

# After CABG Operation, How The Patients Experience Mechanical Ventilation In Critical Care Unit

Dr. Kasturi Mandal<sup>1</sup>, Ipsita Mani<sup>2</sup>, kathika Pattanayak<sup>3</sup>, Madhusri Manna<sup>4</sup>

<sup>1,3,4</sup>(College of Nursing, R.N Tagore Hospital, Kolkata, West Bengal )

<sup>2</sup>(sister Nivedita university, Nursing Institute, Kolkata, West Bengal)

## Abstract:

**Background:** With scientific and technical progress in medical care, as an important respiratory support approach, mechanical ventilation has been increasingly applied in the critical care unit. Patients who are connected to a mechanical ventilator are unable to communicate effectively with significant others. It has also been previously documented that patients on a ventilator often experience discomfort and frustration due to their inability to communicate with others. This was intimately related to feelings of anxiety, fear and agony, which created feelings of insecurity while they were on the ventilator. Present study aimed to find out how the patients undergone CABG experiences mechanical ventilation

**Materials and Methods:** A cross-sectional observational study was conducted in critical care unit of only one hospital. Data collected with the valid and reliable interview schedule in 5 dimensions of experiences of mechanical ventilation. Total 75 patients who undergone coronary artery bypass grafting and was in mechanical ventilation were enrolled from the ward by purposive sampling technique.

**Results:** 75% patients experienced discomfort during mechanical ventilation and main reason was presence of tube; 33% patients experienced stress, helplessness; 23% patients experienced of visualizing dots, shadow and 64% patients experienced disturbance from ventilator & monitor alarms in critical care unit. 12% patients experienced care givers did not pay attention; 20% patients felt their needs were disregarded; 8% patients expressed care givers made derogatory comments. Experiences of Physical problems ( $r=0.219$  ( $df=73$ ); $p<0.05$ ) and perceived environment ( $r=0.356$  ( $df=73$ ); $p<0.05$ ) are positively correlated with duration of mechanical ventilation, whereas experience of psychological problems ( $r=-0.342$  ( $df=73$ ); $p<0.05$ ) and perceived environment ( $r=-0.298$  ( $df=73$ ); $p<0.05$ ) are negatively correlated with duration of sedation and analgesic used.

**Conclusion:** Among all the patients, most bothering problems were discomfort, helplessness, disturbances from conversation. Few experiences are inevitable but there are many areas of negative experiences of patients when they were in mechanical ventilation, could be limited with proper strategies.

**Key Word:** Mechanical ventilation, experiences, Critical Care unit, CABG.

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## I. Introduction

The patients will receive mechanical ventilation in ICU every day. Mechanical ventilation is a life-saving and frequently used treatment modality in a variety of medical diagnoses in the Intensive Care Unit. Despite this fact, mechanical ventilation can be a distressing experience for the patient and may result in overwhelming levels of anxiety and discomfort<sup>1</sup> which can have consequences in both the short and long-term outcomes for these patients<sup>2</sup>. In addition, mechanically ventilated patients are susceptible to various stressors such as fear, agitation, communication problems and loss of control and as such, these patients are reliant on ICU staff for their care needs<sup>3</sup>.

Many studies conducted overseas have found that the depth of sedation has an impact on perception of stressful experiences and that lighter sedation seems to increase the risk of perceiving experiences in ICU as more bothersome<sup>4,5</sup>. Also, this seems to suggest mechanically ventilated patients may be expected to endure anxiety and discomfort, in addition to their illness situation<sup>6,7</sup>

In a descriptive study exploring the level of frustration of mechanically ventilated patients and the intervention of health care professionals regarding communication, data analysis revealed that 62% of the participants expressed high levels of frustration in communicating their needs. With regard to interventions provided by the health personnel in promoting communication of needs, 66% of the patients applauded the professional intervention as being helpful, 24% said the intervention wasn't useful to them and 10% indicated the professionals were never helpful when it came to communication<sup>8</sup>. The inability to communicate was expressed as the worst experience, as patients felt annoyed when they could not be understood by the health care

professionals.<sup>9</sup> The inability to communicate by the participants was experienced as hard, especially with their inability to use any of the alternative means of communication or sign language due to the weakness of their muscles and body, resulting in frustration and panic<sup>10</sup> Failed communication was expressed by the participants as the inability of the healthcare workers to understand their messages of distress, wishes or needs<sup>11</sup>.

