

Effect of Nursing Intervention Program on quality of life, Post-Traumatic Stress Symptoms and Dispositional Resilience among Nurses Caring Patients with Corona Virus

¹Safaa Abdelazem Osman Ali ¹, ²Evon S. Shokre ², Shaymaa Elsayed Mosaad Mohammed^{3*}, Eman Ali Abd El Moaty Sheha⁴, Zainab Gazar Alkotb Alagamy⁵

⁽¹⁾Psychiatric Health Nursing, Faculty of Nursing, Suez Canal University, Ismailia, Egypt.

⁽²⁾Psychiatric Health Nursing, Faculty of Nursing, Fayoum University, Egypt

⁽³⁾ Lecturer of Medical-Surgical Nursing, Faculty of Nursing, Mansoura University, Egypt

⁽⁴⁾Family and Community Health Nursing, Faculty of Nursing- Damietta University, Egypt

⁽⁵⁾Community Health Nursing, Faculty of Nursing- Fayoum University, Egypt

Abstract

Background: Nurses play a crucial role in helping curb the hazardous health impact of coronavirus disease (COVID-19), their quality of lives, psychological aspect and major functioning has been greatly affected by the pandemic. **Aim** Evaluate the effectiveness of nursing intervention program on quality of life, Post-traumatic stress symptoms and dispositional resilience among nurses who caring for patients with corona virus at isolation hospitals in Mansoura university hospitals. **Method** Quasi experimental design, one group pre-test post-test, convenient sample was conducted among 90 nurses isolation unit at Mansoura university hospital, Dakahlia/Egypt. **Tools** questionnaire to collect nurse's demographic data, nurses Quality of life SF-12 questionnaires (QoL), Impact of Event Scale Revised (IES-R) and Dispositional Resilience Scale (DRS). **Results** Total scores of quality of life and DRS domain were improve after implementation of nursing intervention program, while total score of IES-R was decreased after implementation of nursing intervention program, a highly statistically significant positive correlation between total scores of QoL and DRS after the program implementation as ($t=0.400$, $p=0.019$; $t=2.400$, $p=0.019$; $t=1.503$, $p=0.037$). **Conclusion** The nursing intervention program tailored to needs is effective in improving nurses' quality of life and dispositional resilience, as well as decrease post-traumatic stress symptoms level. **It was recommended** to continuous educational program for nurses in clinical area to adapt with stressors through use dispositional resilience to enhance their quality of life. On-the-job continuing nursing education activities should be developed and implemented regularly to respond to nurses' unmet needs.

Key words: Dispositional Resilience, Nurses, Nursing Intervention program, Quality of Life, Post Traumatic Stress.

Introduction

Nurses are the first line of battle during pandemics, under unusual circumstances, nurses undoubtedly show fear, distress, worry, anger, frustration, struggling and mental injury through watching patients die as a result of Corona Virus infection, uncertainty surrounding that possible spread, regular and direct contact with patients with COVID-19, this is likely to have long term consequences on all dimension of their quality of life (Li et al., 2020). Unlike other health staff who usually see patients in sterile and stable circumstances. Nurses caring patients with Corona virus are unique in many ways that they had direct encounter with many challenges and exposed to threats own psychological and physical wellbeing as well as consequences to health of their loved ones and colleagues (Kang et al., 2020).

Exposure to an epidemic is a traumatic event, exposure to this traumatic event may trigger serious mental health and behavioral problems to nurses caring patients with Corona virus such as Post-traumatic Stress Symptoms (PTSS), confusion, anger, boredom, loneliness, panic, and depression (Zhou et al., 2020). PTSS characterized by avoidance of stimuli associated with the traumatic event and emotional numbing, intrusion symptoms such as flash back, persistence of trauma and night mars, symptoms of hyper-arousal such as staying asleep and symptoms of negative alterations in cognition and mood such as low self-esteem, shame, guilt and fear (Yin, 2019).

In turn, presence of PTSS more than one month will transformed to Post Traumatic Stress Disorder (PTSD), PTSD is a serious condition that has negative consequence on the overall nurses health

and associated with several psychological and physical comorbid conditions such as major depressive disorder, acute stress disorder, substance abuse or dependence, other anxiety disorder, cardiovascular problems and respiratory disorders (Tang et al., 2017).

Additionally, post-traumatic stress responses can negatively impact working efficiency and satisfaction of many nurses and trigger them to reduce their work hours, can originate non-empathic behavior toward patients, also social relationships are severely harmed and withdrawal behavior become more prominent (Alsubaie et al., 2019). For the most nurses, the first few weeks after experiencing a traumatic event are the most challenging, so the availability of social support including family members, peer colleagues and senior support, low stressful environment, and the availability of enough time for emotional regulation before exposure to next traumatic event are generally important to help them to handle the painful stressor, control of critical situation, and prevent long-term emotional deregulation (Oi et al., 2016).

Nurses' exposure to negative events is associated with negative thoughts and emotions that can have negative consequences, especially on mental health. However, traumatic events may also be associated with positive changes after trauma and, therefore, may be perceived as a spur to personal growth. Such positive personal changes may include self-perception, relationships with others and appreciation of life, which results from having coped with life crises. Changes in self-perception may lead nurses to develop positive feelings about their character and competence (Oh et al., 2017). Therefore resilience can be understood as a process through which the individual is able to preserve him/herself from unpleasant life events, allowing for the control of stress and negative emotions, it increases the tolerance of negative emotions and failures and plays an important role in preventing the negative consequences of negative life events. Nurses with a higher level of resilience are more positive and possess higher self-esteem and self-efficacy. Resilient nurses tend to experience difficulties as an opportunity to obtain new experiences, and to develop different decision-making processes (Oginska-Bulik & Michalska, 2021).

The resilience of nurses is a key component of maintaining essential healthcare services during the COVID-19 virus (coronavirus) outbreak. Therefore, it is crucial to anticipate the stresses associated with this work and put in place supports for nurses. Monitoring and assessment of mental

health and wellbeing of nurse are important, along with efforts to ensure their successful reintegration with work colleagues (Schreiber et al., 2019).

