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Relationship between anxiety and fear levels and the weaning success or failure of mechanically ventilated patients.

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Abstract:
Background: *Mechanical ventilation (MV) is the most commonly used therapy in the ICUs. Patients report unpleasant physical and psychological symptoms such as anxiety and fear. Psychological symptoms are attributed to the mechanical ventilation itself. Because of associated adverse effects and complications of MV, weaning is an essential and universal element in the care of mechanically ventilated patients (MVPs). Many studies have indicated that anxiety during the weaning process decrease oxygen saturation and increase oxygen consumption in MVPs.*
Aim of the study*: This study aims to determine therelationship between anxiety and fear level on the weaning success or failure of mechanically ventilated patients.*
Settings*: This study was carried out at the intensive care units of Damanhur Medical Institute and General intensive care unit of Hosh Isa.*
Subjects*:convenience sample of 60 adult mechanically ventilated patients were included in this study.*
Tools: *Two tools were used to collect the data of this study including Beck Anxiety Inventory (BAI) andnumerical Rating Scale Fear Assessment*.
Method*: Newly admitted adult MVPs were enrolled in the study. Anxiety and fear level was assessed; immediately after the initiation of mechanical ventilation, immediately before the weaning trial and immediately after completion the weaning trial using tool I and II.****Results:*** *More than half of thestudied patients experienced severe anxiety and more than one third of the studied patients experienced most afraid immediately after the weaning trial. More than two thirds of MVPs who experienced anxiety and fear levels have been failed their weaning trial.*
Conclusion: *There were a positive relation between anxiety and fear levels and weaning failure.*

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I. Introduction

Mechanical ventilation (MV) is the most commonly used therapy in the ICUs.It is a main supportive therapy for patients with life threatening illness. The mechanical ventilator functions as an additional set of muscles, decreases the load on the respiratory muscles and improves oxygenation status.Despite these advantagesMV is not without complications. Patients report unpleasant physical and psychological symptoms such as anxiety and fear. Psychological symptoms are attributed to the mechanical ventilation itself. MV can be both physiologically and psychologically stressful [(1)].

Weaning is an essential and universal element in the care of mechanically ventilated patients (MVPs) because of associated adverse effects and complications of MV. Weaning covers the entire process of liberating the patient from mechanical support. Both delayed and premature discontinuations of MV have been associated with increased weaning failure possibility. About 25% of MVPs who meet weaning criteria fails their weaning trials [(2, 3)]. Weaning process is still described as a stressful, frightening, hopeless, frustrating period and is not an easy process for MVPs during their ICU stay[(4, 5)].Mechanically ventilated patients in ICU are at risk for anxiety, fear, and ventilator associated complications [(6)].Anxiety and fear are estimated to occur in as many as 70% to 87%of MVPs [(2, 7)].

Anxiety is regarded as untreated fear, acquired from the ventilator weaning process. High levels of anxiety and fear may in turn lead to breathing difficulty and greater distress during the attempts of weaning, as anxiety and fear increase muscle tension which increase the work of breathing during theweaning process due to sudden shift from artificial ventilation to spontaneous breathing. This in turn increases energy demand and can lead to dyspnea, which cause compromised respiratory function during the weaning process contributing to weaning failure with increased morbidity and mortality rate [(8, 9)]. Repeated ventilator weaning failure can cause prolonged mechanical ventilation period which may increase morbidity and mortality rates and economic burden [(10)].

Many studies have indicated that anxiety during the weaning process decrease oxygen saturation and increase oxygen consumption in MVPs. Despite several international researches[10-13]have been conducted to study the association between anxiety and fear with weaning trials failure, but up to our knowledge there are no national studies have been conducted to identify the effect of anxiety and fear levels on weaning outcomes. Therefore, this study was conducted to determine the effect of anxiety and fear level on weaning success/failure among mechanically ventilated patients.