## **II. Material And Methods**

Quantitative research approach was adopted. This was a single center descriptive study conducted over two month period in a selected multispecialty hospital in Kolkata. Research Questions of the study were

1. How did the patient experience mechanical ventilation after CABG operation when they were in critical care unit?
2. What was the relationship between duration of mechanical ventilation and experiences in different dimensions?
3. What was the relationship between duration of sedation and analgesia used and experiences in different dimensions?

**Sample size and sampling technique:** considering the average proportion of problems experiences in different dimension as 75% from the small-scale study conducted earlier, 95 % desired level of confidence and 10 % acceptable margin of error, the calculated sample size was 73. Hence total 75 patients were selected by purposive sampling Though it was quantitative research, but data nature was little bit qualitative ie semi-structured interview schedule was used. For that reason purposive sampling technique was adopted. Sampling inclusion criteria were

- Patients who experienced mechanical ventilation and undergone coronary artery bypass grafting ( CABG) procedure
- and extubated in the ITU during two month period and
- also were willing to express the remembered experience of mechanical ventilation

**Data collection tools and techniques :** Patients' experience of mechanical ventilation were assessed in 5 dimensions and were asked to recall the CCU experience when they were in mechanical ventilation. Data were collected through one interview schedule on background of information, one record analysis proforma, one interview guide on ventilator care experience inventory scale which was based on published qualitative studies and one focused group discussion with 6 extubated patients. The scale included 42 items and three parts reflecting the following 5 dimensionalities of the patients' experience with ventilation.

Face validity of the tools was established by the experts from Intensive care unit and the faculty. Tools were tested for content validity by seven experts had specialization and critical care experience. Content validity index of interview schedule on background of information, one interview guide based on ventilator care experience inventory scale and record analysis proforma were 0.97, 0.95, 1 respectively. Reliability of tool were established by inter rater method. Percentage of agreement was calculated for interview schedule on background of information and value was 100 %. Pearson r was calculated for interview guide on ventilator care experience inventory scale and record analysis proforma and it was 0.82 and 1.0 respectively. The tool was translated to Bengali and re translated to English by language experts. Hence tools were valid and reliable for the purpose of the study.

The scale had three parts and included 42 items reflecting the following 5 dimensionalities of the patients' experience with ventilation.

- Experiences of physical problems,
- Experiences of psychological problems
- Experiences of perceptual problems.
- Experiences of environmental problems
- Experiences of care givers and care

Part A consisted of experiences of physical problems, psychological problems and perceptual problems.

- Experiences of physical problems like pain, feeling of choked, thirst, difficulty in swallowing, discomfort due to presence of tubing, handling of body, impaired communication, loss of movement, strange environment, suctioning and not being able to sleep etc. Total items in this area were 11.
- Experiences of psychological problems like fearfulness, fear of death, frustration, anxiety, feeling of insecurity, feeling of helplessness, feeling of isolation, anger etc. Items were 8
- Experiences of perceptual problems like horrifying memory of people trying to harm him, strange experience ( visualizing dots, shadows, colors, figures everywhere, hearing strange voice, feeling of something moving over the body etc. Items were 4

Part B consisted of experiences of environmental problems like disturbing noise of ventilator alarms, staff conversation, disturbance by bright light of ITU, irritation by rushing in and out with high intensity activities, different types of machines attached, breathing tube, invasive lines etc. Total items were 5.

Part C consisted of experiences of care givers and care like paying attention, making derogatory comment, disregarding wishes, unnecessary handling, drainage extraction, frequent physical examination, caring attitude, timely response to the need etc. Total Items were 14. Three answering modes i.e. Consent mode, frequency mode and experience severity mode were used in this scale.

