8	How do you disposed the used developer or fixer solution	38	22	76%	24%
9	How do you disposed the hazard liquid waste?	49	1	98%	2%
10	Before disposal the needful should be?	48	2	96%	4%

TABLE 2: (POST TRAINING ON BMW NEW RULE 2016 KAP SURVEY RESULTS)

KAP STUDY-QUESTION WISE ANALYSIS OF ALL STAFFS		SCORE		PERCENTAGE	
		KNOWLEDGE			
Sl.No	KNOWLEDGE BASED QUESTIONS :- 9	CORRECT	IN CORRECT	CORRECT	IN CORRECT
1	Are all health care wastes are hazardous?	3	47	6%	94%
2	Are you aware that Bio Medical waste management rules are applicable to you?	49	1	98%	2%
3	Can any plastic Bags be used for waste Disposal	42	8	84%	16%
4	Have you had any training in BMW?	50	0	100%	0%
5	According to BMW guidelines, what is the maximum time limit for which waste can be stored ?	22	28	44%	64%
6	How many times of waste are collected from wards /units?	46	4	92%	8%
7	What is the cost incurred to Hospital?	0	50	0%	100%
8	which of the following is the universally accepted symbol for Bio-Hazard	50	0	100%	0%
9	Who is the controlling authority BMW rule in State/ Control pollution Control Board	50	0	100%	0%
ATTITUDE BASED QUESTIONS-6		ATTITUDE			
1	Are you aware of any legislation application to Hospital Waste management?	5	45	10%	90%
2	If yes, give name of the Document?.....	1	49	2%	98%
3	BMW is team work/no single class of people is responsible for safe management?	50	0	100%	0%
4	Do you agree that BMW Should segregated in to different categories	50	0	100%	0%
5	Do you feel that BMW should be made part of Dental undergraduate curriculum	50	0	100%	0%
6	Do you think Knowledge on BMW Rule -2016& implementation is adequate	50	0	100%	0%
PRACTICE BASED QUESTION:-10		PRACTICE			
1	Does your Hospital tied up with BMW/ outsourcing	47	3	94%	6%
2	Do you Dispose all kinds of waste into general garbage	48	2	96%	4%
3	Do you segregate BMW according to different categories	50	0	100%	0%
4	where do you dispose cotton, gauze, any other item contaminated blood	46	4	92%	8%
5	Where do you dispose Expired Medicine	27	23	54%	46%
6	where do you dispose sharp waste	47	3	94%	6%
7	Where do you dispose excess mercury /Spillage	50	0	100%	0%
8	How do you disposed the used developer or fixer solution	30	20	60%	40%
9	How do you disposed the hazard liquid waste?	50	0	100%	0%
10	Before disposal the needful should be?	50	0	100%	0%

COMPARISON OF KAP PRE & POST TRAINING ANALYSIS BY BAR GRAPH:

