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Assessment Approach for Diabetic Patients: A Systematic Review

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ABSTRACT

Purpose

To elaborate a contextualized comprehensive model for the assessment of diabetic patients.

Data sources

Electronic search of PubMed, Google Scholar, CAS Google Scholar, Yahoo, Cochrane, ResearchGate of diabetic assessment websites and bibliographies of included articles and key journals.

Study selection

English and French language studies published between January 1996 and April 2024 that appraised approaches of assessing diabetic patients using quantitative or qualitative measures of good practices for patient safety.

Data extraction

Data extraction and critical appraisal were conducted by three system-internals and one independent reviewer, the statistician, for ethical consideration. Study design, intervention, level of application, setting, study participants, assessment of diabetic patients, measures, standards, guidelines, implementation and impact lessons were extracted from the included articles.

Results of data synthesis

Over 580 articles were screened for inclusion, of which 27 full-text articles were included in data synthesis comprising descriptive survey, survey, quasi-experimental, qualitative, randomised trial, systematic review and longitudinal study.

Conclusions

Assessment is a core component of nursing practice, especially as it is intended to guide clinical decisions in the delivery of safe patient care. The nursing assessment process offers a perfect chance to assess and record patient needs, problems, and risks. At admission to an acute care hospital, patients undergo routine nursing assessment which includes the collection of important data, physiological measures, and functional and psychological evaluation and risk appraisal to enable the nurse plan care. Standards, guidelines and models included *P-Q-R-S-T Tool,* S-A-M-P-L-E tool, SBAR model, ABCDE model, Health Assessment Form (IHA) and The A1C test. These guides have been standardized to meet the requirements of diversified settings. Governments and organisations are advised to consider and take advantage of the comprehensiveness of these guidelines and standards while enhancing research for improvement.

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KEYWORDS: *Assessment, Diabetes, Patients, Hospital, Model*

INTRODUCTION

Assessment is a core component of nursing practice, especially as it is intended to guide clinical decisions in the delivery of safe patient care. The nursing assessment process offers a perfect chance to assess and record patient needs, problems, and risks. At admission to an acute care hospital, patients undergo

routine nursing assessment which includes the collection of important data, physiological measures, and functional and psychological evaluation and risk appraisal to enable the nurse plan care. Assessment gives complete information that is used by nurses to make a decision quickly and accurately. Clinical judgment is an imperative, not only in the collection of cues and recognition of changes in the patient, but also in processing information, initiating the medical intervention, and evaluating outcome.

A nursing assessment is a process where a nurse gathers, sorts and analyses a patient's health information using standardized tools in order to learn about a patient's overall health, symptoms and concerns. During physical assessment the nurse documents and interprets information (subjective and objective) in order to plan patient's care or make decisions about the patient's health status and identify urgent, emergent or life-threatening conditions. The physical assessment is done by the professional nurse. The Assessment data provides the nurse with the necessary information to diagnose the client's status. When the data is got, the nurse uses it to model the client's world by interpreting the relationships amongst the diagnoses and to develop an image of the client's situation from his/her perspective. The perception facilitates the client in attaining, maintaining or promoting health through purposeful interventions.

METHODS

Data sources

An electronic search was conducted of the PubMed, Google Scholar, CAS Google Scholar, Yahoo, Cochrane and ResearchGate. Medical subjects heading search terms and keywords were used notably 'assessment of diabetic patients' and 'diagnosis of diabetic patients'. Additionally, bibliographies of included articles and key journals were hand searched. The search languages were English and French. In French, the main search keywords were 'diagnostique des diabétiques', 'diagnostique des patients diabétiques', 'diagnostique des personnes souffrant du diabète', 'évaluation des des diabétiques', 'évaluation des patients diabétiques' and 'évaluation des personnes souffrant du diabète'. This was important and peculiar to this study context given that the official languages used in Cameroon are English and French as to give room for the exploitation of both English and French literatures. Even though linking nursing assessments to patient outcomes is challenging, patient outcomes are varied and are influenced by numerous factors which always involve a wider team than only one nurse.

Duration

The duration of the systematic review was 11 months, from October 2023 to August 2024.