Experiences of physical, psychological, perceptual problems and experiences of environments were assessed in *consent mode* and experience *severity mode*. Experiences of nurse and nursing care were assessed in *frequency mode*;

In **consent mode** , 2 levels scoring method (yes/ no) was used; in **experiences severity mode**, 4 levels scoring method was used (1 = not bothered, 2 = slightly bothered, 3 = moderate bothered, 4 = extremely bothered). Experiences of care givers and care during ventilation were assessed in frequency mode. In **frequency mode** 5 levels scoring method were used (5 = all time, 4 = most time, 3 = some times, 2 = seldom, 1 = never.). To avoid any response set of participants, positive and negative scoring was used. Higher score indicated bad experience. Extremely bother was considered as very bad experience, little bothered was considered as slightly bad experience.

This study was conducted after Ethical committee approval. Informed consent obtained and anonymity and confidentiality were maintained.

### Statistical analysis

Descriptive statistics used for description of sample characteristics, experiences in different dimensions. Inferential statistics (Pearson r) calculated to find out the relationship between experience and duration of sedation, analgesia and mechanical ventilation.

### III. Result

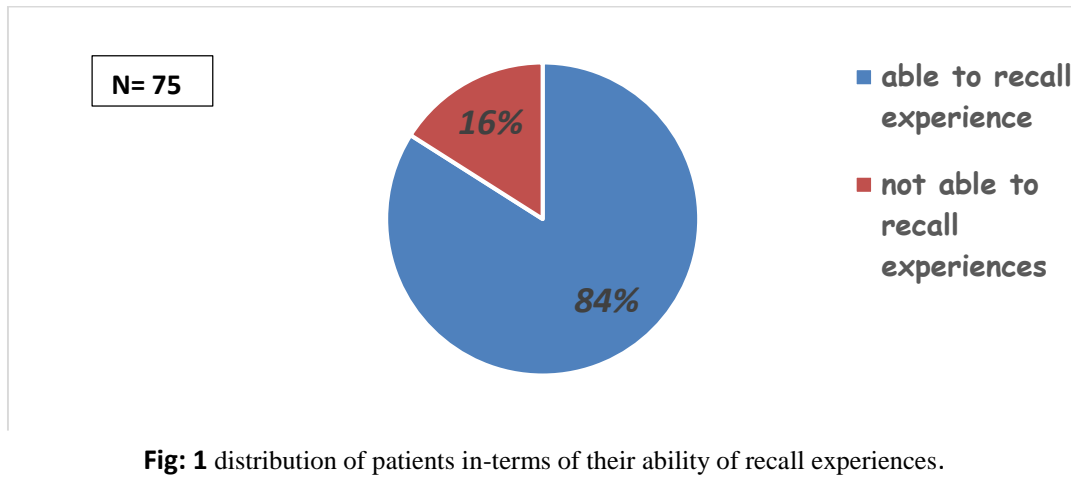
Data presented in table 1 shows that higher proportion of the patients belonged to the age group 50 – 59 years and 60 – 69 years. Most of the patients i.e 80 % were male and had common habit of smoking. Only 3 % patients had experience of mechanical ventilation earlier and 11 % patient had previously seen any patient with mechanical ventilation.

Data presented in Figure 1 reflects that only 16 % patients were not able to experience of mechanical ventilation

**Table no : 1 Distribution of participants in terms of characteristics**  
N = 75

Sl. No	Characteristics	Frequency	percentages
	Age (yrs)		
	• 40 – 49	14	19
	• 50 – 59	28	37
	• 60 – 69	28	37
	• >70	5	7
2.	Gender		
	• Male	62	83
	• female	13	17
3.	Use of substance *		
	• Smoking	38	51
	• Alcohol	9	19
	• Guthka, pan	14	11
	• No use of substance	20	26
5.	Previous Experience*		
	• Previous hospital admission	17	23
	• Previous experience of Mechanical ventilation	2	3.0
	• Previously seen any patient with mechanical ventilation	8	11

