Effect of Nursing Instructions on Patient's knowledge and Venous Leg Ulcer Healing

[1]Shimaa Ibrahim Mahmoud, [2]Zeinab M. El-Sayed, [3]Hala Ibrahim AboDeif

[1]Clinical Instructor; Medical Surgical Nursing, [2]Assistant Professor; Medical Surgical Nursing,
[3]Lecturer; Medical Surgical Nursing, Faculty of Nursing, Cairo University, Egypt.

Corresponding author email: shimaaahmed838@yahoo.com
Phone number: 01112023712

Abstract: **Background: Venous leg ulcer (VLU) is the most severe and incapacitating outcome of chronic venous insufficiency in the lower limbs and accounts for 80 percent worldwide. It is a slow-healing wound. So, the nurse plays a crucial role in providing effective instructions and measures to improve patient's knowledge and enhance leg ulcer healing. Aim: the aim of the current study was to evaluate the effect of nursing instructions on patient's knowledge and VLU healing. Research hypothesis: H1: VLUs patients who receive nursing instructions will have high knowledge mean score compared to those who receive hospital routine care. H2: VLUs patients who receive nursing instructions will exhibit high wound healing mean score compared to those who receive hospital routine care. Design: A quasi-experimental design (Comparison group pre/posttest design) was utilized. Setting: This study was conducted in Vascular Disease Outpatient Clinic and Inpatient ward, at Kaser EL-Aini Hospital-affiliated to Cairo University Hospital. Subjects: A convenient sample of 60 adult male and female patients with confirmed diagnosis of VLUs were enrolled in the current study and divided into study and control group 30/ each. Tools: Three tools were utilized to gather data (1) Demographic and medical data form, (2) Patient's knowledge assessment tool of VLUs management and (3) Bates-Jensen Wound Assessment tool. Results: The study findings revealed that the mean age of the study and control group were (44.5±10.1) and (44.0±9.3) years respectively. Also 50 % and 23.3% of study and control group had venous leg ulcer from 1 < 3 months respectively in addition, 33.3% and 50% of study and control group their BMI over 30 kg/m² respectively. All patients of the study group had satisfactory level of knowledge ≥75% at the 2nd and 4th weeks after nursing instructions. Concerning leg ulcer healing (83.3%) of study group had minimum wound regeneration while (53.4%) of the control groups had moderate wound regeneration at the 4th weeks. Besides, there was a positive correlation between total knowledge score and healing of VLUs of the study sample r=.0.9 at p= 0.0001. Conclusion: The current study concluded that effective nursing instructions is very important in improving patient's knowledge regarding VLUs management and enhance wound healing. Recommendation: Illustrative booklet related to VLUs healing measures should be available to well-known by all heath team members mainly nurses as well patients to enhance quality of self-care. Continuing education must be provided for nurses working in such area of specialty.**

Keywords: **venous leg ulcer -patient's knowledge- ulcer healing- nursing instructions.**

1. INTRODUCTION

Leg ulcer is the medical term which refers to sore that take more than four to six weeks to heal; they usually develop on the inside of the leg. Venous leg ulcer (VLU) is the most common type of leg ulcers, accounting for approximately 70%. In fact, venous leg ulcer estimated between 0.1% - 0.3% in the UK world population, and its incidence and prevalence are rising worldwide including both genders in adult groups (Parker, Finlayson, Shuter, & Edwards, 2015). Economically, this increase in incidence contributes to the rise of the healthcare burden everywhere (Essays, 2013).

Venous leg ulcer has multiple risk factors such as diabetes mellitus, peripheral neuropathy, immobility, atherosclerosis, infections, and obesity (Gould et al., 2016). The majority of leg ulcers are caused by underlying venous hypertension with

subsequent venous insufficiency (Latz, Brown & Bush 2015).The majority of patients who complain of venous leg ulcer are unable to perform their daily activities due to walking difficulty and pain which result in triggering negative feelings such as mood changes, changes in family relationships and social living. All these changes affect sleep, quality of life, self-esteem, self-image and cause anxiety (Salomé, 2012).