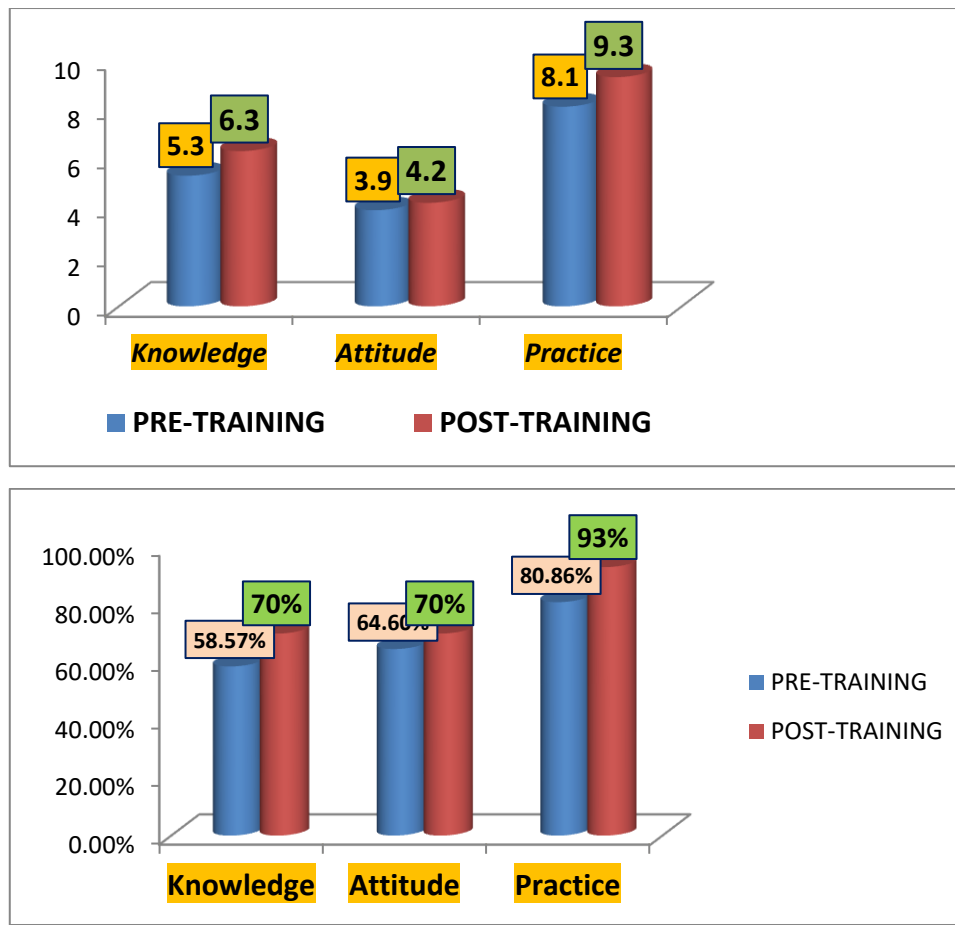


FIGURE-1

Table 3:

PRE-TRAINING KAP ANALYSIS ON BIOMEDICAL WASTE MANAGEMENT OF DHH-DHENKANAL								
Sl.No	Caegory of Staff	Number	KAP SCORE			KAP PERCENTAGE		
			Knowledge	Attitude	Practice	Knowledge	Attitude	Practice
1	Doctor	10	5.3	4.5	8.1	58.88%	75.00%	81.00%
2	Staff Nurse	10	5.6	3.8	8.8	62.22%	63.33%	90.00%
3	Attendant	10	4.3	3.8	7.3	48.14%	63.88%	73.33%
4	Lab	4	5	4	8	55.55%	66.66%	80.00%
5	Pharmacist	6	4.8	4	7.5	53.70%	66.66%	75.00%
6	X-Ray	2	6	3	9	66.66%	50.00%	90.00%
7	Sweeper	8	5.8	4	7.7	64.81%	66.66%	76.67%
	<b>Total</b>	<b>50</b>	<b>5.3</b>	<b>3.9</b>	<b>8.1</b>	<b>58.57%</b>	<b>64.60%</b>	<b>80.86%</b>
POST-TRAINING KAP ANALYSIS ON BIOMEDICAL WASTE MANAGEMENT OF DHH-DHENKANAL								
Sl.No	Caegory of Staff	Number	KAP SCORE			KAP PERCENTAGE		
			Knowledge	Attitude	Practice	Knowledge	Attitude	Practice
1	Doctor	10	7.1	4.6	9.6	79.00%	75.92%	95.56%
2	Staff Nurse	10	6.4	4.0	8.3	70.83%	66.66%	82.50%
3	Attendant	10	6.0	4.0	9.2	66.66%	66.66%	92.00%
4	Lab	4	6.5	4.3	10	72.22%	70.83%	100.00%
5	Pharmacist	6	6.4	4.2	9	71.10%	69.99%	90.00%
6	X-Ray	2	6.5	4.5	10	72.22%	75.00%	100.00%
7	Sweeper	8	5.2	4	8.8	57.77%	66.66%	88.00%
	<b>Total</b>	<b>50</b>	<b>6.3</b>	<b>4.2</b>	<b>9.3</b>	<b>70%</b>	<b>70%</b>	<b>93%</b>

