

## **Problem Solving Training Program for Staff Nurses and its Effect on their Self Efficacy**

Hanan Amin Hassan Shosha<sup>1</sup>, Hemat Abd El Azeem Mostafa<sup>2</sup>, Hanaa Mohamed Abdrabou<sup>3</sup>

### **Abstract**

*Background: Globally, the health sector is curious about the nurses' problem-solving abilities and the effects on nurses' self-efficacy; significantly nurses can boost their self-confidence and competencies to manage challenging situations by being given the knowledge and talents to properly accomplish clinical concerns. Aim: This study aimed to assess the effect of problem-solving training program on staff nurses self-efficacy. Methods: A quasi-experimental research design was used, and the study conducted at intensive care units in El Mehalla General Hospital in Gharbia Governorate affiliated to the Ministry of Health and Population. All available nurses (N=142). Tool: Three tools were used to collect data, problem solving knowledge questionnaire, problem-solving inventory, and perceived self-efficacy scale. Result: there were (93.7% & 92.3%) of studied nurses had gained higher adequate problem-solving knowledge at post-program implementation and follow-up phase respectively, linked to 19.7% at the pre-program. Whilst more than three-fifth of the studied nurses gained strong level of problem-solving skills and self-efficacy at post-program matched with 12.7% and 23.2% of nurses had at the pre-program, respectively. Conclusion: The study emphasized that the studied nurses had highly statically significant differences between program phases and gained a higher mean score with adequate problem-solving knowledge and strong response regarding problem-solving skills and high self-efficacy during the post-implementation phase which slightly decline at three-month follow-up phase from the pre-program. Recommendations: Design and implement interventions that enhance nurses' problem-solving skills strategies related to problem-solving management integrated into the nursing process.*

**Keywords:** *Problem-Solving, Self-Efficacy, Staff Nurses.*

### **Introduction**

Most staff nurses suffer from loss of some important practical skills as a problem-solving skill. Therefore, the importance of the training program is demonstrated because it captures the possibility of training them in these critical skills. The training program equals the level of all staff in the organization to have the same knowledge. This helps to alleviate the tasks entrusted to managers as a result of the lack of knowledge and skill of staff (Pistoia, 2022).

Problem solving is how an individual harnesses all the knowledge he or she has already learned, experiences and acquired skills in order to respond to an unexpected event or impediment unusual attitude, control and access to an appropriate solution In other words, the method of solving the problem is one that puts the individual in a real position that

---

<sup>1</sup> M.Sc. Nursing – Ain-Shams University

<sup>2</sup> Professor of Nursing Administration, Faculty of Nursing- Ain Shams University

<sup>3</sup> Assistant Professor of Nursing Administration, Faculty of Nursing- Ain Shams University

forces him to think and work his mind in order to reach a particular decision and solve the problem (Al-Rafou', 2022).

Problem solving can also be consisting of a number of actions undertaken to achieve a particular goal, and includes two types of thinking, one of which is finding a number of alternative solutions to the problem, the other being convergence: This is done by narrowing the multiple possibilities for finding the best way to solve the problem. The skill of problem solving is of great importance, as it helps learners acquire knowledge of themselves, helps them make important decisions in their lives, makes them control the attitudes and circumstances you propose, and provides them with autonomy mechanisms (Sayekti & Waluya, 2020).

Thus problem solving skills increase self-efficacy which is not a simple process of acquiring and not a process free of obstacles as well. There are many problems that people can face in the process of solving problems, which may occur due to lack of experience or competence, and this makes us call for the need to train the staff nurses (Alis Nihlatin, 2021).

Self-efficacy determines goal selection, initiation of adaptation behaviour and effort, perseverance in the face of obstacles, and thus affects the performance of tasks. Theory suggests that cognitive, social and emotional processes, which vary between individuals, play an important role in acquiring, organizing and retaining patterns of behaviour. These processes, together with environmental stimuli and reinforcements, may strengthen or weaken effective behaviour (Melhem, 2022).

Perceived self-efficacy is one of most important factors influencing the perseverance and performance of health workers and is shaped by thoughts and beliefs about self-sufficiency. The nurse's ability to work solve problems can be predicted through self-conscious academic competence. Thus, the high level of self-understanding competence of nurses is clear evidence of the safety of the professional process and the key to nurses' success in achieving professional and social compatibility to address the problems and face (Melhem, 2022).

In order to increase self-efficiency in the working environment, nurses must be in an environment that allows them to feel enhanced in the performance of tasks and achievement. There is a need to implement such critical factors as training objectives, feedback on performance, and performance modelling in the working environment that enhances self-efficiency (Khawla, 2021).

Self-efficiency is linked to problem-solving skill, as a strong sense of self-efficiency promotes human achievements and personal well-being and thus overcomes obstacles and difficulties. A highly self-efficient nurse's view challenges as things that are supposed to be mastered rather than threats that should be avoided. Additionally, nurses able to recover from failure faster and are likely to attribute failure to lack of effort. They deal with situations that are threatened by the belief that they can control them. These things have been linked to lower levels of stress and lower exposure to depression (Al-Zahrani, 2021).

Training is a systematic and continuous process during an individual's life aimed at enhancing an individual's ability to achieve a high level of performance and professional development, through the acquisition of information, skills and trends associated with work field specialization. The training is defined as: "a planned activity aimed at developing the technical and behavioural capabilities and skills of active individuals to enable them to perform effectively and productively to achieve their personal and organizational goals with the highest possible efficiency (Al-Saleh, 2021).

One of the benefits of nurses training is that it provides the expertise, knowledge and skills of human resources in developing and developing the knowledge and skills of educational personnel, familiarizing trainees with different roles and providing the

knowledge and skills that enable nurses to effectively and efficiently perform those roles, developing the trainees' awareness of the need to accept and prepare for change, and making an effort to put changes to the test and experience and contribute to the development and renewal process (Nasser, & Hamza, 2022).

Effective training also helps the nurses acquire problem-solving skill, problem-solving skill based on motivating the individual to analyse and thinks to extract alternatives or hypotheses that help solve the problem, and problem-solving skill is an important skill and now taught around the world (Alis Nihlatin, 2021). Every health organization has the opportunity to encourage, guide or direct one's own development and must be entrusted with the responsibility of assisting all staff working with one's own to concentrate, guide and use their own development in a meaningful manner (Oraby & Elsafty, 2022).

#### Significance of the study

Staff nurses face the labor market with problems related to work or care provided to the patient. Therefore, staff nurses must have problem solving skills that plays a very important role in promoting interaction, teamwork, motivation of learning, interpersonal skills, as well as, helping staff nurses gaining a feeling of satisfaction and self-efficacy There are limited international studies handled to assess the effect of a problem-solving training program for staff nurses and assess its effect on their self-efficacy such as the study carried out by Ancel, (2016). So it is imperative to conduct the present study that hopes to reach many recommendations that may apply to improve problem solving of staff nurses.

### **AIM OF THE STUDY**

The study aimed to assess the effect of problem-solving training program on staff nurses self-efficacy.

#### Research hypothesis

This study was hypothesized that, the staff nurses self-efficacy will be improved after the implementation of the problem-solving training program.

### **SUBJECTS AND METHODS**

#### I- Technical Design:

The technical design used for the study includes research design, setting of the study, sampling and tools for data collection.