The management of VLU is time-consuming as evidenced on healing times in the literature varies. However, overall 70% of VLU will be expected to heal within 4 weeks' period, despite evidence based care 30% will remain unhealed. So it is important to identify those who will not respond to routine care and remain unhealed (Parker, 2014). The management of VLU is complex ranges from medical, surgical and nursing management that aimed to reduce pain, closure of the ulcers, and prevention of the recurrence, which depends on appropriate assessment, examination of the ulcer and the patient (Sinha & Sreedharan, 2014).

According to Fonseca et al., (2015) the management of patients with VLU require a proper therapeutic plan that is developed by a multidisciplinary team and it includes: assessment of wound exudates; ulcer extension; localization; as well as identifying signs and symptoms of infection. The nurse who provides care to patients with VLU must be knowledgeable, can differentiate clinical diagnosis related to the types of leg ulcers, be aware of wound healing stages of the ulcer, type of tissue, primary bandages on the market, and how to choose the type of compression therapy suitable for treatment.

Nurses are seen as pivotal for effective VLU management, however nursing instructions as; using warm tap water or saline for cleaning the wound, bandaging or compression, encouraging the patient to exercise more than once a day, elevating the affected leg if exercises are not tolerable, proper diet, amount of fluids, self-care measures, as well the importance of compliance for systemic medication provides consistency among treatment protocols given to patients, resulting in improved efficacy and the quality of care and reduced cost (Probst, Allet, Depeyre, Colin, & Skinner, 2019). Therefore the current study aimed to evaluate the effect of nursing instructions on wound healing among patients with venous leg ulcer.

Significance of the Study

The accurate prevalence of chronic venous disease remains not easy determined because of variation in study population, selection criteria, disease definition between different studies. There is an increasing VLU coinciding with increasing older populations. In westernized countries its prevalence account for 3% While 1% and 3% in Europe and the USA respectively among people over 80 years (Franks et al., 2016).

Although evidence on effective management of the VLU, a significant evidence-practice gap with many suggested reasons have been identified as lack of information and skill to evidence based guidelines, the costs and lack of reimbursement associated with specialist wound care and treatments such as compression bandaging, lack to multidisciplinary teams, poor communication and limited evidence on effective assessment, referral and treatment pathways of care to manage VLU patient (Edwards, et al., 2013).

The researcher observed that the flow rate of newly diagnosed patients with VLU admitted to vascular disease outpatient clinic increased. Also, the majority of these patients verbalized a feeling of despair resulting from less ability to perform activity of daily living and deficit in their general self-care abilities. Therefore ,this study which will suggest and implement nursing instructions will hopefully enhance patient's awareness of VLU management, additionally the study findings will increase nurses' body of knowledge regarding VLU management that consequently optimizes patient's outcomes as promote wound healing and improve quality of care.

2. MATERIAL & METHODS

Aim of the study:

To evaluate the effect of nursing instructions on patient's knowledge and venous leg ulcer healing.

Research hypothesis:

HI: Venous leg ulcer patients who receive nursing instructions will have high knowledge mean score compared to those who receive hospital routine care.

H2: Venous leg ulcer patients who received nursing instructions will exhibit high wound healing mean score compared to those who received hospital routine care.

Research Design:

A quasi-experimental design (Comparison group pre/posttest design) was utilized in this study. A quasi-experimental design is an empirical study used to estimate the causal impact of an intervention on its target population without random assignment (Gray, Grove, Sutherland, Burns, 2017).

Setting:

This study was conducted in vascular disease outpatient clinic and inpatient, at Kaser EL-Aini Hospital-affiliated to Cairo University Hospital.

Sample:

A convenient sample of 60 adult male and female adult patients through consecutive 6 months from July 2018 to January2019 with confirmed diagnosis of VLU, the ages <18 years. Have first time of VLU, with controlled diabetes and hypertension. Not suffer from other vascular diseases, and Able to communicate verbally were enrolled in the current study.

