



A study to assess the prevalence, severity and occupational risk factors of varicose veins among staff nurses

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Abstract

Background

Varicose vein is a common occupational health problem among nurses due to prolonged standing and physical strain associated with professional duties. It affects their comfort, work efficiency, and quality of life.

Aim

The present study was conducted to assess the prevalence, severity, and occupational risk factors of varicose vein among staff nurses.

Methods

A descriptive cross-sectional research design was adopted for the study. A non-probability purposive sampling technique was used to select 300 staff nurses working in various departments. Data were collected using a structured questionnaire, and the Venous Clinical Severity Scale (VCSS) was used to assess the severity of varicose vein.

Results

The findings of the study revealed that 30% of the staff nurses had symptoms of varicose vein. Among them, 36% had severe symptoms. A higher prevalence was observed among nurses with more than five years of experience, those working in operation theatres and intensive care units, and nurses who stood continuously for prolonged periods. The occurrence of varicose vein was strongly associated with occupational and personal risk factors such as age, weight, standing duration, department of work, years of experience, family history, and hypertension.

Conclusion

The study concluded that varicose vein is prevalent among staff nurses and is significantly associated with occupational risk factors. Preventive measures such as periodic rest, leg elevation, and the use of compression stockings are recommended to reduce the risk and severity of varicose vein among nurses.

Keywords: Varicose vein, Staff nurses, occupational risk factors, prevalence, severity, prolonged standing, venous clinical severity scale, compression stockings, nursing profession, occupational health

Introduction

Varicose veins are a common chronic venous disorder characterized by dilated, elongated, and tortuous superficial veins resulting from venous valve incompetence and venous hypertension. They predominantly affect the lower limbs and are associated with symptoms such as pain, swelling, heaviness, cramps, and leg fatigue. If left untreated, varicose veins may lead to serious complications including thrombophlebitis, skin pigmentation, venous eczema, and venous ulcers, thereby affecting quality of life and work productivity (Eberhardt & Raffetto, 2023).

Nursing is considered one of the occupations at high risk for developing varicose veins because nurses are frequently exposed to prolonged standing, continuous walking, patient handling, and physically demanding duties during working hours. These occupational activities increase venous pressure in the lower extremities and impair venous return, predisposing nurses to chronic venous insufficiency (Youn & Lee, 2021) [6]. In addition to occupational exposure, several individual risk factors such as increasing age, obesity, family history, pregnancy, sedentary lifestyle, and lack of regular exercise contribute to the development of varicose veins among healthcare professionals (Vuylsteke & Thomis, 2020) [5].

Recent studies indicate that the prevalence of varicose veins among nurses is increasing globally due to extended working hours and demanding clinical environments. A cross-sectional study conducted among hospital nurses reported that prolonged standing for more than 6 hours per day was significantly associated with the occurrence of varicose veins and related symptoms (Sharif Nia *et al.*, 2022) [4]. Another study found that nurses working in intensive care units and operation theatres had a higher prevalence of venous disorders because of continuous standing and limited opportunities for rest during duty hours (Alshammari *et al.*, 2021) [1].

In India, varicose veins have emerged as an important occupational health concern among nursing personnel. Studies conducted in tertiary care hospitals revealed that a considerable proportion of nurses experience symptoms of venous insufficiency, particularly those with longer years of clinical experience and extended standing duration (Kumar & Prasad, 2020) [3]. Despite the growing burden of varicose veins among nurses, awareness regarding preventive strategies such as regular exercise, use of compression stockings, weight management, and periodic leg elevation remains inadequate in many healthcare settings. Therefore, early identification of prevalence, severity, and occupational

risk factors is essential for planning preventive interventions and promoting the health and well-being of nurses.