\* All the data are not mutually exclusive and exhaustive



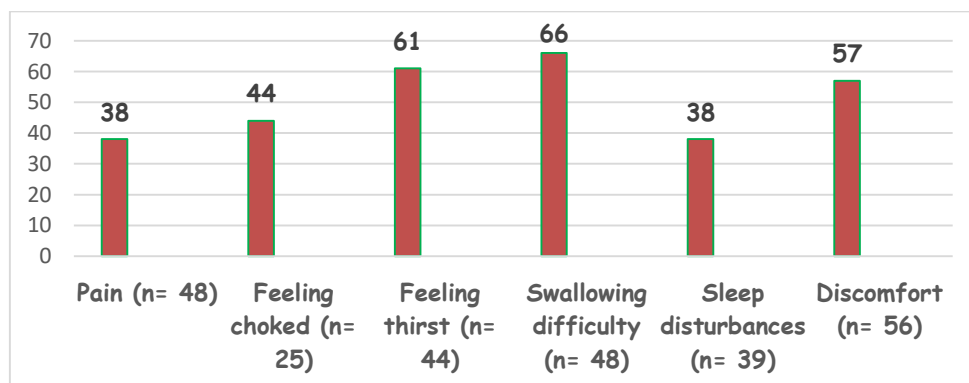
Data presented in **table 2** shows that majority ( 75%) patients experienced and recalled that they were in discomfort in mechanical ventilation. Among all mechanical ventilated patients , most bothering or annoying physical problems were feeling of discomfort followed by swallowing difficulty. The least bothering physical problems were feeling choaked followed by pain as evident from mean score of annoying/bothersome experience from physical problems

Patient who experienced each problem, further their experiences were categorized in dichotomous data; Not bothering ( merging not bothered and slightly bothered) and bothering ( merging moderately bothered and highly bothered). Among the patients experienced each specific physical problem, highest proportion of bothered or annoying problem were swallowing difficulty followed by feeling thirst. Lowest proportion of bothered physical problems were found in the experience of Sleep disturbance & pain which is highlighted in **figure - 2** Data of the **Figure 3** reflects presence of tube was the main reason of discomfort and minor reason was restriction in movements.

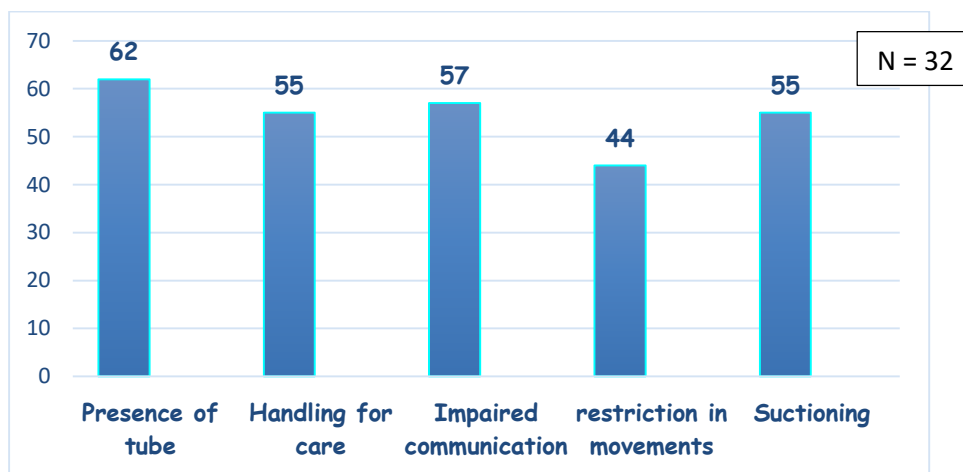
**Table no – 2 Experience of physical problems which bothered moderate to severe during mechanical ventilation.**

**N= 75**

	Physical problems	No of participants experience		Maximum score	Mean score of annoying/bothersome experience from physical problems
		Frequency	Percentage		
1.	Pain	48	64	4	1.61
2.	Feeling choked	25	33	4	0.90
3.	Feeling thirst	44	58	4	1.73
4.	Swallowing difficulty	48	64	4	1.84
5.	Sleep disturbances	39	52	4	1.65
6.	Discomfort	56	75	4	2.24