Tools:

To achieve the aim of the current study three tools were utilized to collect data relevant to the study variables as follows:

Tool (1): Demographic and medical data form; it consisted of two parts: **Part I:** Patient's demographic data; covers items related to age, marital status, level of education. **Part II:** Medical data as diagnosis, date of onset, body mass index.... etc. **Tool (2):** Patient knowledge assessment of VLU management: It includes four main perspectives a- Nutritional status, b- Compression therapy, c- Leg exercises, and d- Elevation of leg. For each question "zero" indicate wrong answer while (score 1) indicates correct answer; the higher score indicate high knowledge level while low score indicate there is low knowledge level. Satisfactory knowledge level ≥75%. **Tool (3):** Bates-Jensen Wound Assessment Tool (BWAT) developed by (Barbara, 2001), It was a rating form to assess wound status. It consists of thirteen items, each item includes 5 sub items; the scoring system for each sub item rating between one to five, where one is the least severity and five is the most severity with total score of (65) with wound regeneration status which divided into minimum (13-24), mild (25-39), moderate (40-54), extensive (55-65). With the reliability of (Cronbach's alpha= 0.91-0.92).

Ethical consideration:

In order to protect the human rights an official permission was taken from the ethical committee. Also approval was obtained from hospital/clinic administrators. Each participant in the study and control group was informed about the nature and purpose of the study. The researcher give emphasis to participation in the study is entirely voluntary as they can withdraw at any time; anonymity and confidentiality are assured though coding the data. After that oral and written informed consent was obtained from all participants.

Procedure:

Once official permission is granted to proceed with the proposed study, the researcher initiated data collection through (July 2018 to January 2019) started by **preparatory Phase** in which the researcher interviewed each patient individually to be aware of the nature and purpose of the study as well patients signed a consent form. Followed by the **implementation phase** through it the demographic and medical related data were collected using **(tool I),** and patients' knowledge for VLU management also identified through **(tool II)**. Then, (BJWAT, tool III) was filled out by the researcher to assess the degree of VLU as a base line data; both study and control group was received the hospital routine care, after that nursing instructions were provided to study group through one session and each patient was handed in an illustrative booklet that designed by the researcher and includes information related to diet, leg exercises, leg elevation, compression bandage techniques which supported by illustrative pictures. After that follow up of the patients was initiated through the **evaluation phase** at the 2nd week to ensure the progress of wound healing after inflammatory phase, and at 4th week to ensure completion of wound healing as stated in literature/researches review and assess patient's knowledge level through filling (tool II & III). After data collection the control group were handed by the illustrative booklet to apply principle of fairness.

Page | 1070

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 6, Issue 3, pp: (1068-1076), Month: September - December 2019, Available at: **www.noveltyjournals.com**

Statistical analysis:

The data was coded and tabulated using, Statistical package for Social Science (SPSS) version 20 (Jinn, 2011). Data was presented using descriptive statistics in the form of frequencies and percentage…etc. Inferential tests were utilized as correlation tests and t-test…etc., Statistical significance was considered at P-value ≤ 0.05.

3. RESULTS

Statistical findings of the current study divided into three section: **Section (I):** described the demographic characteristics and medical related data (Tables 1-2) **Section II:** Represented the patient's knowledge level at the different time among study and control group (table 3). **Section III:** Represented wound regeneration status at three times of both study and control groups also correlation between patient's knowledge level and healing of venous leg ulcer (table 4-5).

Section I:

Table (1): Frequency and Percentage Distribution of demographic Data among Study & Control Groups (n = 60).

