

# A Case Study on Addressing Nurses' Practice Gaps in Diabetic Peripheral Neuropathy and Hypertension Diagnoses in the Gulf Region

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## Abstract

**Background:** Diabetes, hypertension and common complications like diabetic foot are highly prevalent in the Africa and Middle East region. Nurses are involved in the prevention and early detection of diabetic foot complications and hypertension. However, due to a lack of knowledge and training regarding the latest guideline recommendations, there is a gap in nurses' clinical practice. This qualitative descriptive case study describes the implementation of training workshops for enhancing nurses' skills in accurate blood pressure (BP) measurement and screening for diabetic peripheral neuropathy (DPN).

**Methods:** Ninety nurses attended three full-day workshops conducted in Jeddah and Riyadh, Saudi Arabia and Dubai, United Arab Emirates. The workshops included learning modules on BP, DPN and diabetic foot care, a practical session on correct utilization of BP and DPN assessment tools and case study discussions. A feedback questionnaire was filled in by the participants and qualitative feedback was solicited from the participating hospitals on the impact on the nurses' skills.

**Findings:** The nurses reported that the workshop was relevant to clinical practice and expanded their skills and knowledge. They believed it provided value as they received hands-on training in DPN diagnostic tools and proper BP measurement technique. The discussion on hypothetical patient cases was applicable to their jobs and the participants would highly recommend the workshop to their colleagues. The participating hospitals reported greater nurse involvement in diabetes management.

**Conclusion:** The continuous education of nurses on the latest recommendations and tools must be encouraged to ensure better patient outcomes. Screening tools for DPN should be incorporated in the nurse triage for diabetic patients to enable early detection of diabetic foot complications. Similar workshops can be conducted and utilized as training modules to enhance the skills of caregivers and other healthcare professionals.

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**Key words:** Nurse education, Diabetic foot, Gulf, DN4, practice gaps, nurse role, foot care

## Background

Diabetes and hypertension are two important risk factors that lead to high mortality and morbidity(1). In 2019, the number of diabetic patients was 463 million worldwide and this number is estimated to increase to 578 million by 2030(2). In 2020, the International Diabetes Federation estimated the prevalence of diabetes in the United Arab Emirates (UAE) and Saudi Arabia at 15.4% and 18.3% respectively (3). Additionally, in 2015, hypertension was prevalent in 13% and 19% of the adult population in the UAE and Saudi Arabia respectively(4).

Diabetes is a progressive disease(5) and over time, damages blood vessels and can lead to complications such as neuropathy, retinopathy and nephropathy; while hypertension can result in coronary artery disease, heart failure, stroke, chronic kidney disease, peripheral arterial disease and retinopathy(6, 7). The National Institute for Health and Care Excellence (NICE) recommends that diabetics undertake nine health checks annually(8, 9). Similarly, regular blood pressure (BP) measurements using the recommended protocol are required every two years for non-hypertensive patients and annually for patients with borderline BP(10).

The multidisciplinary team-based approach for the management of hypertension and diabetes is recommended by most international guidelines (11-14). This team can include primary care physicians, specialists, nurse practitioners, physician assistants, nurses, pharmacists, dieticians, vascular surgeons, physiotherapists, ophthalmologists, cardiologists, podiatrists and mental health professionals(12, 15-17). As part of the multidisciplinary team, nurses play a crucial role in not only the treatment of diabetic and hypertensive patients, but also in screening and educating them(18).

The prevalence rate of diabetic peripheral neuropathy (DPN) in the Middle East and North Africa region ranges from 9% to 53% in diabetics(19). Peripheral neuropathy, a common complication of diabetes, is the cause of more than 80% of foot ulcers(20). The primary goal of screening for the multidisciplinary team is to evaluate the integrity of protective sensation of the feet and to identify patients at risk of foot ulcers, and the early detection and treatment of foot problems(21). Nurses specializing in foot care are responsible for the examination and education of patients regarding foot care, wound dressing and preventing foot problems and injuries. Nurses, therefore, require special training to equip themselves with the latest recommendations of diabetic foot care in order to effectively facilitate diabetic patient health(20).

Similarly, hypertension guidelines recommend that nurses should have adequate knowledge regarding the diagnostic process of hypertension and the correct BP measurement technique(10). Current guidelines recommend out-of-office BP measurements, including home BP measurements to confirm hypertension diagnosis(13). Therefore, it is essential that the patient is correctly educated about the techniques involved in self-monitoring and uses validated

and properly calibrated equipment. Trained nurses can educate patients regarding self/home BP monitoring techniques and the equipment involved in the diagnosis and monitoring of hypertension(10).