Occupational stress may significantly affect the nurse's quality of life, reduce the quality of care, flexibility in disposing of illness and PTSD, and social relationships, including positive communication and implementation of professional knowledge and skills (Oh et al., 2017). Poor quality of life results in job-related stress, loss of empathy for patients, increased incidence of practice errors and thus unfavorably correlated with quality of care (Oginska-Bulik & Michalska, P., 2021).

Technology enabled mental health services such as mobile apps, Tele-health, and online treatment provide an efficient and practical means of delivering management to distressed and anxious nurses. These services provide an accessible mechanism for nurses to seek support, advice and practical strategies to manage anxiety and stress without having to attend in-person sessions. Studies show that online services can improve the most common types of anxiety. So it should be promoted as part of the broader response to the current crisis in order to decrease the risk of post-traumatic stress disorder, relapse and worsening symptoms (Brooks, 2020).

Regarding the important role of nurses who caring patients with Corona virus at quarantine hospitals, it's important to maintain a protective measures against trauma related symptomatology, develop healthier coping mechanisms, ensure early identification and early treatment of PTSS are essential (Bukhari et al., 2016). Feeling informed, prepared and properly trained, having access to the appropriate protective equipment and access to psychological support, all help nurses to alleviate fears, strengthen mental health and psychological support and can help to minimize the impact of psychological distress (Brooks, 2018).

Significance of study

Role of nurse who caring patients with COVID-19 at quarantine hospitals is very significant because they are usually the first helpers and life saver to patients in this situation, they can directly impact the care of patients and their families, it gradually drain the life of nurses by continuous exposure traumatic events that arouse intense post-traumatic stress symptoms, uncertainty and stigmatization which can interfere directly with functioning or result in later several psychological, physical and social complications in addition to the

rapid spread of COVID-19, high levels of infection, mortality in complicated cases and no formal operative protocols. So, the community and Psychiatric nurse had a vital role to assess and intervene nurses' stressors related to caring patients with corona virus at quarantine hospitals and its negative effect on quality of life and psychological health of them, also evaluate the effect of the nursing intervention program on reducing post-traumatic stress symptoms and improvement of dispositional resilience and increase quality of life among nurses who caring patients with corona virus at Mansoura university hospital.

Theoretical and Operational definition

Quality of life: is defined by the World Health Organization as "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" (Asante et al., 2019). Standard indicators of the quality of life include wealth, employment, the environment, physical and mental health, education, recreation and leisure time, social belonging, religious beliefs, safety, security and freedom.

Post-traumatic Stress Disorder (PTSD): is a disorder that affects nurses following care patient with corona virus. In this study can be operationally defined by the obtained mean scores of Post-traumatic Stress symptoms measured by Impact of Event Scale Revised (IES-R) which developed by (Horowitz, M., Wilner & Alvarez, W., 1979).

Dispositional Resilience: Resilience is conceptualized as the interactive influence of psychological characteristics within the context of the stress process. In this study can be operationally defined by the obtained mean scores of Dispositional Resilience measured by Dispositional Resilience scale (DRS) developed by (Bartone, PT., 1995).

In this context, this study aimed to evaluate the effectiveness of nursing intervention program on quality of life, post-traumatic stress symptoms and dispositional resilience among nurses who caring patients with corona virus at Mansoura university hospital.

Research Hypothesis:

H1: Nursing intervention program will affect positively on quality of life, post-traumatic stress symptoms and dispositional resilience level among nurses who caring patients with corona virus.

H0: Null hypothesis: Nursing intervention program hasn't any effect on the level of quality of life, post-traumatic stress symptoms and dispositional resilience level among nurses who caring patients with corona virus.

Subjects and methods:

Research Design:

The study followed quasi experimental design with one-group pretest-posttest was conducted to achieve the aim of this study.

Setting:

Based on the specifications concerning the restrictions during the COVID-19 outbreak in the country, the researchers chose the online zoom platform for data collection from nurses who caring corona virus patients at isolation unit at Mansoura university hospital, Dakahlia/Egypt.

Participants:

A Convenient sample consists of 90 nurses who providing care to patients with corona virus at isolation hospitals and willing to participate in the study. **Inclusion criteria:** Age from 20-55 years, both sexes and have access to the internet via any method such as smartphones, laptops, or tablets.

Exclusion criteria: Those having major physical or psychiatric ailments, those with current alcohol or substance abuse/dependence (must have > 90 days of sobriety), as well as those unable to complete the study questionnaires and psychological tests.

The researchers calculated the sample size using the creative research systems sample size calculator website. <https://www.surveysystem.com/sscalc.htm>. Thus, the sample size was equal to 92 persons. 2 nurses were excluded from study. Therefore, the sample size was equal 90 nurses.

Tools of data collection:

Four tools were be used to collect the necessary data as follows

Tool 1: Self-administrated questionnaires: It was established by the researchers to assess the necessary demographic data which consists of participants' characteristics such as age, gender, marital status, level of education, family support, attend COVID-19 prevention program, professional title and years of experience in nursing.

Tool 2: Quality of life SF-12

This tool was established by (Ware, Kosinski, & Keller., 1996) to assess physical and mental health status. It is a simple, short, and reliable scale with adequate psychometric properties includes 12 items; 2 concerning physical functioning, 2 regarding role limitations caused by physical health problems, 1 question about bodily pain, 1 with reference to general health perceptions, 1 on vitality, 1 in regard to social functioning, 2 in relevance to role limitations because of emotional problems and 2 questions referring to general mental health. It was constructed as a shorter alternative of the SF-36 Health Survey. Translation and validation of the questionnaire in Arabic version was made by *Haddad et al (2021)*. It was taking approximately 5–10 min to complete. Scores on this questionnaire are in the range of 0–100, where higher scores indicate a better self-perceived health status.

Tool 3: Impact of Event Scale Revised (IES-R): It established by (Horowitz, Wilner & Alvarez., 1979) and translated in to Arabic by (Abd EL-Fadeel., 2018). It consists of 22-item self-report measure to assess subjective distress caused by traumatic events based on three clusters of symptoms identified in the Diagnostic and Statistical Manual of Mental Disorder, third edition (DSM-III), as indicators of posttraumatic stress disorder (PTSD), eight items to assess intrusion symptoms, eight items to assess avoidance symptoms and six items to assess hyper-arousal symptoms. Respondents are asked to identify a specific stressful life event and then indicate how much they were distressed or bothered during the past seven days by each "difficulty" listed. Items are rated on a 5-point scale ranging from 0 ("not at all") to 4 ("extremely"). The IES-R yields a total score (ranging from 0 to 88) and subscale scores can also be calculated for the Intrusion, Avoidance, and Hyper-arousal subscales.