#### A. Research design:

A quasi-experimental research design (One group pre - test, post- test) was used in conducting the current study.

#### Study Setting:

The study was conducted in intensive care units in El Mehalla General Hospital in Gharbia Governorate affiliated to the Ministry of Health and Population It offers general care in various specialities including five critical care units namely: intermediate paediatric intensive care (26 nurses) located at fourth floor, paediatric intensive care (27 nurses) located at fourth floor, intermediate intensive medical car (55 nurses) located at third floor, internal mediate intensive car (57 nurses) located at third floor, surgery intensive care unit (55 nurses) located at third floor.

**Sample:**

The subjects of the present study included (142 out of 220) nurses staff nurse who was selected by simple random sampling technique to participate in this study. According to the following equation:

$$N = \frac{N}{1 + N(e)P(1-p)}$$

$$[N - 1(d^2/z^2)] + p(1-p)$$

n= sample size

N=population size

d = the error rate is 0.05

z= the standard score corresponding to the significance level is 0.95 and is equal to 1.96

p = availability of property and neutral=0.05

**Tools of data collection:**

The data were collected through using the following three tools: Problem-solving knowledge questionnaire, problem-solving inventory and self-efficacy scale.

Tool I: Problem solving Knowledge Questionnaire (Appendix I): it aimed to assess staff nurses' knowledge regarding problem solving. It was divided into two parts.

- Part 1: Personal characteristics: Concerned with nurses' personal characteristics related to age, gender, marital status, level of education, years of experience in nursing field, years of experience in nursing and in department, and attending training courses.
- Part 2: Problem-solving knowledge questionnaire: It was developed by the researcher based on relevant review (Mitchell, M. & Holly, 2017; Lee et al., 2018; Moorthi, 2018 & Yadvac, 2019). It consisted of 7 dimensions included; General concepts of problem solving (8 questions), classification of problem (2 questions), steps of problem-solving (6 questions), problem-solving strategy (3 questions), problem-solving style (4 questions), problem-solving skills (5 questions), problem-solving barriers (2 questions).

**Scoring System:**

The questionnaire was contained 30 questions, each question was assigned a score of (1) for the correct answer and (zero) for incorrect answer, the maximum possible total score was 30 grades; these scores were summed and were converted into a percent score. It was classified into 2 categories as the following:

- Adequate level of knowledge if score  $\geq 60\%$  ( $\geq 18-30$  grades).
- Not adequate level of knowledge if score  $< 60\%$  ( $< 0-17$  grades).

(Ali & Nageeb, 2020)

Tool II: Problem-Solving Inventory (Appendix II): It was developed by the researcher based on related literature (El Ghoul, 2017). To assess perceived problem-solving skills among staff nurses. It was consisted of 5 dimensions; General orientation (8 items), definition of problem (8 items), generating alternatives (8 items), making-a decision (8 items), evaluation (8 items).

**Scoring System:**

The questionnaire was contained 40 questions were measured on 5-points Likert scale, each statement was assigned a score strongly disagree (1) to strongly agree (5). The scoring system ranged from (40- 200) grades; these scores were summed up and were converted into a percent score. It was classified into 3 categories as the following;

- Weak < 60% (40 - > 119).
- Moderate  $\geq$  60% - > 75% (120 - > 149).
- Strong  $\geq$  75%- 100% (< 150 – 200).

(Ahmady & Shahbazi, 2020; Durmaz et al., 2018)

Tool III: Self-Efficacy Scale (Appendix III):- It aimed to assess self-efficacy as perceived by staff nurses. It was adopted from (Elwan, 2012). It consisted of 32 subitems which divided into 4 dimensions included; Emotional dimension (8 items), social dimension (8 items), insistence and persistence dimension (8 items), cognitive dimension (8 items).

Scoring system:

The statements were measured on 5 Point Likert scale ranged from strongly disagree (1) to strongly agree (5). The grades for each item were summed up and then converted into a percent score as the following:

- Low perceived self-efficacy < 60 % (32-95).
- Moderate perceived self-efficacy  $\geq$  60% -> 75% (96 - > 119).
- High perceived self-efficacy  $\geq$  75%-100% (<120 – 160).

(Abd Elhamed et al., 2019)

Operational Design:

The operational design included preparatory phase, a pilot study and field work.

The preparatory phase:

It includes 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.

Tool validity:

The tools were revised by five experts include; three professors of Nursing Administration were working at the Faculty of Nursing, Ain-Shams University, Damamhur University, and Cairo University, respectively . And also, two assistant professor of Nursing Administration were working at the Faculty of Nursing, Benha University and Helwan University, respectively. The jury reviewed the developed tool for clarity, relevance; comprehensiveness and no modification were done.

Tool reliability:

Reliability of the tools were tested through Alpha Cronbach reliability analysis to determine the extent to which the questionnaire items were related to each other which indicated the following:

Questionnaire dimension	No of items	Alpha test	Cronbach
Problem-solving knowledge questionnaire	30	0.970	
Problem-solving inventory questionnaire	40	0.998	
Self-efficacy scale	32	0.996	

Pilot study:

After reviewing the tools by the experts, the researcher conducted a pilot study before administering the final questionnaire. The purpose of the pilot study was to ascertain the clarity, relevance, and applicability of the study tools and to determine obstacles that may be encountered during data collection. It also helped to estimate the time needed to fill out the questionnaire. The pilot study was carried out on (14 nurse) which presented (10%) of the sample size. Based on the result of the pilot study, rephrasing some questions was done to ensure clarity of the questions and to be easily understood by nurses.

#### Fieldwork:

The actual field work of the study started from the beginning of August 2022 to the middle of June 2023. The study was conducted through the following five phases:-

#### Phase I (preliminary):

The researcher visited the department of training at the hospital and the hospital director to explain the purpose, nature of the study and obtained their permission to carry out the study. Then the researcher met with the staff nurses, oriented them about the study aim and invited them to participate. The researcher distributed the three data collection tools, problem-solving knowledge questionnaire, problem-solving inventory, and self-efficacy scale to the study subjects. Every nurse took approximately (40-45) minutes to fill the questionnaires.

The study tools were distributed three times throughout the study phases (pre, post training program and three-months after the training program implementation).

The researcher was present during the data collection period to explain how to fill the questionnaires then sought their cooperation and give the necessary instructions. The filled forms were handed back to the researcher to check each one to ensure its completeness. This phase took two months from August to September, 2022.

#### Phase II (Training program planning):

During this phase, the researcher developed the content of the training program. This was based on the pertinent literature from articles, magazines, internet search and guided by the results of the assessment pre-test phase. The suitable place and time for conducting the sessions were determined after taking the approval from the hospital director and study subject's agreement, as well as the program schedule were prepared accordingly. This phase was conducted at the end of October 2022. The program consisted of two main parts (theoretical part sessions and practical sessions included small groups' activities). This phase took approximately four weeks.

#### Phase III (program implementation):

The training program was implemented to the staff nurses in department of training. Staff nurses were divided into five groups, each group was consisted of 28 -29 nurses. Each group has one session/week and each session was conducted through 3 hours, from 10am to 1pm.

The total numbers of sessions were 6 sessions, with 18 hours 12 theoretical hours and 6 practical hours each theoretical session followed by practical session for achieving the training program. At the beginning of the first session an orientation of the training program and its aim took place. Feedback was given in the beginning of each session about the previous sessions. Hand-outs were distributed at the last session on summary of the training program.