**Fig: 2** Experience of physical problems which bothered moderate to severe during mechanical ventilation



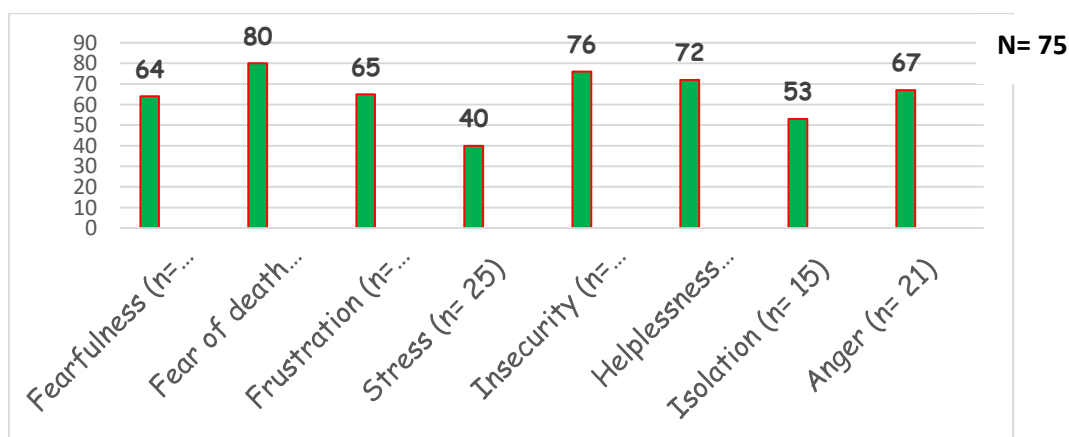
**Figure no – 3** Moderate to severe bothering reasons of discomfort during mechanical ventilation

Data presented in **table 3** shows that 33% patients experienced and recalled that they experienced stress and helplessness during mechanical ventilation. Among all mechanical ventilated patients, most bothering or annoying psychological problems were feeling of helplessness followed by insecurity. The least bothering psychological problems were fearfulness followed by feeling of isolation as evident from mean score of annoying/bothersome experience from psychological problems.

**Table no – 3 Experience of Psychological problems which bothered moderate to severe**  
N= 75

	Psychological problems	No of participants experience		Maximum score	Mean score of annoying/bothersome experience from psychological problems
		Frequency	Percentage		
1	Fearfulness	22	29	4	0.50
2	Fear of death	15	20	4	0.72
3	Frustration	23	31	4	0.96
4	Stress	25	33	4	0.93
5	Insecurity	21	28	4	0.98
6	Helplessness	25	33	4	<b>1.09</b>
7	Isolation	15	20	4	0.58
8	Anger	21	28	4	0.89

Among the patients experienced each specific psychological problem, highest proportion of bothered or annoying problem were fear of death followed by feeling of insecurity. Lowest proportion of bothered psychological problems were found in the experience of stress which is highlighted in **figure - 4**

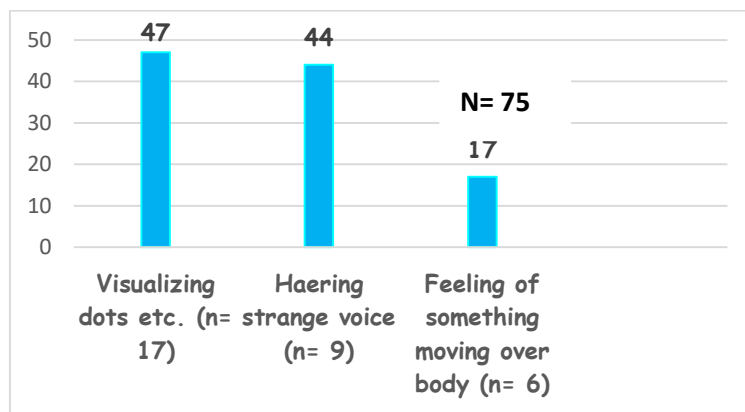


Data presented in table 4 shows that 23% patients experienced and recalled that they had experience of Visualizing dots, shadow, colours figures everywhere during mechanical ventilation. Among all mechanical ventilated patients, most bothering or annoying perceptual problem was Visualizing dots, shadow, colours figures everywhere.