Scoring system of (IES-R) is regarding the level of post-traumatic stress symptoms, the total score for each subscale should be calculated using the mean of the scored responses. Scores will range from 0 to 4, in which 0 indicate not at all, 1 indicates little bit symptoms, 2 moderate symptoms, 3 indicate quite bit symptoms and 4 indicate extreme symptoms. Therefore the maximum total means IES-R score will range from 0 to 12. Lower scores are better; it has been suggested that one grades the PTSD as high if the score on either subscale is >19, medium for scores of 8.5 to 19, and low-level for scores of 1 to 8.5 (Kerai, et al., 2017).

Tool 4: Dispositional Resilience Scale (DRS): this tool was established by (Baraton., 2007) and translated in to Arabic by (Abd EL-Fadeel., 2018). It measures concept of hardiness. It consists of fifteen statements and includes three dimensions which describe a generalized style of functioning. Control contains five items, (e.g., "by working hard you can nearly always achieve your goals") commitment contains five items (e.g., "life in general is boring for me") and challenge contains five items (e.g., "changes in routine are interesting to me"). Respondents are required to indicate their agreement on a four-point scale: 0 (not at all true); 1 (a little true); 2 (quite true); 3 (completely true). There are six items that are negatively keyed; 3, 4, 8, 11, 13, 14. Once items are reverse coded, an overall hardiness score is obtained by summing all 15 items.

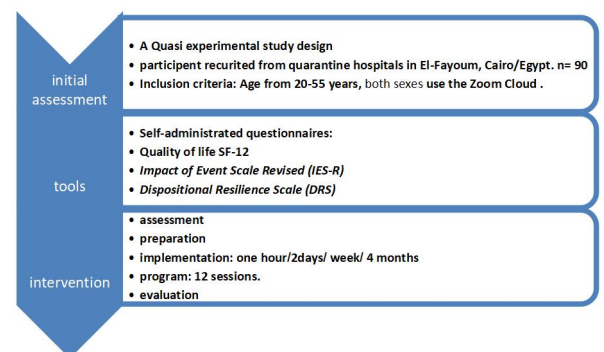
Scoring system of (DSR): Scores for all three subscales can be calculated individually by summing the relevant questions for each of the subscales within five scoring bands: 39+ (Very high), 34-38 (High), 28-33 (Average), 22-27 (Low), and 22 and below (Very low).

The conceptual framework in Figure 2 below displays the interaction effect between Post-Traumatic Stress symptoms and dispositional Resilience in predicting quality of life of nurses during program.

Method

The study was carried out through three phases: a preparation phase, implementation phase, and evaluation phase. The total period of data collection, including the three phases of the program covered a period of 9 months, from the beginning of July 2020 till the end of March 2021. The researchers designed the Process flowchart to illustrate the steps that involved in the research (see Fig1)

Figure 1: The flow chart process



Kimber O., Cromley G.J., and Molnar-Kimber K.L. Let Your Ideas Flow: Using Flowcharts to Convey Methods and Implications of the Results in Laboratory

Exercises, Articles, Posters, and Slide Presentations. *J Microbiol Biol Educ.* 2018; 19(1): 19.1.22. PMC5969414. PMID: 29904528. doi: 10.1128/jmbe.v19i1.1477 PMID: created by the researchers or WhatsApp. The researchers named the WhatsApp group “Nurses' QOL”. Informed consent was required from all study subjects who fulfilled the criteria before including them

Preparatory Phase:

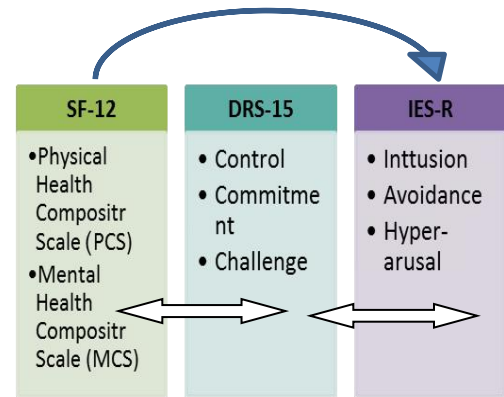
This phase included reviewing of recent updating, current, national and international related literature to cover the various aspects of research problem by the using nursing textbooks, articles, magazines and websites. This was necessary for the researchers to be aquatinted with, and oriented about all aspects of the study problems, as well as to assist in development of data collection tools.

The tools were assessed for their comprehensiveness, clarity, relevance, and applicability. Then, the study tools were prepared and formulated on the Google Form, which facilitated the online sharing of the questionnaire and enabled the researchers to maintain the confidentiality of the study subject's data. The researchers tested the tool link to determine if it renders correctly in various browsers.

Moreover, the researchers surveyed all nurses, established a trusting relationship and informed them the purpose of the study as well as the date and time of data collection. Then, the nurses who agreed to participate in the study were asked to send their phone numbers to the researchers on the messenger to be added to the group in the study, so it was sent to them, and they were asked to print the consent sign their names, scan or take a photo of the consent and resend it to the researchers through WhatsApp group or by email. Additionally, a pilot study was performed on 9 nurses who were not included in the study to assess the applicability, clarity, and feasibility of the study tools. Then, the necessary modifications were made accordingly.

The conceptual framework in Figure 2 below displays the interaction effect between Post-Traumatic Stress symptoms and dispositional Resilience in predicting quality of life of nurses during program.

Figure 2: The interaction effect between Post-Traumatic Stress symptoms and dispositional Resilience in predicting quality of life of nurses during program.