Variables	Study group(n=30)		Control group(n=30)	
	No.	%	No.	%
Age				
20-29	1	3.3	2	6.7
30-39	8	26.7	5	16.7
40-49	10	33.3	14	46.7
50-60	11	36.7	9	30.0
	Mean±SD 44.5±10.1		Mean±SD 44.0±9.3	
Gender				
Male	26	86.7	26	86.7
Female	4	13.3	4	13.3
Occupation				
Driver	8	26.7	9	30.0
Carpenter	9	30.0	10	33.3
Call center	1	3.3	0	0.0
House wife	3	10.0	4	13.3
Secrete	6	20.0	5	16.7
Farmer	3	10.0	2	6.7
Education				
Cannot read& write	7	23.3	6	20.0
Read & write	4	13.3	7	23.3
Primary	1	3.3	0	0
Preparatory	1	3.3	0	0
Secondary	2	6.7	4	13.3
Diploma	11	36.7	12	40.0
College	4	13.3	1	3.3
Marital status				
Single	1	3.3	3	10.0
Married	28	93.3	27	90.0
Widow	1	3.3	0	0
Residence				
rural	6	20.0	12	40.0
urban	24	80.0	18	60.0

Table 1. Clarify that the mean age of both group was 44.5±10.1 and 44.0±9.3years respectively. Related to gender 86.7% of both study and control group were male. 90% and 93.3% of them respectively were married. 36.7% of the study group

Page | 1071

and 40% of the control group had diploma degree. While 66.3% in both groups were carpenter and 80% of them from urban area.

Table (2): Frequency and Percentage Distribution of Medical Related Data among Study & Control Groups (n = 60).

Variables	Study group(30)		Control group(30)	
	No.	%	No.	%
Date of onset				
1 < 3 months	15	50.0	7	23.3
3< 5 months	6	20.0	8	26.7
5< 7 months	9	30.0	15	50.0
Location of ulcer				
Medial malleolus	21	70.0	12	40.0
Foot	9	30.0	18	60.0
BMI classification				
Normal	1	3.3	2	6.7
Overweight	9	30.0	10	33.3
Class I obese	10	33.3	15	50.0
Class II obese	7	23.3	2	6.7
Morbid obese	3	10.0	1	3.3
	Mean 33.9		Mean 31.4	
Blood pressure				
Normal	28	93.3	26	86.6
Abnormal hypertension	1	3.3	3	10.0
Pre- hypertension	1	3.3	1	3.3
Smoking				
No	12	40.0	6	20.0
Yes	18	60.0	24	80.0
Current medication				
Protocol of care (Augmentin, daphlon, Panadol)	24	80.0	17	56.7
Aspocid	4	13.3	11	36.7
Marivan	2	6.7	2	6.7

Table 2. Illustrated that onset of ulcer 1<3 months represented 50.0%. While 93.3% and 86.6% of study and control group respectively had no chronic disease. 33.3% and 50% of study and control group respectively categorized as class I obesity. 70% their ulcer on medial malleolus and 60% of ulcer occurrence on foot for study and control group respectively. 80% and 56.7% of study and control group were using augmentin, daphlon, Panadol medication. 60% and 80% of study and control group respectively were smoker.

Section II:

Table (3): Patient's knowledge level at the different time among study and control group (N=60).

Time	Baseline				Assessment I (2nd weeks)				Assessment II (4th weeks)			
Knowledge level	Study groups		Control groups		Study groups		Control groups		Study groups		Control groups	
	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
Satisfactory	7	23.3	2	6.7	30	100.0	2	6.7	30	100.0	2	6.7
Unsatisfactory	23	76.7	28	93.3	0.0	0.0	28	93.3	0.0	0.0	28	93.3

*Satisfactory knowledge level ≥75%.   * Unsatisfactory knowledge level < 75%.

Table 3. Showed that 100.0% of the study had satisfactory level of knowledge about management of VLU of the study group, while 93.3% of the control group had unsatisfactory level of knowledge about management of VLU.

Section III:

Table (4): Wound regeneration at three times of both study and control groups (N=60).

