Efficacy of Implementing Nursing Educational Program on Reduction of Risk of Varicose Veins among Nurses at Tanta University Hospital

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Abstract

Background: Varicose veins are one of the most common occupational diseases that have affected many nurses worldwide. This study aimed to: Evaluate the efficacy of implementing nursing educational program on reduction of risk of varicose veins among nurses at Tanta University Hospital. Subjects and method: A quasi experimental design at the main Tanta University Hospital in Operating Theater, General Medical and Surgical Departments. All nurses (150 nurses) were included. Tools: Tool (I): Structured Interview Knowledge Questionnaire: It consisted of four parts: Nurses' Socio-demographic data, Nurses' occupational characteristics, Nurses' health relevant data and Nurses' knowledge questionnaire regarding varicose veins. Tool (II): Comprehensive Classification of Varicose Veins Scale. Tool (III): Self-Reported Questionnaire of Nurses' Practices for Varicose Veins Prevention. Results: It was observed that there were a high positive significant correlation (r=0.332) between the total knowledge and basic preventive health measures of varicose veins. Conclusion: Implementing nursing educational program on reduction of risk of varicose veins was improving their knowledge, practice and decrease risk of varicose veins. Recommendations: It was recommended that provision of health education programs for increasing awareness of all nurses to prevent varicose veins and its consequences.

Key words: Varicose veins, occupational diseases, preventative actions.

Introduction

Varicose veins (VVs) are one of the most common occupational diseases that have affected many people worldwide. Varicose veins are often believed to be a cosmetic problem; however they may cause serious complication including severe pain, discomfort, leg cramps, ulceration, poor quality of life, and even loss of life.¹,²

Varicose veins reported worldwide prevalence ranging between 20% and 60%. The American clinical guidelines for varicose veins care points out that 27% of the Americans had some form of varicose veins in their legs. It is estimated that 20% to 25% million Americans have varicose veins. In Egypt lower limb varicose veins were considered as one of the most common chronic venous problems affecting 47% to 50% of the whole Egyptian population.³-⁶

Varicose veins are abnormal dilated blood vessels that can appear in any part of the body where venous returns to the heart are weak.
but are often seen in the lower extremities, and these conditions increase pressure on the leg veins include overweight, lack of exercises, smoking, hormonal fluctuations during pregnancy, occupations requiring sitting or standing for continuous time, deep venous thrombosis that make veins of leg very weak and finally develop into VVs. (7-12)

At first, varicose veins are asymptomatic, or they cause mild symptoms, but it can cause pain or itching which can have a significant effect on their quality of life. Varicose veins may become more severe over time and may lead to complications, such as skin discoloration, eczema, superficial thrombophlebitis, bleeding, or venous ulcers. (13-18)

Varicose veins categorized according to clinical, etiological, anatomical, and pathophysiological classification into three classes; class one like spider telangiectasia's and reticular veins that describe dilated intradermal venules (<1 mm in diameter), class two like dilated non-palpable veins that describe subdermal venules (1-3 mm in diameter), and class three rope-like dilated palpable sub-cutaneous veins that describe true varicose veins (>3 mm in diameter), all these classes of varicose veins present substantial cosmetic concerns. (19, 20)

The clinical evaluation of varicose veins begins with the physical examination to determine the type, location, extent, and possibly the cause of the venous disease. Varicose veins should be inspected for erythema, tenderness, or induration that may suggest superficial vein thrombosis, moreover the clinical examination should identify any signs of more advanced chronic venous disease such as edema, hyperpigmentation and ulceration. (21-25)

Management of varicose veins consists of external laser treatment, injection sclerotherapy and surgery. Compression stockings are frequently prescribed as the first step in varicose veins management and effective for treatment of discomfort and edema. Compression stockings improve venous hemodynamics by decreasing venous reflux and reducing ambulatory venous hypertension. (26-30)

Whether or not more advanced therapies such as ablation are considered, the best course of action is prevention of varicose veins, some self-care measures that can nurse used it to prevent varicose veins among nurses including regular physical activity such as walking and foot flexion exercise that improve calf muscle pump function to reduce pressure on veins of the leg. (31, 32)

Additionally, nurses should avoiding constipation, eating a high-fiber, low-salt diet, avoiding tight clothing that constricts the legs, groin or waist, avoiding high heels and tight hosiery, changing the sitting or standing position regularly and avoiding long periods of standing or sitting, and avoiding crossing the legs when sitting and shifting weight from one leg to the other every few minutes when standing for long period, this change in clinical practice could ultimately reduce the risk for vascular disease. (33, 34)

Finally, high risk nurses should be instructed to increasing compression strength through wear compression stockings in the morning while the leg is in a nondependent position and to remove them at night before going to bed, use alternative remedies, learn legs acupuncture and acupressure massage, homoeopathy and hydrotherapy technique and uses natural herbal to prevent varicose veins and reduce greater severity of chronic venous insufficiency. (35-38)

The aim of this study is
To evaluate the efficacy of implementing nursing educational program on reduction of risk of varicose veins among nurses at Tanta University Hospital.
Materials and methods
Study design
A quasi experimental design was used to achieve the purpose of the study.

