"AN EXPERIMENTAL STUDY TO ASSESS THE EFFECTIVENESS OF HYPERTONIC SALINE NEBULIZED ENDOTRACHEAL SUCTIONING ON HEMODYNAMIC AND RESPIRATORY PARAMETERS AMONG PATIENT IN MECHANICAL VENTILATOR IN SELECTED HOSPITALS OF SOUTH GUJARAT"

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ABSTRACT

Problem statement: "An Experimental Study To Assess The Effectiveness Of Hypertonic Saline Nebulized Endotracheal Suctioning On Hemodynamic And Respiratory Parameters Among Patient In Mechanical Ventilator In Selected Hospitals Of South Gujarat" **Aim of the study:** The aim of the study was to identify the effect of hyper tonic saline nebulized suction on airway clearance among patient connected to mechanical ventilator. **Objectives:** 1) To assess the hemodynamic and respiratory parameters among patient on mechanical ventilator.2) To assess the effectiveness of hypertonic saline nebulized endotracheal suctioning on hemodynamic and respiratory parameters among patient on mechanical ventilator.3) To find out association between the effectiveness of hypertonic saline nebulized endotracheal suctioning with selected demographical variable among patient on mechanical ventilator. **Method:** Quasi experimental research design is sub division of experimental research design. With experimental one group pretest post-test and one control group research design was adopted for this study. A total of 60 patients who connected to mechanical ventilator s were selected by purposive sampling technique. Data was collected by using structured interview schedule

consisting of demographic variables and by investigation of ABG. **Results:** The majority of the patients in control group and experimental of demographical are belongs to 40-55 age groups and male, obese, vegetarian dietary pattern, more than 10 days of hospital stay, industrial worker, on IPPV mode of ventilator, alcoholism habit and smoking habit. Hemodynamic and respiratory parameters are majority in control group and experimental group are normal rage. In relation with hypertonic saline nebulized suction on hemodynamic parameters among patient in mechanical ventilator for experimental pre- test mean 1334.86 and post- test 1317.55 and computed t value is 2.947 and table value is 2.05 its mean that computed value is more than table value mean it's significant. It shows that hypothesis H2 is accepted for experimental group value The obtained chi-square values show that there was a significant association between hypertonic saline nebulized suction score with the selected demographic variables Such as habit of alcohol, smoking, ET suction frequency and present mucolytic drugs & there is no significant association of demographical variable Such as age, sex, dietary pattern, present of respiratory disease, body built, mode of ventilator, ET suction, occupation and past history of ventilator.

INTRODUCTION

An incidence of critically ill patients obtained in every year reveled that patients were admitted in critical care units were mechanically ventilated at the time of CCU admission. Hence it becomes the responsibility of the health care team members to ensure a safe and patent airway for patient with mechanical ventilator to prevent complication. Artificial airway management ensures that patent airway that is close to the patient natural airway. Humidification, nebulization is carried out using a prescribed medication to promote suctioning of secretions.[22]

The incidence of VAP ranges from 13 to 51 per 1000 ventilator days. Many studies from India have investigated the causative organisms of VAP. Pseudomonas spp., Acinetobacter spp., Escherichia coli, Klebsiella pneumoniae, and Staphylococcus aureus were identified as the common VAP pathogens, with varying prevalence[35] Airway suction is one of the most popular methods for drainage airways in patients with artificial airway; thus, correct suction of airways is important. Hence, the purpose of this study is to determine the effects of suction methods with and without normal saline on hemodynamic and respiratory patients.

Hypertonic saline nebulization is the cheapest, safe, effective and easiest way in maintaining the airway patency for a patient connected to a mechanical ventilator

STATEMENT OF THE PROBLEM

"AN EXPERIMENTAL STUDY TO ASSESS THE EFFECTIVENESS OF HYPERTONIC SALINE NEBULIZED ENDOTRACHEAL SUCTIONING ON HEMODYNAMIC AND RESPIRATORY PARAMETERS AMONG PATIENT IN MECHANICAL VENTILATOR IN SELECTED HOSPITALS OF SOUTH GUJARAT"

OBJECTIVES OF THE STUDY

1. To assess the hemodynamic and respiratory parameters among patient on mechanical ventilator
2. To assess the effect of hypertonic saline nebulized endotracheal suctioning on hemodynamic and respiratory parameters among patient on mechanical ventilator
3. To find out association between the effectiveness of hypertonic saline nebulized endotracheal suctioning with selected demographical variable among patient on mechanical ventilator.