Wound Regeneration	Baseline				assessment (2nd weeks)				assessment (4th weeks)			
	Study group		Control group		Study group		Control group		Study group		Control group	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Minimum	0.0	0.0	1	3.3	15	50.0	1	3.3	25	83.3	1	3.3
Mild	30	100.0	29	96.7	15	50.0	28	93.4	3	10	13	43.3
Moderate	0.0	0.0	0.0	0.0	0.0	0.0	1	3.3	2	6.7	16	53.4

Table 4. This table clarify that after nursing instructions in the 2nd week follow up about half (50%) of the study group had minimum wound regeneration and the second half (50%) of the same group had mild wound regeneration. In the 4th week (83.3%) of the study group had minimum wound regeneration. While 53.4% of the control group had moderate wound regeneration.

Table (5): Correlation between patient's knowledge level and healing of venous leg ulcer (N= 60).

Variables	r	P-Value
Patient's Knowledge level and healing of venous leg ulcer	-0.9	0.0001*

*Significant at P<0.0001

Table 5. Indicated that there was positive correlation between total knowledge score and healing of VLU of the study sample, with high significant statistical difference (r=.0.9 at p= 0.0001).

4. DISCUSSION & CONCLUSION

Venous leg ulcers are the major public health problems with significance economic impact. Effective nursing instruction is very important to improve patient's knowledge and VLU healing. Discussion of this study was presented into three sections: **Section one** describe the demographic and medical related data. **The second section** includes venous leg ulcer knowledge level related data and **the third section** presents wound regeneration status by using (BWAT) and correlation between VLU healing and knowledge level among studied subjects.

Section one revealed that, the majority of studied subjects their age ranged between 40 to 60 years old with a mean of 44.5 ± 10.1. This finding is almost consistent with Jean Monod, and Suzuki, (2018); Xie, Ye, Rerkasem, and Mani, (2018), who found that, the majority of their studied patients were 40 to 80 years old. Also (Žulec, Rotar-Pavlič, Puharić, & Žulec, 2019).Who reported that VLU started with advanced age group. Regarding gender, more than two third of the studied subjects were males. This finding is congruent with Kirsner and Vivas (2015) and Agale, (2013) who affirmed that, the majority of their studied subjects were males. While Hussain, (2015); Jean Monod, & Suzuki, (2018) and Lohr, & Bush, (2013) mentioned that, more than two third of their sample were females.

With reference to marital status, the majority of the studied subjects were married. This results coincide with the study done by Witten's, et al., (2015) who reported that, over whelming majority of their studied subjects were married. One possible explanation for these findings might be that venous leg ulcer affects people in their old age in which they are expected to be married. Concerning the (BMI) calculation the researcher found that merely half of the studied subjects categorized as overweight and nearly one third of them were obese class I. This might interpreted why there is no relation between BMI and VLU healing in the current study finding.

In the current study the result found that more than two third of the studied subjects were smoker. While the other one third of them suffered from chronic diseases especially diabetes and hypertension although diabetes considered as the main factors lead to delayed venous leg ulcer healing but smoking was considered the main contributed risk factor for delay healing of venous leg ulcer and recurrence. this finding were in agreement with Padberg, (2017) who said that the critical chronic disease as diabetes is a vital factor in delaying leg ulcer healing; it leads to poor circulation beside the reduction of sensation among VLU patients result in delaying wound healing and be susceptible to infection especially uncontrolled diabetic patients. According to causes of venous leg ulcer the majority of the study subjects their ulcers caused by different diseases as, Deep Venous Thrombosis (DVT), varicose vein, and this finding was supported by (Jindal, et al., 2018) who reported that previous leg injuries, deep venous thrombosis and phlebitis are the various risk factors aggravating this complication.

Section two accept the first hypothesis which was VLU patients who received nursing instructions have high knowledge mean score compared to those who received hospital routine care. The current study revealed that the majority of the studied subjects had satisfactory level of knowledge >75% post nursing instructions. Regarding patient knowledge about VLUs there was a highly statistically difference between the study and the control group, these finding were in agreement with Dogra, & Sarangal, (2014) Who stated that more than two third of the studied subjects had satisfactory level of total knowledge about venous leg ulcer and be familiar with the life style modification. Also Gonzalez (2017) who studied the effect of a patient education intervention on knowledge and venous ulcer recurrence founded that the patient's knowledge scores during assessment were higher than those at baseline.

