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Role of Various Regenerative Methods in the Management of Electrical Burns: Our Experience

Surya Kannan[1], Neljo Thomas[2], Ravi Kumar Chittoria[3]

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Abstract

Although the incidence of electrical burns is rather low, they are considered one of the most devastating injuries, due to their high morbidity and mortality.[1] Moreover, high costs are related to the long term hospitalization, the need for multiple surgical procedures and the functional sequels that might result from the original injury.[2] The mechanism of injury is a result of the combination of thermal and non-thermal processes. An electric current can reach deep tissues, causing deep and extensive injuries. Depending on voltage magnitude, injury may be sustained in nerve, bone and tendon tissue, as well as in skin.[3]

Keywords: Electrical burn, High-voltage, Low-voltage, Non adhesive collagen dressing, Regenerative techniques

INTRODUCTION

Electrical burn injuries are the most disastrous when compared to other forms of burns involving the same surface area. The mechanism of injury is complex, being a result of the combination of thermal and non-thermal processes. An electric current can reach deep tissues, causing deep and extensive injuries. The burden of electrical burn injuries is different among developed and developing countries. According to multiple reports, it is more prevalent in developing countries.[1,2] Statistics show that prevalence is higher among men, and it most commonly affects the young population and the working classes the main human resources of countries.[2,3,6] Preventive measures, namely education on electric current danger and hazards, as well as safety measures in workplaces are probably the most effective methods to reduce the incidence of electrical injury.[7,8] We share our experience in the management of electrical burns by using various regenerative techniques in this article.

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MATERIALS AND METHODS

This study was conducted in the Department of Plastic Surgery at tertiary care center. Informed written consent was taken from the patient. The details of the patient: 13 yr old female presented with alleged history of thermal burns over forehead and bilateral lower limbs on 14.5.21 at 4.30 pm at her residence from low voltage electric tower and sustained injury over forehead involving both eyes,

scalp, left big toe, right little toe. On examination she was found to have forehead and both upper eyelids superficial second degree burns with loss of epithelium, frontal scalp-1st degree burns about 4*4 cm ,1*1 cm deep burns with necrosed skin,no exsposed bone or soft tissue and left big toe 1*1 cm deep burns over tip, right little toe 2*2 cm superficial second degree burns over the little toe tip. At presentation BJWATS score was of 29, 24, 17, so was admitted in ward and treated with continuous ECG monitoring, antibiotics, analgesics, antacids and regular wound dressing with Autologous Platelet Rich Plasma (APRP) (figure 2), hydrojet debridement (figure 3) and Prolotherapy (figure 4). Once the wound bed was healthy, heterografting (figure 6) with negative pressure wound therapy (NPWT) (figure 7) was applied to scalp, both feet and non-adhesive dressing with collagen ointment (figure 5) was done. Patient underwent regular dressing and later er yag laser (figure 8) was given to healed areas.

Fig. 1: Face burns at the time of presentation

Fig. 2: APRP therapy

Fig. 1: Foot at the time of presentation

Fig. 3: Hydrojet debridement

Fig. 4: Prolotherapy

Fig. 4: Prolotherapy

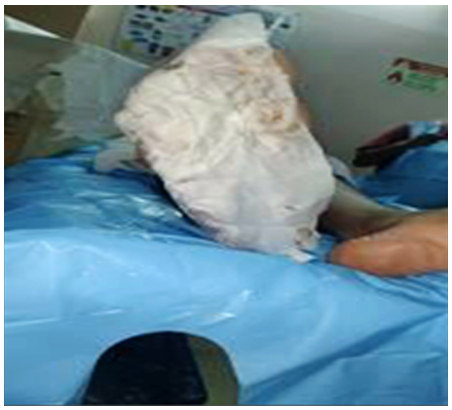

Fig. 5: Non adhesive dressing

Fig. 6: Heterografting

Fig. 7: Negative pressure wound therapy application

Fig. 8: Er YAG laser to healed areas

Fig. 9: At discharge

RESULTS

After the use of various regenerative methods, the wound healing was successful (fig. 9) Patient was ambulating well.

DISCUSSION

Neoangiogenesis, stimulation of the local immune response, and the presence of growth factors such as epidermal growth factor (eGF), transforming growth factor (TGF), and basic fibroblast growth factor all play a role in wound healing (bFGF). Role of prolotherapy in TGF-β expression which by high-glucose helps in angiogenesis, fibroblast proliferation, collagen synthesis, matrix deposition, and remodeling, and wound reepithelialization. Multiple agents are being used in prolotherapy like irritants (phenol), chemoattractants (sodium morrhuate), osmotic agents (dextrose). Although the exact mechanism of prolotherapy is not clear, it is believed that the injection of hypertonic dextrose causes cell dehydration and osmotic rupture at the injection site that leads to local tissue injury. That will subsequently induce granulocyte and macrophage migration to the site, with release of the growth factors and collagen deposition. In vitro studies have shown that even concentrations as low as 5% dextrose have resulted in the production of several growth factors critical for tissue repair.[14]

Platelet rich plasma (PRP) is a new adjunct that is increasingly being used to treat soft tissue defects in order to speed up healing of chronic nonhealing wounds. Platelet rich plasma is made by combining centrifuged blood with thrombin and calcium chloride to form a viscous coagulum gel that is rich in growth factors released by activated platelets. After preparation, platelet rich plasma is stable for around 8 hours. TGF-b and PDGF are the most essential growth factors in PRP. They have an impact on every stage of wound healing because they stimulate cell proliferation and differentiation. PRP also enhances tissue incorporation of biological mesh.

Early burn wound excision and wound closure with immediate autologous skin or skin substitutes, has lowered the mortality rate of severe burns and improved survival chances by minimising infections and metabolic problems.[13] Split thickness skin grafting restores epidermal function, avoids further hypothermia, protein and fluid losses, and infection risk, and integrates itself into the healing process, remains the primary permanent source of burn wound closure.

CONCLUSION

We have used different regenerative methods to augment the wound healing process and have found it to be useful. In this study, management of electrical burns by collagen dressing, NPWT and heterografting was done.

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Clinical Audit on Baseline Monitoring of Ventilator Care Bundle Components in ICU Patients

Shibilamol C Baby

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Abstract

Background: Ventilator associated pneumonia (VAP) is a type of lung infection that occurs in people who are on mechanical ventilation breathing machines in hospitals. As such, VAP typically affects critically ill persons that are in an intensive care unit (ICU). VAP is a major source of increased illness and death. Persons with VAP have increased lengths of ICU hospitalization and have up to a 20–30% death rate. The main aim of the study was to attain 0% of VAP rate in ICUs. The purpose of the study was to analyzing the standard practices in nursing care and to identify the faults in VAP bundle care checklist.