HYPOTHESIS

- H_1: There will be significant effectiveness of hypertonic saline nebulized suctioning on hemodynamic and respiratory parameters among patient on mechanical ventilator at level of $p \leq 0.05$
- H_2: There will be a significant association between hemodynamic and respiratory parameters in patient with selected demographical variable at level of $p \leq 0.05$

DELIMITATIONS

This study is delimited to

- A study is limited to 60 sample
- Study is limited to 4 week of data collection
- Study is limited to patient in mechanical ventilator

OPERATIONAL DEFINITIONS

ASSESS: In this study it refers to evaluate effect of hypertonic saline nebulized suctioning on hemodynamic and respiratory parameters in patient undergoing mechanical ventilator in ICU

HYPERTONIC SALINE: This study the hypertonic saline use to nebulization on patient connected to ventilator to improve hemodynamic and respiratory parameters

NEBULIZATION: This study nebulization is administration of hypertonic saline to patient connected to mechanical ventilator

SUCTIONING: In this study suctioning through hypertonic saline nebulized on improve hemodynamic and respiratory parameters in patient undergoing mechanical ventilator in ICU

HEMODYNAMIC PARAMETERS: In this study it refers to assess the hemodynamic parameters are systolic blood pressure, diastolic blood pressure, mean blood pressure, spo2, heart rate, for to see the effect of hypertonic saline nebulized suction on endotracheal patient in ICU

RESPIRATORY PARAMETERS: In this study it refers to assess the Respiratory parameter are respiratory rate, spo2, ABG-PO2, ABG-PCO2, ABG-HCO3 for to see the effect of hypertonic saline nebulized suction on endotracheal patient in ICU

MECHANICAL VENTILATOR: Mechanical ventilator is process of providing respiratory support by means of a mechanical device called a ventilator.[5]

PATIENT

In this is study the patient is who is on mechanical ventilator with endotracheal tube incubated.

RESEARCH METHODOLOGY

REASERCH APPROACH: Quantitative research approach

RESEARCH DESIGN: Quasi experimental i.e. "Pre-test, post-test with one group control and one group experimental

VARIABLES:

Research variables:

- **Independent variable:** Independent Variable is Administration of hypertonic saline nebulization
- **Dependent variable:** Dependent hemodynamic and respiratory parameter
- **Demographic Variables**: Age, sex, dietary pattern, significant of respiratory disease, habit of smoking, habit of alcohol, body built, mode of ventilator, hospital stay, ET suction duration, ET suction frequency, occupation, past history of ventilator, present history on mucolytic drug.

RESEARCH SETTING: Selected Hospitals of south Gujarat

POPULATION AND SAMPLE

POPULATION: Patients who are on mechanical ventilator with endotracheal tube

SAMPLE: samples are 60 patients (who fulfill the selection criteria) of different hospitals at Valsad district.

SAMPLING TECHNIQUE: "Non- probability Purposive" sampling technique

DESCRIPTION OF TOOL:

SECTION- A demographic data

It consists of selected demographic variable like age, sex, life style, habit of smoking, habit of alcoholism, dietary pattern, significant of respiratory diseases, mode of ventilator, body built, ET suction duration, ET suction frequency, past history of ventilator, present on mucolytic drug and hospital stay.

SECTION- B

Clinical characteristics: - such as respiratory rate, heart rate, systolic blood pressure, diastolic blood pressure, mean arterial blood pressure, PEEP, spontaneous respiratory set, tidal volume, spo2, ABG –PH, ABG-po2, ABG-pco2, ABG-HCO3, A-NA+ concentration , A-K+ concentration.

RESULT

Section I: Description demographic characteristics of participants base on percentage and frequency

a) this section describes the demographic profile of patient on mechanical ventilator with endotracheal tube in the control group.

N = 30

SR.NO	DEMOGRAPHIC DATA	FREQUENCY	PERCENTAGE (%)
1.	**Age**		
	a) < 25	0	0.0
	b) 25-40	12	40
	c) 40-55	14	46.67
	d) > 55	4	13.33
2.	**Sex**		
	a) Male	18	60
	b) Female	12	40
	c) Transgender	0	0.0
3.	**Dietary pattern**		
	a) Vegetarian	15	50
	b) Non vegetarian	8	26.67
	c) Mixed	7	23.33
4.	**Significant of respiratory disease**		
	a) Yes	7	23.33
	b) No	8	26.67
	c) Specified	15	50
5.	**Habit of alcohol**		
	a) Yes	4	13.33
	b) No	26	86.67
6.	**Habit of smoking**		
	a) Yes	4	13.33
	b) No	26	86.67
7.	**Body built**		