Section three accepted the second hypothesis; VLUs patients who received nursing instructions exhibit high wound healing mean score compared to those who receive hospital routine care. The current study clarify that the study group had been expressed improvement in the VLU regeneration after follow nursing instruction at the 2nd week (assessment 1), this could elaborate the effect of nursing instruction on wound healing. Also this study denoted that there were statistical significant differences between study and control group as regard the interpretation of Bates-Jensen Wound Assessment Tool (BWAT) in the form of wound regeneration as (minimum, mild, moderate) at the 2nd and 4th weeks, this could be explained as half of the studied subjects their wound regeneration improved between mild to minimum at 2^{nd}week; while at 4th week the majority of them changed to minimum wound regeneration. The finding of the current study supported also by Gonzalez (2017) who emphasis on the fact that the educational intervention shows promise for improving patient knowledge and reducing recurrence of venous ulcers.

The current study demonstrated that there was a highly significance differences between patient's knowledge and healing of VLU. This might emphasized the importance of the instructions and patients care provided by the researcher as self-care activities, such as increasing their physical activity, mobility levels, performing foot exercises such as heel raises, flexion, extension, and rotation of the ankles and elevating their limbs, and have been shown to be beneficial as they increase venous return. This finding is in agreement with Žulec, Rotar-Pavlič, Puharić, &Žulec, (2019) who stressed the patient awareness of leg exercise, healthy diet, appropriate position of leg elevation and compression therapy technique enhance the VLUs healing.

Conclusion: The current study concluded that effective nursing instructions is very important in improving patient's knowledge regarding venous leg ulcer management and enhance wound healing.

Nursing Implications: Nurses have a responsibility to assist the patients to receive appropriate nursing care and treatment, in order to achieve this role, VLU-related guidelines and recommendations should be well known by the nursing staff to rise up the patients' awareness.

Recommendations and Implications

1. The study can be replicated with larger sample in different settings to validate and generalize the findings

2. Illustrative booklet related to venous leg ulcer healing measures should be available to well known by all heath team members mainly nurses.

3. Continuing education must be provided for nurses working in such area of specialty.

4. Increase awareness of patient through educational sessions.

REFERENCES

[1] Agale, S. V (2013). Chronic leg ulcers: epidemiology, aetiopathogenesis, and management Ulcers.

[2] Barbara B. Bates-Jensen wound Assessment Tool (2001). Available @ http://www.geronet.med.ucla.edu/centers/borun/modules/pressureulcer prevention/puBWAT.

[3] Dogra, S., &Sarangal, R (2014). Summary of recommendations for leg ulcers. Indian dermatology online journal.; 5(3), 400.

[4] Edwards H, Finlayson K, Courtney M, Graves N, Gibb M, & Parker C(2013). Health service pathways for patients with chronic leg ulcers: identifying effective pathways for facilitation of evidence based wound care. BMC health services research,;13(1), pp.86.

[5] Essays, UK (2013). Management of Venous Leg Ulcers. Retrieved from https://www.ukessays.com/essays/nursing/management-of-venous-leg-ulcers-nursing-essay.php?vref=1..

[6] Fonseca, C., Lopes, M., Ramos, A., & Santos, V. (2015). Nursing Interventions in Prevention and Healing of Leg Ulcers: Systematic Review of the Literature.

[7] Franks, P. J., Barker, J., Collier, M., Gethin, G., Haesler, E., Jawien, A., & Weller, C. (2016). Management of patients with venous leg ulcers: challenges and current best practice. Journal of wound care, 25(Sup6), S1-S67.

[8] Gonzalez, A., (2017). The Effect of a Patient Education Intervention on Knowledge and Venous Ulcer Recurrence: Results of a Prospective Intervention and Retrospective Analysis. Ostomy Wound Manage. 2017;63(6):16-28.

