



“A COMPARATIVE STUDY TO EVALUATE THE EFFECTIVENESS OF HANDS-ON-TRAINING VERSUS VIDEO BASED TRAINING ON KNOWLEDGE AND SKILL REGARDING WAGNER CLASSIFICATION FOR DIABETIC FOOT ULCER AMONG STAFF NURSES OF SELECTED HOSPITALS”

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ABSTRACT

Introduction: Diabetic Foot Ulcer (DFU) is a serious complication of Diabetes Mellitus. Wagner Classification helps assess ulcer severity and guide management. Adequate training is essential for nurses to improve their knowledge and skill regarding DFU grading.

Objective: To evaluate and compare the effectiveness of Hands-on Training and Video-Based Training on knowledge and skill regarding Wagner Classification for DFU among staff nurses.

Methodology: A quantitative, two parallel-arm comparative research design was adopted. Fifty staff nurses were selected using simple random sampling and divided into Hands-on Training and Video-Based Training groups, with 25 nurses in each. Data were collected using a structured knowledge questionnaire and skill assessment checklist. Pre-test and post-test scores were analyzed using descriptive and inferential statistics.

Results: Both groups showed significant improvement in knowledge and skill after the intervention. The Hands-on Training group demonstrated higher post-test mean scores than the Video-Based Training group, indicating greater effectiveness. The findings revealed that Video-Based Training was more effective than Hands-on-Training in improving knowledge regarding Wagner Classification, with a mean difference of 10.60 ± 2.27 compared to 6.44 ± 2.78 ($t = 11.66$, $p = 0.0001$). Hands-on Training was more effective in improving skill, with a mean difference of 4.76 ± 2.14 compared to 2.56 ± 1.58 ($t = 13.72$, $p = 0.0001$). Both training methods were statistically significant at the 5% level, and the research hypothesis (H_1) was accepted.

Conclusion: Both teaching methods improved nurses' knowledge and skill regarding Wagner Classification. Hands-on Training was more effective and may be incorporated into routine in service nursing education.

Recommendations: It is recommended that similar studies in multiple hospitals with larger samples. Assess long-term retention of knowledge and skills through longitudinal studies. Explore innovative teaching methods for Wagner Classification.

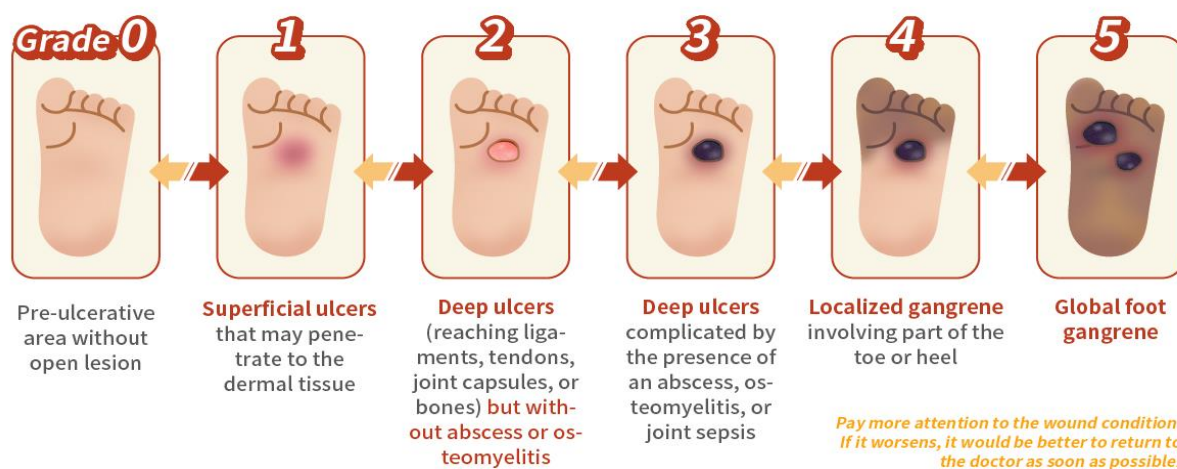
Index Terms: Diabetic Foot Ulcer, Wagner Classification, Hands-on Training, Video-Based Training, Knowledge, Skill.

I. INTRODUCTION

Diabetes mellitus is a chronic metabolic disorder characterized by high blood glucose levels, leading to complications affecting the eyes, kidneys, nerves, heart, and blood vessels. Diabetic foot ulcer (DFU) is a serious complication, often resulting from peripheral neuropathy and poor foot care. It may lead to infection, gangrene, amputation, and reduced quality of life.