Furthermore, the researchers assessed the needs of the study subjects by meeting them online through the Zoom application and asking them about their needs in the corona virus patients care process as well as asking them an open-ended question about their needs in the Google form. Then, the proposed nursing intervention program was prepared by the researchers based on the study subjects' needs and in the form of booklet after reviewing past and recent related literature. Contents of the booklet (pdf) were selected on the bases of identified nurses' needs. Detected needs, requirements and deficiencies were translated into aims and objectives of the nursing intervention program.

The program was planned to be carried out in 12 sessions that were classified into sessions as shown in Table 1

Table 1 Description and illustration of sessions, objective, duration, and content of nursing intervention program

Sessions	Objective	Duration	Content
1 st session	Establishing rapport between the researchers and participates.	45 min.	-Issues of confidentiality. - Introducing basic rules for group. - Introduction and a clarification of the program objective - Administration the pre-assessment.
2 nd session	Increase awareness of quality of life, the physiological stress and its negative consequences.	45 min.	- An overview about quality of life, the physiological stress and its negative consequences.
3 rd session	Decrease nurses' post-traumatic stress through practicing stress management exercises.	60 min.	Use different skills to overcome symptoms of post-traumatic stress and methods of stress management.
4 th session	Enrich the nurses with the required knowledge and skills to deal with the stressors and stress	45 min.	Training the nurses about emotional coping methods.
5 th session	Increase nurses assertiveness behavior and problem solving skills.	60 min.	Teaching the nurses about assertiveness behavior and problem solving strategies.
6 th session	Practice relaxation exercises for reducing anxiety and cope with post-traumatic stress symptomatology	60 min.	Training and instructing the nurses to carry out the healthy methods and relaxation exercises for reducing anxiety and cope with post-traumatic stress symptomatology.
7 th , 8 th and 9 th session	Increase awareness about rapid eye movement reprocessing techniques.	60 min for each.	Training the nurses about rapid eye movement reprocessing techniques for stress reduction.
10 th session	Increase awareness about dispositional resilience.	45 min.	Acquiring information to nurses about dispositional resilience.
11 th session	Teach the nurses how to enhance their sleep patterns.	45 min.	Instructing the nurses about healthy strategies of sleep behavior.
12 th session	End the intervention program and demonstrate post-test.	45 min.	Revision in all over the program and provide nurses a chance to express the benefits from the program and conducting post-test.

Implementation phase:

- The researchers sent the Google Form link of the tools to the studied nurses in the WhatsApp group, and they were asked to fill it in as a pretest to assess the necessary data before the application of the study intervention program. The responses were stored in a worksheet that could only be accessed through a Google account login. Then, the researchers carried out the study intervention program.
- The intervention program were implemented as follows: first, the researchers instructed the studied nurses to download the ZOOM meeting application on their smartphones after illustrating the steps of downloading it to them and

scheduled several meetings to actively listen to the nurses to identify their problems and stressors. Moreover, the researchers assessed the nurses' needs in the care process for corona virus patients, then prioritized their needs, and then implemented the intervention program.

- The researchers prepared an illustrative PowerPoint presentation of each study program session and scheduled a ZOOM meeting at a suitable time for the study subjects to illustrate each session and answer the studied nurses' questions. Moreover, the researchers recorded the sessions based on the studied nurses' requests. Additionally, the researchers were

available to answer the study subjects' questions and inquiries all the time in WhatsApp.

- The researchers divided the nurses on 10 groups, every group equal 9 nurses and meeting every group by the Zoom Cloud Meeting platform, two days a week from 9.00 p.m. to 10.00 p.m. This phase cover a period of four months, from the beginning of September 2020 till end of December 2020.
- The pre and posttest were used to assess QOL, Post-traumatic stress symptoms and dispositional resilience among nurses who caring patients with corona virus at quarantine hospitals. All questions related to the study tools were answered, and a detailed explanation was given to participants.
- **Methods of teaching:** All nurses have given the nursing intervention program content, and utilized the same teaching methods, these were video and discussions applied during zoom meeting.
- **Media of teaching:** They included online handouts, videos, power point presentation, audio and pictures on the Zoom Cloud Meeting platform.

Evaluation phase:

After the implementation of the intervention program, the researchers resent the posttest by sending the Google form link to assess the nurses' quality of life, Post traumatic stress symptoms and dispositional resilience stress level after the implementation of the study. The proposed intervention were evaluated by using suitable statistical analysis. This phase covered a period two months from the beginning of February 2021 till the end of March 2021.

Ethical considerations:

The necessary formal approval and permission to con-duct the study were obtained from the Research Ethics Committee of in Faculty of Nursing, Mansoura University Egypt. Informed written and verbal consent were obtained from each studied nurse included in this study after an explanation of the study purpose and importance. Study subjects' anonymity and privacy were maintained along with the confidentiality of the necessarily collected data. The researchers informed the studied nurses that they had the right to withdraw from the study at any time without giving any reason. Study tools were not including any immoral

statements that touch nurses' beliefs, dignity, religion, culture or any other personal issues.

Statistical Analysis of Data:

After data were collected, they were revised, coded, and input into the statistical software IBM SPSS version 26. The reliability of the tools was determined by Cronbach's alpha. Frequency tables and cross-tabulation were used to illustrate the results. Quantitative data were summarized by the arithmetic mean, standard deviation, and mean score percent. Descriptive statistical analysis included the mean with standard deviation. Inferential statistical analysis included paired sample t-test: This parametric statistical test is used to compare the mean scores for numeric variables between two measures for the same group if the variable follows the normal distribution. P-value <0.05 was considered significant and p-value <0.001 was considered highly significant.

Results

Table 2 illustrates that the mean age of studied nurses was 23.48 ± 0.73 years. Additionally, the majority of them were females (83.3%). Concerning marital status, (74.5%) are married. Regarding years of experience, 56.7% of nurse had less than five year experience and (77.8%) of them work as nurse practitioner.

Fig 3 shows the distribution of the nurses who had covid-19 prevention program, and family support; (55%) of nurses do not attended covid-19 prevention program, and (88.9%) of them had family support.

Table 3 indicates that the total mean SF12, IES and DRS- 15 scores of studied nurses was 54.81 ± 6.311 , 74.81 ± 6.311 and 37.58 ± 5.372 respectively before the implementation of the program, and it increased to 59.18 ± 8.272 , 79.18 ± 8.272 and 58.83 ± 5.555 respectively after the implementation of the program, and the difference was highly statistically significant whereas p-value > 0.05.