Methods: We conducted a retrospective case note review of 29 electronic patient records out of a whole population size of 48 from 4 ICUS (NMICU, NSICU, CICU, COVID ICU). The sample was taken randomly from 4 main ICUS. This was done to ensure that patients had equal chance of selection and to reduce researcher bias. The information was extracted from the electronic patient notes on EMR system. The VAP bundle care checklist was audited by using VAP bundle checklist audit form. The audit form includes 5 parameters (Semi recumbent patient positioning, Ventilator weaning, PUD prophylaxis, DVT prophylaxis, Suction of secretions.

Results: Most percentage distribution 10 (100%) belongs to the category of head elevation and suction, there was an equal distribution among sedation and DVT prophylaxis which was 9 (90%), the least percentage distribution7 (70%) belongs to the peptic ulcer in January month. Whereas February month, the largest category observed were in the category of head elevation, suction, peptic ulcer prophylaxis which consist 10(100%), 7(70%) were in sedation category. Followed by DVT prophylaxis 6(60%). In accordance with percentage distribution in March month, majority of compliance belongs to the category of head elevation 8(88.8%), 7(77.7%) of compliance were in the DVT prophylaxis category. 6(66.6%) in the category of sedation and 5(55.5%) were equally distributed to the category such as suction and peptic ulcer prophylaxis. The study results that overall percentage distribution of VAP bundle care parameters, 96.5% was noted in head elevation parameter and 86.2% in suction parameter. There was an equal distribution 75.8% in the category of sedation, DVT prophylaxis and peptic ulcer prophylaxis.

Conclusions: Findings of this study are useful for the health care workers to improve the standard practices in nursing care and to reduce or prevent the nosocomial infections especially VAP in ICU patients. The study results are helpful to the infection control department with the support from higher administration of the organization to obtain the 0% in ventilator associated pneumonia rate in monthly indicator and to enhance the quality of care in the hospital by implementing the recommendations and action plan of this audit.

Keywords: VAP, IHI, VAP bundle care checklist.

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INTRODUCTION

Ventilator associated pneumonia (VAP) is a type of lung infection that occurs in people who are on mechanical ventilation breathing machines in hospitals. As such, VAP typically affects critically ill persons that are in an intensive care unit (ICU). VAP is a major source of increased illness and death.[1] Persons with VAP have increased lengths of ICU hospitalization and have up to a 20–30% death rate. The goal of infection control is to

prevent cross transmission of pathogens, which has been shown to play an important role in the development of nosocomial infections including VAP. An effective strategy should target infection control from several vantage points: education of the medical team, universal hand hygiene, use of personal protective equipment and a protocol for microbiological surveillance. Clinical audit and care bundles have been proposed to address the gap in implementation of guidelines. The monthly indicator of Sun medical hospital shows that, there was a 23.80% VAP rate in January month and 40% in March month. It is the main motivation to conduct this clinical audit.[2]

Purpose of the Study

The main aim of the study was to attain 0% of VAP rate in ICUs. The purpose of the study was to analyzing the standard practices in nursing care and to identify the faults in VAP bundle care checklist.

Objectives

- To reduce or prevent the nosocomial infections especially VAP in ICU patients.
- To obtain the 0% in ventilator associated pneumonia rate in monthly indicator.
- To assess the compliance to ventilator care bundle in critical care units in Sun Medical Hospital and Reseach Centre.

Standards

- 100% of compliance in ventilator care bundle components.
- To attain standard practices in nursing care.

METHODOLOGY

Study Period

The study was carried out for a period from 2021 January to 2021 March.

Sampling Size

A retrospective case note review of 29 electronic patient records out of a whole population size of 40 from 4 ICUS (NMICU, NSICU, CICU, COVID ICU)

Sampling Techinique

The sample was taken randomly from 4 main ICUS (NMICU, NSICU, CICU, and COVID ICU). This was done to ensure that patients had equal chance of selection and to reduce researcher bias.

MATERIAL AND METHODS

The information was collected from the electronic patient notes on EMR system. The VAP bundle care checklist was audited by using VAP bundle checklist audit form. The audit form includes 5 parameters.

Parameters

The Institute for Healthcare Improvement (IHI) has tackled VAP as one of six areas that hospitals can address to reduce inpatient morbidity and mortality.

The IHI VAP-prevention bundle includes the following strategies:

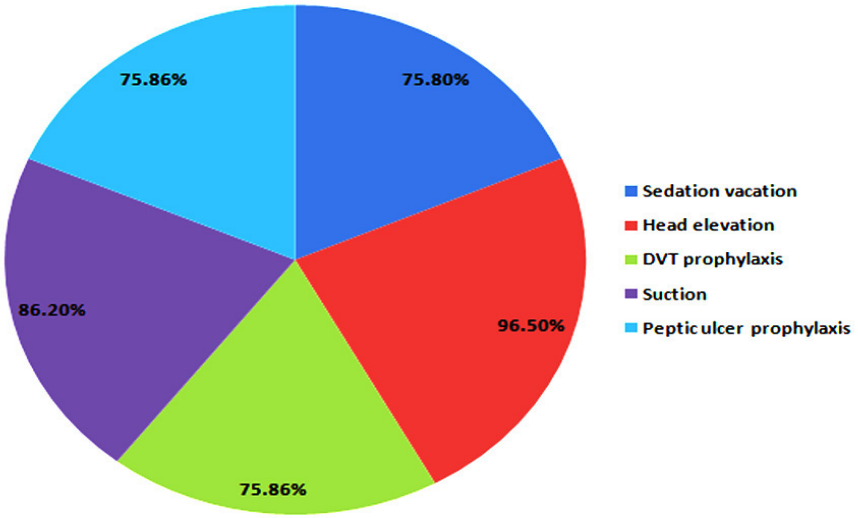
- Semi recumbent patient positioning, to at least 30 degrees.
- Ventilator weaning, via periodic sedation vacations and daily assessment of extubation readiness.
- Peptic ulcer disease (PUD) prophylaxis.
- Deep-vein thrombosis (DVT) prophylaxis.
- Suction of secretion

RESULTS

Table 1: Percentage distribution of compliance of five parameters of VAP prevention bundle

(N=29)