Need For Study

- A cross-sectional study conducted by Shakya *et al.* (2020) ^[7] among hospital nurses reported that prolonged standing during duty hours significantly increased the risk of varicose veins, with nurses commonly experiencing leg pain, swelling, and discomfort. The study emphasized the importance of early screening and preventive strategies among nursing professionals.
- Baghdadi *et al.* (2023) ^[8] conducted a study among nurses working in tertiary hospitals and found a high prevalence of varicose veins associated with prolonged standing, workload, obesity, and years of experience. The researchers highlighted occupational exposure as a major contributing factor for venous disorders among nurses.
- A study by Al-Alreda *et al.* (2023) ^[9] reported that intensive care unit nurses had a higher occurrence of varicose veins due to continuous standing, patient monitoring, and physical strain. The study recommended workplace preventive measures and periodic rest to reduce venous insufficiency.
- Işık *et al.* (2024) identified obesity, prolonged standing, hypertension, smoking, and physical inactivity as major risk factors contributing to venous insufficiency among nurses. The study stressed the need for lifestyle modification and occupational health education.
- A recent study by He *et al.* (2025) found that increasing age, obesity, prolonged standing, and occupational workload were strong predictors of venous disorders among healthcare workers, particularly nurses. The study emphasized the importance of preventive interventions and regular assessment of venous health among nursing staff.

Methodology

1. Study Design

The present study adopted a quantitative research approach, which involves the collection and analysis of numerical data to describe and interpret phenomena objectively. A descriptive cross-sectional research design was used to assess the prevalence, severity, and occupational risk factors of varicose vein among staff nurses without manipulating any variables. This design was considered appropriate as it enabled the investigator to obtain systematic information regarding the occurrence and associated factors of varicose vein among nurses in their natural work setting. The study included details related to the research setting, population, sampling technique, tools for data collection, and plan for data analysis.

2. Participants

In the present study, the sample consisted of staff nurses working in various departments of Selected Private Hospital. A non-probability purposive sampling technique was adopted to select the participants based on the inclusion criteria formulated for the study. Purposive sampling was considered appropriate as it enabled the investigator to select nurses who were directly exposed to occupational factors associated with varicose vein. The total sample size for the study comprised 300 staff nurses.

3. Instrument

The data collection tool used for the present study consisted of three sections. Section A included a structured questionnaire developed by the investigator to obtain demographic and clinical variables of staff nurses such as age, gender, weight, department, duration of standing during duty hours, work experience, and family history of varicose veins. Section B consisted of the Aberdeen Varicose Vein Questionnaire (AVVQ), a standardized tool developed by Smith *et al.* (1993) ^[16] at the University of Aberdeen, Scotland, to assess the symptoms and severity of varicose veins among individuals. The tool contains 13 items with a minimum score of 0 and a maximum score of 39. The obtained score was converted into percentage and interpreted as follows: 0–5% – no symptoms, 6–25% – mild, 26–50% – moderate, 51–75% – severe, and 76–100% – very severe symptoms. Section C included the Venous Clinical Severity Score (VCSS) developed by Rutherford *et al.* (2000) ^[17] to assess the clinical severity of chronic venous disease. The tool consists of 10 components including pain, varicose veins, venous edema, skin pigmentation, inflammation, induration, active ulcer number, active ulcer duration, active ulcer size, and use of compression therapy. The minimum score is 0 and the maximum score is 30. The scores were interpreted as follows: 1–5% – mild, 5–10% – moderate, 10–20% – severe, and 20–30% – very severe.

4. Procedure

Prior to the commencement of the study, formal permission was obtained from the hospital management and nursing superintendent of the selected private hospital in Coimbatore. The investigator explained the purpose and objectives of the study to all participants, and written informed consent was obtained before data collection. Data were gathered using a structured questionnaire, interview method, and physical observation with the help of standardized assessment tools. Each staff nurse was assessed for the presence and severity of varicose vein symptoms, and the observations were recorded appropriately. Confidentiality and anonymity of the participants were ensured throughout the study, and the collected information was utilized solely for research purposes.

5. Hypothesis

H1: There will be a significant association between the prevalence of varicose vein and selected occupational risk factor.

6. Data Analysis

The collected data were organized, coded, tabulated, and analyzed using both descriptive and inferential statistics. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to describe the demographic and occupational variables, as well as the prevalence and severity of varicose veins among staff nurses. Inferential statistics were applied to determine the association between the prevalence of varicose veins and selected occupational variables such as years of experience, duration of standing, body mass index (BMI), and department of work. The Chi-square (χ^2) test was used to assess the level of association, and the findings were interpreted at a significance level of $p < 0.05$.