Study selection

Inclusion criteria:

English and French language studies published between January 2009 to August 2014 with particular reference to diabetic patients and their assessment were considered as to cover a period of 15 years. Assessment of effectiveness was based on published standards, models and guidelines, survey studies, randomised controlled trials (RCTs), quasi-experimental studies, systematic reviews and longitudinal. Multi-country studies, studies in reference health facilities, frontline health facilities and in communities were included. Both quantitative and qualitative studies were considered. Information were extracted from peer-reviewed journals, abstracts, websites, and cited authors within articles.

Exclusion criteria:

All studies not dealing with assessment or diagnostic of diabetic patients were excluded, except inspirations from other systematic review works not dealing with the same topic, but that were in the frame of health care for structural reasons and for comparing approaches of systematic review. All studies before 2009 were excluded.

Data extraction and analysis

Data extraction and critical appraisal of included studies were conducted by three system-internal reviewers (NNE, MBSA, FL), with disagreements settled by a fourth reviewer (NC), the statistician, this time around independent to the system. Implementation data and data from studies using mixed method evaluations were also extracted and reviewed. A meta-analysis was not possible due to insufficient homogeneity (populations, interventions, outcome measures and follow-up periods) of studies but where it could apply, it was done and reported. Consequently, analysis considered essentially common themes, conceptual and analytical trends and were presented in a narrative format.

RESULTS

Over 580 articles were screened for inclusion, of which 27 studies (27 publications) were included in the synthesis. Among them, 1 descriptive survey, 6 survey, 8 quasi-experimental, 3 qualitative, 2 Randomised Trial, 7 systematic review and 1 longitudinal studies met the inclusion criteria (figure 1) and cut-across the specific objectives of the study. Included studies were conducted in several countries in Africa, USA, Iran, Danemark, Cameroon, Indonesia and Italy. The period for the systematic review ranged

from 15 to 24 years. As for the retrospective study, the period considered ranged from 16 to 24 years.