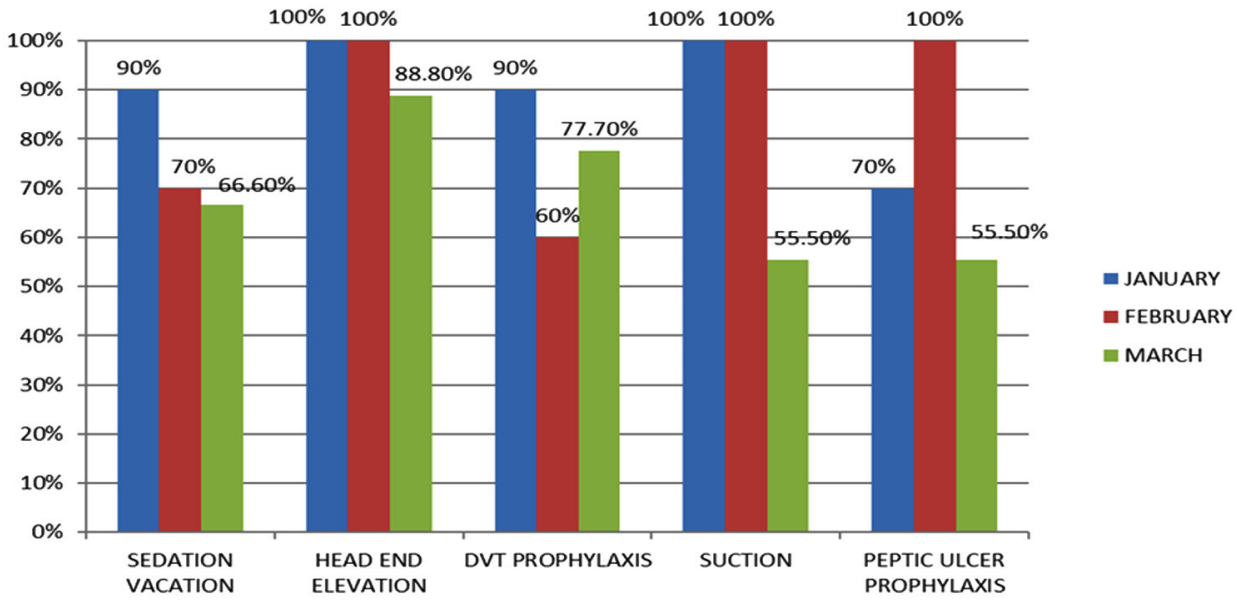
	Sedation vacation	Head elevation	DVT prophylaxis	Suction	Peptic ulcer prophylaxis
Frequency	22	28	22	25	22
Percentage distribution	75.8%	96.5%	75.86%	86.2%	75.86%



Graph 1: Percentage distribution

Table 2: Frequency and percentage distribution of five parameters from January 2021- March 2021

Month	Sedation Vacation		Head End Elevation		DVT Prophylaxis		Suction		Peptic Ulcer Prophylaxis	
	Frequency	Percentage of compliance	Frequency	Percentage of compliance	Frequency	Percentage of compliance	Frequency	Percentage of compliance	Frequency	Percentage of compliance
January (N=10)	9	90%	10	100%	9	90%	10	100%	7	70%
February (N=10)	7	70%	10	100%	6	60%	10	100%	10	100%
March (N=9)	6	66.6%	8	88.8%	7	77.7%	5	55.5%	5	55.5%



Graph 2: Percentage distribution of five parameters from January 2021- March 2021

ANALYSIS AND CONCLUSION

- Regarding the total percentage distribution of VAP bundle care parameters, 96.5% was noted in head elevation parameter and 86.2% in suction parameter. There was a equal distribution 75.8% in the category of sedation, DVT prophylaxis and peptic ulcer prophylaxis.
- In a view of percentage distribution of compliance in January month, most percentage distribution 10 (100%) belongs to the category of head elevation and suction. There was an equal distribution among sedation and DVT prophylaxis which was 9 (90%), whereas the least percentage distribution 7 (70%) belongs to the category of peptic ulcer.
- With the reference to the percentage distribution February month, the largest category observed were in the category of head elevation, suction, peptic ulcer prophylaxis which consist 10 (100%), 7 (70%) were in sedation category. Followed by DVT prophylaxis 6 (60%).
- In accordance with percentage distribution of compliance in March month, majority of compliance belongs to the category of head elevation 8 (88.8%), 7 (77.7%) of compliance were in the DVT prophylaxis category. 6 (66.6%) in the category of sedation and 5 (55.5%) were equally distributed to the category such as suction and peptic ulcer prophylaxis.

RECOMMENDATIONS

1. ***Oral care/ hygiene in every 2-4 hrs***

- Perform regular oral care with an antiseptic solution, e.g. Chlorhexidine, in accordance with the manufacturer's product guidelines.
- Include daily oral care with Chlorhexidine as part of the ICU admission and ventilator order sets.
- Educate the RN staff about the rationale for supporting good oral hygiene and its potential benefit in reducing ventilator-associated pneumonia

2. ***Semi recumbent patient positioning, to at least 30 degrees.***

- Use visual cues that make it easy to identify when the bed is in the proper position, e.g. a line on the wall that can only be seen if the bed is below a 30 degree angle.
- Include clues on order sets for the initiation of and weaning from mechanical ventilation, of tube feedings, and for provision of oral care.
- Create an environment in which respiratory therapists work collaboratively with nurses to maintain head of the bed elevation.

3. ***Ventilator weaning, via periodic sedation vacations and daily assessment of extubation readiness.***

- Perform daily assessments of readiness to wean and extubate.
- Provide a daily reduction or removal of sedative support.
- Designate one time of the day for the SAT and SBT to be attempted.
- Introduce ABCDE Bundle

ABCDE Bundle

- A & B" – Develop protocols, order sets, and standard work procedures for Spontaneous Awakening Trials (SAT) and Spontaneous Breathing Trials (SBT)
- "C" – Coordinate SAT and SBT to maximize weaning opportunities when patient sedation is minimal.
- "D" – Sedation should be goal-oriented.
- "E" – Early progressive mobilization and ambulation.

4. ***Peptic ulcer disease (PUD) prophylaxis.***

- Use medications: H2 blockers are preferred over sucralfate, and proton-pump inhibitors may be efficacious and an alternative to sucralfate or an H2 antagonist.
- Include PUD prophylaxis on the ICU admission and ventilator order sets.
- Incorporate review of PUD prophylaxis into daily multi-disciplinary rounds.
- Engage pharmacy in daily multi-disciplinary rounds to ensure ICU patients are given appropriate PUD and VTE prophylaxis.

5. ***Deep-vein thrombosis (DVT) prophylaxis.***

- Initiate DVT prophylaxis unless contraindicated.
- Engage the pharmacy to ensure ICU patients are given appropriate DVT prophylaxis (redundancy, failure remediation).
- Include DVT prophylaxis on daily checklist.

6. Suction of secretions

- Hand hygiene and use of gloves when handling respiratory secretions as well as adequate disinfection and maintenance of equipment and devices.
- Utilization of endotracheal tubes with subglottic secretion drainage (only for patients ventilated for longer than 24 hours)
- Initiation of safe enteral nutrition within 24-48 hours of ICU admission.