Setting of the study
The study was conducted at the main Tanta University Hospital in Operating Theater, General Medical and Surgical Departments.

Subject
All nurses who working in the previously mentioned settings at the time of data collection (150 nurses). The sample was divided into three groups 50 nurses in each setting. The sample size was calculated based on Epidemiological Information Program based on the total number of nurses.

Data collection tools
Three tools were used in this study after reviewing recent relevant literatures.

Tool (I): Structured Interview Knowledge Questionnaire: It consisted of four parts developed by the researcher based on literature review as follow:
- Part 1: Nurses' Socio-demographic Data: This part included structured questions about the demographic factors and personal characteristics of studied nurses such as: age, sex, marital status, place of residence.
- Part 2: Nurses' Occupational Characteristics: This part consisted of statements that contain information about condition and situation of nursing duty such as: area of work, job position, number of daily working hours and number of overtime hours per month and years of the experience.
- Part 3: Nurses' Health Relevant Data: This part consisted of statements that contain information about studied nurses' health such as: number of pregnancy, doing exercise, bowel movement, weight, height and body mass index (BMI).
- Part 4: Nurses' Knowledge Questionnaire Regarding Varicose Veins: This part used to gather the nurses' knowledge regarding varicose veins such as: definition, risk factors, causes, clinical manifestations, classifications, diagnosis, prevention, complications and management.

Tool (II): Comprehensive Classification of Varicose Veins Scale: The original scale “Comprehensive classification of varicose veins scale” was developed by Elkof et al in 2004 (39), revised by Serup et al in 2017 (40) and the researcher adopt it. It is an internationally accepted standard for describing patients with chronic venous disorder.

Scoring system was calculated as follows:

| Severity  | Classification |
|-----------|----------------|
| Mild      | CEAP C1-C2     |
| Moderate  | CEAP C3        |
| Severe    | CEAP C4-C6     |

Tool (III): Self-Reported Questionnaire of Nurses' Practices for Varicose Veins Prevention
This tool developed by the researcher based on literature review. It included;
- A- Basic preventative health measures which included: posture of sitting or standing, foot and leg exercise, wear compression hosiery, getting medical treatment.
- B- Healthy lifestyle which included: healthy eating habits, general exercise, wear compression stockings, types of clothes, maintain a healthy weight and taking care of legs.

Scoring system was calculated as follows
Self-reported questionnaire of nurses' practices for varicose veins prevention is designed in quadruple point Likert-type scale varying between never, sometimes, usually, and almost always. Each item is graded from one to four (Never = 1, sometimes = 2, usually = 3, almost always = 4).
II. Method

1- Administrative process
An official permission to carry out the study was obtained from the responsible authorities.

2- Ethical consideration
Consent was obtained from every nurse included in the study after explanation of the aim of the study and assuring them of confidentiality of collected data.

3- Tools development
- Tools I and III were developed by researcher based on relevant literature review for collection of baseline data.
- Tool II developed by Elkof et al in 2004 \(^{(39)}\) and revised by Serup et al in 2017 \(^{(40)}\), the researcher adopt it and translated into Arabic.

4- Content validity
The developed tools were tested for content validity, clarity and applicability by a ten jury of experts in the field of Medical Surgical Nursing at the Faculty of Nursing and Medical specialists.

5- Reliability of the tools
All tools of the study were tested for reliability and Cronbach alpha was used and found to be 0.87 for Tool I, 0.98 for Tool II and 0.88 for Tool III, which consider highly reliable tools.

6- A pilot study
A pilot study was carried out on a sample of 10% percentage of total sample (15 nurses) in previous mentioned setting to test clarity, feasibility and applicability of the tools. Subject of pilot study was excluded from the original sample.

7- Data collection
Data collection conducted over a period of 8 months, (started from first of January to the end of August 2021).

8. Implementing nursing educational program
The study was conducted through four main phases which are (assessment, planning, implementation and evaluation).

A- Assessment phase
The researcher introduced herself to each nurse included in the study and explained the purpose and importance of the study and reassurance about the confidentiality of the information was given at the beginning of the interview.

B- Planning phase
The nursing educational program was designed by the researcher to all nurses included in the study by dividing the nurses into three groups, each group included 50 nurses from each department divided into five subgroup each one include 10 nurses.

C- Implementation phase
This phase included collection of data during interview and the implementation of the planned teaching program.

D- Evaluation Phase
Each nurse was evaluated pre implementation, immediately post and one month after educational program.

9. After data collection, data was coded, analyzed then tabulated under the direction of a statistician to obtain results to answer the research questions.

10. Statistical analysis, after completion of data collection, all questions in interview questionnaire sheet was coded, organized and categorized then the data was tabulated and presented into frequency distribution tables.