**OBSERVATION:**

- ✓ There is improvement in all the three aspects of Knowledge, Attitude & Practice.
- ✓ During comparison, it was observed that doctors are having highest attitude both during BMW & M 1998 rule & after training on new rule.
- ✓ Lab, -X-Ray tech highest in practice followed by Doctor, Attendant, pharmacist, sweeper & staff nurse are practising the segregation process well.
- ✓ There is shortage of staff nurses, so they are not practicing as per the expectation due to overload of work.
- ✓ We need to be focused on staff nurses on practice though they have knowledge & attitude.
- ✓ Sweeper & attendants are following the BMW New Rule 2016 well though their knowledge is good, but their attitude increases.
- ✓ Nobody was aware of the budget of BMW & also they could not tell the name of the BMW documents & guidelines correctly.
- ✓ The practice of BMW New Rule 2016 improved result in decrease in Surgical Site Infection Rate.

**PARETO ANALYSIS OF THE PROBLEM RELATED TO BMW & INFECTION CONTROL:**

At the same time, survey was conducted of all the 198 staffs regarding drawbacks in BMW & IMEP practices. The major causes found during the survey were:-

- 1- Lack of awareness of infection control Protocol Guidelines & not using bacilloid, Sterelium, chemical Indicator strips for autoclaving-53
- 2- Lack of training & capacity building-19
- 3- Lack of improper segregation procedure & lack of knowledge-69
- 4- Handholding Support-18
- 5- Lack of sops & commitments-16
- 6- Lack of Attitude-11
- 7- Poor PPE supply & utilization-12

✓ Then causes were arranged in a descending order as in following table:-

**FREQUENCY TABLE:**

**TABLE 4:**

Causes	Frequency/count	Percentage	Cumulative percentage
Lack of knowledge on BMW & lack of knowledge on Infection control practice	69	34.8	34.8
Lack of awareness of infection control Protocol Guidliness & Not using bacilloid, Sterelium, chemical Indicator strips for autoclaving	53	26.81	61.61
Lack of training & capacity building	19	9.5	71.1
Handling Support	18	9.1	80.2
Lack of sops&commitments	16	8.1	88.3
Poor PPE supply & utilization	12	6.1	94.4
Lack of Attitude	11	5.6	100
Total	198	100	100