Results

Table 1: Demographic variables and occupational risk factors (n=300)

S.no	Socio demographic variable & their risk factors	Frequency	Percentage
1.	Gender		
	Male	32	11%
	Female	268	89%
2.	Age		
	20-35 years	278	98%
	36-50 years	22	7%
3.	Weight		
	Normal BMI	268	89%
	Obesity	32	11%
4.	Department		
	Ward	258	86%
	OT&ICU	42	14%
5.	Standing time		
	0-6 hours	10	3%
	6-12 hours	274	91%
	12-18 hours	16	6%
6.	Years of experience		
	>10 years	13	4%
	<10 years	287	96%
7.	Family history		
	Yes	26	9%
	No	274	91%
8.	Pregnancy		
	Yes	22	7%
	No	278	93%
9.	Physical Activities		
	Yes	29	10%
	NO	271	90%
10.	Hypertension		
	Yes	18	6%
	No	282	90%
11.	Diabetes mellitus		
	Yes	12	4%
	No	288	96%
12.	Constipation		
	Yes	5	2%
	No	295	98%
13.	Chronic heart disease		
	Yes	0	0%
	No	300	100%
14.	Deep vein thrombosis		
	Yes	2	4%
	No	298	99%
15.	Asthma		
	Yes	0	0%
	No	300	100%
16.	Kidney failure		
	Yes	0	0%
	No	300	100%
17.	Smoking\Alcohol		
	Yes	20	7%
	No	280	93%

A above table shows that,32 (11%) nurses were male and 268 (89%) were female. Their age group between 20-35 years was 278(93%) and 36-50 years were 22(7%). Most of the nurses have a normal BMI of 268(89%) and obesity 32 (11%). 258 (86%) nurses are working in a inpatient ward 42(14%) nurses are in intensive care unit & Emergency department. 13 (14%) nurses have a experience of >10 years and 287 (96%) nurses are <10 years. The positive family history among staff nurses are 26(9%) and 274 (91%) nurses didn't have a family history .22(7%) of nurses were previously pregnant and 278 (93%) are nonpregnant. 29(10%) of nurses having the habit of doing physical activity and 271(90%) didn't had a habit. 18 (6%) had a history of hypertension and 282(94%) had no hypertension 12(4%) had a diabetes mellitus and 288 (96%) had no history of diabetes mellitus. 5(2%) nurses had a constipation and 295 (98%) had no constipation under 300 nurses they had no history of chronic heart disease,Asthma , kidney failure. Under 300 nurses 2(4%) had a history of deep vein thrombosis and 298(99%) had no history .20(7%) nurses had a habit of smoking and alcohol 280(93%) nurses doesn't had a habit of smoking and alcohol.

Table 2: Prevalence of varicose vein among staff nurses (n=300)

S.no	Varicose vein	Frequency	Percentage
1.	Yes	91	30%
2.	No	209	70%
	Total	300	100%

The above table denotes 91(30%) nurses had a symptoms of varicose vein and 209 (70%) had no symptoms of varicose vein.

Table 3: Severity of varicose vein among staff nurse (n=300)

S.no	Clinical severity score	Frequency	Percentage
1	No symptoms	209	70%
2	Mild	22	7%
3	Moderate	30	10%
4	Severe	33	11%
5	Very severe	6	2%
	Total	300	100%

Among 91 nurses who are with the symptoms of varicose vein , 22(24%) nurses experiencing a mild symptoms of varicose vein , 30(33%) nurses experiencing the moderate symptoms of varicose vein 33(36%) nurses experiencing the severe symptoms of varicose vein and 6(7%) nurses experiencing severe symptoms.

Table 4: Association between the prevalence of varicose vein and its risk factors (n=300)

S.no	Selected variable	Frequency	Prevalence		X ² value	Degree of freedom	X ² table value
			Yes	No			
1.	Age				35.2*	1	3.84
	20-35 years	278	72	206			
	36-50 years	22	19	3			
2.	Gender				0.84	1	3.84
	Male	32	9	23			
	Female	268	268	186			
3.	Weight				61.6*	1	3.84
	Normal BMI	268	62	206			
	Obesity	32	29	3			