The training program theoretical sessions were including the following subjects: (First session: Introduction to training program content; greeting and identification of each other, expectation regarding program content, and distribution of tools (problem solving questionnaire and problem solving skills questionnaire). concept of problem. Second

session: characteristics of problem solving, types of problem solving, and stages of problem solving, Third session: Importance of problem solving and process of problem solving Fourth session: Strategies of the problem five sessions: styles of the problem solving (Brainstorming, Fishbone diagram...). Sixth session: Problem solving barriers, solution to overcome to these barriers, Characteristics of good problem solver, and Benefit of problem solving skills, conclusion of the program content, and post-test.

The teaching methods used during the implementation of the training program included; lecture, group discussion, observation, cross teaching, role play, and open dialogue, oral question and practice sessions, as teamwork activities. In addition, educational media used are data show, whiteboard, posters, papers and pens. This phase took six weeks. From November to mide January.

Phase IV (post program evaluation):

A post- test was done immediately after training program implementation by using the same data collection tools as in the pre planning phase.

Phase V (follow-up):

The follow-up test was repeated three months after post intervention evaluation by using the same data collection tools to evaluate effect of the problem-solving training program on the staff nurses.

### III. Administrative Design:

To carry out the study an official approval letter was submitted to the Dean of the Faculty of Nursing – Ain-Shams University and from the Directors of El Mehalla General Hospital in Gharbia governorate affiliated to Ministry Of Health and Population. The letter explains the aim of the study and methods of data collection. Oral consent was obtained from each study subject. Data collection procedures, analysis, and reporting of the results were undertaken in a manner designed to protect confidentiality of subjects.

Ethical considerations:

An official permission to conduct the proposed study obtained from the Scientific Research Ethics Committee Faculty of Nursing, Ain-Shams University. The researcher met the Medical and Nursing Directors of El Mehalla General Hospital in Gharbia Governorate to clarify the aim of the study and obtain their support and approval. Participation in the study was voluntary and subjects were given complete full information about the study and their role before signing the informed consent. Ethics, values, culture and beliefs were respected.

### IV. Statistical Design:

Upon completion of data collection, data will be computed and analyzed using the computer software of Microsoft Excel Program and Statistical Package for Social Science (SPSS) version 20. Data were presented using descriptive statistics in the form of frequencies and percentages for categorical data, the arithmetic mean ( $\bar{X}$ ), and standard deviation (SD) for quantitative data. Qualitative variables were compared using the chi-square test ( $\chi^2$ ). In addition, linear correlation coefficients (R- tests) were used to identify the correlation between the study variables.

Degrees of the significance of results were considered as follows:

- P-value  $> 0.05$  Not significant (NS).
- P-value  $< 0.05$  statistically significant (S).
- P-value  $< 0.01$  highly statistically significant (HS).

## RESULTS

Table (1): Frequency distribution of studied nurses' personal characteristics (n=142)

Items	No.	%	
Age (year)	▪ 20- ≤ 30 years	70	49.3
	▪ 31- ≤ 40 years	41	28.9
	▪ 41- ≤ 50 years	24	16.9
	▪ > 50 years	7	4.9
	▪ Mean± SD	33.49 ± 8.13	
Marital status	▪ Single	109	76.8
	▪ Married	24	16.9
	▪ Widow	2	1.4
	▪ Divorced	7	4.9
Educational level	▪ Technical Institute of Nursing	98	69.0
	▪ Bachelor nursing degree	44	31.0
Years of experience in nursing field	▪ 1-≤ 5 years old	36	25.4
	▪ 6-≤ 10 years old	34	23.9
	▪ 11-≤ 15 years old	23	16.2
	▪ > 15 years old	49	34.5
	▪ Mean± SD	11.32 ± 6.05	
Years of experience in department	▪ 1-≤ 5 years old	31	21.8
	▪ 6-≤ 10 years old	46	32.4
	▪ 11-≤ 15 years old	28	19.7
	▪ > 15 years old	37	26.1
	▪ Mean± SD	9.57 ± 5.18	
Attending training courses	▪ No	142	100.0

Table (1) shows studied nurses' personal characteristics; it shows that 49.3% of the age range of the studied nurses was 20- ≤ 30 years old, with a mean age of  $33.49 \pm 8.13$ . In relation to marital status, (76.8%) of them are single. As regard education, (69%) of the studied nurses hold a degree from technical institutes of nursing degree. As concerning the working experience, 34.5% of them working for more than > 15 years old in nursing field with a mean of  $11.32 \pm 6.05$ . While (32.4%) of the studied nurses working for 6-≤ 10 years old in working department with a mean of  $9.57 \pm 5.18$ . Finally, all (100%) of the studied nurses attended training courses.



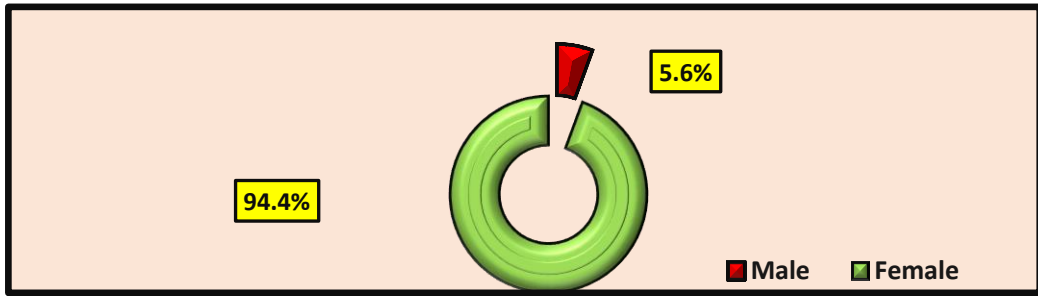
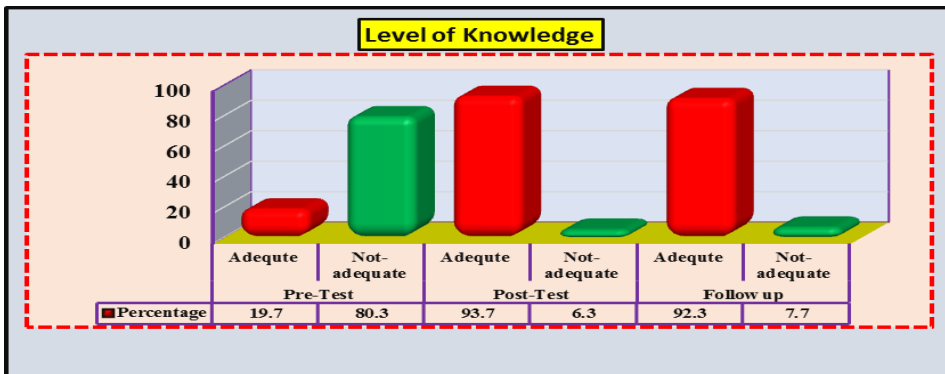


Figure (1): Percentage distribution of studied nurses' gender (n=142)