	a) Healthy	11	36.67
	b) Obese	19	63.33
	c) Malnourish	0	0.0
8.	Mode of ventilator		
	a) SIMV	6	20
	b) IPPV	13	43.33
	c) CPAP	1	3.33
	d) ACV	10	33.33
	e) PSV	0	0.0
	f) CMV	0	0.0
9.	Hospital stay		
	a) 1-5 days	0	0.0
	b) 5-10 days	13	43.33
	c) More than 10 days	17	56.67
10.	ET suction duration		
	a) 10sec	30	100
	b) 15 sec	0	0.0
11.	ET suction frequency		
	a) 2 hourly	14	46.67
	b) Medical require	16	53.33
12.	Occupation of patient		
	a) Farmer	3	10
	b) Industrial worker	14	46.67
	c) Businessmen	0	0.0
	d) Non worker	13	43.33
13.	Past history of ventilator		
	a) Yes	0	0.0
	b) No	30	100
14.	Patient on Present mucolytic drug		
	a) Yes	17	56.67
	b) No	13	43.33

this section describes the demographic profile of patient connected to ventilator with ET tube in the experimental group. N = 30

SR.NO	DEMOGRAPHIC DATA	FREQUENCY	PERCENTAGE (%)
1.	**Age**		
	a) < 25	7	23.33
	b) 25-40	9	30
	c) 40-55	12	40
	d) > 55	2	6.67
2.	**Sex**		
	a) Male	19	63.33
	b) Female	11	36.67
	c) Transgender	0	0.0
3.	**Dietary pattern**		
	a) Vegetarian	13	43.33
	b) Non vegetarian	8	26.67
	c) Mixed	9	30
4.	**Significant of respiratory disease**		
	a) Yes	7	23.33
	b) No	19	63.33
	c) Specified	4	13.33
5.	**Habit of alcohol**		
	a) Yes	5	16.67
	b) No	25	83.33
6.	**Habit of smoking**		
	a) Yes	2	6.67
	b) No	28	93.33
7.	**Body built**		
	a) Healthy	14	46.67
	b) Obese	16	53.33
	c) Malnourish	0	0.0
8.	**Mode of ventilator**		
	a) SIMV	2	6.67
	b) IPPV	18	60
	c) CPAP	0	0.0
	d) ACV	10	33.33
	e) PSV	0	0.0
	f) CMV	0	0.0
9.	**Hospital stay**		

	a) 1-5 days	0	0.0
	b) 5-10 days	8	26.67
	c) More than 10 days	22	73.33
10.	**ET suction duration**		
	a) 10sec	30	100
	b) 15 sec	0	0.0
11.	**ET suction frequency**		
	a) 2 hourly	18	60
	b) Medical require	12	40
12.	**Occupation of patient**		
	a) Farmer	4	13.33
	b) Industrial worker	15	50
	c) Businessmen	0	0..0
	d) Non worker	11	36.67
13.	**Past history of ventilator**		
	a) Yes	2	6.67
	b) No	28	93.33
14.	**Patient on Present mucolytic drug**		
	a) Yes	8	26.67
	b) No	22	73.33

SECTION II: FREQUENCY & PERCENTAGE DISTRIBUTION OF SAMPLE IN EXPERIMENTAL AND CONTROL GROUP ON DEMOGRAPHICAL VARIABLES.

a) this section describes the distribution of respiratory and hemodynamic variables of control group of patient connected to ventilator with ET tube - pre-test

SR.NO	RESPIRATORY & HEMODYNAMIC VARIABLE	FREQUENCY	PERCENTAGE (%)
1.	**Heart rate**		
	a) 60-100 beats/min	24	80
	b) >100	6	20
	c) <60	0	0.0
2.	**Respiratory rate**		
	a) 12-20 breath/min	22	73.33
	b) >20 breath/min	8	26.67
	c) <12 breath/min	0	0.0
3.	**Systolic blood pressure**		
	a) 90-120mmHg	11	36.67

	b) > 120 mmHg	19	63.33
4.	**Diastolic blood pressure**		
	a) 60-80mmHg	23	76.67
	b) >80 mmHg	7	23.33
5.	**Mean arterial blood pressure**		
	a) 70-100mmhg	24	80
	b) > 100mmHg	6	20
6.	**PEEP**		
	a) >5 cmH2O	4	13.33
	b) 5-15 cmH2O	26	86.67
7.	**Spontaneous respiration rate set**		
	a) 12-16breaths/min	30	100
	b) <12 breaths/min	0	0.0
8.	**Tidal volume**		
	a) 500ml/min	16	53.33
	b) <500ml/min	14	46.67
9.	**Spo2 level**		
	a) 95-100%	30	100
	b) <95	0	0.0
10.	**ABG-PO2**		
	a) 80-100 mmHg	15	50
	b) > 100 mmHg	15	50
	c) <80 mmHg	0	0.0
11.	**ABG- PCO2**		
	a) 35-45 mmHg	11	36.67
	b) > 45 mmHg	5	16.67
	c) <35mmHg	14	46.67
12.	**ABG-PH**		
	a) 7.35- 7.45	28	93.33
	b) > 7.45	2	6.67
13.	**ABG- HCO3**		
	a) 22-28 mEq/L	29	96.67
	b) > 28 mEq/L	1	3.33
14.	**ABG- Na+ concentration**		
	a) 135-145 mEq/L	25	83.33

	b) <135 mEq/L	5	16.67
	c) >145 mEq/L	0	0.0
15.	**ABG- K+ concentration**		
	a) 3.5-4.5 mEq/L	30	100
	b) <3.5 mEq/L	0	0.0
	c) > 4.5 mEq/L	0	0.0

b) this section describes the distribution of respiratory and hemodynamic variables of control group of patient connected to ventilator with ET tube - post-test

