Distorted Memory among the Patients in Intensive Care Unit and its Related Factors.

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Abstract

Background: Patients surviving the intensive care unit frequently develop memory gaps or distorted memory and unpleasant recall after discharge, this memory usually associated with anxiety, depression and post traumatic disorder that affected negatively on quality of life. **Aim of study:** Was to assess distorted memory among the patients in intensive care unit and its related factors. **Design:** Descriptive exploratory. **Setting:** Medical intensive care unit at El-Demerdash Hospital affiliated to Ain-Shams University. **Subjects:** purposive sample included 98 patients. **Tools: 1-** Patients structured interview questionnaire including demographic characteristics, medical data, acute physiology and chronic health evaluation for assessing disease severity level and hospital anxiety and depression scale. **2-** Patients distorted memory related factors assessment tool. **3-** Distorted memory assessment tool and **4-** Mini-Mental State Examination tool. **Result:** revealed that, the studied patients total mean scores regarding disease severity, anxiety & depression, distorted memory affecting factors, distorted memory and cognitive disturbance were 11.49±5.40, 15.83±3.29, 16.92±3.13, 45.17±6.32, 12.26±3.66 and 21.67±4.21 respectively. **Conclusion:** Majority of the studied patients had moderate level of disease severity, highest percentage of them had severe depression and anxiety level, more than three quarter of them reported high affecting factors on their distorted memory. As well, more than half of them had bad/distorted memory and severe cognitive disturbance. Additionally, there were a highly significant positive correlation between all the studied variables. **Recommendations:** suggesting evidence-based strategies to avoid developing distorted memory among the patients in intensive care unit.

Keywords; Distorted memory, patients in intensive care unit and related /associated Factors

Introduction

Distorted memories in the Intensive Care Unit (ICU) refer to the phenomenon of individuals recalling inaccurate or altered memories of their time spent in this place. This can occur as a result of a combination of factors, including the use of sedatives and pain medications, the stress and fear associated with a critical illness, and the limited amount of time the patient is able to spend in a fully conscious state. **(Fukuda et al., 2022).**

Patients who experience distorted memories in the ICU may recall events that never actually happened or remember things in a completely different way than they actually occurred. This can lead to confusion, frustration, and a feeling of disconnection from their ICU experience. **(Smit et al., 2022).**

The distorted memories can have a lasting impact on patients, leading to psychological distress and affecting their quality of life. They may struggle with anxiety, depression, and post-traumatic stress disorder (PTSD) due to the altered perceptions and fragmented memories of their ICU experience. Intensive care unit experiences can often result in distorted memories and alterations in perception, attention, and cognition. This phenomenon is referred to as ICU-related memory impairment. **(Thomas et.al., 2020).**

During a stay in the ICU, patients are often subjected to numerous stressful and traumatic events, such as invasive procedures, pain, lack of sleep, and exposure to drugs. These events can result in the formation of fragmented and distorted memories, and even a loss of time perception. Additionally, sedation

and mechanical ventilation can also contribute to memory impairment. **(Wu et al., 2018).**

Significant of the study

Studies have shown that the prevalence of ICU-related distorted memories varies widely, but it is estimated to affect 10-20% of patients who have been in the ICU for an extended period. These patients may experience persistent anxiety, depression, sleep disturbances, and avoidance behavior related to their ICU stay. Distorted memories can have significant impacts on patients and their families and can be long-lasting. It is important for healthcare providers to be aware of the risk of these conditions and to take steps to prevent, recognize, and manage them when they occur. This may include screening for delirium, providing support to patients and families, and providing access to appropriate treatment and resources as needed. **(Bruna, 2019)**.

Aim of the study

The aim of this study was to assess distorted memory among the patients in intensive care unit and its related factors through the following.

1- Assess distorted memory rate among the patients in intensive care unit.

2- Assess the factors associated with development of distorted memory among the patients in intensive care unit.