The purpose of this case study is to qualitatively describe a training course that advances nurses' skills in accurate BP measurement and screening tools to diagnose painful diabetic neuropathy. A workshop was designed to train nurses on BP measurement according to the recent American College of Cardiology/ American Heart Association guideline recommendations and a simple tool used to diagnose painful DPN(13). The Douleur Neuropathique 4 (DN4) questionnaire is used to diagnose painful DPN with high specificity and sensitivity. A working knowledge of these two tools was expected to help nurses participate in the diagnosis of hypertension and diabetes.

## Methods

### Setting and participants

Three full-day workshops were conducted in three cities across Saudi Arabia and the UAE. The first workshop was held in November 2019 in Dubai, UAE, with nurses attending from key hospitals across Jeddah, Riyadh and Dammam, Saudi Arabia and Dubai, UAE. The second workshop took place in January 2020 in Jeddah, Saudi Arabia, and the participants included nurses from the International Medical Center and other key hospitals in the city. The third workshop was held in February 2020 in Riyadh, Saudi Arabia and was attended by nurses from key private hospitals in Riyadh. Overall, 90 nurses working in triage or diabetic centers were trained through the workshops.

### Workshop implementation

The overall purpose of the workshops was to train nurses to support patients in the diagnosis of DPN and accurate BP measurement technique. The workshop agenda included an academic lecture-based section and a practical clinical section with case studies. The workshop faculty consisted of a hospital chairman acting as a moderator, a physician speaker for BP and another for DPN, and a nurse speaker for diabetic foot care. The lecture modules were prepared by the speakers of each session.

For the practical training session, the participants of each workshop were divided into groups of 6-8, where they practiced utilizing the digital sphygmomanometer with the proper BP measurement tech-nique, the DN4 questionnaire, the monofilament, pin and brush. The groups were also involved in discussions on case studies that were assigned to each group. Each group chose one member on behalf of the group as the speaker, who discussed the cases with the workshop faculty.

### Outcome metrics/measures

At the end of the workshops, the participants filled in a feedback questionnaire on their opinion and experience of the workshop (Table). Qualitative feedback was also solicited from the participating hospitals on the impact of the workshops on the nurses' skills and knowledge.

## Results

The feedback questionnaire results showed that the response to the workshop was positive. The participants responded that the speakers were experts in their fields and the content presented was easy to grasp. According to the participants, the speakers presented their topics in a clear and sequential manner by first introducing the disease; its burden and impact; and the current guidelines, recommendations and treatment options. The lectures reserved a big section for the role of the nurse in the screening, diagnosis and management of the disease. At the end of the lecture, time was allocated for questions and answers, and the participants' queries were addressed.

The level of the workshop was 'intermediate' as it provided the participants with hands-on training of the diagnostic tools of DPN. The workshop expanded their skills and educated them on how to detect pain in diabetic patients and guided them on the proper BP measurement technique.

The workshop was applicable to their job since the DN4 questionnaire is a core diagnostic tool for DPN and was available in a printed format. The participants also had the opportunity to discuss hypothetical patient case studies to familiarize themselves with the use of the diagnostic tools.

The participants reported that they would 'highly recommend' the workshop to their peers and the information provided could be applied to practice in terms of the role of nurses in detecting DPN. The workshop provided value to the participants as it included case studies that were designed by the speakers. The case studies included patients with peripheral neuropathy, along with the patient

history, signs and symptoms. This enabled the participants to better engage in the discussion because of their own experience and helped the nurses prepare for cases they might encounter in their own clinics. The cases discussed in each group were shared with all the groups; therefore, the participants were exposed to different case studies with several diseases and varied outcomes.

Overall, the training workshops had a positive impact on the nurses' education due to the incorporation of clinical knowledge. They were trained on practical tools used for the assessment of DPN and accurate BP measurement technique, and acquired knowledge required to educate patients regarding symptoms and potential complications, such as verbal descriptors of neuropathic pain, red flags for severe hypertension, etc.

The participating hospitals provided feedback that the trained nurses became more aware of the importance of screening diabetic patients for the risk of diabetic foot. During their triaging, the nurses became more involved in flagging patients at risk and were confident in educating patients at risk and their families. There were administrative changes implemented in the participating hospitals after the training workshops. The hospital nursing management team advised to nominate 'champions' from the nursing team to facilitate the in-house training and education of the nurses as a continuity of educational events outside the hospital. Additionally, the management team established service-based key performance indicators to assess the improvement and performance of the nurses. Proposals for similar workshops for nurses in other institutes have been well-received with the objective of regional collaboration and exchange of experiences.