N = 30

SR. NO	RESPIRATORY & HEMODYNAMIC VARIABLE	FREQUENCY	PERCENTAGE (%)
1.	**Heart rate**		
	a) 60-100 beats/min	28	93.33
	b) >100	2	6.66
	c) <60	0	0.0
2.	**Respiratory rate**		
	a) 12-20 breath/min	21	70
	b) >20 breath/min	9	30
	c) <12 breath/min	0	0.0
3.	**Systolic blood pressure**		
	c) 90-120mmHg	13	43.33
	a) > 120 mmHg	17	56.67
4.	**Diastolic blood pressure**		
	a) 60-80mmHg	30	100
	b) >80 mmHg	0	0.0
5.	**Mean arterial blood pressure**		
	a) 70-100mmhg	28	93.33
	b) > 100mmHg	2	6.67
6.	**PEEP**		
	a) >5 cmH2O	3	10
	b) 5-15 cmH2O	27	90
7.	**Spontaneous respiration rate set**		
	a) 12-16breaths/min	30	100
	b) <12 breaths/min	0	0.0
8.	**Tidal volume**		
	a) 500ml/min	16	53.33

	b) <500ml/min	14	46.67
9.	**Spo2 level**		
	a) 95-100%	30	100
	b) <95	0	0.0
10.	**ABG-PO2**		
	a) 80-100 mmHg	15	50
	b) > 100 mmHg	15	50
	c) <80 mmHg	0	0.0
11.	**ABG- PCO2**		
	a) 35-45 mmHg	18	60
	b) > 45 mmHg	2	6.67
	c) <35mmHg	10	33.33
12.	**ABG-PH**		
	a) 7.35- 7.45	30	100
	b) > 7.45	0	0.0
13.	**ABG- HCO3**		
	a) 22-28 mEq/L	30	100
	b) > 28 mEq/L	0	0.0
14.	**ABG- Na+ concentration**		
	a) 135-145 mEq/L	28	93.33
	b) <135 mEq/L	2	6.67
	c) >145 mEq/L	0	0.0
15.	**ABG- K+ concentration**		
	a) 3.5-4.5 mEq/L	30	100
	b) <3.5 mEq/L	0	0.0
	c) > 4.5 mEq/L	0	0.0

c) this section describes the distribution of respiratory and hemodynamic variables of experimental group of patient connected to ventilator with ET tube - pre-test

N = 30

SR.NO	RESPIRATORY & HEMODYNAMIC VARIABLE	FREQUENCY	PERCENTAGE (%)
1.	**Heart rate**		
	a) 60-100 beats/min	18	60
	b) >100	12	40
	c) <60	0	0.0
2.	**Respiratory rate**		
	a) 12-20 breath/min	7	23.33
	b) >20 breath/min	23	76.67
	c) <12 breath/min	0	0.0
3.	**Systolic blood pressure**		
	a) 90-120mmHg	16	53.33
	b) > 120 mmHg	14	46.67
4.	**Diastolic blood pressure**		
	a) 60-80mmHg	25	83.33
	b) >80 mmHg	5	16.67
5.	**Mean arterial blood pressure**		
	a) 70-100mmhg	26	86.67
	b) > 100mmHg	4	13.33
6.	**PEEP**		
	a) >5 cmH2O	5	16.67
	b) 5-15 cmH2O	25	83.33
7.	**Spontaneous respiration rate set**		
	a) 12-16breaths/min	30	100
	b) <12 breaths/min	0	0.0
8.	**Tidal volume**		
	a) 500ml/min	21	70
	b) <500ml/min	9	30
9.	**Spo2 level**		
	a) 95-100%	30	100
	b) <95	0	0.0
10.	**ABG-PO2**		
	a) 80-100 mmHg	11	36.67
	b) > 100 mmHg	19	63.33
	c) <80 mmHg	0	0.0