Research questions

1- What is the distorted memory rate among the patients in intensive care unit?

3- What are the factors associated with development of distorted memory among the patients in intensive care unit?

Subjects and Methods

1.Research design:

A descriptive exploratory research design was utilized to achieve the aim of the present study.

2.Setting:

The study was conducted in medical ICU at El-Demerdash Hospitals affiliated to Ain-Shams University. The ICU unit located in ground floor and consisted of two room (17 beds), first room for general cases and consisted of 15 beds and second room for isolated cases and consisted of 2 beds.

3.Subjects:

A purposive sample of (98) patients admitted to the previously mentioned setting and met the following criteria.

Inclusion Criteria:

Post extubated patients above 18 years old in the ICU, conscious and able to follow simple commands.

Exclusion Criteria

Unconscious patient, patient with preexisting dementia, stroke, on deep sedation or have psychological problems.

Sample size

Using PASS 11 program for sample size calculation, confidence level 95%, margin of error + 0.1 and by reviewing previous studies results **(Yamaguchi et al., 2017)**, showed the rate of distorted memories among critically ill patients admitted to the ICU (62%). Based on that, the required sample was 98 patients to be sufficient to measure the rate of distorted memories among critically ill patients admitted to the intensive care unit.

Tools of data collection:

Four tools were used in the current study as the following:

I: patients` structured interviewing questionnaire:

It consisted of 4 parts; parts 1 and 2 developed by the investigator based on review of relevant recent literature **Fiest, et al., (2020) & Foster, et al., (2017)** while, parts 3 and 4 quoted from **Knaus et al., (1985), Snaith and Zigmond(1983)** as the following:

- **Part (1): Patients demographic characteristic** as age, gender, level of

education, occupation and residence. It consisted of 5 closed questions.

- **Part (2): Patients medical data:** it included medical diagnosis, length of ICU stays, past medical and surgical history and sedation. It consisted of 5 closed questions.

- **Part (3): Acute Physiology and Chronic Health Evaluation (APACHE) tool:** this is a standard tool developed by **Knaus et al., (1985)** to assess severity level of disease for adult patients in ICU. It included the following three variables:

A- **First,** 13 acute physiologic variables, the point for each item ranged from 0 to 4.

B- **Second,** Age, its point classified into:

- ≤44 (0 point)
- 45-54 (2 points)
- 55-64 (3 points)
- 65-74 (5 points)
- ≥ 75 (6 points)

C- **Third,** chronic health status, its point classified into:

- None (0 point)
- Non-surgical (5 points)
- Emergent operation (5 points)
- Elective operation (2 points)

The total score of APACHE ranged from 0 to 71 points classified as the following:

Excellent level (0-14)

Mild level (15-28)

Moderate level (29-43)

Severe level (44-57)

Very Severe level (58-71)

- **Part (4): Hospital Anxiety and Depression Scale (HADS)** this is a standard tool developed by **Snaith & Zigmond, (1983)** to assess the psychological status related factors, this scale consisted of fourteen questions; Seven questions for anxiety and seven for depression. Responses scored on a scale of 3 to 0. The maximum score was therefore 21 for Anxiety and 21 for Depression. The total score of HADS scale classified as the following

- ≤ 7 considered mild level

- 8 ≤ 10 considered Moderate / border line level

- ≥11 considered Abnormal or severe level

II: Distorted memory related factors assessment tool:

This tool was developed by the investigator after reviewing the related literature **cumming, et al., (2020) &Kim, et al., (2016)** to assess factors associated with distorted memory among the studied patients that included environment, patients and team related factors. This questionnaire included 30 questions, each one had 3 answer options either agree (3), somehow (2) and disagree (1) for positive questions and the reverse score for the negative items. The total score ranged from 30-90 & classified as the following:

< 50% = <45 grades considered low affecting factors

> 50% = >45 grades considered high affecting factors

III: Distorted memory assessment tool:

This is a standard tool developed by **Jones et al., (2000)** and modified by investigator to assess presence or absence of memory loss or delusional memories among the patients in ICU. It consisted of 8 items; each item took a 1 degree for correct answer and zero for incorrect answer. Total score was 8 grades classified as the following:

< 50% = <4 grade considered bad memory.