Table 4 reveals that younger nurses (24 years old or younger) had higher total QOL and DRS scores than older nurses (> 24 years old), but have lower total IES-R scores. According to gender, female nurses have a higher mean score in QOL and DRS than males, while males have a higher mean total score in IESR than females. As regard marital status, single nurses evidenced higher QOL and DRS than married nurses, but married nurses reported a lower level of post-traumatic stress (IESR) than single ones. According to family support, the nurses

who have family support have a higher mean score in QOL and DRS than others, but they have a lower mean score in total IES-R.

Table 5 shows correlations between total scores of QOL (SF-12), DRS, and IES-R among nurses throughout the program phases. There was a statistically significant positive correlation between total scores of QOL (SF-12) and DRS ($r = 0.281$ at $p < 0.05$) before the program implementation, while

there was a highly statistically significant positive correlation between total scores of QOL (SF-12) and DRS ($r = 0.489$ at $p < 0.001$) after the program implementation. Whereas there was a highly statistically significant positive correlation between total QOL (SF-12) and IES-R scores after program implementation ($r = 0.490$ at $p 0.001$). There was a highly statistically significant positive correlation between the total scores of DRS and IES-R ($r = 0.309$ at $p < 0.001$) after the program implementation.

Table2 Distribution of the studied Nurses according to their demographic data (n=90)

Personal characteristics	Frequency	%
Age in year:		
• <24	60	66.7
• ≥24	30	33.3
Mean±SD	23.48±0.73	
Gender:		
• Male	15	16.7
• Female	75	83.3
Marital status:		
• Single	23	25.5
• Married	67	74.5
Experience year:		
• >5	51	56.7
• <5	39	43.3
Professional title		
• Staff nurse	10	11.1
•		
• Nurse practitioner	70	77.8
• Chief nurse	5	5.5

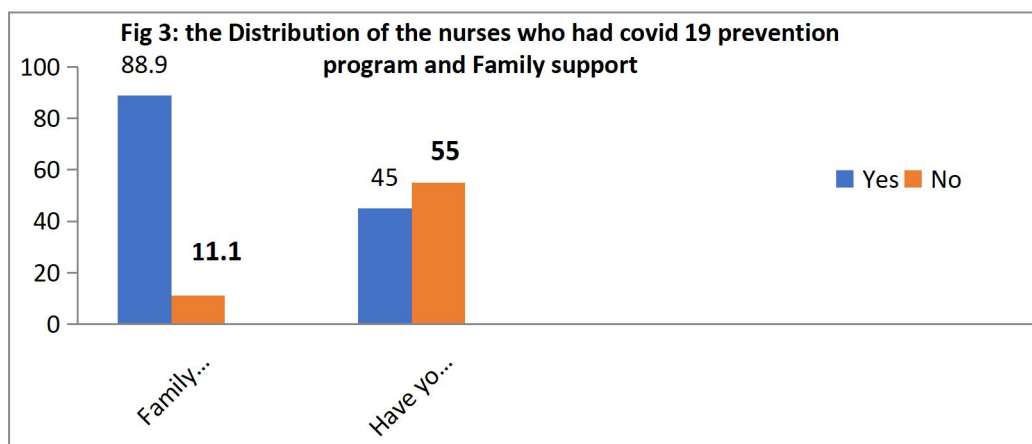


Table 3: Total mean Quality of life SF12, IES-R and DRS-15 Domains of studied nurses before and after implementation of intervention program.

Domains	Mean scores		Paired t-test	P-value
	PRE program (n=90)	POST program (n=90)		
Quality of life SF-12	Mean ±SD	Mean ±SD		
• PCS	35 ±8	39 ±10	4.027	0.047*
• MCS	50 ±3	53 ±3.993	0.866	0.389
Total SF-12score	54.81 ±6.311	59.18±8.272	0.400	0.019*
• IES-R				
• Intrusion	5.70±0.906	15.99±1.119	2.017	0.047*
• Avoidance	37.21±3.118	37.66±3.993	0.866	0.389
• Hyper-arousal	31.45±4.401	53.98±4.904	4.079	0.000**
Total IES-R score	74.81±6.311	79.18±8.272	2.400	0.019*
• DRS- 15				
• Commitment	21.21±2.453	33.68±2.750	0.211	0.030*
• Control	18.14±2.782	38.79±3.149	0.384	0.040*
• Challenge	18.23±2.256	38.36±2.296	0.438	0.013*
Total DRS score	37.58±5.372	58.83±5.555	1.503	0.037*

Paired t-test: Compare mean scores pre-program and post program.

*Statistically significant at $P < 0.05$ **highly statistically significant at $P < 0.001$, insignificant $P > 0.05$.

Table4: Relation between demographic data and mean scores of Quality of life SF-12, DRS-15 and IES-R of studied nurses

	Family support		Age group		Marital status		Gender	
	>24	<24	Married	Single	Male	Female	Yes	No
	M(SD)	M(SD)	M(SD)	M(SD)	M(SD)	M(SD)	M(SD)	M(SD)
Quality of life SF-12								
• PCS	15.84(3.83)	19.89(8.33)	19.43(7.82)	15.46(3.58)	18.37(7.39)	16.22(3.63)	19.00(8.37)	16.61(4.08)
• MCS	5.52(1.50)	5.36(1.92)	5.60(1.99)	5.20(1.14)	5.34(1.77)	5.77(1.48)	5.65(1.87)	5.22(1.51)
TotalSF-12score	8.36(1.64)	7.68(1.60)	7.78(1.80)	8.40(1.29)	7.96(1.59)	8.22(1.85)	9.94(1.62)	8.10(1.68)
IES-R								
IES-R Avoidance	13.73(7.14)	10.57(5.00)	14.04(6.29)	9.26(5.24)	12.48(6.87)	11.11(3.95)	11.33(6.97)	12.90(5.68)
IES-R Intrusiveness	14.52(7.32)	12.57(6.83)	15.60(6.99)	10.40(6.08)	13.37(7.22)	14.11(6.86)	12.55(7.17)	14.45(7.00)
IES-R Hyper arousal	10.52(6.14)	8.26(4.93)	11.21(5.46)	6.60(4.74)	9.31(5.69)	9.66(5.65)	9.27(5.60)	9.50(5.76)
Total IES-R score	38.78(19.40)	31.42(15.50)	40.86(17.45)	26.26(14.58)	35.17(18.58)	34.88(15.61)	33.16(18.83)	36.85(16.94)
DRS								
• Commitment	6.05(1.12)	6.10(1.79)	6.20(1.69)	6.00(1.34)	5.89(1.14)	6.66(2.23)	6.50(1.61)	5.70(1.26)
• Control	6.36(2.49)	6.00(1.52)	6.06(1.86)	6.26(2.19)	6.34(2.17)	5.66(1.58)	6.25(2.09)	6.11(2.05)
• Challenge	6.47(1.92)	6.78(1.81)	6.46(1.72)	6.73(1.95)	6.65(1.89)	6.55(1.81)	7.11(1.77)	6.20(1.85)
Total DRS score	6.57(3.68)	4.42(1.77)	4.00(2.32)	6.47(3.11)	5.41(3.39)	5.77(1.64)	5.70(3.18)	5.27(2.98)