The data from Figure – 5 shows that among the patients experienced each specific perceptual problem, highest proportion of bothered or annoying perceptual problems was Visualizing dots, shadow, colours figures everywhere.

**Table no – 4 Experience of Perceptual problems which bothered moderate to severe**  
N= 75

	Perceptual problems	No of participants experience		Maximum score	Mean score of annoying/bothersome experience from perceptual problems
		Frequency	Percentage		
1.	Visualizing dots, shadow, colors figures everywhere	17	23	4	0.61
2.	Hearing strange voice	9	12	4	0.32
3.	Feeling of something moving over body	6	8	4	0.12



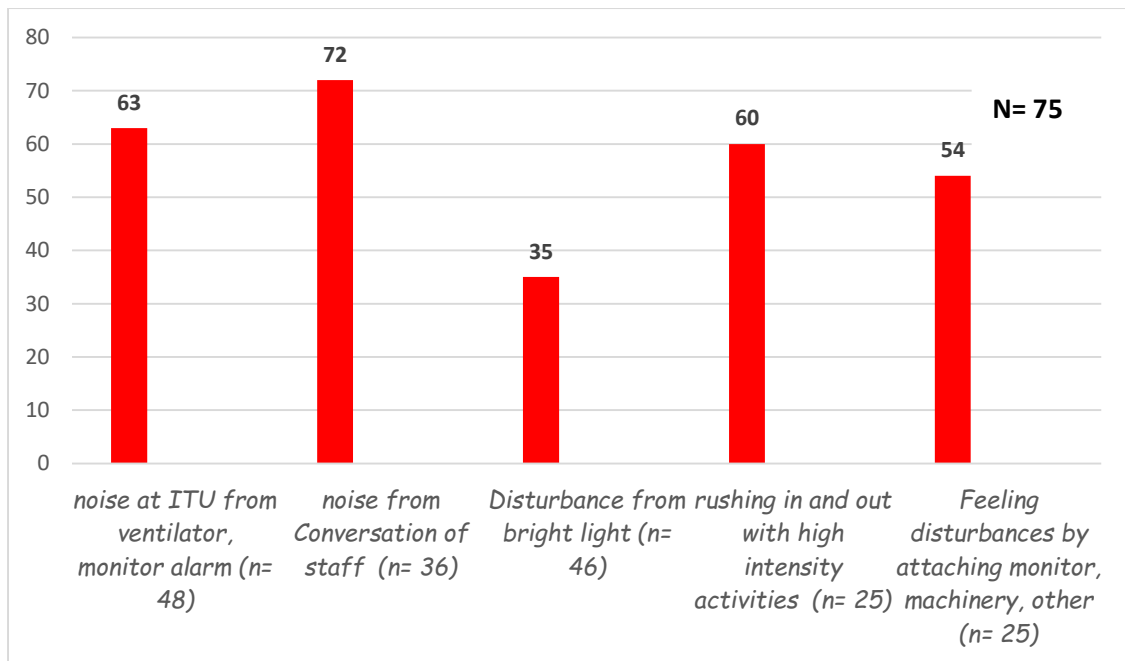
**Fig: 5.** Experience of perceptual problems which bothered moderate to severe

Data presented in **table 5** shows that majority ( 64%) patients experienced and recalled that they experienced Disturbance from noise at ITU from ventilator, monitor alarm during mechanical ventilation. Among all mechanical ventilated patients, most bothering or annoying problems from environment were feeling of disturbance from noise at ITU from ventilator, monitor alarm as evident from mean score of annoying/bothersome experience from perceived environment