≥ 50% = ≥4 grade considered good memory.

IV: Mini-Mental State Examination (MMSE):

This is a standard tool developed by **Psychiatr, (1975)** and modified by the

investigator and used to detect any cognitive disturbance; it included 10 items reflecting tests of orientation, attention, memory, language and visual-spatial skills. The maximum score for the items was 30 and classified as the following:

- MMSE scoring 24-30: no cognitive impairment
- MMSE scoring 18-23: mild cognitive impairment
- MMSE scoring 0-17: severe cognitive impairment

Operational design:

1. Preparatory phase:

It was included reviewing of related literature, and theoretical knowledge of various aspects of the study using books, articles, internet periodicals and magazines to develop tools for data collection.

2. Tools validity

The Content validity of the used tools were revised by a panel of 7 experts to test clarity relevance, comprehensiveness, understanding and application and necessary modifications were done accordingly.

3. Tools reliability:

The reliability was conducted for the used tools using appropriate statistical test. Cronbach's Alpha coefficient test used to ensure internal consistency of tools. Reliability value of APACHE was 0.98, HADS was 0.78 , distorted memory affecting factors was 0.810, distorted memory assessment was 0.86 and MMSE was 0.80.

Pilot study:

Before embarking on the data collection, a pilot study was carried out on 10 patients, representing about 10% of the sample size. The aim of the study subjects was to ensure the clarity and applicability of the tool, and to identify obstacles and problems that may be encountered during data collection. Additionally, it served to estimate the time needed to fill out data collection tool. Since no changes were needed in the tool, the pilot patients were included in the main study sample.

Field work:

- Before starting data collection, a written official permission was obtained from the responsible authorities in the study hospital. This was based on a letter sent from the Dean of the Faculty of Nursing, Ain-Shams University, explaining the aim and purpose of the study.
- Data collection phase was started and finished through four months from the beginning of march 2022 to the end June 2022. Firstly, the investigator started by introduce his self to each patient, giving a clear and brief idea about the aim of the study and its expectations explained the purpose of the study for the subjects included in the study to obtain their oral consent and cooperation.
- The investigator visited the selected setting three days per week, Sunday, Monday and Wednesday in the morning and afternoon shifts from 9 am to 6 pm.
- The used tools were administered to each patient individually and fulfilled by the investigator.
- The investigator met about 3 patients every visit. The first tool took about 30-35 minutes; second tool took about 20-25 minutes; Third tool took about 20-25 minutes and fourth tool took 25-30 minutes to be filled and completed. Finally, data entered and statistical analysis and calculation was conducted.

Administrative design:

An official approval letter to carry out this study was obtained from the dean of the faculty of nursing, ethical scientific research committee, and directors of Ain Shams University Hospital. Patients' consent was obtained orally for data collection after explaining the purpose of the study.

Ethical considerations:

A written research approval to conduct the study was obtained from the scientific research ethical committee at Faculty of

Nursing Ain Shams University before initiating the study work.

The researcher clarified the objectives and aim of the study to the patients in the study.

The researcher assured maintaining anonymity and confidentiality of patients data included in the study.

Patients were informed that they allowed to withdraw from the study at any time.

Oral approval was obtained from all study participants.

Statistical design:

Recorded data were analyzed using the statistical package for social sciences, version 22.0 (SPSS Inc., Chicago, Illinois, USA). Quantitative data were expressed as mean± standard deviation (SD). Qualitative data were expressed as frequency and percentage. Pearson's correlation coefficient (r) test was used to assess the degree of association between two sets of variables.