Note. QOL- Quality of life, PCS – physical component score, MCS- mental component score, IES-R – Impact of Event Scale-Revised, DRS- Dispositional Resilience Scale, * $p < .01$.

Table 5: Correlation matrix of nurses' overall scores of QOL (SF-12), DRS and IES-R throughout the program phases.

Variables	Pre- program(n=90)				Post-program(n=90)			
	QOL		DRS		QOL		DRS	
	r	P-value	r	P-value	r	P-value	r	P-value
DRS	0.281*	0.012			0.489**	0.000		
IES-R	0.270*	0.015	0.152	0.179	0.490**	0.000	0.309**	0.005

*Statistically significant at $P < 0.05$, ** Highly statistically significant at $P < 0.001$, insignificant $P > 0.05$.

Discussion:

The nursing is considered one of the most stressful profession (Arslan et al., 2020). Caring for patients with COVID-19 has considerably impacted the psychological and physical status of nurses in terms of distress, anxiety, depression, and post-traumatic stress disorder (PTSD), as well as heavy workload, which threatens the physical and mental safety and reduces their quality of life of nurses (Hazavehei et al., 2019 & Xiong et al., 2020). However, resilience has a pivotal role in improving and enhancing the nurses' response to crisis (Carmassi et al., 2020). Indeed, resilience indicators have been shown to be protective factors for mental health outcomes in nurses during the COVID-19 pandemic (Baskin et al., 2021 & Labrague, 2021).

Concerning the demographic characteristics of the studied nurses, the present study revealed that the majority of nurses were female; their age was less than 24 years, with a mean age of 23.48 ± 0.73 years and they were married. This is due to the fact that at the time of the Corona pandemic, younger nurses who did not suffer from chronic diseases were more volunteer to serve corona patients than older nurses. Also, the highest percentage of nursing staff were females, and most nurses in Egypt get married at an early age. This was consistent with the results of previous studies (Keener et al., 2021 & Inocian et al., 2021). found that the majority of participants were females, under 25 years of age (Taylor, 2020). and married (Woon et al., 2021). On the contrary, (Elnehrawy, & Zewiel, 2021, Asnakew et al., 2021 & Jose et al., 2020). and the mean age of the respondents was 36.16 (8.17) years or more (Zhang, and Ma, 2020).

Additionally, the present study illustrated that about two-thirds of the studied nurses were working as nurse practitioners with less than five years of experience. Slightly more than half of the studied sample had not participated in COVID-19 prevention programs. This may have been attributed to the fact that, during the current pandemic and as a

result of the great spread of the Corona virus with the lack of healthcare members trained to deal with such infectious diseases, hospitals were forced to work any nurse even if they did not have enough experience to deal with isolation cases or had not participated in any COVID-19 prevention programs before that. These findings confirmed the results reported by (Echel, Echel & Aronowitz, 2020). who concluded that approximately half of participants work as nurse practitioners, the majority is satisfied with their career, and three quarters have not participated in SARS prevention and control programs. Also, this study was in agreement with the findings that showed that the participating nurses had a mean of 5.6 ± 4 years of experience (Jose et al., 2020). Moreover, the majority of the studied nurses receive support from their families. This is due to the fact that the family in our Egyptian culture and rural society is the main source of support and safety for family members. This was consistent with the results of previous studies that stated that the majority of participants reported increased support from family members (Eche, Echel & Aronowitz, 2020, Zhang, and Ma, 2020, and Woon et al., 2021). are examples of such studies.

Concerning the nurses' quality of life in the current study throughout the Program Phases, there were statistically significant improvements in the physical quality of life and total SF12 scores post program implementation. This can be explained by COVID-19, which is very frightening. A heavy workload can disrupt the work-life balance, and the nurses may not be able to do the life-related activities, and the quality of life may be affected. There was also a physiological and psychological burden among the nurses due to their direct contact with patients, work load, and lack of experience and knowledge in dealing with COVID-19 patients, but after increasing the nurses' awareness of dealing with COVID-19 patients, it led to an improvement in their quality of life. This point of view was in agreement with (Celmece, & Menekay, 2020), who carried out a study about quality of life prior and during the COVID-19 Pandemic; it was concluded that the

SARS-CoV-2 pandemic has had a detrimental influence on the quality of life of care providers because health professionals experience changes in their lives as a result of their work pressure. Also, this finding was consistent with the results from previous studies about the quality of life of healthcare providers (Suryavanski et al., 2020 & Woon et al., 2021). It indicated that increased severity of anxiety and a higher degree of work environment stressors disrupted the quality of life of healthcare workers during the COVID-19 pandemic.

Furthermore, working long hours without sufficient breaks and ventilation may contribute to a diminishing psychological quality of life (Roslan, et al., 2021). Lower health-related quality of life has been documented in healthcare professionals who are directly involved in caring for COVID-19 patients particularly in terms of the mental health component (Al-Haroon, & Al-Qahtani, 2020). Moreover, Zhang, & Ma, (2020) illustrated that the overall quality of life of the study participants was lower during the pandemic period.