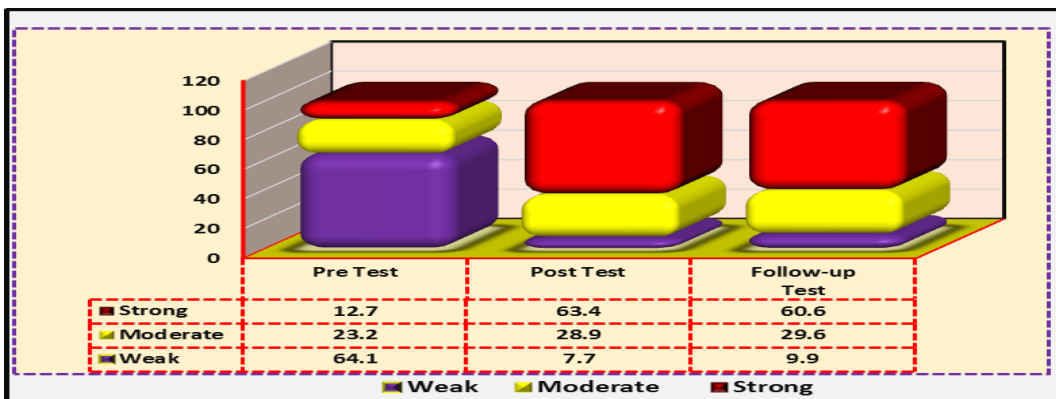
Figure (1) illustrates that the majority (94.4 %) of the studied nurses were female, while the minority were male (5.6%) with a male to female ratio 0.1:1.



$\chi^2=61.6, P=0.000$

Figure (2): Levels of studied nurses' total knowledge regarding problem-solving throughout program phases.

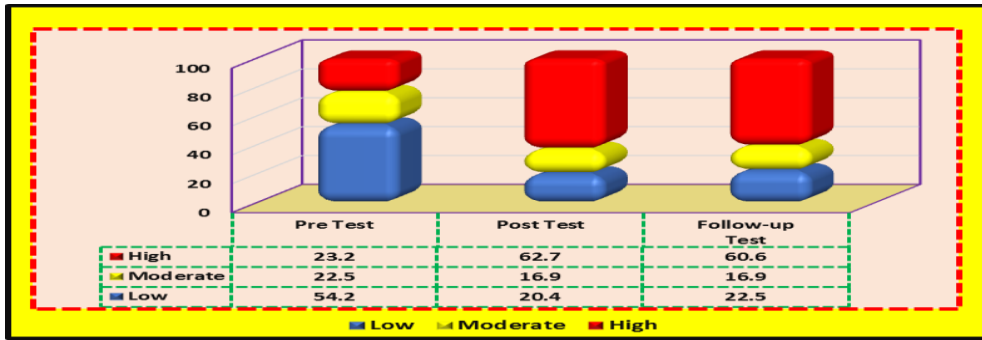
Figure (2) Displays that, at preprogram phase about one-fifth (19.7%) of studied nurses had adequate total knowledge level. As observed at post program and follow up phases the total knowledge level was improved markedly (93.7%, 92.3% respectively).



$\chi^2=61.6, P=0.000$

Figure (3): Levels of studied nurses' total problem-solving skills throughout program phases (n=142)

Figure (3) Displays that, at preprogram phase more than one-tenth (12.7%) of studied nurses had strong level of problem-solving skills. As observed at the post program and follow up phases the total level of problem-solving skills was improved markedly (63.4%, 60.6% respectively).



$\chi^2=61.6, P=0.000$

Figure (4): Levels of studied nurses’ total self-efficacy throughout program phases (n=142)

Figure (4) Displays that, at preprogram phase more than one-fifth (23.3%) of studied nurses had high level of self-efficacy. As observed at the post program and follow up phases the total level of self-efficacy was improved markedly (62.7%, 60.6% respectively).

Table (2): Relation between personal characteristics and total knowledge regarding problem-solving throughout program phases among the studied nurses

Personal Characteristics		$\bar{x} \pm SD$ Pre- test	$\bar{x} \pm SD$ Post- test	$\bar{x} \pm SD$ Follow up
Age (year)	• 20- ≤ 30	6.54 ±10.0	29.6 ± 0.60	29.4 ± 1.4
	• 31- ≤ 40	12.4 ± 4.6	28.4 ± 4.2	27.5 ± 6.0
	• 41- ≤ 50	16.4 ± 9.7	26.5 ± 6.9	25.1 ± 9.7
	• > 50	10.4 ± 1.13	30.0 1.00	30.0 ± 1.1
	• F & P	9.47 (0.000 <sup>**</sup> )	4.56 (0.004 <sup>**</sup> )	4.52 (0.005 <sup>**</sup> )
Gender	• Male	26.1 ± 10.1	27.3 ± 7.4	26.8 ± 8.8
	• Female	9.15 ± 8.3	28.9 ± 3.5	28.2 ± 5.1
	• t & P	5.53 (0.000 <sup>**</sup> )	1.10 (0.270)	0.70 (0.48)
Marital status	• Single	11.7 ± 8.8	28.8 ± 3.8	28.0 ± 5.7
	• Married	6.0 ± 10.1	29.7 ± 0.44	29.7 ± 0.44
	• Widow	1.0 ± 000	29.0 ± 0.3	29.0 ± 0.5
	• Divorced	1.71 ± 0.75	25.7 ± 7.4	25.0 ± 8.8
	• F & P	5.74 (0.001 <sup>**</sup> )	2.07 (0.107)	1.52 (0.210)
Educational level	• Technical	5.65 ± 4.9	29.1 ± 2.8	28.5 ± 4.14
	• Bachelor	20.0 ± 8.9	28.1 ± 5.3	27.3 ± 7.5
	• t & P	12.2 (0.000 <sup>**</sup> )	1.44 (0.150)	1.25 (0.213)
Experience in	• 1- ≤ 5	3.25 ± 4.0	28.8 ± 2.3	27.6 ± 4.2

nursing	• 6-≤ 10	3.53 ± 2.5	30.0 ± 1.00	30.0 ± 1.00
	• 11-≤ 15	10.9 ± 3.8	27.6 ± 6.3	26.8 ± 8.3
	• > 15	19.3 ± 8.7	28.5 ± 4.2	27.9 ± 6.1
	• F & P	70.3 (0.000**)	1.97 (0.121)	1.9 (0.129)
Experience in department	• 1-≤ 5	1.77 ± 0.61	29.7 ± 0.425	29.7 ± 0.42
	• 6-≤ 10.	6.17 ± 4.6	28.4 ± 3.9	27.7 ± 5.6
	• 11-≤ 15	10.1 ± 8.1	28.8 ± 3.6	27.3 ± 6.01
	• > 15	21.9 ± 8.1	28.5 ± 5.1	28.0 ± 6.7
	• F & P	91.0 (0.000**)	0.88 (0.452)	1.21 (0.308)

\*Significant  $p \leq 0.05$  \*\*Highly significant  $p \leq 0.01$  F: ANOVA Test T: Independent T test

Table (2): shows that there was a highly statistically significant relation between personal characteristics (age) and total knowledge regarding problem-solving throughout program phases (pre, post & follow-up) among the studied nurses, at  $P \leq 0.05$ . Additionally, there was a highly statistically significant relation between personal characteristics (gender, marital status, educational level & experience in both nursing & department) and total knowledge regarding problem-solving at a pre-test only among the studied nurses, at  $P \leq 0.05$ .