Aim of the study:

This study aims to determine therelationship between anxiety and fear level on the weaning success or failure of mechanically ventilated patients.

Research questions:

1. What is the relationship between anxiety level on the weaning success or failure of mechanically ventilated patients?
2. What is the relationship between fear level on the weaning success or failure of mechanically ventilated patients?

Research design:

A descriptive correlational research design was used in this study to determine relationship between anxiety and fear levels on the weaning success or failure among mechanically ventilated patients.

Settings:

This study was carried out at 1- the intensive care units of Damanhur Medical Institute including general intensive care unit which has 15 beds andcardiopulmonary intensive care unit which has 7 beds. 2- General intensive care unit of Hosh Isa General Hospital which has 15 beds.

Subjects:

Convenience sample of 60 adult mechanically ventilated patients were included in this study. As estimated by power analysis (Epi-info7 program) based on the following parameters: Population size=400 in 3 months, Expected frequency=20%, Acceptable error10%, Confidence co-efficient 95%, Minimum sample size 60. Patients were selected according to the following inclusion criteria: adult patients aged 18 years or more and alert. Exclusion criteria: Patients who have altered level of consciousness, and or on anxiolytics were excluded from the study.

Tools: Two tools were used to collect the data of this study.

Tool one: Beck Anxiety Inventory (BAI) scale:

This tool was adopted from the arabic version of Beck Anxiety Inventory scale which was developed by Alshatti T (2015) [14] to measure the severity of anxiety level among MVPs during weaning trails and it was originally developed by Beck (1988) [15]. This scale consists of 21 items as a self –report measure of anxiety such as feeling hot, wobbliness in legs, unable to relax, fear of worst happening, dizzy, lightheaded, heart pounding/racing, fear of dying, indigestion, faint lightheaded. Each item is scored as follow: 0(Not at all bothered), 1(Mildly but it didn't bother me much), 2(Moderately-it wasn't pleasant at times) to 3(Severely-it bothered me a lot).The total score is calculated by finding the sum of the 21items ranging from 0 to 63.Scoring system: Low anxiety level=score of 0-20, Moderate anxiety level =score of 21-35, Potentially Severe level of anxiety=score of 36 and above.

Tool two: Numerical Rating Scale Fear Assessment (NRSFA) scale:

This tool was adopted fromNumerical Rating Scale Fear Assessment scale which was developed by Chen Y (2006) [16]. It was used to measure both emotional and cognitive fear levels. It consists of two questions; the first one is to assess emotional fear which is (how frightened /afraid are you now of weaning from ventilator support?) The response of the patient was rated on 0-10 numerical rating scale where 0 equal to none to 10 equal to extremely high chance. The scoring system: None =0, low chance=1-3, Moderate chance=4-6, high chance=7-9, extremely high chance =10.

While the second one is to assess cognitive fear which is (what do you think is the chance that you will experience shortness of breath from ventilator?). The response of the patient was rated on 0-10 numerical rating scale where 0 equal to not afraid at all to 10 equal to most afraid you can be. The scoring system: Not afraid at all=0, Mild fear level=1-3, Moderate fear level=4-6, Severe fear level=7-9, Most afraid you can be=10.

Conditioned fear in the present study was represented by emotional and cognitive fear. It was assessed by the researcher through taking the mean of the score of the two above questions. Which was rated on 0-10 numerical rating scale where 0 equal to not afraid at all to 10 equal to most afraid you can be. The scoring system: Not afraid at all=0, Mild fear level=1-3, Moderate fear level=4-6, Severe fear level=7-9, Most afraid you can be=10.

In addition to patients' socio-demographic and clinical data

This part was used by the researcher to record patients' socio- demographic and clinical characteristics. Patient's demographic data including age, sex and name of ICU. Clinical data such as diagnosis, date of starting of mechanical ventilation, date of first weaning trial failure, number of weaning trials failure, weaning outcome (success/ failure).