Results
Table (1) illustrates distribution of the studied nurses according to their socio-demographic characteristics in three work places. (n=150). This table showed that slightly more than half (51.3%) of the total studied nurses were in the age group ranged from 21- < 30 years old with a statistical significant difference were found.
between three work places since $P = (0.018)$. In relation to sex the majority (92.0%) of the total studied nurses were female.

**Table (2)** shows distribution of the total studied nurses according to their occupational characteristics in three work places. (n =150). This table illustrated that majority (83.3%) of the total studied nurses were nurses in their job description with statistical significant difference were found between three work place since $P = (0.027)$ . In relation to daily work hours more than half (58.7%) of the total studied nurses work a daily time from 6 to 8 hours with statistical significant difference were found between three work places.

**Table (3)** illustrates distribution of the studied nurses according to their main health relevant data in three work places. (n =150). This table demonstrated that less than one third (30.0%) of the total studied nurses have two children. In relation to exercise time per week about two thirds (60.0%) of the total studied nurses haven't do any exercise per week. As regards to nature of excretion more than two thirds (77.3%) of the total studied nurses have normal bowel movement.

**Figure (1)** revealed distribution of the studied nurses according to their total knowledge score regarding varicose veins throughout the period of the study in three work places. (n = 150). This figure revealed that about half (44.0%) of the operating theatre nurses have low level of total knowledge before implementation of the educational program while (78.0%) have high level of total knowledge one month after implementation of the program.

**Table (4)** illustrates distribution of the studied nurses according to their total score of comprehensive classification of varicose veins scale throughout the period of the study in three work places. (n = 150). This table represented that more than two thirds (72.0%) of the total studied nurses has Telangiectasia (Score C1) in comprehensive classification of varicose vein scale before implementation of the educational program comparing to slightly more than half of the total studied nurses have no signs of varicose veins (Score C0) one month after follow up.

**Table (5)** illustrates relation between socio-demographic data of the studied nurses and total knowledge one month after the educational program in three work places. (n = 150) This table showed that the mean ± SD of total knowledge for the age group 30-< 40 years were (59.81±3.87, 52.04±4.13 and 53.75±3.96) for the studied nurse's work in operating theatre, medical and surgical department respectively.

**Table (6)** reveals relation between socio-demographic data of the studied nurses and practices of basic preventive health measures one month after the educational program in three work places. (n = 150). This table revealed that the highest mean ± SD of the practices of basic preventive health measures one month after educational program for the age group 30 - < 40 years were (57.30±9.92) for the studied nurse's work in operating theatre.
Table (1): Distribution of the studied nurses according to their socio-demographic characteristics in three work places. (n=150)

| Socio-demographic characteristics | The studied nurses (n =150) |  |  |  |  | Chi-square | P-value |
|-----------------------------------|-----------------------------|---|---|---|---|-----------|---------|
|                                   | Operating Theatre (n = 50)  | Medical Department (n = 50) | Surgical Department (n = 50) | Total | N   | %   | N   | %   | N   | %   | N   | %   | X²  | P-value |
| Age                               | 21 - < 30 years             | 21 | 42.0 | 28 | 56.0 | 28 | 56.0 | 77 | 51.3 | 15.333 | 0.018* |
|                                   | 30 - < 40 years             | 10 | 20.0 | 15 | 30.0 | 8  | 16.0 | 33 | 22.0 | 12.0   |        |
|                                   | 40 - < 50 years             | 5  | 10.0 | 4  | 8.0  | 9  | 18.0 | 18 | 12.0 | 14.7   |        |
|                                   | 50 - 60 years               | 14 | 28.0 | 3  | 6.0  | 5  | 10.0 | 22 | 14.7 | 11.7   |        |
| Sex                               | Male                        | 5  | 10.0 | 2  | 4.0  | 5  | 10.0 | 12 | 8.0  | 1.630  | 0.443  |
|                                   | Female                      | 45 | 90.0 | 48 | 96.0 | 45 | 90.0 | 138| 92.0 | 1.630  | 0.443  |
| Marital status                    | Single                      | 6  | 12.0 | 12 | 24.0 | 8  | 16.0 | 26 | 17.3 | 1.630  | 0.443  |
|                                   | Married                     | 41 | 82.0 | 34 | 68.0 | 40 | 80.0 | 115| 76.7 | 1.630  | 0.443  |
|                                   | Divorced                    | 0  | 0.0  | 1  | 2.0  | 1  | 2.0  | 2  | 1.3  |
|                                   | Widow                       | 3  | 6.0  | 3  | 6.0  | 1  | 2.0  | 7  | 4.7  |
| Place of residence                | Urban                       | 16 | 32.0 | 16 | 32.0 | 17 | 34.0 | 49 | 32.7 | 0.061  | 0.970  |
|                                   | Rural                       | 34 | 68.0 | 34 | 68.0 | 33 | 66.0 | 101| 67.3 |        |
| Socioeconomic status              | Lower than moderate         | 16 | 32.0 | 4  | 8.0  | 6  | 12.0 | 26 | 17.3 | 13.652 | 0.034* |
|                                   | Middle                      | 33 | 66.0 | 41 | 82.0 | 41 | 82.0 | 115| 76.7 |        |
|                                   | Above moderate              | 1  | 2.0  | 4  | 8.0  | 2  | 4.0  | 7  | 4.7  |
|                                   | Rich                        | 0  | 0.0  | 1  | 2.0  | 1  | 2.0  | 2  | 1.3  |
| Educational level                 | Nursing Diploma             | 17 | 34.0 | 16 | 32.0 | 23 | 46.0 | 56 | 37.3 | 4.955  | 0.550  |
|                                   | Technical Nursing Institute | 25 | 50.0 | 23 | 46.0 | 21 | 42.0 | 69 | 46.0 |        |
|                                   | Bachelor of Nursing         | 7  | 14.0 | 10 | 20.0 | 4  | 8.0  | 21 | 14.0 |        |
|                                   | Post graduate nursing studies| 1  | 2.0  | 1  | 2.0  | 2  | 4.0  | 4  | 2.7  |