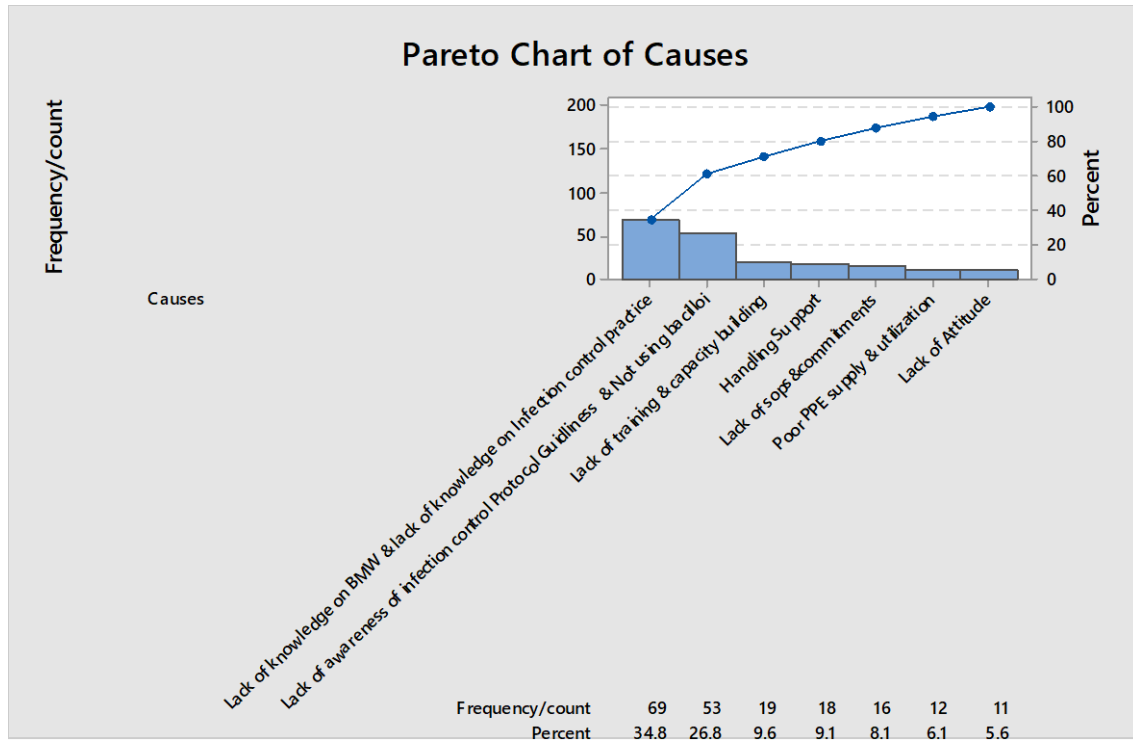


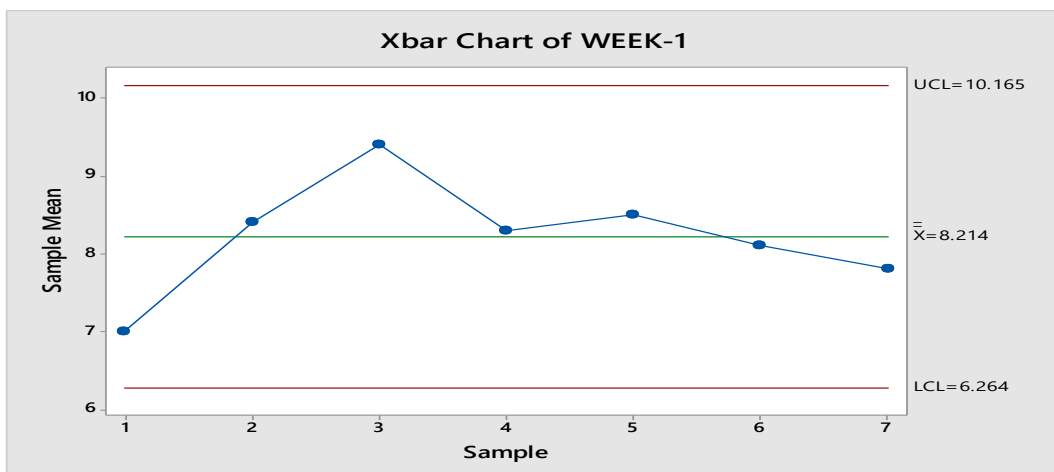
FIGURE 2: PARETOANALYSIS

**(2-Check through Control Chart)**

TABLE 5: Data for control chart

SUB GROUP	WEEK-1	WEEK-2	WEEK-3	WEEK-4	WEEK-5	WEEK-6	WEEK-7	WEEK-8	WEEK-9	WEEK-10
1	7.0	8.8	8.0	8.1	8.3	8	8.3	8.5	8.8	8.9
2	8.4	8.4	8.3	8.4	8.5	8.5	8.9	8.7	8.8	8.9
3	9.4	9.0	8.3	8.5	8.4	8.7	8.8	8.6	8.7	8.8
4	8.3	8.8	8.7	8.5	8.6	8.5	8.7	8.9	8.8	8.7
5	8.5	8.4	8.9	8.8	8.9	9	8.7	8.8	8.9	8.6
6	8.1	7.9	8.0	8.2	8.5	8.4	8.3	8.5	8.6	8.5
7	7.8	7.9	7.7	8	7.9	7.8	8.2	8.3	8.4	8.1