**Table no – 5 Experience of environment which bothered moderate to severe during mechanical ventilation.**  
N= 75

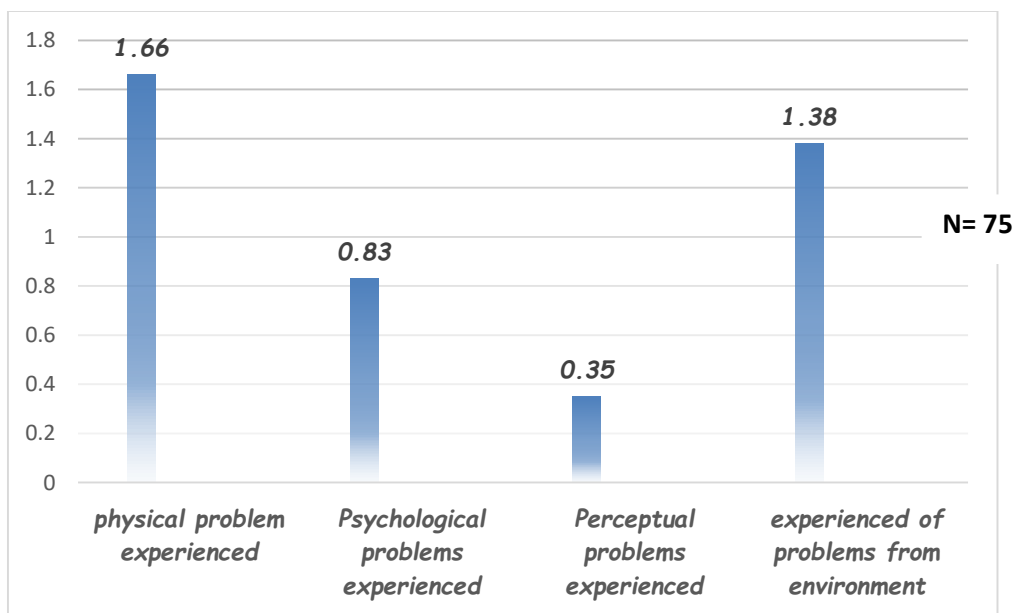
	Perceived environment	No of participants experience		Maximum score	Mean score of annoying/bothersome experience from Environment of critical care unit
		Frequency	Percentage		
1	Disturbance from noise at ITU from ventilator, monitor alarm	48	64	4	1.88
2	Disturbance from noise from Conversation of staff	36	48	4	1.54
3	Disturbance from bright light	46	61	4	1.40
4	Irritation from rushing in and out with high intensity activities	25	33	4	1.05
5	Feeling disturbances by attaching monitor, machinery, other equipment	26	35	4	1.01

The data from **Figure – 6** shows that among the patients experienced problems from perceived environment, highest proportion of bothered or annoying problem were disturbance from noise from conversation of staff followed by disturbance from noise at ITU from ventilator, monitor alarm.



**Figure no – 6 Moderate to severe bothering reasons of disturbances from environment during mechanical ventilation**

Data from **Figure – 7** represents experience of physical problems followed by experiences of disturbances from perceived environment occurred more whereas perceptual problem occurred least.



**Figure no – 7 Average mean score of different problems bothering the patients during mechanical ventilation**

Data presented in **Table no 6** reflects that 12% patients experienced care givers did not pay attention; 20% patients felt their needs were disregarded; 8% patients expressed care givers made derogatory comments. 24% and 28% patients experienced unpleasant interventions during drainage removal and suctioning respectively;

37% patients reported caregivers did not provide adequate explanation. 72% patients reported that they experienced caregivers as caring and compassionate.

**Table no – 6**  
**Experience of care giver and care during mechanical ventilation in critical care unit.**  
**N = 75**

	Experience of care givers and care	No of patients experience	
		Frequency	Percentage
1.	Experience of disrespect by nurse		
	• Not paying attention	9	12
	• Making derogatory comments	6	8
	• Disregarding need	15	20
	• Handling unnecessarily	10	13
2.	Experience of unpleasant intervention		
	• Drainage extraction	21	28
	• Frequent physical examination	7	9
	• Suction	18	24
	• Frequent position change	12	16
3.	Experience of inadequate explanation	28	37
4.	Experience caregiver were understanding whatever was communicated	32	43
5.	Experience caregiver were attending his/ her need	38	51
6.	Experience of caregiver caring and compassionate attitude.	54	72