The Wagner Classification system, developed by Meggitt in 1976 and modified by Wagner in 1981, grades diabetic foot ulcers from Grade 0 to Grade 5 according to severity. It helps healthcare professionals assess ulcers, plan treatment, and prevent complications. Grade 0 indicates intact skin, Grade 1 represents a superficial ulcer, Grade 2 involves a deep ulcer extending to ligaments or muscle, Grade 3 includes bone involvement or abscess formation, Grade 4 denotes localized gangrene of the forefoot, and Grade 5 indicates gangrene of the entire foot. This classification assists healthcare professionals in determining appropriate treatment strategies, comparing clinical outcomes, and reducing morbidity and mortality associated with diabetic foot disease.⁴

The Wagner Ulcer Classification System for Classifying Diabetic Foot Ulcers



OBJECTIVES:

1. To assess knowledge and skill score regarding Wagner classification for Diabetic foot ulcer among staff Nurses of selected Hospitals in both group at baseline.
2. To evaluate the effectiveness of Hands-on-training on knowledge and skill regarding Wagner classification for Diabetic foot ulcer among staff Nurses of selected Hospitals.
3. To evaluate the effectiveness of Video based training on knowledge and skill regarding Wagner classification for Diabetic foot ulcer among staff Nurses of selected Hospitals.
4. To compare the knowledge and skill score of Hands-on- training group with Video based training group
5. To find out association of study findings with selected demographic variables

HYPOTHESIS:

H₀(Null Hypothesis)- There is no Significant difference in Knowledge and Skill Score Regarding Wagner's Classification for diabetic Foot Ulcer in Hands-on-Training group and Video Based Training Group.

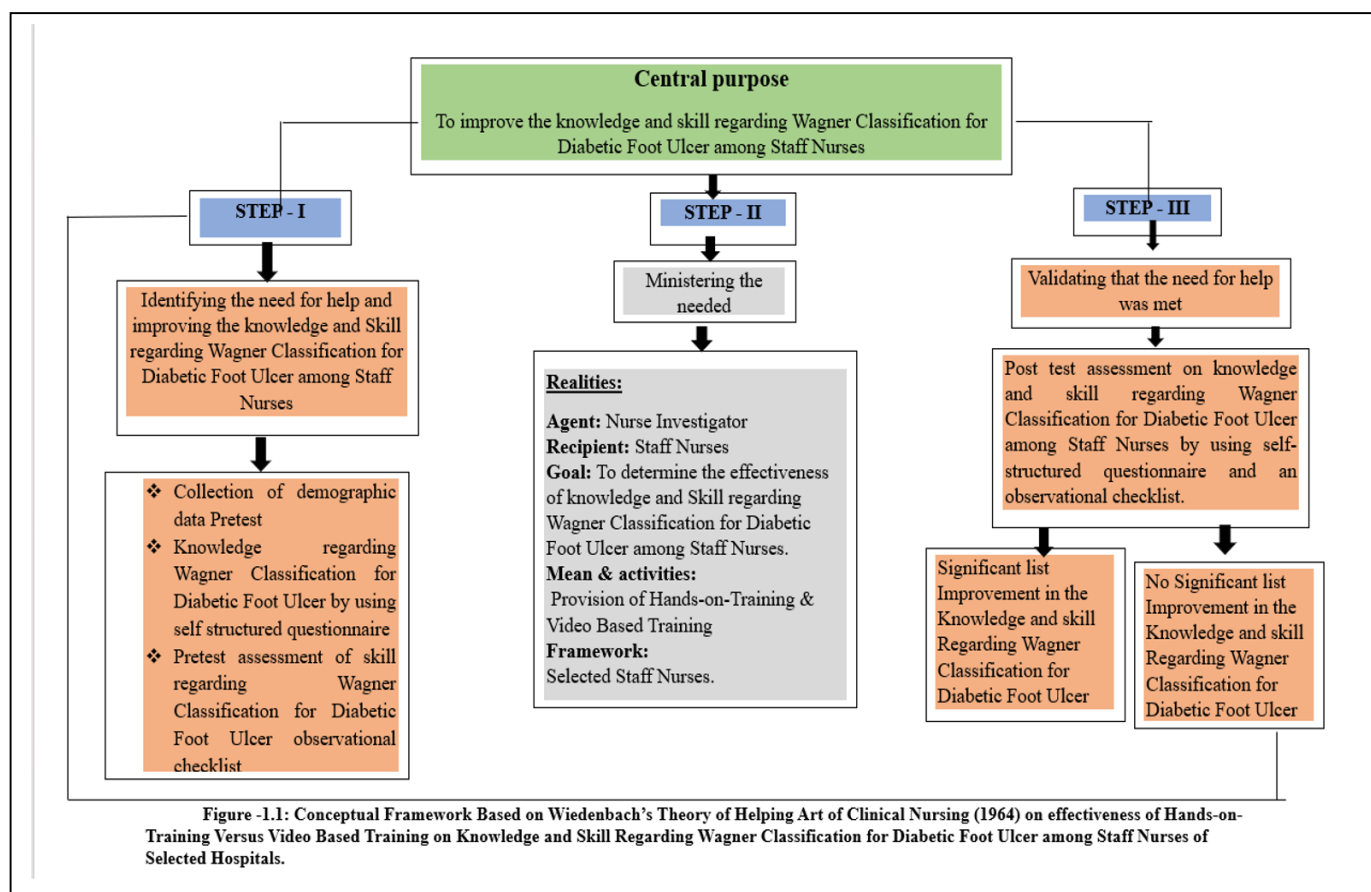
H₁(Research Hypothesis)-There is Significant difference in Knowledge and Skill Score Regarding Wagner's Classification for diabetic Foot Ulcer in Hands-on-Training group and Video Based Training Group.