Non-significant >0.05, Significant at P-value < 0.05, High Significant at <0.001*
Table (2): Distribution of the total studied nurses according to their occupational characteristics in three work places. (n =150)

| Occupational characteristics | Operating Theatre (n = 50) | Medical Department (n = 50) | Surgical Department (n = 50) | Total | Chi-square | X² | P-value |
|-----------------------------|---------------------------|---------------------------|-----------------------------|-------|------------|----|---------|
| Job description             |                           |                           |                             |       |            |    |         |
| Nurse                      | 37 (74.0)                 | 42 (84.0)                 | 46 (92.0)                   | 125 (83.3) | 10.976     |    | 0.027*  |
| Specialist Nursing          | 9 (18.0)                  | 8 (16.0)                  | 4 (8.0)                     | 21 (14.0) | 10.976     |    | 0.027*  |
| Nursing Supervisor          | 4 (8.0)                   | 0 (0.0)                   | 0 (0.0)                     | 4 (2.7)  | 10.976     |    | 0.027*  |
| Daily work hours            |                           |                           |                             |       |            |    |         |
| Less than 6 hours           | 23 (46.0)                 | 8 (16.0)                  | 5 (10.0)                    | 36 (24.0) | 28.311     |    | <0.001* |
| From 6 to 8 hours           | 19 (38.0)                 | 37 (74.0)                 | 32 (64.0)                   | 88 (58.7) | 28.311     |    | <0.001* |
| More than 8 hours           | 1 (2.0)                   | 3 (6.0)                   | 6 (12.0)                    | 10 (6.7) | 28.311     |    | <0.001* |
| Overtime hours/ month       |                           |                           |                             |       |            |    |         |
| None                        | 26 (52.0)                 | 29 (58.0)                 | 28 (56.0)                   | 83 (55.3) | 9.606      |    | 0.142  |
| Less than 20 hours          | 15 (30.0)                 | 8 (16.0)                  | 18 (36.0)                   | 41 (27.3) | 9.606      |    | 0.142  |
| From 20 to 40 hours         | 7 (14.0)                  | 14 (28.0)                 | 3 (6.0)                     | 18 (12.0) | 9.606      |    | 0.142  |
| More than 40 hours          | 2 (4.0)                   | 5 (10.0)                  | 1 (2.0)                     | 8 (5.3)  | 9.606      |    | 0.142  |
| Years of experience         |                           |                           |                             |       |            |    |         |
| Less than one year          | 4 (8.0)                   | 14 (28.0)                 | 5 (10.0)                    | 23 (15.3) | 23.474     |    | 0.003* |
| One year to less than 6 years | 20 (40.0)              | 10 (20.0)                 | 12 (24.0)                   | 42 (28.0) | 23.474     |    | 0.003* |
| From 6 to less than 10 years | 8 (16.0)               | 14 (28.0)                 | 12 (24.0)                   | 34 (22.7) | 23.474     |    | 0.003* |
| From 10 to less than 15 years | 3 (6.0)                | 8 (16.0)                  | 10 (20.0)                   | 21 (14.0) | 23.474     |    | 0.003* |
| 15 years and over           | 15 (30.0)                 | 4 (8.0)                   | 11 (22.0)                   | 30 (20.0) | 23.474     |    | 0.003* |
| Continuous hours of work in the standing position in each shift |                           |                           |                             |       |            |    |         |
| Less than one hour          | 9 (18.0)                  | 8 (16.0)                  | 5 (10.0)                    | 22 (14.7) | 2.812      |    | 0.832  |
| From one hour to less than two hours | 13 (26.0)       | 10 (20.0)                 | 15 (30.0)                   | 38 (25.3) | 2.812      |    | 0.832  |
| From 2 to 4 hours           | 15 (30.0)                 | 17 (34.0)                 | 18 (36.0)                   | 50 (33.3) | 2.812      |    | 0.832  |
| More than 4 hours           | 13 (26.0)                 | 15 (30.0)                 | 12 (24.0)                   | 40 (26.7) | 2.812      |    | 0.832  |
| Continuous hours of work in a seated position in each shift |                           |                           |                             |       |            |    |         |
| Less than one hour          | 17 (34.0)                 | 27 (54.0)                 | 20 (40.0)                   | 64 (42.7) | 6.574      |    | 0.362  |
### Table (3): Distribution of the studied nurses according to their main health relevant data in three work places. (n = 150)