Method:

An official letter from the faculty of nursing was delivered to the hospital authorities in Damanhur and Hosh Isa Hospitals and approval to conduct this study was obtained after providing explanation of the aim of the study.

Arabic version of the two tools; Beck anxiety inventory [(15)] and Numerical Rating Scale Fear Assessment [(16)] were used. The tools were submitted to a Jury of 7 experts in Critical Care Nursing, Critical Care Medicine to assess clarity and content validity of the tools.

Oral informed /written consent was obtained from patients after explanation the aim of the study. It included the aim of the study, potential benefits, risks and discomforts associated with participation. Patients' anonymity, confidentiality of the data, and privacy were maintained during implementation of the study.

A pilot study was carried out on six MVPs in order to assess the clarity, the feasibility and applicability of the tools. Reliability of the two tools was measured using Cronbach Alpha reliability, the reliability coefficient was (r =0.92) which is good.

Newly admitted adult MVPs were enrolled in the study except patients with the exclusion criteria and patients who was enrolled in pilot study. The demographic and clinical data of the studied MVPs were obtained and recorded immediately after the initiation of mechanical ventilation.Anxiety and fear level was assessed; immediately after the initiation of mechanical ventilation, immediately before the weaning trial and immediately after completion the weaning trial using tool I and II.The patient was asked to indicate a number rated on 0-3 in response to each item of the scale, while 0 "Not at all bothered", 1 "Mildly but it didn't bother me much", 2 "Moderately-it wasn't pleasant at times" to 3 "Severely-it bothered me a lot". After that the total score is calculated by the researcher through finding the sum of 21 items ranging from 0 to 63.

The researcher red the BAI items to the MVPs. MVPs responded to the researcher by holding a certain number of fingers indicating the desired response. Scoring system: low anxiety level=score of 0-20, moderate anxiety level =score of 21-35, potentially severe level of anxiety=score of 36 and above.

Conditioned fear in the present study was represented by emotional fear and cognitive fear. NRSFA used by the researcher to quantify the intensity of measurement variables; emotional fear and cognitive fear.

Emotional fear was assessed by the researcher through asking each MVP to choose a number on 0-10 numerical rating scale in response to the question: (how frightened / afraid are you now of weaning from ventilator support?) where 0 equal to «not afraid at all» and 10 equal to «most afraid you can be». The scoring system: None =0, low chance=1-3, Moderate chance=4-6, high chance=7-9, extremely high chance =10. While cognitive fear was assessed by the researcher through asking each MVP to choose a number rated on 0-10 numerical rating scale in response to the question: (what do you think is the chance that you will experience shortness of breath from ventilator?),in which 0 equal to «non» and 10 equal to« extremely high chance». The scoring system: not afraid at all=0, mild fear level=1-3, moderate fear level=4-6, severe fear level=7-9, most afraid you can be=10.

Anxiety and Fear levels were assessed for second and third time using (tool I, II) by the researcher. If MVPs tolerated the weaning trial for the first 120 minutes, successful weaning was considered.

Statistical Analysis:

- The collected data were organized, tabulated and statistically analyzed using the statistical package for social studies (SPSS) version 23. Following data entry, checking and verification process were carried out to avoid any errors during data entry.
- Quantitative data were summarized by the arithmetic mean and standard deviation.
- Frequency tables and cross tabulations with percentages were used to illustrate the results of categorical data and tested by the Chi Square Test or Fisher's Exact Test.
- Comparison of means was done by One-Way Analysis of Variance (ANOVA).

- Correlation analysis: Pearson Correlation is used to test nature and strength of relation between two quantitative/ ordinal variables.

II. Results

Table (I) shows the frequency distribution of the studied patients according to their **clinical data.** In relation to **age,** more than two thirds of studied patients (61.6%) were ranged between 51-60 years old and 55% of patients in this study were females. As regards **admission medical diagnoses,** this table reveals that more than one third (31.66) of the studied patients had respiratory disorders, while 1.6% had blood disorders.