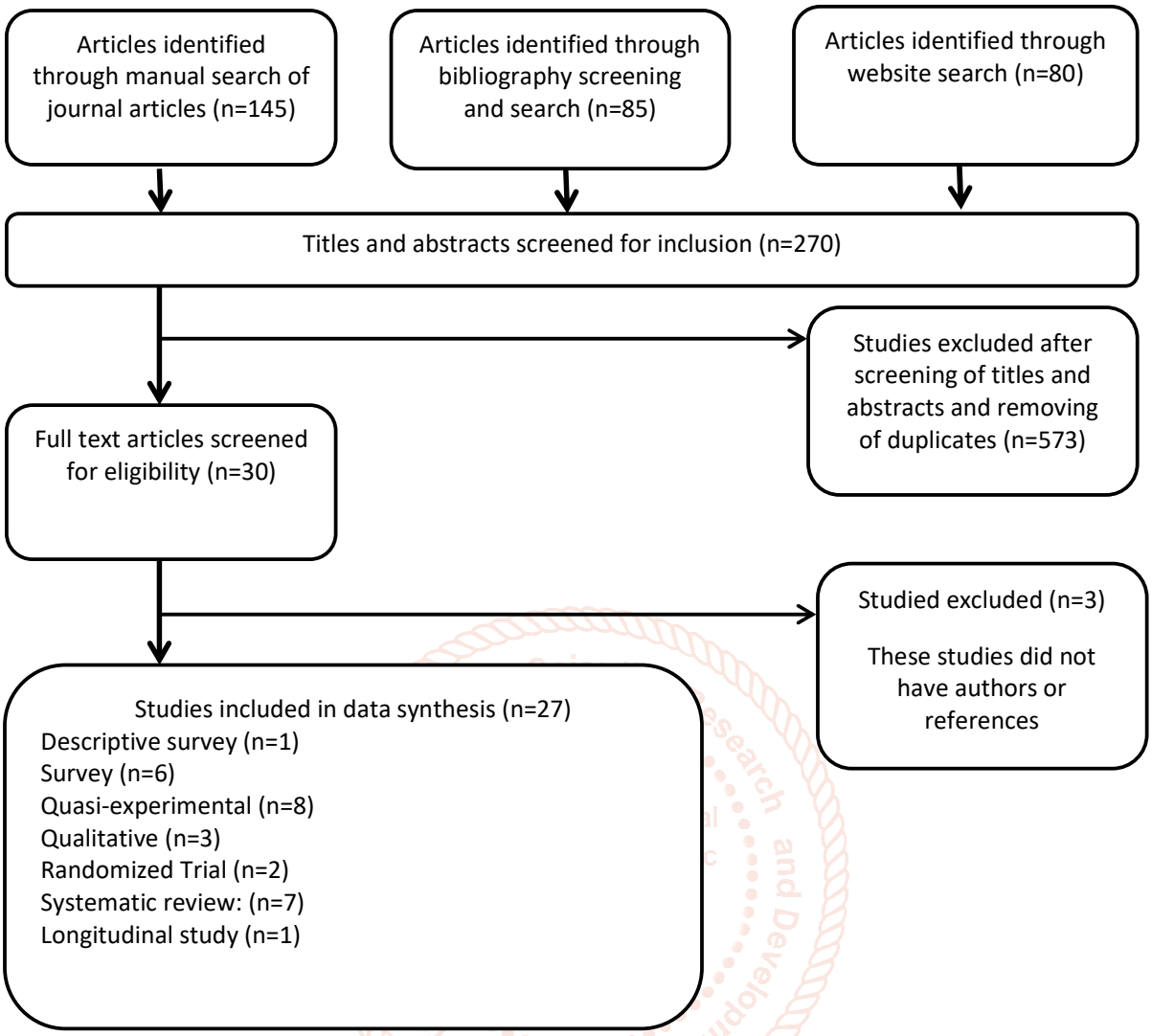

Figure 1: Flow chart of search result

SUMMARY AND DISCUSSION OF STUDY FINDINGS

Priority issues

Diabetes Mellitus is a metabolic disease characterized by hyperglycaemia resulting from defects in insulin secretion, insulin action, or both resulting in abnormal metabolism of carbohydrates and elevated levels of glucose in the blood. Diabetes mellitus is caused by several factors, including lifestyle factors and genes. Overweight, obesity, and physical inactivity. The symptoms of diabetes include: increased thirst and urination, increased hunger, fatigue, blurred vision, numbness or tingling in the feet or hands, sores that do not heal, unexplained weight loss. The chronic hyperglycaemia of diabetes is associated with long-term damage, dysfunction, and failure of various organs, especially the eyes, kidneys, nerves, heart and blood vessels. Several pathogenic processes are involved in the development of diabetes. Long term complications of diabetes include retinopathy with potential loss of vision; nephropathy leading to renal failure; autonomic neuropathy causing gastrointestinal, genitourinary and cardiovascular symptoms, and sexual dysfunction. Common diabetes health complications include heart disease, chronic kidney disease, nerve damage, and other problems with feet, oral health, vision, hearing, and mental health.

The prevalence of diabetes for all age-groups worldwide was estimated to be 2.8% in 2000 and 4.4% in 2030. The total number of people with diabetes is projected to rise from 171 million in 2000 to 366 million in 2030. The prevalence of diabetes is higher in men than women, but there are more women with diabetes than men. In Cameroon, the prevalence of diabetes mellitus was estimated at around 6% in 2018. This prevalence is increasing in the general population, rising from 2.0% in 1999 to 4.7% in 2002 and 5.8% in 2018 respectively. The 2021 international diabetic federation reported that 620,800 adult lived diabetes . Assuming that age-specific prevalence remains constant, the number of people

with diabetes in the world is expected to approximately double between 2000 and 2030 .

The nurses needs to be knowledgeable and understands why they assess a patient. Accurate patient assessment is an important element to determine the status and needs of the patient and the delivery of appropriate patient care. For this reason, nurses must be skilled in conducting accurate and timely patient assessments in order to deliver quality and safe patient care. The components of physical assessment include; interviewing, inspection, palpation, percussion and auscultation . Considering that the goal of nurses in caring for clients is 'to achieve a state of perceived optimum health and contentment, it is important that, nurses assess clients appropriately to ascertain the human responses, to which they direct their actions. Consequently, recognizing normal and abnormal patient physiology helps nurses to prioritize interventions and care delivery.

Unfortunately, nurses do not do complete assessment due to some reasons. Authors revealed that the use of physical assessment techniques was not routinely integrated into the nursing care. Their studies identified several barriers that explained that situation, such as nurses lacking confidence in their abilities, lack of time and lack of encouragement to perform assessment. The results also indicated that the perceived primary barriers to performing nursing physical assessments were the specialty of practice area, the lack of nursing role models and the lack of time and interruptions during assessment. The following barriers to nursing assessment where highlighted, notably reliance on others and technology; lack of time and interruptions; ward culture; lack of confidence; lack of nursing role models; lack of influence on patient care; and specialty area.