**CONTROL CHART GRAPH:**





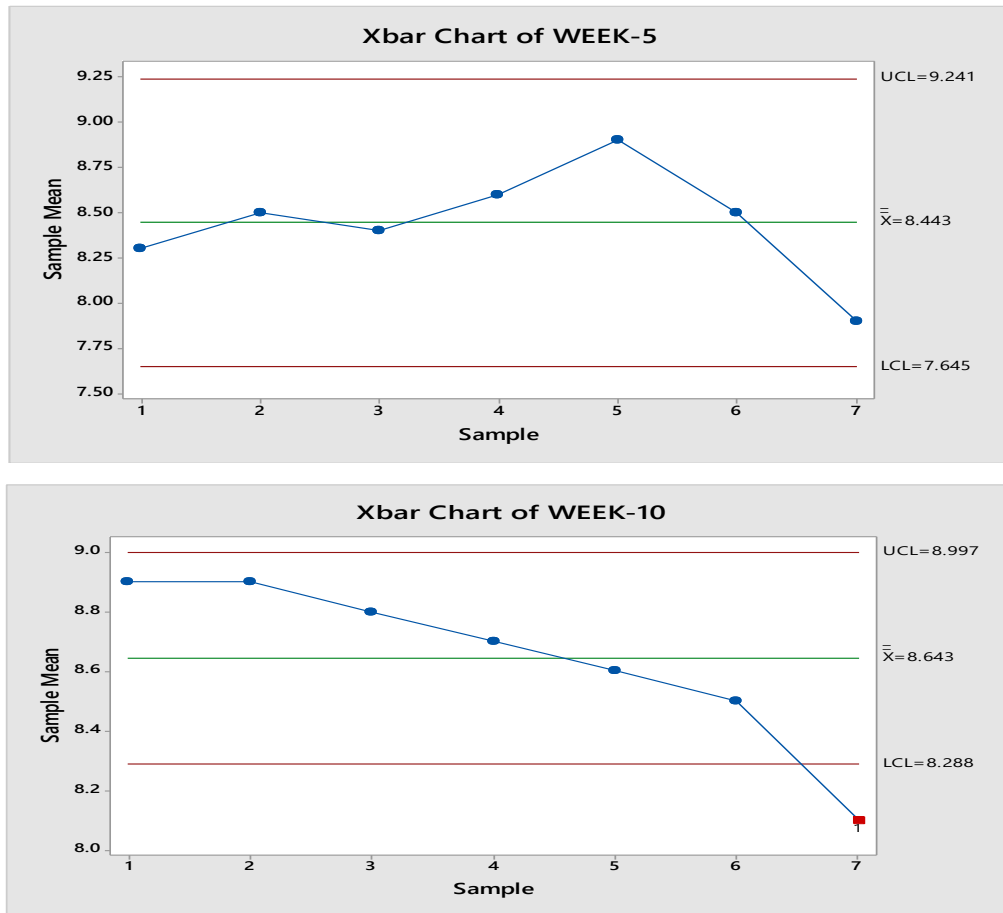


FIGURE 3: Week wise X-bar chart

Table 6: Data for run chart

SUB GROUP	WEEK-1	WEEK-2	WEEK-3	WEEK-4	WEEK-5	WEEK-6	WEEK-7	WEEK-8	WEEK-9	WEEK-10
1	7.0	8.8	8.0	8.1	8.3	8	8.3	8.5	8.8	8.9
2	8.4	8.4	8.3	8.4	8.5	8.5	8.9	8.7	8.8	8.9
3	9.4	9.0	8.3	8.5	8.4	8.7	8.8	8.6	8.7	8.8
4	8.3	8.8	8.7	8.5	8.6	8.5	8.7	8.9	8.8	8.7
5	8.5	8.4	8.9	8.8	8.9	9	8.7	8.8	8.9	8.6
6	8.1	7.9	8.0	8.2	8.5	8.4	8.3	8.5	8.6	8.5
7	7.8	7.9	7.7	8	7.9	7.8	8.2	8.3	8.4	8.1

Sl.No	Caegory of Staff
1	Doctor
2	Staff Nurse
3	Attendant
4	Lab
5	Pharmacist
6	X-Ray
7	Sweeper