ACTION PLAN

- Introduce a new parameter oral care/ oral hygiene in VAP bundle care checklist
- Encourage the nurses to do the oral care/oral hygiene in every 2-4 hrs.
- Educate all departmental staff about the importance and purpose of VAP bundle care checklist.
- Inform the nurses to strictly follow the proper method of VAP bundle care checklist documentation.
- Continuous assessment and supervision of bundle care checklist audit.
- Engage respiratory therapy to all ventilator patients.
- Inform the nurses to inspect and changed the ventilator circuit when visibly soiled.

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Co-relational Retrospective Study on Hand Hygiene Compliance among Health Care Worker in Sun Medical Research Centre, Thrissur

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Abstract

Introduction: Hand Hygiene is a general term that applies to hand washing, antiseptic hand wash, antiseptic hand rub, or surgical hand antisepsis. Good hand hygiene is an important aspect of protecting yourself and others from infection transmission. It is one of the most effective ways to prevent hospital care associated infection rates. Failure to perform appropriate hand hygiene is considered to be the leading cause of healthcare associated infections and spread of multi-resistant organisms such as Methicilin Resistant Staphylococcus Aureus (MRSA) and has been recognized as a substantial contributor to outbreaks.

Methods and materials: The present study was undertaken to explore the hand hygiene compliance among health care workers. The main objectives of the study were to explore the hand hygiene compliance rate among health care workers focuses in 5 moments and to improve the hand hygiene practices among health care workers. In this study the variables were age, gender, education status of the subjects. Review of literature was discussed about the observational studies related to hand hygiene compliance. Quantitative approach was adapted for this study. The design used was co relational retrospective design. The setting of the study was selected as Sun Medical Research Centre, Thrissur. Convenient sampling technique was utilized to collect data from 872 subjects, who meet the inclusion criteria. The tool used for the study was observational checklist. The study was conducted from 1/10/2020 to 31/12/2020 in SMC, Thrissur. The collected data were analyzed on the basis of thematic analysis.

Results: The findings of the study revealed that the overall hand hygiene compliance of the hospital is gradually increased from 93%-99% in the 3 month duration. But doctors were found to be more compliant with hand hygiene practice compared to nurses and other HCWs. The study showed the lowest compliance rates were among ANM and other category which gradually decreased from 99.6% to 97% and 98%-96%.

Conclusion: Hand hygiene is the first line of defense against the spread of many infections. The study explored the hand hygiene compliance among health care workers. Findings of this study are useful for the health care workers to improve the awareness about hand hygiene in each unit and to protect themselves as well as patients. The study results are helpful to the quality department with the support from higher administration of the organization to enhance the compliance to 100% by Improving the availability, display of written hand hygiene protocols, supervision, feedback and quality improvement activities.

Keywords: Hand hygiene compliance, HCW, MRSA

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INTRODUCTION

Background of the Study

Hand Hygiene is a general term that applies to hand washing, antiseptic hand wash, antiseptic hand rub, or surgical hand antisepsis. Good hand hygiene is an important aspect of protecting yourself and others from infection transmission. It is one of the most effective ways to prevent hospital

care associated infection rates. Failure to perform appropriate hand hygiene is considered to be the leading cause of healthcare associated infections and spread of multi-resistant organisms such as Methicilin Resistant Staphylococcus Aureus (MRSA) and has been recognized as a substantial contributor to outbreaks.[1]

Washing hands with soap and water are recommended for visibly soiled hands and is the best way to get rid of germs in most situations. If soap and water are not readily available, we can use an alcohol based hand sanitizer that contains at least 60% alcohol. These sanitizers are the most efficacious agents for reducing the number of bacteria and viruses on hands and are recommended for routine decontamination of hands for all clinical indications (except when hands are visibly soiled). Clean hands are a simple effective approach to reducing the spread of infections from one person to another and throughout an entire community - from our home and workplace to childcare facilities and hospitals.[2]

NEED AND SIGNIFICANCE OF THE STUDY

Most germs that cause serious infections in healthcare are spread by people's actions. Hand hygiene is a great way to prevent infections. This contributes to the spread of healthcare-associated infections that affect 1 in 31 hospital patients on any given day. Every patient is at risk of getting an infection while they are being treated for something else. Even healthcare providers are at risk of getting an infection while they are treating patients. Preventing the spread of germs is especially important in hospitals and other facilities.[3] In 2002, the estimated number of HAIs in U.S. hospitals was approximately 1.7 million, with more than 98,000 deaths annually, according to the CDC. Hospitals prioritized the challenges, and hand hygiene ranked first on the survey. Many health care associated infections (HAIs) are transmitted by health care personnel, and hand hygiene is a primary means to reduce these infections.4Hand washing is also one of the key cornerstones of COVID-19 prevention. Now more than ever as we embrace the new normal and live with COVID-19, hand hygiene needs to become an integral part of our daily routine and our lives, as we live through this pandemic.[5] We conducted this study to evaluate the awareness, and compliance of hand hygiene among the health care workers in Sun Medicaland Research Centre, Thrissur. The result can help to increase the awareness among the staffs about the importance of hand hygiene and help to reduce the hospital associated infections.

STATEMENT OF THE PROBLEM

A co-relational retrospective study on hand hygiene compliance among the health care workers in Sun Medical and Research Centre, Thrissur.

OBJECTIVES

- To explore the hand hygiene compliance rate among the health care workers focuses in 5 moments.
- To improve the hand hygiene practices among health care workers

OPERATIONAL DEFINITION

Health care worker: Healthcare worker is one who delivers care and services to the sick and ailing either directly as doctors and nurses or indirectly as aides, helpers, laboratory technicians, or even medical waste handlers.

Hand hygiene compliance: It is defined by the World Health Organisation (2009) as 'an action of hand hygiene performed at 5 moments of patient care.

Assumptions

Hand hygiene compliance may positively increase the percentage or negatively decrease the percentage during the 3 months.