Framework for nursing health assessment / Guidelines and standards

The method of assessing clients has evolved over the years. One of the most widely accepted methods, that is the 'functional abilities approach, was pioneered by McCain in1965. In 1982, Gordon proposed the 'functional health patterns' assessment tool. These methods have encouraged nurses to be organized and be systematic in their approach. The A1C test (also known as HbA1C, haemoglobin A1C, glycated haemoglobin or glycosylated haemoglobin) indicates a person's average blood glucose level over the past two to three months . Crook *et al* derived an Initial Health Assessment Form (IHA) to aid clinicians in the identification of an individual's supportive care needs during their first visit. The main goal of that study was to improve the assessment of a patient's needs. The framework used to collect nursing health assessment include; demographic data, history of the present health concerns, past health history, family history, live style and health practices. The use of a framework helps to organize assessment data and promote the collection of a holistic data which in turns provide clues for the evaluation of human responses. Nurses perform several different health assessments. The assessment varies based on the setting, the patient's demographic and disease condition. Some common assessments include initial comprehensive or complete health assessment, focused assessment, time-lapsed assessment, emergency assessment, comprehensive or complete health assessment, comprehensive holistic health assessment, on-going or partial health assessment, problem-focused assessment and special population assessment. Assessment consists of six major categories; the description of the situation, expectations, support resources, health status, strengths and geographical data. The purposes of data collection in each of these categories are: (i) to develop an overview of the situation from the client's perspective, to identify the etiological factors involved and to identify possible therapeutic interventions; (ii) to develop an understanding of the client's expectations for the present and future. To determine the current developmental status in order to understand the client's personal model and to utilize maximum communication skills; (iii) to determine the nature of the external support system; (iv) to determine the client's perceived health status; and (v) to determine the client's strengths and virtues, determine the client's currently available internal resources and to collect information necessary for admission to the unit. As for the approach to physical assessment, it is first of all considered that assessment is the deliberate and systematic collection of data to determine a client's current and past health status, functional status and to determine client's present and past coping patterns. Nursing assessment include four steps which are: The collection of subjective data, the collection of objective data, validation or verification of data from primary sources e.g. the client, and secondary sources family members, health professionals and medical record, and documentation of data, and the analysis of all data as a basis for developing nursing diagnoses and individualised plan of care for the client. During any nursing assessment should be considered: (i) the age and developmental stage of the patient, modify language and communication style should be consistent with patient's needs; (ii) implement behaviours that show respect for patient's age, gender, cultural values and

personal preferences and consider privacy of the patient as well; (iii) gather as much information as possible by observation first. Use a systematic approach; but be flexible to accommodate patient's behaviour; (iv) examine least intrusive areas first (i.e. hands, arms) and painful and sensitive assessment last (i.e. ears, nose, mouth); (v) when assessing children it is important to use play techniques for infants and children. Determine what parts of the exam is to be completed before possible crying (i.e. heart, lungs & abdomen); (vi) involve the family, parents and carers in the assessment process. Encourage the child and family to ask questions and voice any concerns; listen and follow up any concerns they may have regarding the clinical condition of their child; (vii) where possible, assessments should be clustered with other cares at a time when the child is relaxed and compliant. However, the clinical need of the assessment should also be considered against the need for the child to rest. For a stable child it may be appropriate to delay assessments until the child is awake; (viii); throughout the assessment process, the nurse should communicate findings and refer concerns to the medical team as necessary and (ix) serious clinical concern and/or identification of a deteriorating patient requires fast and appropriate care. The first part of assessment is assessment of the general appearance of the patient or client. This entails Assessment of the patient's overall physical, emotional, and behavioural state. This aspect of assessment should occur on admission and then continue to be observed throughout the patients' stay in hospital if admitted. Elements noted include signs of deterioration including whether patient looks well or unwell, pale or flushed, lethargic or active, agitated or calm, compliant or combative, posture and movement. Specific considerations are made with respect to age. The overall purpose of the assessment is to establish a database about the clients perceive needs, health problems and responses to the problem. The data should also reveal related experiences, health practices goals, values and expectation about the health system. The nurse applies critical thinking when conducting client assessment. Critical thinking is the active organised cognitive process used to carefully examine one's thinking. Critical thinking allows the nurse to see the big picture about the client's health condition. While gathering data, the nurse synthesizes relevant knowledge, clinical experience, critical thinking standards attitudes and standards of practice simultaneously. Critical thinking thus helps the nurse to direct the assessment in a meaningful and purposeful way. The nurse brings knowledge from the physical, biological and social sciences to the assessment. The data is relevant for eventual analysis of the type of pain, its possible source and likely approaches that will relieve the pain. After an initial assessment the nurse begins to focus on the client's potential problem areas by conducting a more comprehensive assessment. The nurse's assessment moves from the general to specific. More focused questions can be asked about those health patterns that suggest that a problem exist. The nurse should recognise patterns of behaviour and physical responses that pertain to a functional health category. After which he or she compares assessment data with the baseline e.g. (usual blood pressure, weight, nutritional intake, established norms based on age, gender height and weight cultural, social, religious practices, ethnic dietary guidelines and healthcare practices). Two main approaches for conducting a comprehensive assessment are the use of structured data base form, (the use of a form); and problem oriented approach. Whatever approach is used to collect data, the nurse should cluster cues and identify emerging patterns and potential problem.