4.	Department Ward OT& ICU	258 42	53 38	205 4	83.5*	1	3.84
5.	Standing hours 6 to 12 hours 12 to 18 hours	274 16	1 90	9 200	20.4*	1	3.84
6.	Years of experience >10 years <10 years	13 287	11 80	2 207	18.9*	1	3.84
7.	Family history Yes No	26 274	23 68	3 206	45.5*	1	3.84
8.	Pregnancy Yes No	22 278	9 82	13 196	1.25	1	3.84
9.	Physical Activities Yes No	29 271	1 90	28 81	5.41*	1	3.84
10.	Hypertension Yes No	18 282	14 77	4 205	203.4*	1	3.84
11.	Diabetes Mellitus Yes No	12 288	2 89	10 199	1.1	1	3.84
12.	Constipation Yes No	5 295	4 87	1 208	5.9*	1	3.84
13.	Smoking & Alcohol Yes No	20 280	17 74	3 206	49.6*	1	3.84

The above table depicts the association between prevalence of varicose vein and occupational risk factors. The stated variable were age ,gender, weight ,standing time, department ,years of experience ,family history ,pregnancy ,physical activities, hypertension, diabetes mellitus, constipation, smoking and alcohol .It was found that there was a association between prevalence of varicose vein and risk factors of age($x^2=35.2$), weight($x^2 =61.2$), working department($x^2 83.5$), family history($x^2 =45.5$),physical activities($x^2 5.41$), hypertension($x^2 =203.4$), constipation ($x^2 =5.9$),smoking($x^2 =49.6$).

Discussion

The present study showed that the majority of nurses were female (89%) and belonged to the age group of 20–35 years (93%). Similar findings were reported in previous studies, where young female nurses formed the majority of the nursing workforce (Shakya *et al.*, 2020) ^[7]. Most nurses had normal BMI (89%), while 11% were obese. Obesity has been identified as an important risk factor for varicose veins due to increased pressure on lower limb veins (Işık *et al.*, 2024).

Most participants were working in inpatient wards (86%), which involves prolonged standing and physical workload. Previous studies have also identified prolonged standing as a major occupational risk factor for varicose veins among nurses (Yun *et al.*, 2018) ^[18]. The majority of nurses had less than 10 years of work experience (96%), whereas increased years of standing work have been associated with higher risk of venous disorders.

Family history of varicose veins was present in 9% of nurses, supporting earlier studies that identified genetic predisposition as a contributing factor. Only 7% of nurses reported previous pregnancy, which is also considered a risk factor due to hormonal and circulatory changes during pregnancy (Yun *et al.*, 2018) ^[18].

The present study also found that 90% of nurses did not engage in regular physical activity, which may contribute to poor venous circulation. Small proportions of nurses had hypertension, diabetes mellitus, constipation, and deep vein thrombosis, which have been reported as associated factors for venous insufficiency in earlier studies (Işık *et al.*, 2024). Additionally, 7% of nurses reported smoking and alcohol habits, which may negatively affect vascular health.

The present study also showed that 70% of nurses had no symptoms of varicose veins, while 6% had mild symptoms, 13% had moderate symptoms, 10% had severe symptoms, and 1% had very severe symptoms. Although most nurses were asymptomatic, a notable proportion experienced symptoms related to venous insufficiency. Similar findings were reported by Shakya *et al.* (2020) ^[7], where nurses exposed to prolonged standing experienced symptoms such as leg pain, swelling, and discomfort.

The presence of moderate to severe symptoms may be associated with prolonged standing, workload, obesity, and lack of physical activity. Yun *et al.* (2018) ^[18] and Işık *et al.* (2024) also reported that occupational exposure and prolonged standing increase the severity of varicose vein symptoms among nurses. These findings highlight the importance of early screening and preventive measures among nursing professionals.

Among the 91 nurses with symptoms of varicose veins, 24% experienced mild symptoms, 33% had moderate symptoms, 36% had severe symptoms, and 7% had very severe symptoms. The findings indicate that a considerable proportion of symptomatic nurses experienced moderate to severe levels of discomfort. Similar findings were reported by Baghdadi *et al.* (2023) and Al-Alreda *et al.* (2023) ^[8, 9], where nurses commonly experienced leg pain, heaviness, swelling, and fatigue due to prolonged standing and occupational workload. Yun *et al.* (2018) ^[18] also reported

that prolonged standing increases the severity of venous symptoms among nurses. Furthermore, Işık *et al.* (2024) identified occupational exposure, obesity, and inadequate physical activity as factors contributing to the progression and severity of varicose vein symptoms. These findings highlight the importance of early screening and preventive measures among nursing professionals.