11.	ABG- PCO2		
	a) 35-45 mmHg	26	86.67
	b) > 45 mmHg	2	6.67
	c) <35mmHg	2	6.67
12.	ABG-PH		
	a) 7.35- 7.45	28	93.33
	b) > 7.45	2	6.67
13.	ABG- HCO3		
	a) 22-28 mEq/L	22	73.33
	b) > 28 mEq/L	8	26.67
14.	ABG- Na+ concentration		
	a) 135-145 mEq/L	28	93.33
	b) <135 mEq/L	2	6.67
	c) >145 mEq/L	0	0.0
15.	ABG- K+ concentration		
	a) 3.5-4.5 mEq/L	29	96.67
	b) <3.5 mEq/L	0	0.0
	c) > 4.5 mEq/L	1	3.33

d) this section describes the distribution of respiratory and hemodynamic variables of   experimental group of patient connected to ventilator with ET tube - post-test   **N = 30**

SR. NO	RESPIRATORY & HEMODYNAMIC VARIABLE	FREQUENCY	PERCENTAGE (%)
1.	Heart rate		
	a) 60-100 beats/min	26	86.67
	b) >100	4	13.33
	c) <60	0	0.0
2.	Respiratory rate		
	a) 12-20 breath/min	24	80
	b) >20 breath/min	6	20
	c) <12 breath/min	0	0.0
3.	Systolic blood pressure		
	1. 90-120mmHg	15	50
	2. > 120 mmHg	15	50
4.	Diastolic blood pressure		
	a) 60-80mmHg	26	86.67
	b) >80 mmHg	4	13.33

5.	**Mean arterial blood pressure**		
	a) 70-100mmhg	26	86.67
	b) > 100mmHg	4	13.33
6.	**PEEP**		
	a) >5 cmH2O	6	20
	b) 5-15 cmH2O	24	80
7.	**Spontaneous respiration rate set**		
	a) 12-16breaths/min	30	100
	b) <12 breaths/min	0	0.0
8.	**Tidal volume**		
	a) 500ml/min	7	23.33
	b) <500ml/min	23	76.67
9.	**Spo2 level**		
	a) 95-100%	30	100
	b) <95	0	0.0
10.	**ABG-PO2**		
	a) 80-100 mmHg	12	40
	b) > 100 mmHg	18	60
	c) <80 mmHg	0	0.0
11.	**ABG- PCO2**		
	a) 35-45 mmHg	27	90
	b) > 45 mmHg	0	0.0
	c) <35mmHg	3	10
12.	**ABG-PH**		
	a) 7.35- 7.45	30	100
	b) > 7.45	0	0.0
13.	**ABG- HCO3**		
	a) 22-28 mEq/L	24	80
	b) > 28 mEq/L	6	20
14.	**ABG- Na+ concentration**		
	a) 135-145 mEq/L	25	83.33
	b) <135 mEq/L	5	16.67
	c) >145 mEq/L	0	0.0
15.	**ABG- K+ concentration**		
	a) 3.5-4.5 mEq/L	30	100
	b) <3.5 mEq/L	0	0.0

	c) > 4.5 mEq/L			0		0.0

SECTION III

This includes effectiveness of hypertonic saline nebulized endotracheal suctioning on hemodynamic and respiratory parameters among patient in mechanical ventilator

TABLE: individual standard deviation, t test of control group of hemodynamic and respiratory parameters among patient in mechanical ventilator

N=30

Parameters		Mean	SD	Computed value of 't'	Table value of 't'	Significance
Heart rate	Pre test	88.47	15.98	**1.04**	**2.05**	**NS**
	Post test	85.07	13.85			
Respiratory rate	Pre test	19.73	2.61	**-0.81**	**2.05**	**NS**
	Post test	20	2.46			
SBP	Pre test	127.33	7.39	**1.366**	**2.05**	**NS**
	Post test	125.33	7.76			
DBP	Pre test	78	8.05	**1.00**	**2.05**	**NS**
	Post test	76.33	6.69			
MABP	Pre test	94.52	5.93	**0.999**	**2.05**	**NS**
	Post test	92.63	5.27			
PEEP	Pre test	6.1	2.02	**-1.069**	**2.05**	**NS**
	Post test	6.27	2.12			
SRRS	Pre test	13.73	1.64	**0.999**	**2.05**	**NS**
	Post test	13.2	1.54			
Tidal volume	Pre test	489	13.48	**-0.999**	**2.05**	**NS**
	Post test	493.33	8.02			
SPO2	Pre test	99.5	0.63	**1.00**	**2.05**	**NS**
	Post test	99.4	0.72			
ABG-PO2	Pre test	105.6	12.49	**1.00**	**2.05**	**NS**
	Post test	105.4	8.07			
ABG-PCO2	Pre test	36.00	5.829	**0.999**	**2.05**	**NS**
	Post test	34.65	5.154			
ABG-H	Pre test	7.4	0.037	**1.0026**	**2.0**	**S**
	Post test	7.38	0.037			
HCO3	Pre test	25.18	1.546	**1.00**	**2.05**	**NS**
	Post test	24.67	1.388			
	Pre test	137.9	3.088			