Results:

Table (1) illustrates mean age of the studied patients was 44.59±7.58 years old, (68.4%) of them were females & (49%) had primary education. Moreover, (72.4%) of studied patients were unemployed /house wives & (57.1%) of them lived in urban.

Table (2) reveals that 55.1% of the studied patients had post traumatic/ abdominal surgery & length of stay in ICU for 41.8% of them were from 3-<6 days; Additionally, 6.1% of the studied patients had previous neurological history (surgical or medical); and 7.1% didn't previously take any kind of sedative medication.

Regarding the total severity level according to (APACHE) score among the studied patients in ICU. **Table (3)** reveals that 93.9% of them had moderate level & 6.1% of them had mild level.

Regarding anxiety and depression total level among the studied patients in ICU. **Table (4)** reveals that, 34.7% of them had mild anxiety & 29.6% had mild depression. Also, 28.6% of them had moderate anxiety & 24.5% of them had moderate depression. Besides, 36.7% of them had severe anxiety & 45.9% of them had severe depression.

Results in **table (5)** reveals that (76.5 %) of the studied patients reported high affecting factors on them distorted memory while (23.5%) of them reported low affecting factors.

Table (6): demonstrates distorted memory total mean among the patients in ICU was 45.17±6.32.

Table (7): represents cognitive disturbance total mean score among the studied patients in ICU was 21.67±4.21.

Table (8) presents that, there was a statistically significant positive correlation between total scores of distorted memory, cognitive disturbance and APACHE, anxiety, depression **p<0.05** & affecting factors **p<0.001** among the patients in ICU.

Table (1): Number and percentage distribution of demographic characteristics among the studied patients (n=98)

Items	No	%
Age (years)		
20-<30 years	7	7.1
30-<40 years	12	12.2
40-<50 years	57	58.2
50-<65 years	22	22.4
Mean±SD	44.59±7.58	
Gender		
Male	31	31.6
Female	67	68.4
Education		
Illiterate	12	12.2
Primary	48	49.0
Secondary level	30	30.6
University graduate	8	8.2
Occupation		
Worked	27	27.6
Unemployed / House wife	71	72.4
Residence		
Rural	42	42.9
Urban	56	57.1

Table (2):Number and percentage distribution of medical data among the studied patients (n=98).

Items	No	%
Medical diagnosis		
Cardiovascular disorder	20	20.4
Respiratory disorder	11	11.2
Kidney disorder	6	6.1
GIT disorder	7	7.1
Post Traumatic/ abdominal surgery	54	55.1
Length of ICU stay		
1-<3 days	37	37.8
3-<6 days	41	41.8
6-<10 days	20	20.4
Previous neurological history (Surgical or medical)		
Yes	6	6.1
No	92	93.9
Previous taking any kind of sedative medication.		
Yes	7	7.1
No	91	92.9

Table (3): Total disease severity level among the patients under study (n=98).

Disease severity levels	No.	%
Excellent level	0	0.0
Mild level	6	6.1
Moderate level	92	93.9
Severe level	0	0.0
Mean±SD	11.49±5.40	

Table (4): Anxiety and depression total level among the studied patients in intensive care unit (n=98).

HADS levels	Level of total Anxiety		Level of total depression	
	No	%	No	%
Mild	34	34.7	29	29.6
Moderate	28	28.6	24	24.5
Severe	36	36.7	45	45.9
Total mean score	15.83±3.29		16.92±3.13	

Table (5): Distorted memory related factor affecting the patients in ICU (n=98).

Items	No	%
Patient related factors		
Low effect	35	35.7
High effect	63	64.2
Environmental related factors		
Low effect	14	14.3
High effect	84	85.8
Medical team related factors		
Low effect	21	21.4
High effect	77	78.6
Total Distorted memory related factors		
Low affecting factors	23	23.5
High affecting factors	75	76.5
Total mean score	45.17±6.32	

Table (6): Distorted memory total level among the patients in intensive care unit (N=98).