| Main health relevant data | The studied nurses (n = 150) | Operating Theatre (n = 50) | Medical Department (n = 50) | Surgical Department (n = 50) | Total | Chi-square | P-value |
|--------------------------|-------------------------------|---------------------------|---------------------------|----------------------------|-------|------------|---------|
|                          | N    | %       | N    | %      | N    | %       | N    | %       | X²     |       |
| Number of children       |      |         |      |         |      |         |      |         |        |       |
| None                     | 5    | 10.0    | 15   | 30.0    | 6    | 12.0    | 26   | 17.3    | 24.046 | 0.002  |
| One                      | 7    | 14.0    | 5    | 10.0    | 10   | 20.0    | 22   | 14.7    |        |        |
| Two                      | 14   | 28.0    | 15   | 30.0    | 16   | 32.0    | 45   | 30.0    |        |        |
| Three                    | 11   | 22.0    | 13   | 26.0    | 16   | 32.0    | 40   | 26.7    |        |        |
| More than three time     | 13   | 26.0    | 2    | 4.0     | 2    | 4.0     | 17   | 11.3    |        |        |

**Non-significant >0.05, Significant at P-value < 0.05, High Significant at <0.001***

| Exercise time per week   |      |         |      |         |      |         |      |         |        |       |
|--------------------------|      |         |      |         |      |         |      |         |        |       |
| None                     | 33   | 66.0    | 29   | 58.0    | 28   | 56.0    | 90   | 60.0    |        |        |
| One                      | 9    | 18.0    | 6    | 12.0    | 15   | 30.0    | 30   | 20.0    | 11.433 | 0.178 |
| Twice                    | 6    | 12.0    | 6    | 12.0    | 4    | 8.0     | 16   | 10.7    |        |        |
| Three                    | 1    | 2.0     | 6    | 12.0    | 2    | 4.0     | 9    | 6.0     |        |        |
| More than three time     | 1    | 2.0     | 3    | 6.0     | 1    | 2.0     | 5    | 3.3     |        |        |

| Nature of excretion (faeces) |      |         |      |         |      |         |      |         |        |       |
|------------------------------|      |         |      |         |      |         |      |         |        |       |
| Normal                       | 42   | 84.0    | 35   | 70.0    | 39   | 78.0    | 11   | 6.0     | 4.938  | 0.294 |
| Constipation                 | 8    | 16.0    | 12   | 24.0    | 10   | 20.0    | 30   | 20.0    |        |        |
| Diarrhea                     | 0    | 0.0     | 3    | 6.0     | 1    | 2.0     | 4    | 2.7     |        |        |

| Weight & height (           |      |         |      |         |      |         |      |         |        |       |
|------------------------------|      |         |      |         |      |         |      |         |        |       |
| **Mean± SD** |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| **Weight** | 82.3±15.35 | 78.78±16.3 | 80.7±15.02 | 80.59±15.6 | 0.639 | 0.529 |
| **Height** | 163.06±15.4 | 162.44±6.4 | 163.84±7.3 | 163.11±10.6 | 0.222 | 0.801 |
| **BMI (weight / height\(^2\))** |  |  |  |  |  |  |
| Under weight | 1 | 2.0 | 2 | 4.0 | 0 | 0.0 | 3 | 2.0 | 12.819 | 0.118 |
| Ideal weight | 5 | 10.0 | 10 | 20.0 | 8 | 16.0 | 23 | 15.3 | 17.462 | 0.065 |
| Over weight | 22 | 44.0 | 16 | 32.0 | 16 | 32.0 | 54 | 36.0 | 12.67 | 7 |
| Obesity | 12 | 24.0 | 17 | 34.0 | 23 | 46.0 | 52 | 34.7 | 7 |
| Over obesity | 10 | 20.0 | 5 | 10.0 | 3 | 6.0 | 18 | 12.0 | 0.66 |