Na+	Post test	137.53	2.76	**1.00**	**2.05**	**NS**
K+	Pre test	3.95	0.29	**1.203**	**2.05**	**NS**
	Post test	3.93	0.272			

TABLE: individual standard deviation, t test of effectiveness of hypertonic nebulized suction on experimental hemodynamic and respiratory parameters among patient on mechanical ventilator

N=30

Parameters		Mean	SD	Computed value of 't'	Table value of 't'	Significance
Heart rate	Pre test	98.87	8.480	**3.07**	**2.05**	**S**
	Post test	93.67	7.914			
Respiratory rate	Pre test	22.47	1.870	**5.20**	**2.05**	**S**
	Post test	20	1.819			
SBP	Pre test	123.67	10.333	**0.038**	**2.05**	**NS**
	Post test	123.33	10.613			
DBP	Pre test	77.67	7.279	**0.796**	**2.05**	**NS**
	Post test	76	7.239			
MABP	Pre test	92.75	5.669	**0.756**	**2.05**	**NS**
	Post test	91.76	6.742			
PEEP	Pre test	5.9	1.688	**1.919**	**2.05**	**NS**
	Post test	5.43	1.278			
SRRS	Pre test	14.067	1.617	**1.534**	**2.05**	**NS**
	Post test	13.67	1.397			
Tidal volume	Pre test	484.33	16.33	**0.0893**	**2.05**	**NS**
	Post test	482	15.84			
SPO2	Pre test	98.27	0.943	**2.484**	**2.05**	**S**
	Post test	97.63	1.098			
ABG-PO2	Pre test	105.5	6.328	**2.951**	**2.05**	**S**
	Post test	101.83	1.931			
ABG-PCO2	Pre test	39.496	4.054	**3.342**	**2.05**	**S**
	Post test	38.78	3.699			
ABG-PH	Pre test	7.379	0.047	**3.651**	**2.05**	**S**
	Post test	7.351	0.036			
HCO3	Pre test	26.17	2.580	**1.505**	**2.05**	**NS**
	Post test	25.95	2.334			
Na+	Pre test	137.10	2.482	**2.12**	**2.05**	**S**
	Post test	136.33	1.879			

K+	Pre test	3.9436	0.392	1.412	2.05	NS
	Post test	3.8067	0.316			

TABLE: mean, standard deviation, mean difference of control group on hemodynamic and respiratory parameters among patient in mechanical ventilator experimental

N=30

Observation	SD	Mean	Mean difference	Computed value of 't'	Table value of 't'	Significance
Pre-test	50.24	1332.419	7.29	1.111	2.05	NS
Post- test	36.46	1325.133				

Note: NS- Statistically not significant at level of $P \leq 0.05$, df =29.

TABLE: mean, standard deviation, mean difference of hypertonic saline nebulized endotracheal suctioning on hemodynamic and respiratory parameters among patient in mechanical ventilator experimental

Observation	SD	Mean	Mean difference	Computed value of 't'	Table value of 't'	Significance
Pre-test	24.6	1337.59	20.04	2.947	2.05	S
Post- test	23.28	1317.55				

Note: NS- Statistically not significant at level of $P \leq 0.05$, df =29.

SECTION IV

Association between the pre-test hemodynamic and respiratory parameters with the selected demographic variables of control group and experimental group

Association between the pre-test hemodynamic and respiratory parameters in control group with the selected demographic variables as follows.

SR NO	Variable	Category	Chi Square Value		Calculated value	DF	Table Value	Inference
			< MED	≥ MED				
1.	Age	a) < 25	0	0	1.348	3	7.82	NS
		b) 25-40	7	5				
		c) 40-55	5	9				
		d) > 55	2	2				
2	Sex	a) Male	11	7	3.77	2	5.99	NS
		b) Female	3	9				

						Df		Inference
		c) Transgender	0	0				
3	Dietary pattern	a) Vegetarian	8	7	2.0	2	5.99	NS
		b) Non vegetarian	2	6				
		c) Mixed	4	3				
4	present of respiratory disease	a) Yes	4	4	0.61	2	5.99	NS
		b) No	6	9				
		c) Specified	10	16				
5	Habit of alcohol	a) Yes	4	0	5.27	1	3.84	S
		b) No	10	16				
6	Habit of smoking	a) Yes	0	4	4.03	1	3.84	S
		b) No	14	12				
7	Body built	a) Healthy	7	4	2.00	2	5.99	NS
		b) Obese	7	12				
		c) Malnourish	0	0				
9	Mode of ventilator	a) SIMV	2	4	3.62	5	7.82	NS
		b) IPPV	5	8				
		c) CPAP	0	1				
		d) AVC	7	3				
		e) PSV	0	0				
		f) CMV	0	0				
10	Hospital stay	a) 1-5 day	0	0	0.0	2	5.99	NS
		b) 5-10day	6	7				
		c) More than 10days	8	9				
11	ET suction duration	a) 10sec	14	16	0	1	3.84	NS
		b) 15sec	0	0				
12	ET suction frequency	a) 2hourly	3	11	5.75	1	3.84	S
		b) Medical require	11	5				
13	Occupation	a) Farmer	1	2	1.18	3	5.99	NS
		b) Industrial worker	8	6				
		c) Businessmen	0	0				
		d) No working	5	8				
14	Past history of ventilator	a) Yes	0	0	0.0	1	3.84	NS
		b) No	14	16				
15	Patient on Present mucolytic drug	a) Yes	5	12	10.65	1	3.84	S
		b) No	9	4				