As for the organisation of data gathering during assessment, it is important that the nurse focus on the initial nurse/patient interaction because it plays a very important role towards the gathering of data. As for the types of assessment data, the information gotten during assessment includes subjective and objective data, from or about the patient. Subjective data are client's perception about his/her health problem in other words what the patient feels, sense or fears. Even though only the patient can provide subjective data, the nurse must be aware that problems can result in physiological changes which are identified in objective data collection. Objective data are observation or measurement made by the nurse. The measurement of objective data is based on accepted standards. Assessment data must be descriptive, concise and complete for instance to know about client sleep problem the nurse can ask "tell me how many hours of sleep you averagely have". This is because the client database originates with the client's perception of the symptom or health problem. Additional data originate from the perception and observation of the family, nurse's observation or reports from members or the health team. The nurse then conducts a focused examination and records only observation. Complete data collection result from obtaining all information relevant to the actual or potential health problem. In order to have complete data, ask questions that tell you when, where, what is the duration and factors influencing patient's problem. The collection of inaccurate, incomplete or inappropriate data may lead to incorrect identification of patient's health care needs and consequent inappropriate nursing diagnoses . The Client is the

best source of information because he is the only one to provide accurate information if he is oriented and answers questions appropriately . However in situation where the client can't, then family members, significant others or medical records will be the source of the information. They can provide information especially in the case where patient is a child, mentally handicapped, critically ill disoriented or unconscious. They can also be a source of secondary information to confirm what client has said about his illness and / or how changes have occurred in the client. Sometimes it is good to have spouse or close friend sit during assessment as they can provide pertinent view about the patient's health problems. Medical records provide pertinent data about client medical history lab test, diagnostic study result, and physicians proposed treatment plan.

Methods used to collect data include observation, interview, physical examination laboratory and other diagnostic tests. The use all of these methods, can obtain complete assessment data. The most important way of collecting data is by interviewing the patient. Interview is the first step of establishing data base. The interview is an organisational conversation with the client to obtain the client health history and information about the client health / illness. During an interview the nurse has the opportunity to introduce self and explain role to the client, establish a therapeutic relationship, gain insight to client goals and expectation and obtain cues. The interview has phases of action (i) The pre interaction phase – preparation of environment (ii) The orientation phase – introduction of self and explanation of reason for interview (iii) The working phase – interaction with the client and gathering information about the patient's health status, and (iv) the termination phase – ending the interview. During the interview therapeutic Communication Techniques are used to take a good history (9) and the techniques employed include active, attentive listening, reflection, sharing observations, empathy, share hope, share humour, touch, therapeutic silence, provide information, clarification, focusing, paraphrasing, asking relevant questions, summarizing, self-disclosure, and confrontation,