**Table. Topics included in the feedback questionnaire provided to workshop participants**

Topic	Questions in the feedback questionnaire
Speakers and content	<ul style="list-style-type: none"> <li>• Were the speakers knowledgeable in their content areas &amp; replied well to questions?</li> <li>• Was the content presented in an organized manner &amp; within the time allocated?</li> </ul>
Workshop	<ul style="list-style-type: none"> <li>• What was the length of the workshop (short, right length, long)?</li> <li>• What was the level of the workshop (introductory, intermediate or advanced)?</li> <li>• Was the workshop applicable to your job?</li> <li>• Are you interested in teaching this course program at your workplace?</li> <li>• Can the information discussed here be applied to practice?</li> <li>• What was the value as a result of attending this workshop on your job, practice &amp; skills?</li> </ul>

## Discussion

Nurses are an invaluable part of multidisciplinary teams in the healthcare system and play a key role in the management of chronic diseases(12, 14). However, nurses' awareness of neuropathic pain is lacking and their involvement in diabetic foot management is limited(22, 23). Basic and continuous education of nurses in this area should be enhanced and the active participation of nurses in pain management must be encouraged. This can be achieved through the integration of the DN4 questionnaire in the nurse triage for diabetic patients or those at risk for diabetes. The training workshops provided nurses with hands-on training and education on diabetic foot management, and correct BP measurement technique. Additionally, the nurses were exposed to discussions on case studies seen in clinical practice, which were relevant to their professional practice. The results of the feedback questionnaire indicate that the workshops were successful and provided value to the participants.

Effective communication between nurses and patients is critical to ensure that patients achieve successful clinical outcomes. The nurse should be able to create an environment of trust, show interest in the patient, and should develop a harmonious relationship with the patient(24). Many patients may be fearful or anxious in a hospital environment and nurses must be adequately trained in creating a calming and open environment(25). Training workshops should focus on teaching nurses communication skills to approach anxious patients and provide support to them.

The interdisciplinary approach to education ensures an enhanced understanding of multiple disciplines and thereby, improved delivery of care and patient outcomes(26). The workshops described in this study facilitated discussion between healthcare professionals from different fields. Future workshops can include a wider panel of experts such as pain physicians, endocrinologists, neurologists, internists and nurses to provide other perspectives to clinical care.

Training workshops for healthcare professionals in the future can incorporate collaboration between groups from different hospitals or different countries to further facilitate learning through interaction and communication between participants. Interaction between nurses from different countries has been found to increase exposure to different practices and clinical experiences and instill critical thinking in terms of learning(27). Our workshops can also be utilized as part of continuous training programs and on platforms for caregivers to enhance their knowledge through clinical updates and learning novel tools.

### Strengths and Limitations

Our training workshops provided the nurses with the knowledge and skills for the assessment of DPN and the appropriate technique for BP measurement. To the best of our knowledge, our workshops were the first local initiative to highlight the gap in management of diabetic

neuropathy and to strengthen the nurses' role in screening and diagnosis of DPN. The workshops incorporated interdisciplinary learning through the interaction with speakers from different specialties and the case study discussions. Additionally, the case study discussions promoted collaboration and cooperation between the nurses. The success of the workshops has facilitated an increased interest in the education and training of nurses outside the hospitals.

Future workshops can incorporate a quantitative pre-and post-assessment to demonstrate impact with a quantitative indicator. The workshops can be recorded to enable skill maintenance and retention post-training and will serve as a guide when the nurses conduct trainings in their institutions. Further, the trainings described can be incorporated into continuous learning modules to ensure consolidation of the techniques and acquired skills. In the future, similar workshops can be conducted for larger groups of participants to enable widespread dissemination of information and training on blood pressure measurement and DPN screening.

## Conclusion

Our study indicates that the workshops provided the nurses with hands-on training on diabetic polyneuropathy assessment tools and accurate BP measurement techniques. The exchange of practical tips in the diagnosis of DPN and hypertension helped in improving nurses' skills in their workplace. The workshops enabled the nurses to perform proper triaging of patients and effective communication in the screening of chronic diseases. The active role of nurses in diabetic foot management should be encouraged and their knowledge must be continuously improved through regular training. The success of these and future workshops is reliant on the involvement of the participating nurses and their willingness to enhance the knowledge of their colleagues in their place of work. The creation of team spirit is also highlighted through the successful collaboration between the nurses during the workshop. This study has reiterated the value of interdisciplinary discussions in the education and practice of healthcare professionals in the service of patients.

### Funding

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