Table (3): Relation between personal characteristics and total problem-solving skills throughout program phases among the studied nurses (n=142)

Personal Characteristics		$\bar{x} \pm SD$ Pre- test	$\bar{x} \pm SD$ Post- test	$\bar{x} \pm SD$ Follow up
Age (year)	• 20- ≤ 30	95.0 ± 35.6	147.3 ± 28.1	143.3 ± 27.9
	• 31- ≤ 40	106.5 ± 28.3	181.8 ± 29.7	179.9 ± 34.4
	• 41- ≤ 50	11.2 ± 44.7	167.3 ± 47.5	164.5 ± 48.2
	• > 50	82.7 ± 2.11	173 ± 3.00	160 ± 3.5
	• F & P	2.38 (0.072)	10.5 (0.000**)	10.5 (0.000**)
Gender	• Male	164.2 ± 52.3	183.6 ± 44.3	183.6 ± 44.3
	• Female	96.7 ± 30.1	160.6 ± 34.3	156.8 ± 35.9
	• t & P	5.8 (0.000**)	1.80 (0.073)	2.02(0.045*)
Marital status	• Single	103.7 ± 36.7	171.1 ± 32.4	167.0 ± 35.0
	• Married	94.8 ± 29.4	137.1 ± 26.6	134.4 ± 27.6
	• Widow	81.0 ± 0.00	122.0 ± 0.00	122.0 ± 0.00
	• Divorced	74.86 ± 15.3	115.0 ± 18.0	114.1 ± 17.7
	• F & P	2.00 (0.116)	14.8 (0.000**)	11.5 (0.000**)
Educational level	• Technical	86.10 ± 19.5	152.7 ± 29.7	147.6 ± 30.4
	• Bachelor	132.6 ± 40.7	182.3 ± 38.0	182.0 ± 38.7

	• t & P	9.2 (0.000**)	5.0 (0.000**)	5.7 (0.000**)
Experience in nursing	• 1-≤ 5	81.0 ± 21.4	132.1 ± 25.6	130.4 ± 26.6
	• 6-≤ 10	82.0 ± 0.00	153.8 ± 17.2	145.4 ± 15.9
	• 11-≤ 15	92.7 ± 24.2	170.4 ± 38.7	165.6 ± 38.8
	• > 15	131.3 ± 38.7	185.4 ± 30.9	184.3 ± 34.2
	• F & P	33.3 (0.000**)	25.8 (0.000**)	25.5 (0.000**)
Experience in department	• 1-≤ 5	82.0 ± 3.00	133.4 ± 13.1	128.0 ± 9.6
	• 6-≤ 10.	80.83 ± 16.2	154.5 ± 29.5	147.6 ± 29.0
	• 11-≤ 15	102.0 ± 3102	173.7 ± 36.7	172.6 ± 39.0
	• > 15	139.3 ± 37.8	186.0 ± 33.6	186.0 ± 33.7
	• F & P	43.0 (0.000**)	20.0 (0.000**)	25.3 (0.000**)

\*Significant  $p < 0.05$

\*\*Highly significant  $p < 0.01$

F: ANOVA

Test T: Independent T test

Table (3): shows that there was a highly statistically significant relation between personal characteristics (age, gender, marital status, educational level & experience in both nursing & department) and total problem-solving skills throughout program phases (pre, post & follow-up) among the studied nurses, at  $P = < 0.05$ . Except for age and marital status at a pre-test in addition to gender at a posttest phase, there isn't statistically significant relation.

Table (4): Relation between personal characteristics and total self-efficacy throughout program phases among the studied nurses (n=142)

Personal Characteristics		$\bar{x} \pm SD$ Pre- test	$\bar{x} \pm SD$ Post- test	$\bar{x} \pm SD$ Follow up
Age (year)	• 20- ≤ 30	85.5 ± 29.6	113.9 ± 26.5	110.0 ± 26.9
	• 31- ≤ 40	104.0 ± 23.2	146.2 ± 33.6	134.2 ± 32.8
	• 41- ≤ 50	103.4 ± 40.0	140.0 ± 39.8	132.0 ± 38.1
	• > 50	86.5 ± 4.3	160.0 ± 1.00	128.0 ± 2.000
	• F & P	4.51(0.005**)	13.2 (0.000**)	6.84 (0.000**)
Gender	• Male	141.3 ± 44.2	148.0 ± 33.9	148.0 ± 33.9
	• Female	91.1 ± 27.1	128.8 ± 34.3	120.0 ± 31.4
	• t & P	4.87 (0.000**)	1.53 (0.128)	2.43 (0.016)
Marital status	• Single	98.8 ± 30.9	138.5 ± 32.8	128.3 ± 31.3
	• Married	83.4 ± 23.6	106.8 ± 24.3	106.2 ± 24.5
	• Widow	67.5 ± 0.70	94.0 ± 1.00	91.0 ± 2.00
	• Divorced	61.7 ± 13.1	85.8 ± 9.8	79.1 ± 8.1
	• F & P	5.47 (0.001**)	13.0 (0.000**)	9.5(0.000**)
Educational level	• Technical	81.1 ± 16.3	121.3 ± 32.6	109.3 ± 24.1

	• Bachelor	122.4 ± 35.2	149.0 ± 30.8	149.0 ± 30.8
	• t & P	9.5 (0.000**)	4.76 (0.000**)	8.30 (0.000**)
Experience in nursing	• 1 ≤ 5	74.0 ± 13.7	98.9 ± 26.4	91.6 ± 18.4
	• 6 ≤ 10	77.0 ± 2.7	121.5 ± 20.6	113.5 ± 14.4
	• 11 ≤ 15	90.8 ± 23.9	147.4 ± 33.0	119.6 ± 22.0
	• > 15	121.8 ± 32.0	150.2 ± 29.1	150.2 ± 29.3
	• F & P	41.5 (0.000**)	28.5 (0.000**)	48.4 (0.000**)
Experience in department	• 1 ≤ 5	73.8 ± 2.5	102.2 ± 10.5	98.8 ± 6.61
	• 6 ≤ 10.	78.9 ± 16.2	125.7 ± 34.4	110.9 ± 24.2
	• 11 ≤ 15	95.5 ± 24.8	137.9 ± 38.9	124.0 ± 36.6
	• > 15	128.3 ± 31.4	152.2 ± 26.5	152.2 ± 265
	• F & P	47.8 (0.000**)	16.6 (0.000**)	28.9 (0.000**)

\*Significant  $p \leq 0.05$

\*\*Highly significant  $p \leq 0.01$

F: ANOVA

Test T: Independent T test

Table (4): shows that there was a highly statistically significant relation between personal characteristics (age, gender, marital status, educational level & experience in both nursing & department) and total problem-solving skills throughout program phases (pre, post & follow-up) among the studied nurses, at  $P = 0.000$ . Except for gender at a posttest and follow-up test phase, there isn't statistically significant relation.