The nursing health history is data collected about a client current level of wellness that include a review body of system family, health history. sociocultural history, spiritual health mental and emotional health history. Taking of the history requires using some History Taking Techniques. When taking the history of a patient the chief complaint, history of the present illness, presence of pain should be recorded and pain evaluated using the *P-Q-R-S-T Tool.* Another technique use is the S-A-M-P-L-E tool. Another assessment model is Gordon's functional health patterns which provide a holistic model for assessment. The assessment data is classified under 11 headings: Health Perception – Health Management Pattern; Nutritional – Metabolic Pattern; Elimination Pattern, Activity – Exercise Pattern, Cognitive – Perceptual Pattern, Sleep – Rest Pattern, Self-perception – Self-concept Pattern; Role – Relationship Pattern; Sexuality – Reproductive Pattern; Coping – Stress Tolerance Pattern; and Value – Belief Pattern'. SBAR assessment model stands for Situation, Background, Assessment and Recommendation. According to Safer Healthcare: (i) Situation: Clearly and briefly describe the current situation; (ii) Background: Provide clear, relevant background information on the patient (iii) Assessment: State your professional conclusion, based on the situation and background (iv) Recommendation: Tell the person with whom you're communicating what you need from him or her, in a clear and relevant way. The ABCDE (Airway, Breathing, Circulation, Disability and Exposure) approach is a universal, priority-based approach for the assessment and treatment of critically ill patients.

The nursing health History is collected about the patient's current level of wellness including a review on the History of current illness/injury and relevant past medical history, Allergies and reactions, Medications, Immunisation status, Implants Infectious/Isolation Status, Recent overseas travel, family history, sociocultural history, spiritual health, mental and emotional reaction to illness. Biographical information is factual demographic data about the patient's address, age, occupation, working status, source of health care and types of insurances patient has. Components of nursing history comprise reason for seeking health care, present illness or health concerns, health history; family History; activities of daily living (ADL); environmental history; psychosocial history; spiritual health, review of system. Documentation of history finding is very important. For assessment to be comprehensive, the nurse must communicate with other healthcare team members (physician physical therapist, social worker other nurses). As the nurse conducts the nursing health history, assessment data are recorded in a clear concise manner using appropriate terminology. The use of a standard form makes it easier to document information. However the data should be communicated in a concise, efficient manner so as to promote quick solutions especially during difficult circumstances.

The second aspect of nursing assessment is Physical Examination which is conducted after the nursing health history so that historical data can be verified, and new data obtained. During physical examination vital signs and other objective measurement are taken and all body systems are examined. The nurse uses techniques of inspection, palpation, percussion auscultation and olfaction to observe abnormalities that may yield information about the past, present and future health problems. However, before conducting physical examination the nurse should prepare the client, environment and necessary equipment; begin the examination with assessment of patient's height, weight and vital signs; assess patient's behaviour and perception about health (general survey) including the mental status, body type, nutritional status, sex race, behaviour, appearance, grooming and speech and then do a head to toe examination. As for the formulation nursing judgements the successful interpretation of assessment data requires critical thinking. Thus when data is correctly collected and analysed, the nurse is able to make necessary clinical decision for patient's care.

As for the data validation and interpretation, it is advocated that after gathering assessment data the nurse validate the collected information to ensure its accuracy. The nurse may ask family members to validate information, do a PE, or compare patient data with existing medical records. After collecting and validating the information, it is very important that the nurse interprets the data. Through the process of inferential reasoning and judgements, the nurse decides what information has meaning to client health status. When data is grouped together it gives cues that alert the nurse's thinking processes to generate nursing diagnosis. Data documentation is the last part of a complete assessment. This thorough, concise and accurate documentation is very important. Measurable data recorded factually and in accurate terms e.g. weight 170 kg abdomen is soft and non-tender to palpation. Subjective data should be recorded in quotation marks. As for the classification, we have Type 1, Type 2, Gestational diabetes mellitus, Prediabetes.

In relation to other complications, diabetes can cause long-term damage to the body resulting in multiple complications such as kidney failure, heart disease, blindness, and decreased sensation in the extremities. Diabetes also damages the small blood vessels, causing the vessels' walls to stiffen. This leads to high blood pressure and cardiac issues. Therefore, the client's blood pressure, heart rate, and cardiac rhythm should be assessed for abnormalities. Respiratory Function as often the client's blood sugar will be too high (hyperglycemia) or too low (hypoglycemia) and can cause respiratory distress . The nurse should assess the client's respiratory rate, depth, and effort. They should also monitor for signs of hypoxia or respiratory distress. Neurologic Function as the body has a large amount of blood vessels and nerves. One particular area of concern is the feet, sensory function, vision, hearing, and tactile sensations. There may be disturbances in the vessels of any part of the body. Most likely are problems in the nerves (diabetic neuropathy), the retina of the eye (diabetic retinopathy), kidneys, and the legs. As for the assessment and Management of Foot Ulcers for People with Diabetes, Best practice guidelines are systematically developed statements designed to assist nurses and clients in decision making about appropriate health care. This guideline has been developed to address the question of how to assess and manage people with established diagnosis of diabetic foot ulcer(s). It provides evidence based recommendations to all nurses and the inter-professional team who provide care in all health-care settings to people (>15 years of age) with type 1 and/or type 2 diabetes and who have established diabetic foot ulcers .