[9] Gould, L. J., Dosi, G., Couch, K., Gibbons, G. W., Howell, R. S., Brem, H., & Tomic-Canic, M. (2016). Modalities to Treat Venous Ulcers: Compression, Surgery, and Bioengineered Tissue. Plastic and Reconstructive Surgery, 138(3S), pp.199S-208S.

[10] Gray R, Grove K, Sutherland s, Burns N. (2017). The practice of nursing research .Appraisal, Synthesis, and Generation of Evidence . ; 8 ed.ELSERVER,pp99

[11] Hussain, S. M. A. (2015). A comparison of the efficacy and cost of different venous leg ulcer dressings: a retrospective cohort study. International journal of vascular medicine,

[12] Jeanmonod, D. J., & Suzuki, K. (2018). We are IntechOpen the world's leading publisher of Open Access books Built by scientists for scientists TOP 1% Control of a Proportional Hydraulic System. Intech open.; 2, 64.

[13] Jindal R, Dekiwadia D, Krishna P, Khanna A, Patel M, Padaria S, & Varghese R. (2018). Evidence-Based Clinical Practice Points for the Management of Venous Ulcers. Indian Journal of Surgery. 1-12.

[14] Jinn J. (2011). SPSS for Windows (Version 20).

[15] Kirsner, R. S., &Vivas, A. C. (2015). Lower-extremity ulcers: diagnosis and management. British Journal of Dermatology; 173(2), 379-390.

[16] Latz C, Brown K & Bush R. (2015) Compression therapies for chronic venous leg ulcers: interventions and adherence. Journal of Chronic Wound Care Management and Research. 9 January 2015 Volume:2 Pages 11—21.

[17] Lohr, J. M., & Bush, R. L. (2013). Venous disease in women: epidemiology, manifestations, and treatment. *Journal of vascular surgery*.; *57*(4), 37S-45S.

[18] Padberg Jr, F. T.(2017). The physiology and hemodynamics of the normal venous circulation. In Handbook of Venous and Lymphatic Disorders .; (pp. 57-68). CRC Press.

[19] Parker, C. N. (2014)*Predicting the likelihood of non-healing: a venous leg ulcer risk assessment tool* (Doctoral dissertation, Queensland University of Technology).

[20] Parker, C. N., Finlayson, K. J., Shuter, P., & Edwards, H. E. (2015) Risk factors for delayed healing in venous leg ulcers: a review of the literature. International journal of clinical practice.; 69(9), 967-977.

[21] Probst, S., Allet, L., Depeyre, J., Colin, S., & Skinner, M. B. (2019) A targeted interprofessional educational intervention to address therapeutic adherence of venous leg ulcer persons (TIEIVLU): study protocol for a randomized controlled trial. *Trials*.; 20(1), 243.

[22] Salomé, G. M. (2012). Nursing assistance to the individual with venous ulcers. Revista de enfermagem UFPE on line-ISSN:, 6(12), pp. 1981-8963.

[23] Sinha, S., &Sreedharan, S. (2014) Management of venous leg ulcers in general practice-a practical guideline. *Australian family physician*.; *43*(9), pp.594.

[24] Wittens, C. D. A. H., Davies, A. H., Bækgaard, N., Broholm, R., Cavezzi, A., Chastanet, S., ... & Kakkos, S. (2015). Editor's choice-management of chronic venous disease: clinical practice guidelines of the European Society for Vascular Surgery (ESVS). European Journal of Vascular and Endovascular Surgery, 49(6), 678-737.

[25] Xie, T., Ye, J., Rerkasem, K., & Mani, R. The venous ulcer continues to be a clinical challenge: an update. Burns & trauma. 2018; 6(1), 18.

[26] Žulec, M., Rotar-Pavlič, D., Puharić, Z., &Žulec, A. "Wounds Home Alone"—Why and How Venous Leg Ulcer Patients Self-Treat Their Ulcer: A Qualitative Content Study. *International journal of environmental research and public health*. 2019; *16*(4), 559.