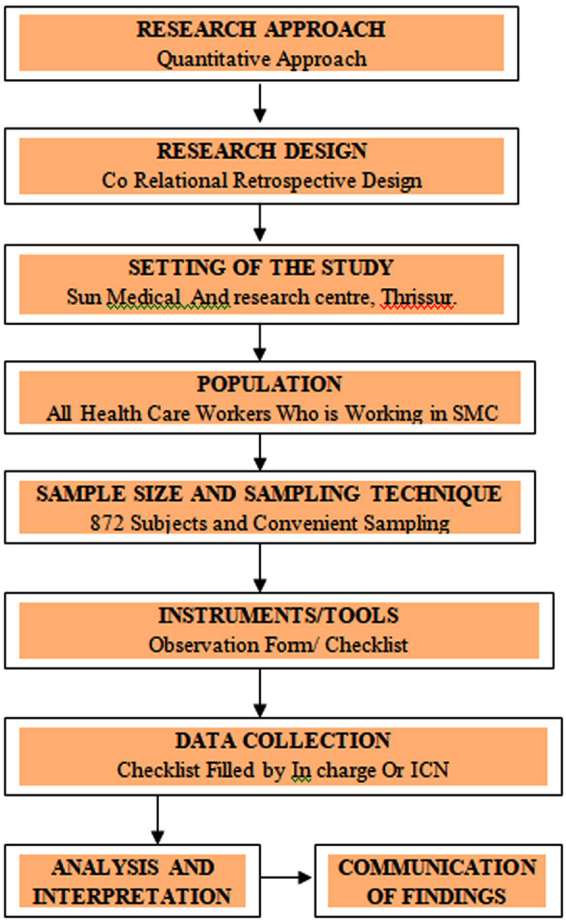
REVIEW OF LITERATURE

An observational cross sectional study was conducted to explore hand hygiene compliance rate among HCWs focuses in the 5 moments. Convenience sampling was conducted to observe HCWs and a modified instrument adapted from the institute for Healthcare improvement with integration of 5 moments of hand hygiene. The study commence with observation from various units among all categories of HCWs (n = 699), nurses 56% (n=391), doctors 26% (n= 182) and 18% (n=126) of the other categories. The compliance rate results showed in the moment 1 & 2 was 47% (n=328). In moment 3, 55 out of 165 (33.3 %) complied with hand wash which were doctors 6 % (n=10), nurses 19.4% (n=32) and 7.9 % (n=13) among other HCWs. In moment 4 and 5 were 74.2% compliance rate. Study concluded that there are needs to develop

improvement plans by collaborating all the departments with support from administration to meet the 100% compliance rate as recommended by WHO.[7]

An observational study was conducted in hospitals from two southern states of India. The samples were assessed hand hygiene compliance during examinations by using tools adapted from internationally recommended checklists. The results shows that a greater proportion of contacts in private newborn units than public complied with all steps of hand hygiene (44% vs 12%, p <0.001), and similarly in tertiary than secondary units (33% vs 12%, p<0.001). But there was no evidence of a difference by case load of the facility (low load-28%; intermediate load-14%; high load- 24%, p =0.246). The conclusion of the study offered that observed overall compliance with hand hygiene was low, although better in private than public facilities in both newborn units and labour rooms. Glove usage was a particular problem in newborn care units.[6]

METHODOLOGY



Research Apporach

Research approach adopted for the study depends on nature of the problem. A quantitative approach was used in this study.

Research Design

Research design selected for this study was co relational retrospective design.

Variables

Variables are considered for this study was age, gender and educational status of the sample.

Setting of the Study

The setting of the study was Sun Medical and Research Centre, Thrissur. It is a 150 bedded hospital and around 500 staffs are working here. The study was conducted at 10 units in the hospital such as CICU, NMICU, NSICU, Casualty, Labour Room, OT, 238, 268, 363, 300 wards.

Population

Population of the study was all health care workers.

Target Population

In this study target population were all health care workers who are working in SMC.

Accessible Population

Accessible population were all health care workers who are working at 10 units in the hospital such as CICU, NMICU, NSICU, Casualty, Labour Room, OT, 238 ward, 268 ward, 363 ward, 300 ward.

Sample and Sampling Technique

In this study, sample was all staffs in 10 units in SMC who is fulfill the inclusion criteria. The samples were selected by using convenient sampling technique because of the duty schedule of the subjects. It is the selective sampling that involves the conscious selection by the researcher of certain subjects to include in a study for the convenient of the researcher.

Inclusion criteria

- Samples who are willing to participate in this study
- Samples who are available during data

collection period

Exclusion criteria

- Samples who are not willing to participate in this study

TOOLS AND TECHNIQUE

The tool of the study was adapted from original WHO observation form.

Section A: Information about facility, ward, department details of hand hygiene moment and observer name.

Section B: Observational checklist for 4 professional category codes.

DATA COLLECTION PROCESS

The data collection was carried out for a period from 1/10/2020 to 31/12/2020. The formal permission to conduct the study was obtained from NABH coordinator, SMC Thrissur. The same information was communicated to 10 units. Investigator introduced herself and explained the purpose of the study. Confidentiality was ensured to all subjects. Many methods are utilized to examine hand hygiene compliance, such as close observation, self reporting, monitoring of hand hygiene product utilization. The HCWs was observed by the in charges and ICN during their contact with the direct patient care. The ICN were selected and trained in charges to utilize the

Table 1: Frequency of action and opportunities of 4 professional category codes in October month

Category	Nurse		ANM		Doctor		Other	
Moments	Action	Opportunities	Action	Opportunities	Action	Opportunities	Action	Opportunities
1	6	6	5	5	6	6	6	6
2	5	5	7	7	4	4	6	6
3	5	5	6	6	4	4	6	6
4	4	4	8	8	4	4	5	5
5	7	7	7	7	6	6	5	5
6	8	8	7	7	6	6	4	4
7	10	10	9	10			8	10
8	10	10	9	10	-	-	9	10
9	10	10	10	10	-	-	8	10
10	9	10	9	10	-	-	8	10
11	10	10	2	2	2	2	1	1
12	10	10	5	5	4	4	1	1
13	10	10	3	3	3	3	1	1
14	10	10	6	6	3	3	2	2
15	10	10	4	4	4	4	3	3
16	10	10	4	4	5	5	2	2
17	10	10	10	10	5	5	4	4
18	10	10	4	4	5	5	4	4
19	10	10	10	10	8	8	4	4
20	10	10	10	10	8	8	4	4
21	10	10	4	5	4	5	5	5
22	10	10	5	5	5	5	5	5
23	10	10	5	5	5	5	5	5
24	10	10	6	6	7	7	2	2
25	10	10	6	6	6	6	4	4
26	10	10	7	7	6	6	3	3
27	10	10	6	6	5	5	4	4
28	9	9	9	9	9	9	8	8
29	10	10	7	7	10	10	7	7
Total	263	264	190	194	134	135	134	141

instrument effectively to enhance the reliability and validity of data collections to reduce bias. Each sample took 3 min to perform the each task.

PLAN FOR DATA ANALYSIS

The data analysis includes 2 sections – section A and section B

1. Identify the setting (ward, service, and department) to allow analysis according to the scope of observation previously defined for the survey.
2. Record the number of each session undertaken during the current survey and related observation data by professional category, in the same line. This attribution of a session number validates the fact that data has been taken into account for compliance calculation.
3. Results per professional category and per session (vertical columns):

3.1 Sum up recorded opportunities ("opp") in the case report form per professional category and record the sum in the corresponding cell in the calculation form.