**Table 7 & 8** shows that mean duration of MV and sedation, analgesia used is 17.8 & 36.4 respectively. Data also suggests that experience of physical problems ( $r=0.219$  ( $df=73$ ); $p<0.05$ ) and perceived environment ( $r=0.356$  ( $df=73$ ); $p<0.05$ ) were positively correlated with duration of mechanical ventilation, whereas experience of psychological problems ( $r=-0.342$  ( $df=73$ ); $p<0.05$ ) and perceived environment ( $r=-0.298$  ( $df=73$ ); $p<0.05$ ) were negatively correlated with duration of sedation and analgesic used.

**Table -7 Duration of mechanical ventilation and sedation used**

Treatment variables	Duration		
	Mean	Median	SD
Mechanical ventilation	17.8	16.2	5.2
Use of sedation & analgesia	36.4	39.5	11.5

**Table -8 correlation coefficient calculation between different areas of experiences and duration of MV and Sedation, analgesia used**

Experiences	Duration of MV	Duration of sedation & analgesia used	df	$\alpha$ level
Physical problems	0.219*	0.187	73	0.05
Psychological Problems	0.143	-0.342*		0.05
Perceptual Problems	0.023	0.015		0.05
Perceived environment	0.356*	-0.298*		0.05

#### IV Discussion

Although factual recollection of pain, discomfort, negative psychological experience appear to be related, increasing the level of sedation is not necessarily the best way to prevent those. Not only will deep sedation lead to increased length of stay in the ICU and prolonged ventilator dependency<sup>16</sup> but it may also have an adverse effect on the rate of post-traumatic stress disorder experienced by patients after their discharge from the ICU<sup>17</sup> The development of drugs that can eliminate the emotional impact of stressful events in the ICU, while preserving mental clarity and memory, might offer the best way to avoid long-term psychological distress<sup>18</sup>.



This study reveals that Patients who undergone CABG operation followed by mechanical ventilation were aware of their surrounding during CCU stay and able to recall experiences in different dimensions. They were aware of what was happening to them though they were sedated. This findings is supported by the findings of the study conducted by Ho Siew Eng et al <sup>16</sup>. To protect patients from these harmful factual memories during their ICU stay, care givers specially bedside nurses should be aware of the need to communicate adequately and respect patients' need<sup>18</sup>.

More importantly, bedside nurses should be more diligent and committed in delivering nursing care to ventilated patients in ICU. They need to minimize the noises which causing the disturbances followed by irritation. Care givers have to set up proper alarm limits in all CCU equipment and do soft conversation. Nurses may be able to reduce the stress associated with endotracheal tube suctioning by providing prior explanations to patients of what they may expect and be gentle during the procedure. They can identify inadequate levels of analgesia and sedation by assessing patients' reactions to the endotracheal tube suctioning<sup>19</sup>.

However, when ventilated ICU patients' feelings are unmet due to the inability to communicate adequately with nurses, these could aggravate anger, discomfort and anxiety <sup>20</sup>. This will subsequently lead to a prolonged rehabilitation and poor recovery that exacerbate physical and psychological disability

## V. Conclusion

Patients with better factual recollection had greater recollection of discomfort. Discomfort thus appears to be a serious problem for patients in a critical care unit . Its prevalence is probably underestimated because retrospective assessment of the degree of discomfort when the patient has been discharged from the ICU is seriously handicapped by global or partial amnesia, caused by critical illness, delusional states and the use of drugs. However, the fact that discomfort is not always remembered does not imply that the patient has not suffered during his or her stay in the ICU. Reduction in discomfort along with disturbances from different sourced noises should remain a focus of attention for both researchers and clinicians caring for critically ill patients.

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**Conflict of interest:** None

**Author Contribution :**

- Conceptualized the proposal, research design, methodology, tool development, FGD, analysis & interpretation of data, manuscript preparation and submission – Kasturi Mandal
- Writing proposal, obtained ethical & administrative permission, field work – Ipsita Mani
- Data collection, data organization, tool development, FGD, field study – kathika Pattanayak, Madhusri Manna.

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