Items	NO.	%
Good memory	39	39.8
Bad memory	59	60.2
Total mean score	12.26±3.66	

Table (7): Cognitive disturbances total level among the studied patients in intensive care unit (N=98).

Items	NO.	%
No cognitive impairment	27	27.6
Mild cognitive impairment	16	16.3
Sever cognitive impairment	55	56.1
Total mean score of mini-mental state examination (MMSE)	21.67±4.21	

Table (8): Correlation matrix between total scores of the studied patients, distorted memory, cognitive disturbance and APACHE, anxiety, depression & affecting factors among the patients in intensive care unit (N=98).

		Total score of anxiety	Total score of depression	Total score of affecting factors	Total score of distorted Memory	Total score of cognitive disturbance
APACHE score	r-value	0.450	0.350	0.337	0.394	
	p-value	<0.001**	0.016*	0.013*	0.012*	
	N	98	98	98	98	
Total score of anxiety	r-value		0.385	0.224	0.273	0.319
	p-value		<0.001**	0.037*	0.033*	0.032*
	N		98	98	98	98
Total score of depression	r-value	0.385		0.238	0.288	0.337
	p-value	<0.001**		0.022*	0.018*	0.017*
	N	98		98	98	98
Total score of affecting factors	r-value	0.224	0.238		0.218	0.256
	p-value	0.037*	0.022*		<0.001**	<0.001**
	N	98	98		98	98
Total score of distorted Memory	r-value	0.273	0.288	0.218		0.299
	p-value	0.033*	0.018*	<0.001**		<0.001**
	N	98	98	98		98
Total score of cognitive disturbance	r-value	0.319	0.337	0.256	0.299	
	p-value	0.032*	0.017*	<0.001**	<0.001**	
	N	98	98	98	98	

**p-value <0.05 significant correlation; **p-value <0.001 highly significant*

Discussion:

Concerning characteristics of studied patients, the present study revealed that, majority of the studied patients were females. This could be attributed to women's expectancy is higher than men's. This result is in disagreement with ***Wang et al. (2020)*** in the study titled "***Effect of an ICU diary on psychiatric disorders, quality of life, and sleep quality among adult cardiac surgical ICU survivors: a randomized controlled trial"*** who revealed that more than half of studied patients were males. Also, this finding is in disagreement with ***Lotti O, et al. (2016)*** in the study titled ***" The role of memories on health-related quality of life after intensive care unit care: an unforgettable controversy? "*** who revealed that more than half of studied patients were males.

Concerning medical data of studied patients, The present study revealed that, about one third of the studied patients were stayed in the ICU from three to less than six days ,this may be due to reducing LOS improves financial, operational and clinical outcomes by decreasing the cost for patients as well as minimizing the risk of hospital acquired infection. This result is in disagreement with ***Lotti O, et al.(2016)*** in the study titled ***" The role of memories on health-related quality of life after intensive care unit care: an unforgettable controversy? "*** who mentioned that the median LOS was 8 days for ICU. Also, this finding is in agreement with ***Tomohide F, et.al. (2020)*** in the study titled ***"Distorted Memories and Related Factors in ICU Patients"*** who mentioned that studied patients were stayed in the ICU for 3 days.

The current study reported that half of studied patients were diagnosed of post traumatic / abdominal surgery, this may be due to the post operative management of these patients post-surgery guarantees the effectiveness and efficiency in maintaining optimum patients care. This result is in agreement with ***Åse Valsø, et al. (2019)*** **in** the study titled ***"post-traumatic stress symptoms and sense of coherence in proximity to intensive care unit discharge"*** who found that,

the medical diagnosis for more half of studied patients were trauma, acute surgery, elective surgery and organ transplant.