| **Current medical diseases** |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| None | 20 | 40.0 | 8 | 16.0 | 14 | 28.0 | 42 | 28.0 | 12.839 | 0.381 |
| Diabetes | 13 | 26.0 | 15 | 30.0 | 8 | 16.0 | 36 | 24.0 | 7 |
| Hypertension | 3 | 6.0 | 4 | 8.0 | 12 | 24.0 | 19 | 12.67 | 26.6 |
| Heart diseases | 1 | 2.0 | 4 | 8.0 | 0 | 0.0 | 5 | 3.33 |
| Kidney diseases | 0 | 0.0 | 1 | 2.0 | 0 | 0.0 | 1 | 0.66 |
| Vascular diseases | 11 | 22.0 | 13 | 26.0 | 16 | 32.0 | 40 | 26.67 | 2 |
| Rheumatoid diseases | 2 | 4.0 | 5 | 10.0 | 0 | 0.0 | 7 | 4.67 |

| **Medical family history** |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| None | 16 | 32.0 | 31 | 62.0 | 19 | 38.0 | 66 | 44.0 |
| Diabetes | 22 | 44.0 | 5 | 10.0 | 9 | 18.0 | 36 | 24.0 | 17.47 | 0.065 |
| Hypertension | 7 | 14.0 | 8 | 16.0 | 3 | 6.0 | 18 | 12.0 | 0.66 |
| Liver diseases | 1 | 2.0 | 1 | 2.0 | 1 | 2.0 | 3 | 2.0 | 7 |
| Kidney diseases | 1 | 2.0 | 5 | 10.0 | 12 | 24.0 | 18 | 12.0 | 12.67 |
| Vascular diseases | 3 | 6.0 | 0 | 0.0 | 6 | 12.0 | 9 | 6.0 | 7 |

*Non-significant >0.05, Significant at P-value < 0.05, High Significant at <0.001*
Figure (1): Distribution of the studied nurses according to their total knowledge score regarding varicose veins throughout the period of the study in three work places. (n = 150)
Table (4): Distribution of the studied nurses according to their total score of comprehensive classification of varicose veins scale throughout the period of the study in three work places. (n = 150)

| Comprehensive classification of varicose veins scale | The studied nurse ( n = 150) | Total | Chi-square |
|-----------------------------------------------------|-----------------------------|-------|------------|
|                                                     | Operating theatre | Medical Department | Surgical Department | N | % | N | % | N | % | N | % | X² | P-value |
| Before                                              |                  |                |                        |   |    |   |    |    |    |    |    |     |         |
| No visible veins (C0)                                | 1 | 2.0 | 1 | 2.0 | 0 | 0.0 | 2 | 1.3 | 2.448 | 0.874 |
| Telangiectasia or reticular veins (C1)               | 38 | 76.0 | 36 | 72.0 | 34 | 68.0 | 108 | 72.0 | 2.448 | 0.874 |
| Varicose veins (C2)                                  | 8 | 16.0 | 10 | 20.0 | 13 | 26.0 | 31 | 20.7 | 2.448 | 0.874 |
| Edema (C3)                                          | 3 | 6.0 | 3 | 6.0 | 3 | 6.0 | 9 | 6.0 | 2.448 | 0.874 |
| Immediately                                         |                  |                |                        |   |    |   |    |    |    |    |    |     |         |
| No visible veins (C0)                                | 1 | 2.0 | 1 | 2.0 | 0 | 0.0 | 2 | 1.3 | 2.448 | 0.874 |
| Telangiectasia or reticular veins (C1)               | 38 | 76.0 | 36 | 72.0 | 34 | 68.0 | 108 | 72.0 | 2.448 | 0.874 |
| Varicose veins (C2)                                  | 8 | 16.0 | 10 | 20.0 | 13 | 26.0 | 31 | 20.7 | 2.448 | 0.874 |
| Edema (C3)                                          | 3 | 6.0 | 3 | 6.0 | 3 | 6.0 | 9 | 6.0 | 2.448 | 0.874 |
| One month after                                     |                  |                |                        |   |    |   |    |    |    |    |    |     |         |
| No visible veins (C0)                                | 36 | 72.0 | 25 | 50.0 | 27 | 54.0 | 88 | 58.7 | 7.754 | 0.101 |
| Telangiectasia or reticular veins (C1)               | 12 | 24.0 | 21 | 42.0 | 16 | 32.0 | 49 | 32.7 | 7.754 | 0.101 |
| Varicose veins (C2)                                  | 2 | 4.0 | 4 | 8.0 | 7 | 14.0 | 13 | 8.6 | 7.754 | 0.101 |

Non-significant >0.05, Significant at P-value < 0.05, High Significant at <0.001*