II. CONCEPTUAL FRAMEWORK

The study is based on Wiedenbach's Helping Art of Clinical Nursing Theory (1964), which includes three factors: Central Purpose, Prescription, and Reality.

- Central Purpose: To improve staff nurses' knowledge and skills regarding Wagner Classification for Diabetic Foot Ulcer.
- Prescription: Administration of Hands-on Training and Video-Based Training.
- Reality: The five realities are agent, recipient, goal, activities, and framework.

Agent: Nurse Investigator | Recipient: Staff Nurses | Goal: Determine training effectiveness | Activities: Hands-on and Video-Based Training | Framework: Selected Staff Nurses.



III. METHODOLOGY

Research Approach:

A quantitative research approach was adopted to assess the effectiveness of hands-on training versus video-based training on knowledge and skill regarding Wagner Classification for Diabetic Foot Ulcer among staff nurses of selected hospitals.

Research Design:

A quantitative, two parallel-arm comparative pre-test and post-test design was used to assess the effectiveness of hands-on training versus video-based training on knowledge and skill regarding Wagner Classification for Diabetic Foot Ulcer among staff nurses of selected hospitals.

Setting of the Study:

The study was conducted in selected Hospitals of the city, chosen based on geographical proximity, availability of subjects, time, cost and cooperation of authorities.

Population:

The study population consisted of staff nurses of selected hospitals. The target population included all staff nurses, while the accessible population included those available and fulfilling the inclusion criteria.

Sampling:

A simple random sampling technique was used to select staff nurses who fulfilled the inclusion criteria.

Sample Size:

The sample consisted of 50 staff nurses, with 25 in each group, selected according to the sampling criteria.

Cochran formula for sample size estimation:

$$n = \frac{Z^2 (pq)}{e^2}$$

Z = Standard Error associated with the chosen level of confidence (Typically 1.96)

P = Proportion of diabetic patients with lifetime risk of developing foot ulcer = 9.25% = 0.0925

E = Desired error margin = 8% = 0.08

$$n = \frac{(1.96)^2 \times 0.0925 \times 0.9075}{(0.08)^2}$$

$$n = 50.38 \text{ i.e. } 50$$

50 participants needed in this study.

Each group = 25 participants.

No dropouts occurred in this study.

Sampling criteria:

The inclusion criteria included staff nurses working in selected hospitals, while those who had previously undergone structured training on Wagner Classification were excluded.

Variables:

The independent variables were hands-on training and video-based training. The dependent variables were knowledge and skill regarding Wagner Classification for Diabetic Foot Ulcer. Demographic variables included age, gender, education, clinical experience, area of work, and previous Wagner training.

Development of Instrument:

The investigator developed the tools based on a review of literature and expert guidance. The tools included a demographic data proforma, a self-structured knowledge questionnaire, and an OSCE checklist to assess skill regarding Wagner Classification for Diabetic Foot Ulcer among staff nurses.

Specification of Instrument:

The self-structured questionnaire consisted of Section A: Demographic profile and Section B: 20 knowledge questions regarding Wagner Classification for Diabetic Foot Ulcer. Section C included an OSCE checklist to assess skill regarding Wagner Classification.