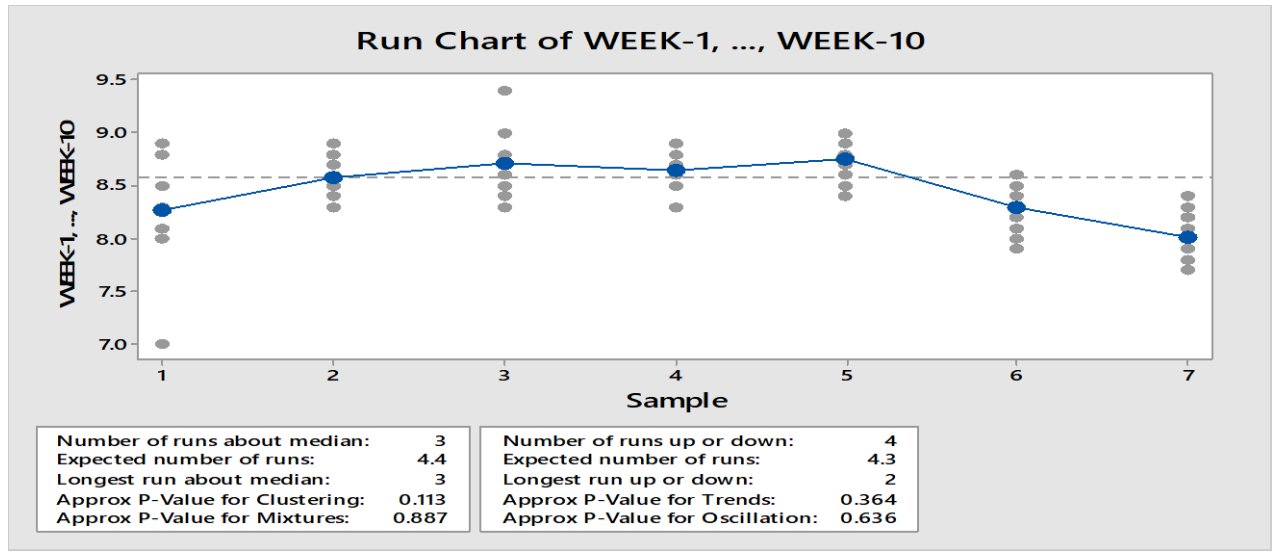


FIGURE 4: Run chart

**OBSERVATION FROM RUN CHART ANALYSIS:**

Run chart implicates that, there is improvement in all categories of staffs. pharmacists doing the best among them & sweeper the slowest improvement. Staff nurse consistent in practice.

**5. OUTCOME**

- From this study & through PDCA cycle of KAP, Pareto, control chart, it was found that the segregation process was improved.
- Also it was found that Surgical Site Infection was decreased after BMW training on New Rule -2016 & its implementation & practice.

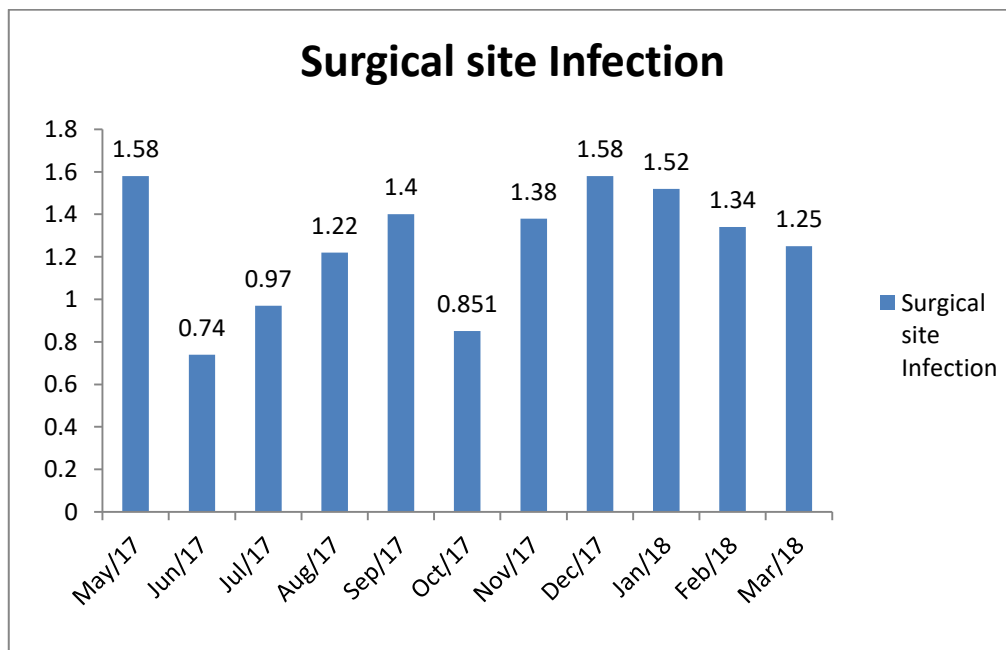


FIGURE 5: SURGICAL SITE INFECTION RATE

**6. LIMITATION**

Lack of time among the staffs as they are overloaded with works due to HR constraint (Particularly staff nurses). Few staffs were reluctant to participate in the survey process. The questioners are in English, so there may be difficult in surveying the sweepers & attendants. Interpreter may be required for them.