With respect to diabetic coma, the management of the first three hours becomes a medical emergency. A known diabetic presenting with coma may have Diabetic Ketoacidosis, Hyperglycemic Hyperosmolar state or Hypoglycemia. Diabetic coma can also present itself in a diabetic patient due to precipitating conditions like septicemia, acute myocardial infarction, stroke, acute liver injury and other hypoxic states . Coma due to severe hypoglycemia is more likely to occur if a patient has taken a large overdose of insulin or other anti-diabetic medications, if alcohol is present in the system while the patient is hypoglycemic or if exercise has reduced the body supply of glycogen . Comas resulting from this condition are induced by a build-up of acidic compounds in the blood called ketones which may occur if a person has missed an insulin dose .

Diabetic retinopathy is the main cause of legal and functional blindness in the working-age population and in many developed countries. Timely identification of individuals with diabetes who are at risk and early management of diabetic retinopathy significantly reduces the progression to blindness. The use of teleophthalmology programs to detect diabetic retinopathy and manage follow-up has been shown to be cost-effective and valuable.

Gaps in practice

Nursing assessment is vital to quality nursing care. However, there is not enough value placed on the role

of the assessment in nursing practice, especially the assessment of diabetic client which can be depicted from the lack of its implementation and incomplete patient documentation. Barriers to conduct nursing assessment have been identified and include lack of nursing role models, and influence on nursing care and on patient outcomes . The lack of a nursing framework to guide nursing assessment may lead to inaccurate diagnosis of patients' needs from a nursing perspective . Lack of confidence and knowledge about diabetes management were the two main challenges highlighted following a survey study including patients, nurses and midwives . Challenges faced by diabetes nurses while undertaking their care role in caring for diabetes patients were number of external forces that interfered with the nurses' work while providing diabetes care and thus affected its quality. These issues included staff shortages, remuneration concerns, heavy workload, and negative relationships with staff. The authors concluded that the role performed by diabetes nurses is complex and requires appropriate preparation and support. To enhance their diabetes care role, nurses should be empowered through specialised training in diabetes and associated complications . Nursing assessments is a fundamental responsibility of the nurse especially as assessment and care are inseparable. Nursing assessment is vital to quality nursing care. Without assessment, care will be given blindly. Assessment is the first and most critical phase of the nursing process. The nursing assessment includes gathering information concerning the patient's individual physiological, psychological, sociological, and spiritual needs. The information is gotten from what the patient tells the nurse (Subjective data) and from the nurses' observation and examination (objective data) and are an essential part of the process. Even though the different systems of the body are assessed differently, the two very common types of assessments are head-to- toe assessments and focused assessments. Recognizing normal and abnormal patient physiology using techniques such as inspection, palpation, percussion and auscultation helps nurses to prioritize interventions and care delivery. However, several studies have observed that physical assessments are underused skill in nurses' clinical practice . There is not enough value placed on the role of the assessment in nursing practice, which can be depicted from the lack of its implementation and incomplete patient documentation . It was found that the prevalence of diabetic foot lesions was high, because of poor foot care . There is a rising evidence of failure to identify hospitalized patients at risk of clinical deterioration which is partly due to inadequate physical assessment by nurses. It was identified that the use of physical assessment techniques was not routinely integrated into the nursing care. Their studies identified several barriers such as nurses lacking confidence in their abilities, lack of time and a lack of encouragement to perform evaluations. Only one third of nurses perform physical assessment. In the same vein, a study resolved that out of 92.5% of the skills taught and practiced in class during training, only 29% were used on a daily/weekly basis, with 34% used on a monthly/occasional basis. This therefore implies that, a conducive working environment is required, for nurses to effectively express their skills and knowledge in clinical assessment. During nursing training in Cameroon, registered nurses are taught assessments generally such as vital signs and head to toe assessment. However little or no emphasis is placed on a complete physical assessment by nurses. Consequently practicing nurses do not use many of the skills taught. Although health assessments are performed regularly and routinely, they are not conducted and documented with great thoroughness and attention to detail. Identification of nursing problems in hospitalized diabetes mellitus patients was earlier paid attention . Lack of confidence and knowledge about diabetes management were the two main challenges highlighted following a survey study including patients, nurses and midwives . It was recommended based on the findings that it is essential to involve patients in their diabetes care and provide regular and up-to-date training and resources for nursing/midwifery staff to ensure safe and high-quality inpatient diabetes care and improve patient and staff satisfaction. To enhance their diabetes care role, nurses should be empowered through specialised training in diabetes and associated complications .