Table (I): Frequency distribution of the studied patients according to their clinical data

Clinical Data	Patient (N = 60)	
	N	%
Age/ year		
- 20 – 35	3	5
- 36- 50	20	33.4
- 51- 60	37	61.6
Sex		
- Female	33	55
- Male	27	45
Diagnosis		
Respiratory disorder	20	33.4
Metabolic disorders	4	6.6
GIT diseases	3	5
Cancer	12	20
Kidney disease	11	18.3
Cardio vascular	9	15
Blood disorder	1	1.7

MV mechanical ventilation **GIT** gastrointestinal tract

Table (II) shows the frequency distribution of the studied patients according to their anxiety level at different timesof the study. This table reveals that anxiety level increased before and after weaning process. Moreover, (26.7%) of the studied patients experienced mild anxiety at the initiation of intubation, which increased to 28.3% before weaning process, and increased, to 31.7% after weaning process. Forty percent of the studied patients experienced severe anxiety at the initiation of intubation, which increased to 56.7% before weaning process and increased to 58.3% after weaning process.

Table (II): Frequency distribution of the studied patients according to anxiety level at different times of the study:

Anxiety level	different times of the study					
	At Initiation		Before Weaning		After Weaning	
	No	%	No	%	No	%
Mild	16	26.7	17	28.3	19	31.7
Moderate	20	33.3	9	15.0	6	10
Severe	24	40	34	56.7	35	58.3

Table (III) shows thefrequency distribution of the studied patients according to their **fear** level at different times of the study. Concerning **cognitive fear,** this table reveals that more than one third of studied patients' experienced high chance of fear (42.4%) at the initiation of intubation, which increased to 48.3% immediately before the weaning, process, but decreased to 30% after weaning process. Whereas, none of the studied patients experienced extremely high chance of fear (0%) at initiation of intubation, which obviously increased to 36.7% after weaning process.

Regarding emotional fear it can be noted that more than half of the studied patients experienced moderate fear level (55.9%) at initiation of intubation, which decreased to 10% immediately before weaning process, and also decreased to 3.3% after weaning process. While 15% of the studied patients experienced severe fear level then increased to 58.3% immediately before weaning process. This percent has been decreased to 38.3% after the weaning process. Whereas, none of the studied patients experienced most afraid (0%) at initiation of intubation then this percent increased to 28.3% after weaning process.

Concerning **conditioned fear** it can be noted that half of the studied patients experienced moderate fear level (50%) at initiation of intubation, which decreased to 11.7% immediately before weaning process. Also, this percent has been decreased to 5% after the weaning process. In addition, 33.3% of the studied patients

experienced severe fear level, which increased to 53.3% immediately before the weaning process. Whereas after the weaning process 33.3% of the studied patients experienced severe fear. Whereas, none of the studied patients experienced most afraid (0%) at initiation of intubation, which increased to (31.7%) after weaning process.

Table (IV) presentsthemean difference of the anxiety and fear scores of the studied patients at different times of the study. In whichthe mean score of **anxiety level** at initiation of intubation was 31.3±9.8. Moreover, it can be seen that the mean score of anxiety level after weaning was increased to 32.4 ± 14.1. A statistical significant difference was found between the studied patients related to experiencing anxiety (P = 0.048). The table also reveals that the mean score of **cognitive fear** at initiation of intubation was 5.9±2.1. Moreover, it can be seen that the mean score of cognitive fear after weaning was increased to 7.0 ± 3.6. A statistical significant difference was found between the studied patients related to experiencing cognitive fear (P = 0.001).

Regarding **emotional fear,** it can be noted that the mean score of emotional fear at the initiation of intubation was 5.4±1.8. Moreover, it can be seen that the mean score of emotional fear after weaning was increased to 6.9 ± 3.4. A statistical significant difference was found between the studied patients related to experiencing emotional fear (P = 0.000). Regarding **conditioned fear** it can be noted that the mean score of conditioned fear at the initiation of intubation was 5.6±195. Moreover, it can be seen that the mean score of conditioned fear after weaning was increased to 6.9 ± 3.5. A statistical significant difference was found between the studied patients related to experiencing conditioned fear (P = 0.000).