3.2 Sum up the positive hand hygiene actions related to the total of opportunities above, distinguishing between handwash (HW) and handrub (HR), and record the sum in the corresponding cell in the calculation form.

3.3 Proceed in the same way for each session.

3.4 Total all sums for each professional category to calculate the compliance rate (given in percent)

4. The addition of the results of each line in the shaded right hand column will allow a calculation of the overall compliance.

$$Compliance\ (\%) \frac{Actions\ ´\ 100}{Opportunities}$$

ANALYSIS AND INTERPRETATION

Organization of The Data

The data were collected from staffs. The data were analyzed and interpreted by using tabular and graphical presentation. Findings were organized under the following sections.

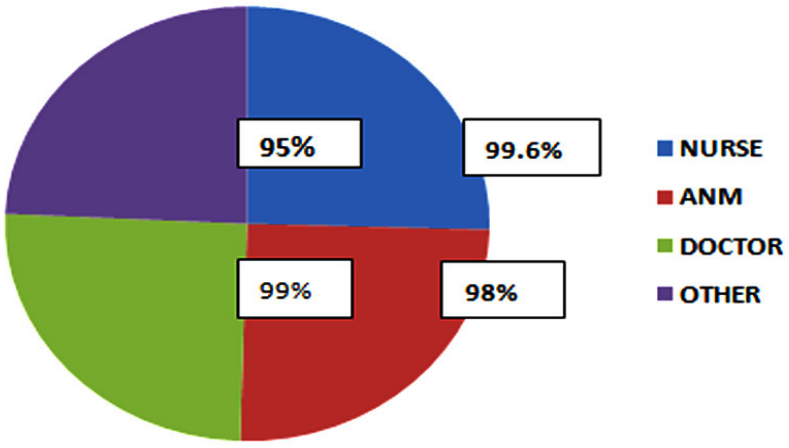
Table 2: Frequency of action, opportunities and percentage distribution of hand hygiene moment (compliance) of 4 professional category codes in October month.

Category	Actions	Opportunities	Compliance
Nurse	263	264	263x100/264=99.6%
ANM	190	194	190x100/194=98%
Doctor	134	135	134x100/135=99%
Other	134	141	134x100/141= 95%

The above table 1 exhibits the frequency of actions and opportunities in October month.

Table 2 displays the percentage distribution of hand hygiene compliance in October month.

In a view of hand hygiene compliance in October month, the largest group observed were in the category of nurses which consist 99.6%, 99% were in doctors category and followed by ANM 98%. The small group observed was 95% in the other category.



Graph 1: Compliance in October month

Table 3: Frequency of action and opportunities of 4 professional category codes in November month

Category	Nurse		ANM		Doctor		Other	
Moment	Action	Opportunities	Action	Opportunities	Action	Opportunities	Action	Opportunities
1	10	10	8	8	9	9	4	5
2	10	10	6	6	9	9	4	4
3	9	10	2	2	3	3	1	1
4	10	10	2	2	2	2	1	1
5	10	10	5	5	6	6	2	2
6	9	10	5	5	5	5	2	2
7	9	10	6	6	6	6	2	2
8	10	10	10	10	6	6	3	3
9	8	10	9	10	10	10	10	10
10	9	10	10	10	10	10	10	10
11	10	10	8	10	10	10	9	10
12	9	10	10	10	7	10	9	10
13	10	10	10	10	10	10	4	4
14	10	10	10	10	6	6	2	2
15	10	10	10	10	10	10	5	5
16	10	10	6	6	4	4	4	4
17	10	10	9	10	-	-	9	10
18	9	10	9	10	-	-	9	10
19	10	10	10	10	-	-	8	9
20	10	10	9	10	-	-	9	10
21	7	7	6	6	5	5	4	4
22	8	8	6	6	6	3	4	4
23	10	10	5	5	5	5	3	3
24	10	10	5	5	5	5	3	3
25	10	10	9	10	10	10	-	-
26	10	10	9	10	10	10	-	-
27	10	10	10	10	10	10	-	-
28	6	6	6	6	4	6	6	6
29	7	7	3	3	4	4	7	7
30	6	6	5	5	5	5	8	8
31	8	8	4	4	4	4	7	7
Total	284	292	222	230	181	183	149	156

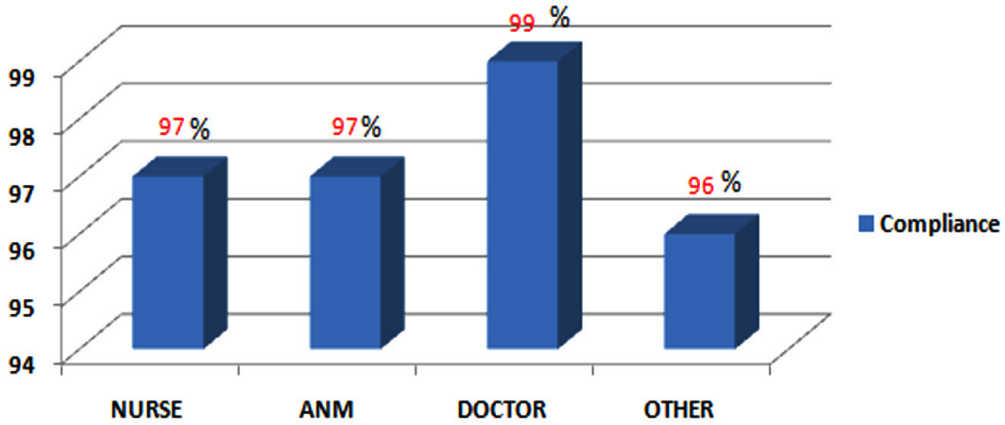
Table 4: Frequency of action, opportunities and percentage distribution of hand hygiene moment (compliance) of 4 professional category codes in November month

Category	Action	Opportunities	Compliance
Nurse	284	292	284x100/292=97%
ANM	222	230	222x100/230=97%
Doctor	181	183	181x100/183=99%
Other	149	156	149x100/156=96%

Table 3 reveals that the frequency of action and opportunities in November month.

Table 4 depicts that the percentage distribution of hand hygiene moment (compliance) in November month.

In accordance with the percentage distribution of hand hygiene compliance in November month, most percentage distribution 99% belongs to the category of doctor. There was an equal distribution among nurse and ANM category which was 97%, whereas the least percentage distribution 96% belong to the category of others.