Table (5): Relation between socio-demographic data of the studied nurses and total knowledge one month after the educational program in three work places. (n = 150)

| Socio-demographic data | Total knowledge (one month) | ANOVA |
|------------------------|-----------------------------|-------|
|                        | Operating theatre | Medical Department | Surgical Department | ANOVA |
|                        | N | Mean | SD | N | Mean | SD | N | Mean | SD | F | P-value |
| Age                    |   |       |   |   |       |   |   |       |   |   |         |
| 21 - < 30 years        | 15 | 0.20 | 0.41 | 4 | 0.25 | 0.50 | 11 | 0.82 | 0.87 | 3.229 | 0.055 |
| 30 - < 40 years        | 21 | 59.81 | 3.87 | 28 | 52.04 | 4.13 | 28 | 53.75 | 3.96 | 24.130 | <0.001** |
| 40 - < 50 years        | 10 | 60.60 | 3.53 | 15 | 48.73 | 4.45 | 8 | 51.38 | 5.48 | 21.823 | <0.001** |
Non-significant >0.05, Significant at P-value < 0.05, High Significant at <0.001*

Table (6): Relation between socio-demographic data of the studied nurses and practices of basic preventive health measures one month after the educational program in three work places. (n = 150)

| Socio-demographic data | Practices of basic preventive health measures (one month) |  |  |  |  |  |
|------------------------|---------------------------------------------------------|---|---|---|---|---|
|                        | Operating theatre | Medical Department | Surgical Department | ANOVA |  |
|                        | N   | Mean | SD  | N   | Mean | SD  | N   | Mean | SD  | F    | P-value |
| Age                    |     |      |     |     |      |     |     |      |      |      |        |
| 21 - < 30 years        | 21  | 55.33| 9.28 | 28  | 56.96| 8.19 | 28  | 56.07| 7.73 | 0.234 | 0.792  |
| 30 - < 40 years        | 10  | 57.30| 9.92 | 15  | 56.73| 7.58 | 8   | 58.88| 7.51 | 0.174 | 0.841  |
| 40 - < 50 years        | 5   | 53.00| 5.83 | 4   | 51.25| 8.54 | 9   | 60.00| 7.12 | 2.751 | 0.096  |
| 50 - 60 years | 14 | 56.93 | 7.58 | 3 | 53.67 | 8.02 | 5 | 55.80 | 11.52 | 0.186 | 0.832 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sex** | | | | | | | | | | | |
| Male | 5 | 51.20 | 4.02 | 2 | 52.50 | 7.78 | 5 | 57.40 | 10.78 | 0.773 | 0.490 |
| Female | 45 | 56.47 | 8.77 | 48 | 56.40 | 8.01 | 45 | 57.18 | 7.71 | 0.128 | 0.880 |
| **Marital status** | | | | | | | | | | | |
| Single | 6 | 51.67 | 5.57 | 12 | 55.75 | 7.44 | 8 | 55.13 | 8.41 | 0.637 | 0.538 |
| Married | 41 | 56.44 | 9.04 | 34 | 56.68 | 8.46 | 40 | 57.25 | 7.90 | 0.097 | 0.908 |
| Divorced | 0 | 55.00 | 0.00 | 1 | 53.00 | 0.00 | 1 | 62.00 | 0.00 | 3.000 | 0.095 |
| Widow | 3 | 57.67 | 3.06 | 3 | 54.33 | 7.23 | 1 | 67.00 | 0.00 | 1.952 | 0.256 |
| **Place of residence** | | | | | | | | | | | |
| Urban | 16 | 57.19 | 9.78 | 16 | 56.13 | 9.38 | 17 | 58.59 | 8.66 | 0.294 | 0.747 |
| Rural | 34 | 55.35 | 7.98 | 34 | 56.29 | 7.35 | 33 | 56.48 | 7.57 | 0.212 | 0.809 |
| **Socioeconomic status** | | | | | | | | | | | |
| Lower than moderate | 16 | 53.44 | 6.67 | 4 | 53.75 | 3.30 | 6 | 51.83 | 5.71 | 0.175 | 0.841 |
| Middle | 33 | 57.18 | 9.28 | 41 | 56.98 | 7.82 | 41 | 58.34 | 8.02 | 0.314 | 0.731 |
| Above moderate | 1 | 55.00 | 0.00 | 4 | 53.25 | 12.53 | 2 | 50.00 | 4.24 | 0.086 | 0.919 |
| Rich | 0 | 0.00 | 0.00 | 1 | 48.00 | 0.00 | 1 | 57.00 | 0.00 | 3.131 | 0.079 |
| **Educational level** | | | | | | | | | | | |
| Nursing Diploma | 17 | 55.94 | 8.79 | 16 | 54.56 | 5.69 | 23 | 59.65 | 8.52 | 2.200 | 0.121 |
| Technical Nursing Institute | 25 | 55.04 | 7.80 | 23 | 57.43 | 8.63 | 21 | 54.48 | 6.84 | 0.912 | 0.407 |
| Bachelor of Nursing | 7 | 59.29 | 11.38 | 10 | 57.10 | 9.47 | 4 | 60.50 | 6.76 | 0.209 | 0.814 |
| Post graduate nursing studies | 1 | 55.00 | 0.00 | 1 | 47.00 | 0.00 | 2 | 51.00 | 0.00 | 2.457 | 0.217 |