It was clear that there was statistically significant improvement in the nurses' IES-R domains' mean scores after the program implementation in intrusion, hyper arousal, and avoidance domains, and the total mean score of IES-R, but the improvement in the avoidance domain was not statistically insignificant. This may have been attributed to the continuous daily exposure of the nurses to the death of patients every moment, the high rates of infection in the country, fear for themselves, their families and their children; their young age and lack of experience with insufficient awareness of dealing with the pandemic, all these factors may have led to an increase in the post-traumatic stress symptoms among nurses. But after program implementation, the nurses increased their awareness of the pandemic and how to deal with it. The nurses assumed this reduced post-traumatic stress symptoms.

The results of the current study were in agreement with the conclusion that the participants who received training reported lower intrusive syndrome, avoidance syndrome, and hyper-arousal syndrome scores than those who did not receive such training (Tang et al., 2020). In the same line, previous studies consistently reported high levels of PTSS among healthcare workers who had been quarantined (Asnakew et al., 2021). Moreover, (Vagni et al., 2020). found that the mediation analysis revealed that about fifth of the effect of "total stress" on arousal and quarter of the effect of "total stress" on avoidance were found to be

significantly mediated, while the effect of total stress on intrusion was not mediated. On the contrary, (Zhang, & Ma, 2020). found that among participants who experienced a mild stressful impact, the mean IES-R subdomain scores were 14 for intrusion, 16.8 for avoidance, and 10.8 for hyper arousal. The ratio of probable PTSD (IES-R \geq 30) was found to be 32%.

The current study highlighted that enhancement in the nurses' dispositional resilience (DRS-15) domains mean scores in post program than pre implementation, with statistically significant differences between pre and post program in commitment, control, and challenges domains and a total mean score of DRS-15. The improvements in resilience skills may be related to the studies where nurses did not clearly define the meaning of resilience prior to this study. But after implementing the program, the nurses improved some skills in themselves, such as autonomy, self-confidence, self-efficacy, humor, and hope. This also indicated that the nurses had responded effectively to the intervention program. This point of view was in agreement with some previous studies (Taylor, 2020, Elnehrawy, & Zewiel, 2021 and Harfush et al., 2020). which reported that the mean score of resilience increased post intervention with a highly statistically significant difference between pretest and posttest scores. In the same line, (Elsayes, & Abdelraof, 2020). illustrated that the awareness resilience scores increased in the experimental group as well as nurses' self-confidence, self-mindfulness, communication, and problem-solving skills improved after a training program related to resilience.

In contrast to this result, a study by (Pines, & Zaidman, 2014) concluded that no significant differences were found between pre and post-test, after teaching topics including resiliency and behaviors of resilient nurses, professional empowerment, conflict management, and teamwork to the nurses. Also (Chesak et al., 2015). found that implementing the SMART resilience training program in a sample of 19 new nurses and 20 controls found that the scores for the education intervention group were nearly identical on the pre- and posttests. This discrepancy may be due to using different tools and different content.

This improvement, whether in quality of life or dispositional resilience and in post-traumatic stress level, could be attributed to the variety of educational methods that the researchers used, such as lectures, discussions, demonstrations, and re-demonstration, online handouts, videos, audios, and pictures on the Zoom Cloud Meeting platform, as well as a simple

colored booklet letting each nurse get started. In many educational programs, too much reliance is placed on the distribution of written materials in the form of booklets. They can remind nurses of the topics they have learned in other ways. They can provide additional information for those who have a particular interest in any health practice. Booklets are better used when they are short, written in plain language, full of good pictures, and used to back up certain educational types. This is in accordance with (Sheha et al., 2020), who indicated the Pyramid of Learning, which showed that people can retain 10% of what they read, 20% of what they see and understand (audiovisual), and 50% of what they learn through discussion.

As regards to comparisons between the various demographic characteristics and total scores of quality of life SF-12, IES-R, and DRS-15 scores, the present study demonstrated few significant differences between pre and post-test. Total quality of life scores are higher in nurses under the age of 24, who are single and female, and who have social support from their family. One possible explanation for this may be the higher level of perceived safety of the surrounding environment among those who were single or young nurses due to their fear of the risk of spreading infection to their family members, and therefore the impact on the person's quality of life will be less. Also, family support as one of the emotional coping methods can protect nurses by positively supporting them. This enables them to view stressful events as less threatening. These findings corroborated the findings of (Woon et al., 2021), who discovered that demographic data were significantly associated with respondents' physical health and psychological quality of life.

In the same line, this result agrees with (Asante et al., 2019), who reported a significantly higher quality of life for those who were single, divorced, or widowed compared with those who were married, in addition to better social relations and social support have been documented to predict higher psychological status and quality of life among healthcare workers. Also (Hading, & Ainii, 2021), concluded that all health professionals who participated in the study indicated good physical and psychological health with moderate social relationship quality and environmental health. This finding was in contrast with (Sahin et al., 2021), who stated that there was no difference between men and women in terms of WHOQOL-BREF scores except for the mental subscale score, which was found to be lower in women than in men.

It was observed that total IES-R scores were higher in nurses less than 24 years of age, married and males than females. This may be due to the lack of experience of nurses working in similar stressful situations at a younger age. Married nurses are more concerned about spreading the infection to their family members and their children. Also, increased post-traumatic stress in men is due to the fact that the male is the head of the family and bears all their responsibilities. This was supported by a previous study (Chong et al., 2004), involving 1257 HCWs in a tertiary hospital affected by SARS that found an increased risk of PTSS among males, reported that the general practitioners working during the SARS outbreak who met psychiatric vulnerability for PTSD were more likely to be younger.