Graph 2: Compliance in November month

Table 5: Frequency of action and opportunities of 4 professional category codes in December month

Category	Nurse		ANM		Doctor		Other	
Moment	Action	Opportunities	Action	Opportunities	Action	Opportunities	Action	Opportunities
1	10	10	6	6	6	6	4	4
2	9	10	7	7	6	6	3	3
3	10	10	5	6	5	5	2	2
4	10	10	7	7	5	5	4	4
5	5	5	3	3	5	5	7	7
6	7	7	3	3	6	6	6	6
7	6	6	4	4	5	5	6	6
8	7	7	4	4	5	5	6	6
9	9	10	10	10	-	-	9	10
10	10	10	9	10	-	-	10	10
11	10	10	2	2	3	3	2	2
12	10	10	7	7	9	9	5	5
13	10	10	3	3	3	3	1	1
14	10	10	9	9	10	10	8	8
15	10	10	7	7	4	4	3	3
16	10	10	4	4	6	6	5	5
17	9	10	-	-	9	10	10	10
18	10	10	-	-	10	10	8	10
19	10	10	9	10	10	10	-	-
20	10	10	10	10	6	6	4	4
21	10	10	10	10	7	7	4	4
22	10	10	10	10	10	10	6	6
23	10	10	10	10	-	-	9	10
24	9	10	9	10	-	-	8	10
25	9	10	9	10	10	10	9	10
26	8	10	6	10	10	10	10	10
27	9	10	10	10	9	10	8	8
28	10	10	10	10	10	10	-	-
29	9	10	5	5	5	5	5	5
30	10	10	5	5	5	5	5	5
Total	276	285	193	202	179	181	167	174

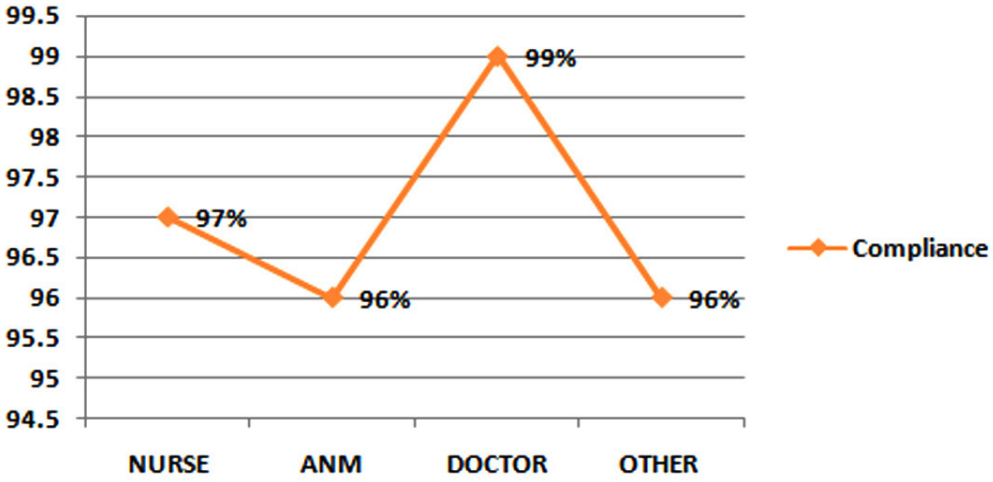
Table 6: Frequency of action and opportunities and percentage distribution of hand hygiene moment (compliance) of 4 professional category codes in December month

Category	Action	Opportunities	Compliance
Nurse	276	285	276x100/285 = 97%
ANM	193	202	193x100/202= 96%
Doctor	179	181	179x100/181=99%
Other	167	174	167x100/174=96%

The above table 5 shows that the frequency of action and opportunities in December month.

Table 6 illustrates that the percentage distribution of hand hygiene moment (compliance) in December month.

Regarding the professional category codes, it implies that majority of hand hygiene compliance belong to the category of doctor 99%, 97% of hand hygiene compliance were in the professional category of nurse and 96% were equally distributed to the category such as ANM & others.



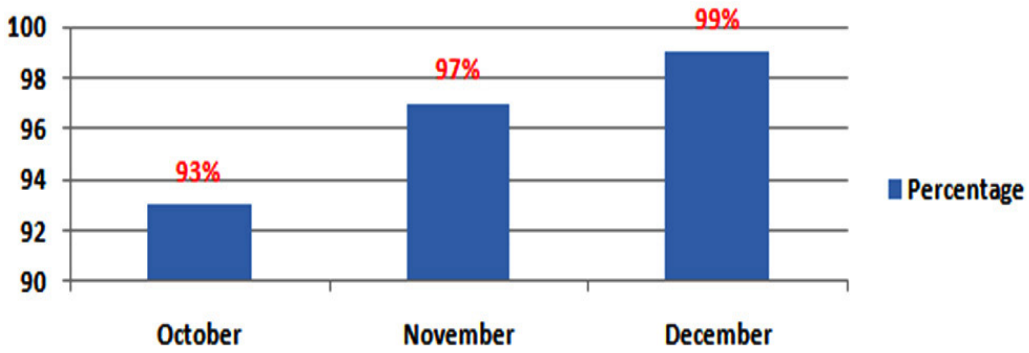
Graph 3: Compliance in December month

Table 7: Percentage distribution of hand hygiene moment (compliance) during 3 months.

Month	Compliance
October	93%
November	97%
December	99%

Table 7 reveals that the percentage distribution of hand hygiene moment during 3 months.

With the reference to the percentage distribution of hand hygiene compliance, 93% was noted in October month and the percentage was gradually increased to 97% in November month and 99% in December month.



Graph 3: Compliance

RESULTS

The results of the study were discussed with the reference to the objectives of the study. The findings of the study were summarized below.

- In a view of hand hygiene compliance in October month, the largest group observed were in the category of nurses which consist 99.6%, 99% were in doctors category, followed by ANM 98%. The small group observed was 95% in the other category.
- In accordance with the percentage distribution of hand hygiene compliance in November month, most percentage distribution 99% belongs to the category of doctor. There was an equal distribution among nurse and ANM category which was 97%, whereas the least percentage distribution 96% belong to the category of others.
- Regarding the December month hand hygiene compliance, it implies that majority of hand hygiene compliance belong to the category of doctor 99%, 97% of hand hygiene compliance were in the professional category of nurse and 96% were equally distributed to the category such as ANM & others.
- With the reference to the percentage distribution of hand hygiene compliance, 93% was noted in October month and the percentage was gradually increased to 97% in November month and 99% in December month.

DISCUSSION

The findings of the study are discussed below,

The overall hand hygiene compliance of the hospital is gradually increased from 93%-99% in the 3 month duration. That is the greatest achievement by the quality control department of the hospital. But in this study, doctors were found to be more compliant with hand hygiene practice compared to nurses and other HCWs. The study showed that the lowest compliance rates were among ANM and other category which support the finding of this study & indicates that many of them are unable to act as role models. The hand hygiene compliance of nurses and ANMs were gradually decreased from 99.6% to 97% and 98% - 96%, which is clearly point out the importance of awareness program and in service education among the nurses, ANMs and other staff category.