Grading for Knowledge Score:

Rating	Score	Description
Poor	0-5	Inadequate knowledge with minimal understanding of the Wagner Classification for Diabetic Foot Ulcer
Satisfactory	6-10	Basic knowledge with limited understanding of Wagner Classification for Diabetic Foot Ulcer
Good	11-15	Moderate knowledge with Fair understanding of Wagner Classification for Diabetic Foot Ulcer
Excellent	16-20	Strong Knowledge with confident and consistent understanding of Wagner Classification for Diabetic Foot Ulcer

Grading for Skill Score:

Rating	Score	Description
Poor Performance	0-3	Minimal knowledge and improper execution.
Average Performance	4-6	Basic knowledge with partial task completion.

Good Performance	7-9	Adequate knowledge and mostly correct performance
Excellent Performance	10-12	Thorough knowledge with accurate and complete performance.

Specification of Intervention:

The intervention included hands-on training and video-based training on Wagner Classification for Diabetic Foot Ulcer, covering grading, assessment, nursing responsibilities, and prevention of complications. A post-test was conducted after 7 days.

Validity:

The research tool was reviewed by experts, and I-CVI was 0.8 and SCVI was 0.88 shown excellent scale level validity.

Reliability:

In the hands-on-training Group the Pearson's correlation coefficient was 0.867 (reliability = 0.9287) and on the other hand, Video based training Group the Pearson's correlation coefficient was 0.805 (reliability = 0.8919).

Pilot study:

The pilot study was conducted to check the feasibility of the study and it is done on 12 samples on 19/09/2025 (pre-test and Intervention) and 26/09/2025 (post-test)

Main study:

The intervention was carried out on 14/11/25 immediately after administering the pre-test. The post-test was conducted on 21/11/25.

Data Collection:

Data were collected using a self-structured knowledge questionnaire and OSCE checklist. Each correct answer was given 1 mark and each incorrect answer 0 marks. Pre-test was followed by hands-on and video-based training, and post-test was conducted after the training.

Data Analysis:

Data were coded and analyzed using SPSS. Descriptive statistics, paired t-test, and Chi-square test were planned according to the study objectives.

IV. RESULTS

This section presents the percentage-wise distribution of 50 staff nurses according to their demographic characteristics, including age, gender, education, working department, clinical experience, and previous Wagner training.

SECTION-A: Distribution of staff nurses with regards to demographic variables.

Table 4.1: Percentage wise distribution of Staff Nurses according to their demographic characteristics.

Demographic Variables	Video Based Training (n=25)	Hands-on-Training (n=25)
Age(yrs)		
20-30 yrs	6(24%)	3(12%)
31-40 yrs	8(32%)	10(40%)
41-50 yrs	7(28%)	7(28%)
>50 yrs	4(16%)	5(20%)
Gender of the child		
Male	5(20%)	6(24%)
Female	20(80%)	19(76%)
Others	0(0%)	0(0%)
Educational Status		
GNM/ANM	6(24%)	7(28%)
BSc Nursing	14(56%)	15(60%)

MSc Nursing	4(16%)	3(12%)
Ph D in Nursing	1(4%)	0(0%)
Current area of work		
Medical Ward	12(48%)	10(40%)
Surgical Ward	8(32%)	10(40%)
ICU	2(8%)	2(8%)
Others	3(12%)	3(12%)
Clinical Experience in years		
<2 yrs	2(8%)	0(0%)
2-5 yrs	7(28%)	10(40%)
5-10 yrs	8(32%)	8(32%)
>10 yrs	8(32%)	7(28%)
Previous Training on Wagner Classification		
Yes	0(0%)	0(0%)
No	25(100%)	25(100%)

24% of Staff Nurses in Video Based Training and 12% in Hands-on-Training were in the age group of 20-30 years, 32% in Video Based Training and 40% in Hands-on- Training were in the age group of 31-40 years, each 28% of Staff Nurses in both the groups were in the age group of 41-50 years and 16% of staff nurses in Video Based Training and 20% in Hands-on-Training were more than 50 years of age.

Pre-test knowledge: In the Video Based Training group, 92% of staff nurses had poor and 8% had satisfactory knowledge, compared with 80% poor and 20% satisfactory in the Hands-on-Training group. Mean knowledge scores were 4.08 ± 1.07 and 4.60 ± 1.08 , respectively. Minimum and maximum scores were 2–6 in the Video Based Training group and 3–7 in the Hands-on-Training group.

Pre-test skill: In the Video Based Training group, 76% of staff nurses had poor and 24% had average skill, compared with 44% poor and 56% average in the Hands-on-Training group. Mean skill scores were 2.80 ± 1.08 and 3.84 ± 1.17 , respectively. Minimum and maximum scores were 0–5 in the Video Based Training group and 2–6 in the Hands-on-Training group.