The present study also revealed a significant association between the prevalence of varicose veins and selected risk factors such as age, weight, working department, family history, physical activity, hypertension, constipation, and smoking habits. In the present study, age ($\chi^2=35.2$) and weight ($\chi^2=61.2$) showed significant association with varicose veins. Similar findings were reported by He *et al.* (2025), who stated that increasing age and obesity were major predictors of venous disorders among healthcare workers.

Working department also showed significant association ($\chi^2=83.5$), indicating that nurses working in wards and critical care units are more exposed to prolonged standing and physical strain. Baghdadi *et al.* (2023)^[8] reported that nurses with long standing hours had higher prevalence of varicose veins and venous symptoms. Likewise, Al-Alreda *et al.* (2023)^[9] found higher occurrence of venous problems among ICU nurses due to occupational workload.

Family history ($\chi^2=45.5$) was significantly associated with varicose veins, supporting the evidence that genetic predisposition plays an important role in venous insufficiency. Physical inactivity ($\chi^2=5.41$), hypertension ($\chi^2=203.4$), constipation ($\chi^2=5.9$), and smoking habits ($\chi^2=49.6$) were also significantly associated with varicose veins. Işık *et al.* (2024) similarly identified lifestyle factors and comorbid conditions as contributors to increased severity and progression of venous disease among nurses. These findings emphasize the importance of preventive occupational and lifestyle modifications among nursing professionals.

Overall, the present study highlights that varicose veins are an important occupational health problem among nurses, particularly among young female nurses exposed to prolonged standing and physical workload. Although the majority of nurses were asymptomatic, a considerable proportion experienced moderate to severe symptoms of venous insufficiency. Factors such as increasing age, obesity, prolonged standing in inpatient and critical care units, family history, physical inactivity, hypertension, constipation, and smoking habits showed significant association with varicose veins. Similar findings reported in earlier studies support that occupational exposure and lifestyle-related factors contribute to the development and progression of varicose veins among nursing professionals. The findings emphasize the need for regular screening, early identification, and implementation of preventive strategies such as physical activity, weight management, periodic rest, and occupational health education to reduce the burden of varicose veins among nurses.

Major Findings of the Study

- The study found that 30% of staff nurses had symptoms of varicose veins, while 70% had no symptoms.
- Among the nurses affected with varicose veins, 36% had severe symptoms, 33% had moderate symptoms, 24% had mild symptoms, and 7% had very severe symptoms.

- The majority of participants were female nurses (89%) and belonged to the 20–35 years age group (93%).
- Nurses working in operation theatres and intensive care units showed higher prevalence due to prolonged standing and workload.
- A significant association was found between the prevalence of varicose veins and several selected risk factors including age, obesity, working department, family history, physical inactivity, hypertension, constipation, smoking, and alcohol consumption. These findings indicate that both occupational and lifestyle-related factors contribute substantially to the development of varicose veins among staff nurses.
- The study highlighted that prolonged standing, occupational workload, obesity, and lack of physical activity were major contributing factors for varicose veins among nurses.

Strengths of the Study

- The study used a descriptive cross-sectional design, which was appropriate to assess prevalence and associated occupational risk factors among nurses.
- A large sample size of 300 staff nurses improved the reliability of the findings.
- Standardized and validated tools such as the Aberdeen Varicose Vein Questionnaire (AVVQ) and Venous Clinical Severity Score (VCSS) were used for assessment, increasing the accuracy of data collection.
- The study assessed both prevalence and severity of varicose veins along with occupational and lifestyle-related risk factors.
- Statistical analysis using the Chi-square test helped identify significant associations between risk factors and varicose veins.
- The findings provide useful evidence for improving occupational health measures and preventive strategies among nurses.

Limitations of the Study

- The study used a non-probability purposive sampling technique, which limits the generalization of findings to all nurses.
- The study was conducted in a single selected private hospital, so the results may not represent nurses working in other hospitals or settings.
- Since the study was cross-sectional, it could identify associations but could not establish cause-and-effect relationships.
- Some data were collected through self-report questionnaires, which may lead to recall bias or inaccurate responses.
- The majority of participants were young female nurses, making comparison with male nurses or older nurses limited.
- Lifestyle factors such as diet, stress level, and genetic investigations were not explored in detail.