SUMMARY

The present study was undertaken to explore the hand hygiene compliance among health care workers. The main objectives of the study were to explore the hand hygiene compliance rate among health care workers focuses in 5 moments and to improve the hand hygiene practices among health care workers. In this study the variables were age, gender, education status of the subjects. Review of literature was discussed about the observational studies related to hand hygiene compliance. Quantitative approach was adapted for this study. The design used was co relational retrospective design. The setting of the study was selected as Sun Medical Research and Centre, Thrissur. Convenient sampling technique was utilized to collect data from 872 subjects, who meet the inclusion criteria. The tool used for the study was observational checklist. The study was conducted from 1/10/2020 to 31/12/2020 in SMC, Thrissur. The collected data were analyzed on the basis of thematic analysis. The findings of the study revealed that the overall hand hygiene compliance of the hospital is gradually increased from 93%-99% in the 3 month duration. But doctors were found to be more compliant with hand hygiene practice compared to nurses and other HCWs. The study showed the lowest compliance rates were among ANM and other category which gradually decreased from 99.6% to 97% and 98%-96%.

CONCLUSION

Hand hygiene is the first line of defense against the spread of many infections. The study explored the hand hygiene compliance among health care workers. Findings of this study are useful for the health care workers to improve the awareness about hand hygiene in each unit and to protect themselves as well as patients. The study results are helpful to the quality department with the support from higher administration of the organization to enhance the compliance to 100% by Improving the availability, display of written hand hygiene protocols, supervision, feedback and quality improvement activities.

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RFP Indian Journal of Hospital Infection
Volume 4 Number 1, January-June 2022

Malaria as a Hospital Infection

Arvind Nath

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Abstract

Malaria can occur as a hospital infection in essentially three ways. One, by the transmission of the Plasmodium parasite from a Malaria patient admitted in the hospital to another patient through the bite of a female Anopheles mosquito. Secondly, it can occur by the transfusion of blood containing the Plasmodium parasite that has not been properly screened. Third, Malaria transmission can occur from an infected patient to non-infected one via gloves and needles contaminated with blood of the infected patient that are used to handle intravenous lines and solutions for the non-infected patient.

Keywords: Malaria, Hospital, Infection.

INTRODUCTION

Malaria as a hospital infection is not a common occurrence. However, it can occur under special circumstances which favor the transmission of the Plasmodium parasite from the infected patient to the non-infected patient. This article describes these situations and remedies to overcome them.

MATERIALS AND METHODS

An internet-based search was made for hospital-acquired Malaria occurring anywhere in the world and relevant articles were selected.

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RESULTS

Three articles were found to describe the transmission of Malaria in the hospital via the blood-borne method. However, no article was found that documented vector borne transmission of Malaria in the hospital.

DISCUSSION

The vector-borne transmission of Malaria in the hospital is easily preventable but highly overlooked. What is required is that the Malaria patient must be kept in a room which has the windows and door screened. Thus, female Anopheles mosquitoes, if present in the hospital premises, will not gain access to the patient for a blood meal and therefore even if they bite other patients, will not transmit the Plasmodium parasite.

The injudicious use of the same syringes, needles, and gloves for a Malaria patient as well as non-Malaria patients leads to spread of the

Plasmodium parasite either through blood or infected erythrocytes.[1-3] Therefore, utmost attention to infection control practices is a must in order to prevent such instances from occurring. Similarly, if thorough screening of blood for the Plasmodium parasite is carried out prior to transfusion, then this mode of transmission of Malaria too can be controlled.

CONCLUSION

Hospital acquired Malaria is preventable if careful attention is paid to the various modes of transmission of the disease.

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Volume 4 Number 1, January-June 2022

Ten Commands for Coping with COVID-19: Basic Minimum Measures

Arvind Nath[1], Eunice Marumudi[2], Brig. Anant Nagendra[3]

How to cite this article:
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The understated very basic precautionary measures are intended for the poorer section of the society who cannot afford or have access to masks, gloves, or other resources:

1. Please follow the directions of the local authorities and the society for preventive actions to be taken. Most importantly *Stay At Home* and avoid contact with others.
2. A cloth the size of a large hanky can be folded three or four times and a piece of elastic can be stitched on at the ends to make a mask. This should be good enough unless you are in contact with a suspected or known positive case of Covid 19. This mask can be boiled, sundried and if possible, hot iron pressed for reuse. One-part bleach and 4 parts waters can also be used to soak it for 30 minutes before wash. Those who cannot even stitch can simply fold it twice and tie against the back of the head. This will also help you in not touching the nose or eyes.
3. For hands, soap, and water with vigorous rubbing to generate foam is good enough. Wash thoroughly covering all parts of the hand - take care to allow water to run from fingers down to elbow. Wash frequently and make sure not to touch nose or eyes. Those who don't have soaps can soak soapnuts (Reetha/Shikakai) in one big container and use throughout the day for washing the hands.
4. Alternative methods for sanitizing hands, concentrated neem water (bunch of neem leaves boiled in water and cooled) can be used as day-to-day sanitizer. For those who don't have even cooking facilities, they can crush few eucalyptus leaves and sanitize.
5. A hot press for the clothes is good enough if they cannot be washed frequently. Those who don't have hot press can dry it in sunlight.
6. Wipe all suspect surfaces with soap. Any cheap soap should be ok. The solution described in Point No. 2 above can also be used for wiping surfaces. Doors, door handles, knobs, switches are important areas for sanitization.
7. Keep distance of at least six feet from others, avoid unnecessary movement and contact with people – known or unknown.
8. Please report to doctor if you have had contact with a person with suspicion of Covid-19 infection. Watch out for fever and report to doctor immediately. A dry cough with fever is a more serious indication for reporting to a medical facility nearby. Sneeze only into your shoulders and not by covering with hand. Cough into a newspaper or any paper

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if tissue is not available and immediately burn the used paper and wash hands again. Report suspicious cases of people relatives or friends - with fever and dry cough to doctors. Strictly follow directions if you are placed in self quarantine.

9. For relieving the symptoms like cold, cough, (if not associated with fever) few drops of eucalyptus oil can be inhaled with steam inhalation or leaves can be boiled and inhaled.
10. Remain calm. Drink lot of fluids, particularly buttermilk since it has lot of lactobacilli to boost the immunity. Citrus fruits can be consumed like lemon/amla/guava. Those who cannot afford citrus fruits can consume few pieces of raw allicin rich foods like garlic and onion.

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