Association between the hemodynamic and respiratory parameters with selected demographic variables of experimental group

Sr No	Variable	Category	Chi Square Value		Calculated Value	Df	Table Value	Inference
			< MED	≥ MED				
1.	Age	a) < 25	3	4	1.75	3	7.82	NS
		b) 25-40	4	6				
		c) 40-55	7	5				
		d) > 55	0	1				
2	Sex	a) Male	7	6	0.55	2	5.99	NS
		b) Female	3	5				
		c) Transgender	4	5				

3	Dietary pattern	a) Vegetarian	7	6				
		b) Non vegetarian	3	5	0.55	2	5.99	NS
		c) Mixed	4	5				
4	Significant of respiratory disease	a) Yes	4	3				
		b) No	8	11	0.48	2	5.99	NS
		c) Specified	2	2				
5	Habit of alcohol	a) Yes	12	6	7.23	1	3.84	S
		b) No	2	10				
6	Habit of smoking	a) Yes	4	9	4.91	1	3.84	S
		b) No	10	7				
7	Body built	a) Healthy	6	8				
		b) Obese	8	8	0.15	2	5.99	NS
		c) Malnourish	0	0				
9	Mode of ventilator	a) SIMV	0	2				
		b) IPPV	10	8				
		c) CPAP	0	0	2.5	5	11.07	NS
		d) AVC	4	6				
		e) PSV	0	0				
		f) CMV	0	0				
10	Hospital stay	a) 1-5 day	0	0				
		b) 5-10day	3	5	0.36	2	5.99	NS
		c) More than 10days	11	11				
11	ET suction duration	a) 10sec	14	16	0	1	3.84	NS
		b) 15sec	0	0				
12	ET suction frequency	a) 2hourly	3	15	13.48	1	3.84	S
		b) Medical require	11	1				
13	Occupation	a) Farmer	1	3				
		b) Industrial worker	7	8				
		c) Businessmen	0	0	1.028	3	7.82	NS
		d) No working	6	5				
14	Past history of ventilator	a) Yes	0	2	2.41	1	3.84	NS
		b) No	14	14				
15	Patient on Present mucolytic drug	a) Yes	8	0				
		b) No	6	16	12.46	1	3.84	S

DISCUSSION

1. Demographic profile of the patient in mechanical ventilator (control group)

Age in years majority of the participants majority of samples are belong to the 40-55 years 46.6 % **Gender** majority of samples belong to the male group 60 %(18) **Dietary pattern** majority 50 %(15) of the samples were vegetarian, **Specific respiratory disease** majority (15)50% of the samples were belong to the specified disease group **Habit of alcoholism majority** (26)86.66% of samples were no habit of alcoholism **Habit of smoking** majority (26)86.66% of samples were no habit of smoking **Body built** majority (19) 63.66% samples were belong to the obese group **Mode of ventilator** majority of 43.33% (13) samples were in IPPV mode of ventilator, 33.33% (10) samples were in ACV mode, 20% (6) samples were in SIMV mode and 3.33 %(1) samples were in CPAP **Hospital stay** majority 56.66% (17)of the sample were had more than 10 days of hospital stay and 43.33% (13) of sample were had 5-10 days hospital stay. **ET suction duration** majority 100% of sample were had 10sec ET suction duration **ET suction frequency** majority 53.33% (16) sample were had ET suction frequency based on medical indication and 46.66% (14) sample were had ET suction frequency 2 hourly **Occupation** majority 46.66% (14) sample were industrial worker, 10% (3) sample were farmer and 43.33% (13) sample were non worker **Past history of ventilator** majority 100% (30) sample were had no past history of ventilator **Present patient on mucolytic drug** majority 56.66% (17) sample were

patient on mucolytic drug and 43.33% (13) sample not on mucolytic drug during study.