Concerning total disease severity level among the studied patients, the constant study revealed that, majority of them had moderate level. This finding reflected the need of such group of patients for developing suggested guidelines to avoid exposing them to distorted memory whereas the severity condition could be of patients make them at risk for developed distorted memory. this finding is contradicted with ***Vasilevskis, et.al., (2021)*** in the study titled ***"Delirium in the intensive care unit. Critical Care Medicine"*** who mentioned that two third of studied patients had severe health status according to APACHE II score from 0- 4.

Concerning hospital anxiety and depression total level among the studied patients, the study results revealed that the highest percentage of them had severe level. This result is in agreement with ***Christopher M, et.al. (2020)*** in the study titled ***"Dyspnea, Acute Respiratory Failure, Psychological Trauma, and Post-ICU Mental Health"*** who mentioned that the symptoms of PSTD can coexist with depression, anxiety, and other behavioral disorders, and correlated with recalled respiratory distress during the ICU stay. Also, this finding is in disagreement with ***McIlroy*, *et.al. (2019)*** who revealed that ***"ICU diaries decreased anxiety and depression and improved health-related quality of life, but not PTSD among ICU survivors and may result in less PTSD among relatives of ICU patients"***

The present study showed that more than three quarter of studied patients reporting high affecting factors on their distorted memory. This result is in agreement with ***OysteinTronstad, et.al. (2021)*** in the study titled ***"Doing time in an Australian ICU; the experience and environment from the perspective of patients and family members"*** who revealed that a Participants described the ICU as a noisy, bright, confronting and scary environment that prevented sleep and was suboptimal for recovery. Bedspaces were described as small and cluttered, with limited access to natural light or cognitive stimulation. The limited ability to personalize the environment and maintain connections with family and the outside world was considered especially problematic.

Concerning of cognitive disturbance, the present study showed that more than half of them had severe impairment level this could be attributed to the stressful environment in the ICUs. This result is incompatible agreement with ***Dong-Liang Mu, et.al. (2020)*** in the study titled **"*Cross-cultural adaptation and validation of the 3D-CAM Chinese version in surgical ICU patients"*** who founded that most of studied patients were had mild cognitive impairment. Also, this result is disagreed with ***Ryoung-Eun Ko, et.al. (2022)*** in the study titled ***"Association between the presence of delirium during intensive care unit admission and cognitive impairment or psychiatric problems: the Korean ICU National Data Study"*** who revealed that more than half of studied patients had cognitive impairment during ICU admission.

Concerning to Correlation between total scores of distorted memory, cognitive disturbance and APACHE, anxiety, depression & affecting factors among the patients in ICU, the present study mentioned that, there were a statistically significant positive correlation. This study results indicate that patients disease with high severity level, had high anxiety & depression and reporting high affecting factors at higher risk for developing distorted memory and cognitive disturbance. This result is supported by ***Pandharipande, et.al., (2020)*** in the study titled "Long-***term cognitive impairment after critical illness"*** who reported that there were a highly statistically significant positive correlation between total scores of anxiety & depression and their total score of cognitive disturbances in critical ill patients.

Conclusion:

Based on findings of the present study, it can be concluded that:

Majority of the studied patients had moderate level of disease severity, highest percentage of them had severe depression and anxiety level, more than three quarter of them reported high affecting factors on their distorted memory. As well, more than half of them had

bad/distorted memory and severe cognitive disturbance. Additionally, there were a highly significant positive correlation between all the studied variables.

Recommendations:

Based on findings of the present study, the following can be recommended:

- Planning and establishing health education program for patients in ICUs taking into consideration the studied distorted memory related factors to avoid its development among such group of patients.
- Suggesting evidence-based strategies to avoid developing distorted memory among the patients in ICUs.
- Evaluating the effect of implementing suggested evidence-based strategies on the incidence of distorted memory among the patients in ICU and its impact on long run.
- Developing a simplified illustrated and comprehensive Arabic booklet for distorted memory prevention strategies among the patients in ICUs.
- Replication of the study on larger probability sample in ICUs at different geographical locations for data generalizability.

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