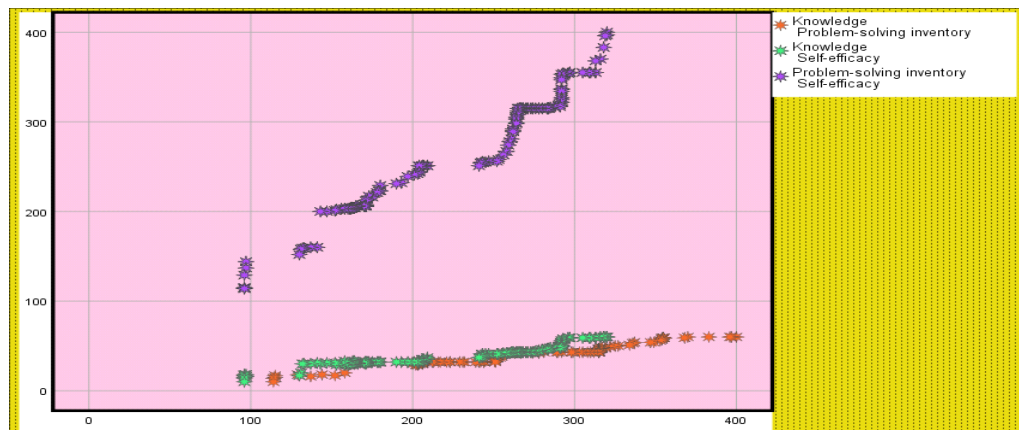


Figure (5): Scatter dot regression between cumulative total of knowledge, problem-solving skills, and self-efficacy among the studied nurses (n=142)

Figure (5) illustrated that, there was a high statistically significant strong positive correlation between cumulative total of knowledge, problem-solving skills and self-efficacy among the studied nurses.

## DISCUSSION

The most distinguishing trait of nursing professionals in the modern nursing environment is the ability to solve problems, investigate, organize, and utilize information for the

desired complicated and strategic practices. Nurses also need to develop problem-solving knowledge and skills to set the best goals and find the best approaches and justifications to use critical thinking, clinical judgment and decision-making. Problem-solving training programs will positively affect nurses' self-efficacy, as well as actively address issues with independence and autonomy, and ability to manage difficult situations (Jo & Hwang, 2022).

The aim of this study was conducted to assess the effect of problem-solving training program on staff nurses self-efficacy.

Concerning the personal characteristics of the studied nurses, as regard the age, educational level, and attended training courses of the studied nurses; the study results show that less than half of the nurses' age ranges 20- ≤ 30 years old, with a mean age of  $33.49 \pm 8.13$ . Moreover, more than two-thirds of them had technical institutes of nursing degree and less than one-third of them had bachelor nursing degree. As well, all of the studied nurses weren't attended training courses.

The result of the study is consistent with the study done by Jo and Hwang, (2022), who reported that more than half of the studied nurses were 22- ≤ 30 years old. Additionally, two-thirds of the studied nurses had different nursing educational degree and only one third graduated from university with three-fifth of them didn't attended training courses.

In the same line, the study done by Zyoud et al. (2022), who stated that most of the nurses average age was 22 years ( $SD=3.76$ ), two-thirds of the studied nurses were female with the majority of them single. Furthermore, two-thirds of the studied nurses had never trained in a hospital about the study topic.

In relation to gender and marital status of the studied nurses; the study results show that the majorities of the studied nurses were female with less than four-fifth of them being single. The result of the study is sustained with the study done by Ahmady and Shahbazi, (2020), who counted that two-thirds of the studied nurses were female. Furthermore, the majority of the studied nurses were single.

On the other hand, the study accomplished by Hassan et al. (2020), who showed that about two thirds of nurse had an age range between 35-45 years, the majority nurse managers were female, and married, more than half of nurse managers had a bachelor degree, more than three-fifths of them work in hospitals affiliated to the ministry of health. Additionally, the majority of nursing managers had attended previous training. About two-thirds of the nursing managers hadn't attended previous training about problem-solving skills and critical thinking.

Concerning to the studied nurses' knowledge regarding problem-solving and based on the statical analysis of the pre, post and follow-up test; the study results clarifies that most of the studied nurses gained higher adequate knowledge at post-test which slightly lessened at follow-up after program implementation from pre-program implementation. Subsequently, there were observable improvements of the total mean score of studied nurses' level of knowledge regarding problem-solving in relation to definition, steps, skills, style, strategy, classification and barriers throughout program implementation phases.

From the researcher point of view, the problem-solving knowledge can be established among nursing staff, and then nurses will receive the best instruction to improve the nurses' problem-solving knowledge which reflected on nurses' performance, job satisfaction, and quality of patient care as well as to prepare for nursing career.

This result was agreed by Bayer et al. (2023) who found that the training program affect the studied nurses' problem-solving knowledge and skills mean score, and the problem-solving skills higher mean score affected the overall the nurses' autonomy score on job satisfaction.

This result was reinforced with the study done by Choi and Jeon, (2022), who found that there were high level of dissatisfied nurses, who had difficulties in the pre- problem-solving program includes problem identification, problem expression, strategy formulation, information construction, resource allocation, supervision, and evaluation which improved post program implementation with a higher mean score of metacognitive level of nursing staff by indicating a significantly higher problem-solving ability.

On the same direction, this results consistant with Jo and Hwang, (2022) who discovered the presence of highly statistically significant differences among the studied nurses had high mean scores in response problem solving knowledge including healthy skepticism and problem definition, intellectual fairness and problem orientation, objectivity in problem classification, systematicity through application of problem strategy, prudence with problem style, intellectual eagerness/ curiosity to overcome problem barriers across after program implementation phases.

In relation to the total nurses' level of problem-solving skills; the result of the study clarifies that during the phase of post and follow-up of program implementation, more than three-fifth of the studied nurses had strong response with higher total mean of score of problem-solving skills up from the pre-program phase. Moreover, there were highly statistically significant differences between total mean score of problem-solving skills between phases of pre/post and post/follow-up phases of program implementation.

From researcher point of view, the training program assists nurses to use problem solving skills correctly, to correctly determine priorities when solving problems, and to pay attention to ethical rules when making decisions. Furthermore, it is necessary to lay the foundation for nurses to experience the real world and help them develop critical thinking and problem-solving skills, facilitates the nurses' reflective learning that helps them to develop nurses' problem-solving skills and obtained a more realistic view of individual professional responsibilities.

In the same context the result of the study applied by Motamed-Jahromi et al. (2022), who and found a significant improvement in the mean scores of the studied nursing students' clinical skills and problem-solving ability at week four and week twelve of follow-up compared with baseline with highly statically differences between program phases. However, the mean scores increased more in the experimental group.

Comparable the result of the study done by Abd El-Monem, (2023) who clarifies that the majority of the participant had highest mean percent related to self-responsibility. As well, more than three fifth of studied staff nurses had high level of problem-solving abilities, and the majority of them had the highest ranking related to problem-solving confidence, while the lowest ranking was related to personal control throughout the post program follow-up evaluation.

Similarly, the study finding was matched with El-Demerdash et al. (2021), who revealed that at the post program follow-up evaluation more than half of the participants had a sufficient level of problem-solving skills. Also, these results were similar to the study conducted by Durmaz et al. (2018), who found most of participants scored satisfactory level of problem-solving skills after the program evaluation phases.

On the other hand, Altas, (2020), who clarified that nurses had low level of critical thinking disposition and moderate level of problem solving skills throughout evaluation after program phases. As well, the study finished by Tulay et al. (2023), who stated that the nurses' problem solving skills were still at a medium level throughout after program evaluation phases.

In the context of the total levels of studied nurses' total self-efficacy throughout program phases; there were markedly improvement of more than three-fifth of the studied nurses' total high self-efficacy response at post and follow-up phases of program implementation compared to pre-program implementation with highly statistically significant difference



between self-efficacy sub-items (Emotional, social, insistence & persistence, and cognitive) among pre/post and post/follow-up program implementation phases.