Demographic profile of the patient in mechanical ventilator (Experimental Group)

Age in years majority of samples are belong to the 40-55 years 40 %(12) age group **Gender** majority of samples belong to the male group 63.33 %(19) and 36.66% (11) were female **Dietary pattern** majority 43 %(13) of the samples were vegetarian **Significant of Respiratory disease** majority (19)63.33% of the samples were belong to no respiratory disease group and (7) 23.33% were had respiratory disease **Habit of alcoholism** majority (25)83.33% of samples were no habit of alcoholism **Habit of smoking** majority (28)93.33% of samples were no habit of smoking **Body built** majority (16) 53.33% samples were belong to the obese group **Mode of ventilator** majority of 60% (18) sample were in IPPV mode of ventilator **Hospital stay** majority 73.33% (22)of the sample were had more than 10 days of hospital stay **ET suction duration** majority 100% of sample were had 10sec ET suction duration.**ET suction frequency** majority 60% (18) sample were had ET suction frequency 2 hourly **Occupation** majority 50% (15) sample were industrial worker, 36.67% (11) sample were non worker **Past history of ventilator** majority 93.33% (28) samples were had no past history of ventilator and 6.67% (2) samples were had past history of ventilator **Present patient on mucolytic drugs** majority 73.33% (22) samples were patient no on mucolytic drug and 26.67% (8) samples were on mucolytic drug during study.

2. Assessment of hemodynamic and respiratory parameter in experimental group

The findings showed that the overall mean percentage of hemodynamic and respiratory parameters before hypertonic saline nebulized suction was 1334.86 with SD 24.6 and Post test hemodynamic and respiratory parameters showed that all the subjects had improve in hemodynamic parameters after hypertonic saline nebulized suction with the mean of 1317.55 SD 23.28. This revealed that the subjects had significant improve in hemodynamic parameters after hypertonic saline nebulized suction.

3. Mean, standard deviation and mean difference of hypertonic saline nebulized suction on hemodynamic & respiratory parameter among patient in mechanical ventilator

In relation with hypertonic saline nebulized suction on hemodynamic parameters among patient in mechanical ventilator pre-test mean 1334.86, SD 24.6, mean percentage was 20.04 and post test mean 1317.55, SD 23.28

The effectiveness of hypertonic saline nebulized suction on hemodynamic and respiratory parameters among patients in mechanical ventilator

The findings revealed the statistical paired 't' test value for overall pre and post test hemodynamic and respiratory is 2.941 which was greater than table value $(t, _{0.05})$ = 2.05 at 0.05 level. The improvement in hemodynamic parameters in post showed the effectiveness of hypertonic saline nebulized suction. Hence hypothesis H_2 is accepted.

Similar Study conducted by N.Purnima, B.Sreelekha, R.Revathi on Effect of Hypertonic Saline Nebulized Suctioning on Airway Clearance Among Patients Connected to Mechanical Ventilator.statistically significant difference in the mean value of heart rate (pretest: 114.93; posttest: 107.60 at p< 0.001); ABG-pH (pretest: 7.282; posttest: 7.38 at p< 0.01); ABG-PCO2 pretest: 57.5; posttest: 53.4 at p< 0.01); ABG-HCO3 - (pretest: 22.20; posttest: 22.87 at p< 0.001). The comparison of data between the study and the control groups (table.1) explained that the mean SpO2andABGPO2 were high in the study group mean SpO2 [study group: 98.7 (SD= 1.163) and control group: 97.0 (SD= 1.964) at p<0.05

4. Association between hemodynamic and respiratory parameters with selected demographic variables.

The obtained chi-square values demographical variable is more than table value and is found there is significant association with the hypertonic saline nebulized suction. Such as habit of alcohol, habit of smoking, ET suction frequency and patient on present mucolytic drugs.The chi-square values demographical variable is less than table value and is found there is no significant association with hypertonic saline nebulized suction. Such as age, sex, dietary pattern, present of respiratory disease, body built, mode of ventilator, ET suction, occupation and past history of ventilator are not significant. Hence the hypothesis H_2 there is significant association between hypertonic saline nebulized suction score with the selected demographic variables.

CONCEPTUAL FRAMEWORK

CONCLUSION

This chapter deals with the aim of the study to assess "Effectiveness of hypertonic saline nebulized suction on hemodynamic and respiratory parameters among patient in mechanical ventilator in selected hospitals of south Gujarat."

After detailed analysis, the analysis revealed the post test mean of hemodynamic and respiratory score (49.67%) was significantly lower than the pretest mean score (50.32%) which showed the effectiveness of hypertonic saline nebulized suction and regarding association with demographic variable, there was significant association of selected demographical variable Such as habit of alcohol, habit of smoking, ET suction frequency and patient on present mucolytic drugs. And age, sex, dietary pattern, present of respiratory disease, body built, mode of ventilator, ET suction, occupation and past history of ventilator are not significant.

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