Also, this was consistent with the results of previous studies that concluded that during COVID-19, HCWs who were younger were more likely to experience higher levels of post-traumatic stress symptoms, depression, anxiety, and acute stress (Rossi et al., 2020, Elbay et al., 2020 & Romero et al., 2020). On the contrary, previous literature suggests that women are positively and significantly associated with posttraumatic stress symptoms (Luceno-Moreno et al., 2020). Furthermore, (Orru et al., 2021), found that the age of participants was found to be significantly associated with PTSD. While (Sahin et al., 2021), reported that there was no statistical difference between men and women according to IES-R score, It was noted that nurses who had no family support were more likely to develop post-traumatic stress symptoms as compared with those who had strong and moderate family support. This may be due to a lower degree of perceived support from the family, which will increase stress because the family is the primary support for its members. This was supported by (Asnakew et al., 2021), who concluded that social isolation and separation from family were found to be associated with higher rates of PTSS in the SARS outbreak. As well as having friends or close relatives with the infection, those healthcare providers who had poor social support were more likely to develop post-traumatic stress disorder as compared with those who had strong and moderate social support.

Furthermore, the current study discovered that total dispositional resilience scores rise in nurses who are younger than 24, single, and female. This may be because of their higher ability to learn and their minds being free of responsibility towards the family and the burdens of life. Also, women are more fearful and anxious about their families than men due to the biological structure of their female. Therefore,

she will feel more fear for her family and an additional source of stress was the realization of the risk of the virus and transmitting it to loved ones. This was consistent with the results of (Zhang & Ma, 2020), Y who showed that a higher level of burnout in the subscale of depersonalization was observed among participants of younger age.

In contrast to some literature, male participants' commitment, control, challenge factor, and total resilience scores did not differ significantly from those of female participants (Elnehrawy, & Zewiel, 2021). Also, (Jose et al., 2020). illustrated that there is no significant association between the resilience of frontline nurses in an emergency and socio-demographic variables, but the nurses who were exposed to COVID-19 patients, two fifth reported high resilience, and the personal accomplishment among frontline nurses in an emergency was found to have a significant association with gender.

Concerning correlations between total scores of QOL (SF-12), IES-R and DRS among nurses throughout the program phases. There was a statistically significant positive correlation between total scores of QOL (SF-12) and DRS before the program implementation, while there was a highly statistically significant positive correlation after the program implementation. This is due to increased resilience scores in dealing with COVID-19 and training in how to deal with it leading to an increased nurse's quality of life. This was consistent with the results of (Kunzler et al., 2020), who reported that a statistically significant improvement in resiliency and overall quality of life at 8 weeks of intervention was observed.

It was clear that there was a statistically significant correlation between total scores of QOL (SF-12) and IES-R before the program implementation, while there was a highly statistically significant positive correlation after the program implementation. This may have been attributed to the fact that when the nurses were trained and their awareness of the Corona pandemic increased, their post-traumatic stress level decreased, and thus their quality of life improved. This point of view was in agreement with (Woon et al., 2021), who stated that the stress due to frequent exposure to COVID-19 patients and psychological sequelae contributed to a lower quality of life. In the same line, (Sahin et al., 2021). reported that IES-R scores were negatively correlated with quality of life. A previous study suggested that the majority of the respondents reported an average level of secondary traumatic

stress (66.9%) in the professional quality of life domains (Inocian et al., 2021).

As a consequence of the improvement in the present study nurses' QOL and DRS-15 after implementation of the program, there were significant decreases in their IES-R. This is an objective indicator of the success of the intervention since it indicates that their improved QOL led to a lower IES-R among studied nurses. The finding adds to the evidence of the success of the intervention program. This was consistent with previous research that found resilience to be a significant protective factor for most post-traumatic stress symptoms, including arousal, intrusion, and avoidance (Vagni et al., 2020 & Luceno-Moreno et al., 2020).

However, resilience is an important protective factor for most symptoms of PTSD, and training about it reduces the degree of post-traumatic stress for nurses and enhances their autonomy, self-confidence, and self-efficacy. Moreover, (Harfush et al., 2020). found that there was a significant correlation between resilience and psychological well-being and that there was a statistically significant negative correlation was found between resilience and all psychological problems. Also, the result of the present study is supported by research conducted in India (Sonika et al., 2019). that proved a high level of resilience helps to manage stress and positively deal with challenges in life and decision-making. This was in contrast with the results of a cross-sectional study on 184 HCWs (50.5% females) including measures of resilience, which did not find any significant association with secondary traumatic stress (Orru et al., 2021).

Limitations of the study

Despite the significance results of the present study, the lack of a control group hinders the validity of the results, as the researchers used a virtual method of data collection, which delayed them from assessing the studied nurses' QoL, DRS-15 and IES-R directly due to the COVID-19 pandemic, thus, results may be related only for those cases.

Conclusion

Based on the results of the present study, it can be concluded that there was a marked and significant improvement in the total quality of life and resilience scores and a marked decrease in the total post-traumatic stress symptoms scores for the studied nurse after the implementation of the nursing intervention program. It was found that there was a

positive correlation between nurses' total quality of life with DRS-15 and IES-R scores, and between the total scores of DRS-15 and IES-R post intervention program.

Recommendation

It is necessary to provide psychological support, training, and supervision to nurses and to help them reflect on how to react emotionally and psychologically to a catastrophic event. Furthermore, nursing intervention program should be provided to nurses with information on how to manage stress, reduce burnout, and increase resilience and QoL during a crisis of this magnitude. In addition, resilience can be acquired through mental health training, which can improve a nurse's sense of self-confidence and self-efficacy. Additionally, there is a need to encourage nurses to empower their emotional and cognitive skills.

Abbreviations

COVID-19	coronavirus disease 2019
QoL	Quality of life
PTSD	Post-Traumatic Stress Disorder
PTSS	Post-traumatic Stress Symptoms
IES-R	Impact of Event Scale Revised
DRS	Dispositional Resilience Scale

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Authors' contributions

All Authors contributed equally to this manuscript; conceptualization, preparation and implementation of the program, methodology, investigation formal and administrative procedures, data entry and analysis, writing-original draft, writing-manuscript, editing and revision.

All authors read and approved the final manuscript.

Competing interests

The authors declare no competing of interests.

Availability of supporting data:

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethical Approval and Consent to participate

All procedures were carried out according to the relevant guidelines and regulations of the Declaration of Helsinki (DoH-Oct2008). The necessary formal approval and permission to conduct the study were obtained from the Research Ethics Committee of the Faculty of nursing, Mansoura University, Egypt. Informed verbal consent was obtained from each studied nurse included in this study after an explanation of the study purpose, and verbal informed consent was approved for each study subject in this study.

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