From the researcher point of view, the nurses who had positive or high self-efficacy felt successful in both professional and personal life were emotionally satisfied, calm in stressful situation handling, more metacognitive problem-oriented and more socially dependable with the other nurses and other medical staff who worked with.

Similar to the result of the study done by Hassan and Saad, (2019) who mention that, there was highly statistically significant improvement in nurse students' skills regarding all dimensions of self-efficacy in post program phase, slightly decline in follow-up phase as compared with pre-program phase. Comparable to the study done by Çinar and Baykal, (2022) who found that the nurse who had received training had experienced positive changes in all dimensions of self-efficacy at both professional and private lives, were happier, calmer, more solution-oriented and more trusting of the nurses that worked with.

In the same respect the study done by Jordan et al., (2020), who stated that the nurses enter professional nursing with a desire to acquire knowledge, develop skills, provide nurturing support during life changing experiences, and have high expectations for gaining skills and knowledge to prepare them to enter professional practice, also, having an open mind and a strong desire to learn new things which are important items of quality for all nurses.

The study results emphasized that there were highly statistically significant relation between personal characteristics (age, gender, marital status, educational level & experience in both nursing & department) and problem-solving knowledge, skills and self-efficacy at post and follow-up phases of program implementation.

From the researcher point of view, the nurse age, educational level and experience years had clear effects of training program and enhance the nurses' learning attitude among the nursing staff and had a positive influence on motivation to work and make social work environment. The problem-solving ability had a positive influence on self-efficacy and would have positive influence on the self-directed learning readiness, as well.

The result of the study is consistent with Jo and Hwang, (2022), who found that the correlation between general characteristics, problem-solving abilities of the studied nurses and self-efficacy and leadership. For general characteristics (age, gender, educational level, and experience years) a positive correlation was observed in major satisfaction and personal relationships.

As well, the study applied by Ludin, (2018) who showed that while age, gender, ethnicity, education level and working experience factors significantly impacted problem-solving critical thinking at  $p < 0.05$ , while only age and working experience significantly impacted clinical problem-solving decision-making  $t p < 0.05$ . Also, Hassan et al. (2023) who found that there were statistically positive correlation between overall nurses' empowerment and self-efficacy including autonomy, participation, responsibility and overall nurses' problem solving abilities including problem solving confidence, approach avoidance style, personal control.

The same, the study result of Mohamed et al. (2020) who stated that with regard to the relationship between metacognition and problem-solving skills, the association between metacognitive knowledge, self-efficacy and problem-solving skill scores at post-program intervention is statistically significant.

On the topic of linear regression analysis of the study results revealed that the problem-solving knowledge, problem-solving skills had positive predictor factor of self-efficacy among the studied nurses. This results confirmed by Jo and Hwang, (2022) who found the regression equation used to analyze the influential factors showed that the problem-



solving abilities including, problem-solving knowledge, skills, goal commitment, and critical thinking had positive predictor factor of self-efficacy, leadership and personal relation among the studied participant.

Likewise, the results of the study applied by Eyimaya et al. (2021) who cleared that nurses get a high self-control and self-efficacy which raised through program implementation and getting problem-solving skills abilities to resolve encounter problems and conflicts. Comparable, Mohamed et al. (2020) who stated that with regard to the relationship between metacognition and problem-solving skills, the association between metacognitive knowledge, self-efficacy and problem-solving skill scores at post-program intervention is statistically significant.

Conversely, the study completed by Saedyan et al. (2022) showed that the relationship between problem-solving skills and their sub-scales and the positive and negative strategies of emergency medical service personnel. Problem-solving skills were significantly inversely correlated with negative strategies, but they were not correlated with positive strategies. Self-efficacy and confidence had a significantly negative correlation with negative strategies and a significantly positive correlation with positive strategies.

Finally, the ability to manage and organize cognitive processes is strengthened, increasing or enabling problem solving critical thinking, judgments, or decisions to solve problems that could affect the conditional knowledge and comprehension monitoring scores during the learning process, according to the researcher's perspective. Additionally, nurses will receive the finest teaching to advance the problem-solving abilities with a high self-efficacy and get ready for a future in nursing if a path model of problem-solving abilities that combines knowledge and skills can be built.

## **CONCLUSION**

In the light of the results of the current study, it can be concluded that, the training program improves nurses' problem-solving knowledge, skills and self-efficacy. The study emphasized that the studied nurses had highly statically significant differences between program phases and gained a higher mean score with adequate problem-solving knowledge and strong response regarding problem-solving skills, and high level of self-efficacy during the post-implementation phase which slightly decline at three-month follow-up phase from the pre-program implementation.

Additionally, there were high statistically significant strong positive correlations between cumulative total of knowledge, problem-solving skills and self-efficacy among the studied nurses. Furthermore, there was a highly statistically significant relation between personal characteristics (age, gender, marital status, educational level & Experience in both nursing & department) and cumulative total of knowledge, problem-solving skills, and self-efficacy among the studied nurse.

## **RECOMMENDATIONS**

Based on the results of the study the following recommendations were suggested:

At hospital administration level:

- Development and implementation of simulated practice training program to enhance the nurses' leadership & problem-solving skills strategies.
- Perform periodical evaluation at hospital for all staff nurses' problem-solving skills and self-leadership.
- Design implementation intervention that enhance nursing problem-solving skills

At practice level:

- Organize nurses' practical workshops on the development of problem solving strategies.
- Improve the nurses' social problem solving skills regarding identifying the patient's needs.
- Design training programs based on factors affecting the nurses' problem-solving and critical thinking skills.

At educational level:

- Develop a case scenario for simulating education to improve the nurses' problem solving skills.
- Enroll the evidence-based practice education and problem-solving skills program as a general education course for undergraduate nursing students.

At research level:

- The implementation of this study in larger groups and in different levels of education.
- Assessing impact of problem-solving skills on improvement of the quality of care regarding patients' needs.

## References

- Abd Elhamed, S.M., Morsy, S.M. & Mohamed, A.S. (2019): Relationship between Head Nurses' Self-efficacy and Job Performance. *Assiut Scientific Nursing Journal*, 7(19), 17-25.
- Abd El-Monem, A.M., Rashed, S.E. & Hasanin, A.Gh. (2023): Artificial Intelligence Technology and its Relation to Staff Nurses' Professional Identity and Problem Solving Abilities; *International Egyptian Journal of Nursing Sciences and Research (IEJNSR)*; Vol. 3 (2), [https://ejnsr.journals.ekb.eg/article\\_277890\\_4de11434501c2710be60ae23e8040864.pdf](https://ejnsr.journals.ekb.eg/article_277890_4de11434501c2710be60ae23e8040864.pdf)
- Ahmady, S. & Shahbazi, S.J.B.N. (2020): Impact of social problem-solving training on critical thinking and decision making of nursing students. *BMC Nurs* 19(1), 1-8. <https://doi.org/10.1186/s12912-020-00487-x>
- Ali, A.Z. & Nageeb, ShM. (2020): Effect of Problem-Solving Educational Program on Decision-Making Skills among Nurses in Critical Care Units; *International Journal of Novel Research in Healthcare and Nursing* Vol. 7, Issue 1, pp: (148-160), Month: January- April, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)
- Alis Nihlatin, (2021): The Relationship between Creative Thinking, Problem Solving Skills, and Self Efficacy with Work Readiness, Universitas Negeri Semarang Indonesia
- Al-Rafou', M.A. (2022): The relationship of perceived selfefficacy with the ability to solve problems among students of Tafila Technical University in Jordan, the educational magazine
- Al-Saleh, M. (2021) The Importance of Training the Institution's Human Resources on its Performance in the Light of the Knowledge Economy, University of M'sila.
- Altas, G. (2020): The Relationship between Critical Thinking Disposition and Problem Solving Skills in Nurses. *International Journal of Caring Sciences*, 13(3), 1890-1897.
- Al-Zahrani, F.M. (2021): problem-solving skill and its relationship to quality of life among a sample of middle school students in Jeddah, *Journal of Educational and Human Sciences*.
- Ancel, G. (2016): Problem-Solving Training: Effects on the Problem-Solving Skills and Self-Efficacy of Nursing Students. *Eurasian. Journal of Educational Research*; 64: 231-246. Available at <http://dx.doi.org/10.14689/ejer.2016.64.13ARA>