Effectiveness of interventions: Significant improvement was observed in knowledge and skill scores in both groups. In the Video Based Training group, knowledge increased from 4.08 ± 1.07 to 10.52 ± 2.80 ($t=11.56$, $p<0.0001$), and skill increased from 2.80 ± 1.08 to 5.36 ± 1.07 ($t=8.08$, $p<0.0001$). In the Hands-on-Training group, knowledge increased from 4.60 ± 1.08 to 15.20 ± 1.73 ($t=23.31$, $p<0.0001$), and skill increased from 3.84 ± 1.17 to 10.44 ± 1.15 ($t=17.85$, $p<0.0001$). Thus, both interventions were effective in improving knowledge and skill regarding Wagner Classification.

Comparison of interventions: Video Based Training and Hands-on-Training both significantly improved knowledge and skill scores. For knowledge, the mean improvement was 10.76 ± 2.27 in the Video Based Training group and 6.44 ± 2.78 in the Hands-on-Training group ($t=11.66$, $p<0.0001$), indicating greater improvement with Video Based Training. For skill, the mean improvement was 2.56 ± 1.58 in the Video Based Training group and 4.76 ± 2.14 in the Hands-on-Training group ($t=13.72$, $p<0.0001$), indicating greater improvement with Hands-on-Training.

Table 4.2: Significance of difference between mean difference in pre and post test Knowledge Score in Video Based Training and Hands-on-Training of Staff Nurses n=50

Training	Mean	SD	Mean Difference	t-value	p-value
Video Based Training	10.76	2.27	4.16±0.71	11.66	0.0001 S, $p<0.05$
Hands on Training	6.44	2.78			

Table 4.3: Significance of difference between mean difference in pre and post test Skill Score in Video Based Training and Hands-on-Training of Staff Nurses n=50

Training	Mean	SD	Mean Difference	t-value	p-value
Video Based Training	2.56	1.58	7.32±0.53	13.72	0.0001 S, $p<0.05$
Hands On Training	4.76	2.14			

Association with Demographic Variables:

In the **Video Based Training group**, pre-test knowledge was significantly associated with **age** ($p=0.0001$) and **educational status** ($p=0.001$). Pre-test skill was not significantly associated with any demographic variable.

In the **Hands-on Training group**, pre-test knowledge was significantly associated with **age** ($p=0.0001$), **educational status** ($p=0.001$), and **clinical experience** ($p=0.048$). Pre-test skill was significantly associated with **age** ($p=0.043$).

V. DISCUSSION

The present study evaluated the effectiveness of Video-Based Training and Hands-on Training regarding Wagner Classification for Diabetic Foot Ulcer among 50 staff nurses. In the Video-Based Training group, the mean knowledge score increased from 4.08 ± 1.07 to 10.52 ± 2.80 , while the mean skill score increased from 2.80 ± 1.08 to 5.36 ± 1.07 . In the Hands-on Training group, the mean knowledge score increased from 4.60 ± 1.08 to 15.20 ± 1.73 , and the mean skill score increased from 3.84 ± 1.17 to 10.44 ± 1.15 .

The findings are consistent with previous research. Carvalho et al. (2025) reported improved nurses' knowledge following digital education on diabetic foot ulcer care. Péré et al. (2021) found that structured training improved clinical skills and confidence. Jeon et al. (2017) emphasized the importance of practical exposure in accurate Wagner classification. Oermann et al. (2021) reported that experiential learning improves psychomotor skills more effectively than passive learning. These findings support the present study, in which both methods improved knowledge and skill, with greater improvement observed after Hands-on Training.

The improvement was statistically significant in both groups. The calculated t values were 11.56 for knowledge and 8.08 for skill in the Video-Based Training group, whereas they were 23.31 for knowledge and 17.85 for skill in the Hands-on Training group. The findings indicate that both methods were effective, but Hands-on Training was more effective, particularly in improving practical skill through demonstration, supervised practice, immediate feedback, and return demonstration.

CONCLUSION

The present study concluded that both Video-Based Training and Hands-on Training improved staff nurses' knowledge and skill regarding Wagner Classification. However, Hands-on Training was more effective, especially in improving practical skills. Regular in-service education and practical training are recommended to strengthen diabetic foot care competency.

RECOMMENDATIONS

1. Conduct similar studies with larger samples from multiple hospitals.
2. Provide regular in-service and refresher training on Wagner Classification.
3. Assess long-term retention of knowledge and skills through follow-up studies.
4. Include nurses' attitude, clinical practice, and patient education outcomes in future research.
5. Similar studies can be conducted in different healthcare settings and among different groups of healthcare professionals.

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