Table (III): Frequency distribution of the studied patients according to fear level at different timesof the study:

Type of fear	Fear levels	different times of the study					
		At Initiation		Immediately Before Weaning		After Weaning	
		No	%	No	%	No	%
Cognitive	None	0	0	0	0	0	0
	Low chance	10	16.9	14	23.3	17	28.3
	Moderate chance	24	40.7	8	13.3	3	5
	High chance	24	42.4	29	48.3	18	30
	Extremely high chance	0	0	9	15.0	22	36.7
Emotional	Not afraid at all	0	0	0	0	0	0
	Mild Fear	11	18.6	15	25	18	30
	Moderate Fear	33	55.9	6	10	2	3.3
	Severe Fear	15	25.4	35	58.3	23	38.3
	Most afraid	0	.0	4	6.7	17	28.3
Conditioned	Not afraid at all	0	0	0	0	0	0
	Mild Fear	10	16.7	14	23.3	18	30
	Moderate Fear	30	50	7	11.7	3	5
	Severe Fear	20	33.3	32	53.3	20	33.3
	Most afraid	0	0	7	11.7	19	31.7

Table (IV): Mean difference of the anxiety and fear scores of the studied patients at different times of the study:

Score		different times of the study	mean ± S.D	F (P)
Anxiety		at initiation of intubation	31.3 ± 9.8	0.840 (0.048*)
		before weaning	31.8 ± 12.5	
		after weaning	32.4 ± 14.1	
Fear	Cognitive	at initiation of intubation	5.9 ± 2.1	4.466 (0.001*)
		before weaning	6.8 ± 2.8	
		after weaning	7.0 ± 3.6	
	Emotional	at initiation of intubation	5.4 ± 1.8	4.210 (0.000*)
		before weaning	6.4 ± 2.7	
		after weaning	6.9 ± 3.4	
Conditioned Fear		at initiation of intubation	5.6 ± 1.95	4.123 (0.000*)
		before weaning	6.6 ± 2.7	
		after weaning	6.9 ± 3.5	

F A NOVA test ***significant** at P ≤ **0.05**

Weaning outcome	Anxiety level			Fear level					Total	FET P
	Low	Moderate	Severe	Not afraid at all	Mild fear level	Moderate fear level	Severe fear level	Most afraid you can be		
	%	%	%	%	%	%	%	%	%	
Weaning failure	30	16.6	21.7	0	10	21.7	36.7	0.0	68.3	2.757 0.005*
weaning Success	0.0	5	26.7	0	6.6	10	13.3	1.7	31.7	
Total	30.0	21.6	48.4	0	16.6	31.7	50.0	1.7	100	

Table (V) describes the relationship between weaning outcomes and anxiety and fear levels**.** This table reveals that 21.7% of the studied patients experienced severe anxiety level has failed their weaning trial, but none of the studied patients experienced mild anxiety levelhas failed their weaning trial. Moreover, 36.7% of the studied patients experienced severe fear level has failed their weaning trial, but only 10% of them experienced mild fear level has failed their weaning trial. Only 1.7% of the studied patients passed their weaning trial successfully experienced most afraid. In addition, it can be noted that more than two thirds of studied patients experienced anxiety and fear (68.3%) has failed their weaning trial. On the other hand 31.66% experienced anxiety and fear passed their weaning trial. There was significant difference p=0.005.

Table (V): Relationship between weaning outcome and fear and anxiety levels:
FET Fisher's Exact test***significant** at P **≤ 0.05**

III. Discussion

Mechanical ventilation is a stressful experience as it involves a threat to body integrity which may potentially lead to the experience of anxiety and fear. Current evidence-based guidelines for weaning and discontinuing ventilator support identified psychological factors such as fear and anxiety as the most important non-respiratory factors to be considered during liberation from ventilator support [(17)].