- Bayer, N., Küçükkelepçe, D.S., Bulut, Ö.Ü. & Gölbaşı, Z. (2023): Effect of Nurses' Autonomy Levels and Problem-Solving Skills on Job Satisfaction. *Clin Exp Health Sci*; 13: 370-6. DOI: 10.33808/clinexphealthsci.1119340.
- Choi, E. & Jeon, J. (2022): Factors Influencing Problem-Solving Competence of Nursing Students: A Cross-Sectional Study. *Healthcare*; 10, 1184. Available at <https://doi.org/10.3390/healthcare10071184>.
- Çınar, H.G. & Baykal, U. (2022): Determining the Effect of Neuro-Linguistic Programming Techniques on the Conflict Management and Interpersonal Problem-Solving Skills of Nurse Managers: A Mixed Methods Study; *J Nurs Manag*; 20 August; 30(1):104–134. DOI: 10.1111/jonm.13455.
- Durmaz, Y. C., Serin, E. K., & Polat, H. T. (2018): Determination of problem-solving and communication skills of nursing/midwifery students. *International journal of caring sciences*, 11(3), 1771-1777.
- Durmaz, Y. C., Serin, E. K., & Polat, H. T. (2018): Determination of problem-solving and communication skills of nursing/midwifery students. *International journal of caring sciences*, 11(3), 1771-1777.
- El-Demerdash, A. M., Ibrahim, S. A., & Elhosany, W. A. (2021): Problem solving skills and clinical decision making among nursing interns; *International Journal of Novel Research in Healthcare and Nursing*, Vol. 8, Issue 1, pp: (304-309).
- Elwan, S.T. (2012): Perceived Self-efficacy among students in Baghdad University. *Educational and psychological research journal*; 245 - 248.
- Eyimaya, A.o., Sezer, T.A., & Tezel, A. (2021): Self-control and problem-solving skills of undergraduate nursing program students, and an analysis of influential factors. *Perspectives in psychiatric care*, 58(2), 464–470. <https://doi.org/10.1111/ppc.12864>.
- Francesca Pistoia, (2022): The importance of Training, Challenges to the Global Issue of End of Life Care.
- Hassan, M. & Saad, A. (2019): Work family conflict and health: A study of workplace, psychological and behavioral correlates. *Journal of Behavioral and Applied Management*, 6(3), 225-247.
- Hassan, Z.M., El Sayed, K.A. & Eid, W.M. (2023): Relation between Level of Empowerment and Problem-Solving Abilities of Nurses at Intensive Care Units; *Tanta Scientific Nursing Journal*; Vol. 29. No.2 May, 2. ISSN 2735 – 5519.
- Jo, H.H. & Hwang, W.J. (2022): Factors Influencing on Problem Solving Ability of Nurses' Experiencing Simulation Practice. *International Journal of Environmental Research and Public Health*; Sep; 19(18):11744. <https://doi.org/10.3390/ijerph191811744>.
- Khawla, H. (2021): The psalmist of self-efficacy and its relationship to coping mechanisms among diabetic patients, *Oasis Journal for Research and Studies* 14.
- Lee, K.J., Rong, J.R., Liu, C.Y., & Kuo, C.G. (2018): The Effects Of Problem-Solving Skills Training On Self-Control Behaviors And Psychotic Symptoms Among Community-Dwelling Patients With Schizophrenia, *International Journal of Studies in Nursing*; 3 (2).53.
- Ludin S.M. (2018): Does good critical thinking equal effective decision-making among critical care nurses? A cross-sectional survey; *Intensive & critical care nursing*, 44, 1–10. <https://doi.org/10.1016/j.iccn>.
- Melhem, A.B.(2022): Self-disclosure and its relationship to self-efficacy and the ability to solve problems among guided students, *Counseling and Special Education*
- Mitchell, M. & Holly, A. (2017): Exploring Self-Efficacy And Anxiety In First-Year Nursing Students Enrolled In a Discipline-Specific Scholarly Writing Course. *Quality Advancement in Nursing Education - Avancées enformation infirmière J*; 3 (1): Retrieved from <https://doi.org/10.17483/2368-6669.1084>
- Mohamed, H.M., Mohamed, A.I., & Maha Abdeen Abdeen, M.A. (2020): “The Impact of Metacognitive Skills Educational Program on Metacognitive Awareness, Self- Efficacy, and

- Problem Solving Skills among Nursing Students.” American Journal of Nursing Research, vol. 8, no. 2: 289-296. doi: 10.12691/ajnr-8-2-19.
- Moorthi, S. (2018): Problem Solving Skills among College Students, International Journal Innovative Research Explorer, 5 (4): pp207-214.
- Motamed-Jahromi, M., Eshghi, F., Dadgar, F., NejadSadeghi, E., & Meshkani, Z. (2022): The Effect of Team-based Training Through Smartphone Applications on Nursing Students’ Clinical Skills and Problem-Solving Ability. Shiraz E-MedJ.;23(5):e114324. <https://doi.org/10.5812/semj-114324>.
- Nasser, S. & Hamza , A. (2022): The importance of training in developing the performance of employees in economic institutions: A field study of the Primatic Foundation for the wage industry in the state of M'sila, University of M'sila.
- Oraby, M. & Elsafty, A. (2022): Impact of Training on Employee Retention: An Empirical Research on the Private Sector in Egypt, International Journal of Business and Management 17.
- Sayekti, S. & Waluya, B. (2020): The analysis of mathematics problemsolving skills and its relation with self-efficacy on the students of MTsN 2 Pematang, Mathematics Education
- Tulay, S., Gulnaz, G. & Midilli, A. (2023): The Relationship between Critical Thinking Disposition and Problem Solving Skills in Nurses; research gate; February, available at <https://www.researchgate.net/publication/>
- Yadav, H., Lim, K. & Hashim, F. (2019): Nursing management. India: Oxford Fajar. Second Edition. SN 978-983-47-2861-8.
- Zyoud, A.H., Hamdan, Kh. M., Alkouri, O.A., Al-Sutari, M.M., Al-Tarifi, M., Alkaid Albqoor, M.A. & Shaheen, A. (2022): Problem-Solving and Communication Skills of Undergraduate Nursing Students; Open Nursing Journal; 28 September, available at <https://opennursingjournal.com/volume/16/locator/e187443462208020/fulltext/#cor1>.