## 7. SUGGESTION

- Knowledge up gradation of staffs with capacity building training, regular monitoring, hands on training.
- Supply of infection control SOPs & materials, consumables.
- Counselling of staffs to improve the attitude.
- Supply of sufficient PEP & other logistics.
- Time to time analysis (PDCA)
- Proper functionalisation of Infection Control Committee

Appointment of Infection control nurse

### Other suggestions:

- BMW new rule book -2016 & SOP should be developed in Odia/Local Language.
- All the signages should be bi-lingual containing English & Odia.
- Plasma Pyrolysis should supply to DHH soon.
- Adequate fund provision for installation of Plasma Pyrolysis/Microwave with human resource & their capacity building, space, maintenance of the BMW unit.
- Exposure visit of related staffs to the Govt./Corporate hospital having Plasma Pyrolysis(Both inside & outside Odisha)
- Exposure visit to good practiced hospitals(Both inside & outside Odisha)
- Regular hands on training of staffs as well as trainers.
- CME of Master trainers in regular intervals
- Proper cost-analysis on investment could be done through the following table, so that scarcity of fund will not hamper the implementation.

## 8. DISCUSSION & CONCLUSION

By this KAP survey, we are able to analyse the current level of knowledge, attitude & practice among the staffs of DHH, Dhenkanal. Based on this KAP survey, we have arranged the training & hand holding support on BMW management. After training, it has been observed that the knowledge, attitude & practice level of maximum staffs are increased, which help us in implementation of BMW New Rule-2016 & Need Based Training programme. Few staffs were practicing well as compared to their knowledge. It implies that they were not very expressive.

Through Pareto analysis, it was concluded that lack of proper segregation practice, lack of knowledge & awareness on infection control guidelines & protocols are the major cause for improper BMW practices. So all the SOPs, guidelines needed to circulate to all the departments of DHH, Dhenkanal.

Based on the result of KAP study & after the decision was taken in DQT & Infection control committee meeting to conduct the hands on training weekly, it was observed that practices as per New rule of BMW are going on satisfactorily. This observation was revealed from control chart analysis that practice work is going good. Pharmacists are improving day by day in highest rate in comparison to other staffs & sweepers are improving with slowest rate. Staff nurses are doing satisfactorily but not upto the mark as per the expectation.

When I have the co-relation analysis between the BMW Practice score from June -17 to March-18 with the Surgical Site Infection Rate, it was found that as the practice is doing proper by the staffs, the SSI is decreasing.

Staff nurses are the backbone of Bio-Medical Waste Management & IMEP & they are improving very slowly, which not upto the mark, so they must be given priority in training & up gradation of knowledge. But they are doing only 82.5 % correct practice as per BMW New Rule. There is a scope of improvement to 100% in proper segregation practice. Because the segregation, which is the most important segment of Bio medical waste management is practically supervised

by the staff nurses. Though they have knowledge & attitude, but they have to spend more time towards up gradation of knowledge through capacity building & training through of guidelines of BMW New Rule -2016 & IMEP.

As we have seen there is a negative co-relation relationship between the BMW practice & SSI, when the practice was increasing, the SSI is decreasing. Patient safety is the important concerned for all health care professional. But it has a major importance for staff nurses. They provide health care services 24hrs a day. So they are considered as the “heart & soul” of BMW & IMEP practices. So they will play an important role to reduce the SSI & improve the quality of care of patients. Consequently they make a difference in outcomes.

Nurses are ones who provide constant care of in-patients & thus they can be most reliable persons to spread their knowledge, attitude & practice for proper implementation of Bio-medical Waste Management as per the prescribed rules & guidelines.

There is a need of proper counselling to group –D staffs as their attitude was decreasing with the help of Jamadar. During the analysis of control chart, the whole process is under control except in week-10, where the sweepers are below the lower limit. So they shall be provided regular training & they should be motivated.