Sixty alert MVPs were included in the current study more than two thirds of them aged more than fifty years old. This may be attributed to this age group is more prone to infections, problems associated with aging process including malnutrition, loss of bone and muscle mass.

As regards sex, the current study reveals that about more than half of the studied patients were females. This could be attributed to the fact that in the Egyptian culture, men are not expected to show or express negative emotions like fear and anxiety. These results are congruent with Gallagher and McKinley (2007) [(18)] who studied stressors and anxiety in MVPs and found that more than two thirds of the studied patients were females. Also, Zakerimoghadam and Ghyasvadian (2016) [(19)] found that females experienced greater level of anxiety and fear during the weaning process in comparison to males. This study targeted mechanically ventilated patients so, more than one third (31.66) of patients were medically diagnosed with respiratory disorders.

The result of the current study shows that the percent of patients with severe anexity increased after weaning. Moreover, mean score of anxiety level increased after weaning process with significant difference. This finding may be due to the stress and fear induced by the weaning process itself and long intubation period. This finding is supported byMurakamik K (2008) [(20)] who showed that MVPs anxiety has been strongly associated with weaning processitself.

The current study finding shows that a significant correlation between anxiety level and weaning outcome, as anxiety in MVPs leads to increased patient's self-reports of dyspnea which may developed to weaning failure. This finding is supported by, Tate J and Dabbs A (2012) [(21)] and Chen y (2006) [(16)]who showed that a significant correlation between MVPs anxiety and weaning failure.

The result of the current study shows also that MVPs experienced high scores of fear after weaning process. All MVPs expressed fear about the weaning process and death, which ranged from mild fear to most afraid. In addition, 33.3% of the studied patients experienced severe fear level, which increased to 53.3% immediately before weaning process. Whereas after the weaning process 33.3% of the studied patients experienced severe fear. This fear may be related to stress of the weaning and MVPs perception of inability to breathe spontaneously after weaning process and fear from weaning failure. This finding is supported

byDwborah J and Maureen O(2001) [22] who showed that MVPs fear has been strongly associated with weaning process itself as fear scores increased significantly during the weaning process itself.

The current study findings show that a significant correlation between fear level and weaning outcome, as fear in MVPs leads to increased heart rate, hyperventilation, and rapid shallow breathing pattern, which may developed to weaning failure. This finding in line with, Tate J and Dabbs A (2012) [23] who found that a significant correlation between MVPs fear and weaning failure, but in opposition to,Chen y (2006) [16]who found that fear didn't have a significant direct effect on weaning outcome.

IV. Conclusion

It can be concluded that there were a positive relation between anxiety and fear levels and weaning failure as, MVPs who experienced high anxiety and fear levels have been failed their weaning trial. Moreover, there were a significant relation between the MV duration and anxiety and fear levels as anxiety and fear levels increased as the duration of MV increased.

Recommendations:

Based on the current study findings, the following recommendations are suggested:

Recommendations regarding clinical practice:

- Assess MVPs routinely for anxiety and fear level during the ventilation period to determine MVPs at risk for weaning failure.
- Provide MVPs with the necessary information related to their diseases to reduce their apprehension.

Recommendations regarding education:

- In-service educational program should be conducted for CCNs focusing on assessment and management of anxiety and fear in MVPs.
- Teach undergraduate nursing students about the effect of psychological condition on the weaning outcome.

Recommendations regarding administration:

- Include anxiety and fear assessment tools as apart in nursing flow-sheet.
- Establish policies to include the psychological readiness assessment as duty of the nursing routine care for MVPs before weaning trials.

Recommendations regarding research:

- Further studies are needed regarding the effectiveness of different techniques to control anxiety and fear in MVPs.
- Replication of this study on different age and sex groups to compare between them.

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