**Non-significant >0.05, Significant at P-value < 0.05, High Significant at <0.001**

**Discussion**

Varicose veins (VVs) are being the most first disease among the chronic venous diseases and it consider a serious worldwide complications among people whose occupation requires long standing, creating serious signs and symptoms which lead to surgical treatment and widespread morbidity. (1, 2)

Regarding socio-demographic characteristic of the studied nurses: The finding of the present study revealed that more than half of the total studied nurses were in the age group ranged from 21 - < 30 years old. This could be explained that this age represent the most active period for nursing work in which nurses exposed to conditions increase pressure on the leg veins include standing for continuous time with both legs bearing weight and overtime work that make veins of leg very weak and finally will develop into varicose veins. (41, 42)

In relation to gender, it was found that the majority of the total studied nurses were female. This could be explained that there was a considerable difference in the number of participating nurses from both genders. This finding was in agreement with Bader A et al (2020) (43), who mentioned that the majority of studied nurses were female gender that consider a positive gender-related risk factor
of VVs can be explained by being pregnant.

**Regarding occupational characteristics of studied nurses:** This study showed that there was a statistically significant relationship between varicose veins and years of experience. In which more than one quarter of the studied nurses has more than 15 years of work experience, this finding was in agreement with Ren Q (2016)\(^{(44)}\), who found that the increased years of experience have a major risk factor for developing varicose veins.

Concerning physical exercise, the finding of current study was noted that more than half of the studied nurses who weren't doing any exercise per week have a significant risk factors of varicose veins. This finding was in line with Yun J et al (2018)\(^{(45)}\), who found that more than half of studied nurses weren't do any exercise and had poor sedentary life style were suffered from varicose veins.

**Regarding health relevant data of the studied nurses:** According to the current study, there was a statistically significant relationship between varicose veins and number of pregnancies; in which more than half of the total studied nurses who had two or three time of pregnancy had more prevalence rate of VVs. This may be due to increases in progesterone production during pregnancy\(^{(46)}\). This result was in similar with Das K et al (2015)\(^{(47)}\), who found that more than one third of the total nurses who had varicose veins and at least have two children.

**Regarding comprehensive classification of varicose veins scale of the studied nurses:** before and one month after implementation of the educational program, the present study revealed that more than two thirds of the studied nurses suffered from Telangiectasia leg veins (C1) and nearly one quarter of them suffered from varicose veins (C2) and edema (C3) before implementation of the educational program compared to more than half of them not suffered from any visible leg veins (C0) after implementation of the program. This result was corresponding Mehri B et al (2018)\(^{(48)}\), who revealed that more than two thirds of the studied nurses suffered from varicose veins (C2) and the incidence of VVs decreased to the minority after two month of implementation of program.

**Regarding knowledge score of the studied nurses about varicose veins:** It is observed from the finding of the present study that less than half of the total studied nurses have relatively low levels of baseline knowledge of varicose veins compared to what is expected. This is supported by the study conducted by Jaya G (2018)\(^{(49)}\) who showed in his study that majority of studied nurses had inadequate knowledge regarding prevention of varicose veins. This result was contradicted with Abrahamson J & Hopp C (2018)\(^{(50)}\) who revealed that majority of staff nurses were aware regarding the causes, prevention and management of varicose veins while remaining minority had poor knowledge regarding causes, prevention and management of varicose veins.

**Regarding practice of preventive health measures regarding varicose veins of the studied nurses:** The result of the present study illustrated that nearly one third of the studied nurses had low nursing performance regarding varicose veins before implementing the educational program, while one third of them had high nursing performance one month after implementation of the educational program. This result is in accordance with Saemi J et al (2020)\(^{(51)}\), who found that there was an improvement between nurses' level of practice pre/post program counseling.

Finally, the present study demonstrated that there was a high positive significant correlation between the studied nurse's total knowledge and their practices of preventive health measures of varicose veins one month
after implementation of the educational program. This finding was inconsistent with **Blessy S et al (2020)** (52), who found that there were a positive association between the knowledge scores of staff nurses regarding risk factors and preventive health measures of varicose vein with selected demographic variables.

**Conclusion and recommendations**

**Conclusion:** Based on the findings of the present study, it can be concluded that: The result of this study showed that most important demographic and occupational risk factors in VVs intensity of the total studied nurses are age, sex, marital status, residence, years of experiences, physical activities especially standing for long periods, pregnancy, physical exercise, weight control and family history.

**Recommendation:** Based upon the findings of this study, the following recommendations are derived:

1. **Recommendation for nurses**
   - All nurses are needed to assess the incidence rate of varicose veins among risk groups because it may be asymptomatic and nurses complained only from cosmetic appearance of the lower limb veins.

2. **Recommendation for nursing administration**
   - Provision of colored booklet in all hospitals should be available regarding increasing knowledge for nurses about varicose veins.

3. **Recommendation for nursing research**
   - Replication of the study on a larger size of nurses in different hospitals and multiple geographical areas to achieve general and confirm the result of the study.

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