Conclusion

The present study concluded that varicose veins and related symptoms are prevalent among staff nurses due to occupational and lifestyle-related risk factors. Prolonged standing, increased workload, obesity, physical inactivity, family history, hypertension, constipation, and smoking were significantly associated with the occurrence of

varicose veins. Although many nurses were asymptomatic, a substantial number experienced moderate to severe symptoms affecting their comfort and quality of life. Therefore, early screening, health education, lifestyle modification, and preventive occupational measures are essential to reduce the risk and severity of varicose veins among nursing professionals.

References

1. Alshammari MT, Alenezi FK, Alrashidi FK. Prevalence and risk factors of varicose veins among nurses working in hospital settings. *Journal of Vascular Nursing*,2021;39(4):176–182.
2. Eberhardt RT, Raffetto JD. Chronic venous insufficiency. *Circulation*,2014;130(4):333–346. <https://doi.org/10.1161/CIRCULATIONAHA.113.006898>
3. Kumar S, Prasad R. Occupational risk factors associated with varicose veins among staff nurses in tertiary care hospitals. *International Journal of Nursing Education*,2020;12(3):45–50.
4. Sharif Nia H, Chan YH, Froelicher ES, et al. Prevalence and occupational risk factors of lower limb varicose veins among nurses: A cross-sectional study. *BMC Nursing*,2022;21(1):1–9.
5. Vuylsteke ME, Thomis S. Risk factors and prevention strategies for chronic venous disease in healthcare workers. *Phlebology*,2020;35(9):650–658.
6. Youn YJ, Lee J. Occupational standing and risk of varicose veins among healthcare professionals. *International Journal of Environmental Research and Public Health*,2021;18(14):7596.
7. Shakya R, Karmacharya RM, Shrestha R, Shrestha A. Varicose veins and its risk factors among nurses at Dhulikhel Hospital: A cross-sectional study. *BMC Nursing*, 2020, 19(8).
8. Baghdadi LR, Alshalan GF, Alyahya NI, Ramadan HH, Alshahrani AM, Alqahtani JA, et al. Prevalence of varicose veins and its risk factors among nurses working at King Khalid University Hospital Riyadh, Saudi Arabia: A cross-sectional study. *Healthcare*,2023;11(24):3183.
9. Al-Alreda JJA, Majeed HM, Hassan AF. Prevalence and contributed factors for varicose veins in intensive care unit nurses at Baghdad teaching hospitals. *Azerbaijan Pharmaceutical and Pharmacotherapy Journal*,2023;22(2):33–36.
10. Işık SA, Ertürk EB, Akay HT, Karahan A, Akpınar D, Karşlıoğlu AO. Analysis of venous insufficiency risk factors and demographic characteristics among nurses: An analytical cross-sectional study. *Medicina*,2024;60(9):1498.
11. He X, et al. Predictors of venous disorders among healthcare workers. *Journal of Occupational Health*,2025;67(1):45–53.
12. Polit DF, Beck CT. *Nursing research: Generating and assessing evidence for nursing practice* (11th ed.). Wolters Kluwer, 2021.
13. Kothari CR. *Research methodology: Methods and techniques* (2nd ed.). New Age International Publishers, 2004.
14. Burns N, Grove SK. *Understanding nursing research: Building an evidence-based practice* (7th ed.). Elsevier, 2017.
15. Etikan I, Musa SA, Alkassim RS. Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*,2016;5(1):1–4.
16. Smith JJ, Garratt AM, Guest M, Greenhalgh RM, Davies AH. Evaluating and improving health-related quality of life in patients with varicose veins. *Journal of Vascular Surgery*,1993;18(6):1044–1052.
17. Rutherford RB, Padberg FT, Comerota AJ, Kistner RL, Meissner MH, Moneta GL. Venous severity scoring: An adjunct to venous outcome assessment. *Journal of Vascular Surgery*,2000;31(6):1307–1312.
18. Yun MJ, Kim YK, Kang DM, Kim JE, Ha WC, Jung KY, et al. A study on prevalence and risk factors for varicose veins in nurses at a university hospital. *Safety and Health at Work*,2018;9(1):79–83.