All the staffs will be make aware of the financial investment on Bio-Medical Waste Management of our hospital as no one has knowledge on this aspect. Also they will be sensitised on the BMW documents/BMW Rule books as they are not aware of the name of the documents but know the content of this books & guidelines.

Considering the importance & significance of all categories of staffs for proper practice of BMW, this study was carried out to find problems & their solutions.

Inter departmental competition could be organised among the different units of DHH, Dhenkanal on neat & cleanliness, BMW & IMEP practices, which will be helpful in motivating the staffs.

New BMW Rule can be implemented through TEAM WORK, MOTIVATION & ATTITUDE.SUPPORT FROM POLICY MAKERS

- This study is very much helpful in route cause analysis of problems pertaining BMW & Infection Control & for taking corrective measures for improvement.
- Better implementation of BMW New 2016 & improvement Surgical Site Infection Rate of DHH.
- Awareness & knowledge up gradation of staffs
- It will contribute a lot to Patient safety, Staff safety & Environmental safety.
- It will also helpful in enhancement of patient satisfaction, employee satisfaction & statutory compliance.

#### **ACKNOWLEDGEMENT**

- I would like to thank Dr.Deepika Sharma,Sr.Consultant-QI,NHSRC My Guide for this project for her expert advice & encouragement throughout this project work & finalising the work within the limited time frame.
- I would also like to thank Dr. Basudev Behera, CDM & PHO, Dhenkanal, Dr.Dhruba Charan Debatta, DMO (Medical Services-cum-Superintendent), DHH, Dhenkanal for supporting me during my project work.
- My sincere thanks to Sri Rakesh Mohanty, Sr. Environmental scientist SPCB, Odisha & Sri Mihir Rajan Panda, EX-BMW Consultant, NHM, Odisha for supporting me during my project work.
- I will not forget Dr.Bidyutlata Mishra, Dr.Jyotish Chandra Mohapatra, Ex- CDM & PHO, Dhenkanal, Dr.Sujata Rani Mishra Ex-(Medical Services-cum-Superintendent), DHH, Dhenkanal under whom I had started my journey of for this project.
- My heartiest thanks to Asst. Matron. DQT, Infection control committee, all the staffs of DHH, Dhenkanal for their wonderful collaboration. You supported me & all of you are always willing to help me.
- And last but not the least I would like to thank the staffs of help desk for their contribution during my survey work
- My heartiest thanks for all your encouragement,which will be very helpful for patient safety, staff safety & environmental safety purpose & will enhance the quality of care at DHH, Dhenkanal

#### REFERENCES

- [1] Bio-Medical Waste Management & Handling Rule 1998 & Bio-Medical Waste Management Rule -2016.
- [2] WHO guideline for prevention of Surgical Site Infection Rate.
- [3] A Guide to KAP Study, Who (Stop TB Partnership).
- [4] Original Reaserch on KAP among Heath care personals in Dental Collage, Kathmagalam.
- [5] BMW Management – A Study of KAP a territory care Hospital,Rajkot,Bijapur,Allahabad.
- [6] KAP of BMW among Staff of institute trauma center Level-II Dr. Ajay Singh.
- [7] KAP Survey of Environmental awareness from interveners, Discussions in Vientiare , Khamnouance, implemented by GIZ.
- [8] IMEP Guidelines of Govt. of Odisha (letter no 12890 Dt. 22.09.2011 )
- [9] A KAP Case Study by Sunil Raina.
- [10] Research Study: - Master's thesis :- Customers relationship management in healthcare Industry Ghana:- Vivian Paazine &mary adjai.
- [11] Statistical tool books & all the related study materials by Prof.Ashoak Sarkar.(on TISS Moodle)
- [12] Study materials of ESCI, Hyderabad on Bio-Medical Waste Management.
- [13] Materials of IMEP workshop on Infection Prevention at AIIMS, New Delhi.
- [14] [www.ncbi.nlm.nih.gov/articles](http://www.ncbi.nlm.nih.gov/articles) on BMW KAP studies.
- [15] [www.researchget.net/articles](http://www.researchget.net/articles) on BMW & Infection Control Studies.