Optimizing assessment of diabetic patients

Overcoming the Challenges for Nurses in Diabetes Care remains a major concern . In addition to proper training, it is essential to make fundamental changes in nursing education, health system, policy, and societal levels in order to extend the role of nurses in diabetes care, management, and prevention. These measures are important to ensure that nurses can actually achieve their potential in tackling global challenges. In 2021, a referendum in Switzerland emphasised the significance of nursing and the duty of the country to ensure adequate numbers of nurses to better recognise the importance of the roles of nurses. Despite their significant contributions, nurses are often not sufficiently recognised in governance mechanisms. In Switzerland, the leadership gap in the nursing sector is addressed by involving a cantonal nurse accountable for sharing the unique standpoints of a nurse and communicating with policymakers and

various other associates. Altering the kinds of services that they offer and raising the payment for nurse-provided services are effective ways to recognise the importance of the roles of nurses. In a health system, it is important to identify the barriers to the expansion of the roles of nurses. For example, the inability of nurses to prescribe medicines is the sole barrier from a system or legal perspective in Kyrgyzstan, a low-income and middle-income country (LMIC). The perception of the roles of nurses in providing care for non-communicable diseases including diabetes by general people and even doctors is another limitation to the roles of nurses . It is important to address more practical elements along with the introduction of Diabetes Specialist Nurses (DSNs) to enable nurses to exert roles in prescribing medicines, running nurse-directed diabetes clinics, carrying out diabetes research, and providing diabetes education. Diabetes inpatient specialist nurses (DISNs) are highly skilled nurses who can coordinate, educate, counsel, motivate, lead, and help in the care management of PWD in diabetes care. A successful extension of nursing roles has been implemented in Thailand, where nurses play various roles as advanced practice nurses, case managers, and educators in diabetes care. Nonetheless, studies have reported that these measures in LMICs resulted in a moderate outcome on Diabetes mellitus (DM) management associated with reduced blood glucose levels . Nurses ought to have a fundamental role in management and prevention in order to ensure access to diabetes care and to reach global targets. Alongside the global rise in the prevalence of DM, it is important to increase the number of nurses and to improve leadership and training. Moreover, it is crucial to exert fundamental changes within the general nursing environment. It is also important to provide better employment opportunities with clear career paths and better professional recognition. Global issues of migration and retention need customised solutions to ensure that resolving staff shortage issues in one country does not lead to the depletion of nurses in other countries. Along with societal recognition by the population and policymakers, the health system ought to completely acknowledge the significance of the roles played by nurses within the health system. This acknowledgement should also address the exclusive gender-associated nursing issue, since it remains largely a female profession in the healthcare sector, which is male dominated in numerous countries . Indeed, nurses require clearly defined responsibilities and roles to provide diabetes care in a health system in order to provide the finest care to the patients they serve. Nurses also require skills and tools to carry out their tasks in different settings. This approach might involve the use or empowerment of diagnostic tools, inter-professional patient education, supportive supervision, task sharing, training on certain disease areas, and prescribing. These roles require recognition in terms of positions and qualifications, along with opportunities for career progression and higher pay. Elevation of an inter-professional method could be an approach to assist such strategies, which includes nursing and medical students learning together during the period of their formative training so that they are well equipped to work as a team in future professional scenarios . Different health professionals should be provided with an environment by the health system that permits them to work as a team for the benefit of diabetic patients . To provide the best possible care to the populations they serve, nurses need defined roles and responsibilities for the provision of diabetes care within the health system and the tools and skills to be able to do their jobs in different contexts . This strategy could include prescribing, training on specific disease areas, task sharing, supportive supervision, inter-professional patient education, and empowerment or use of diagnostic tools. These roles need recognition in terms of qualifications and positions, with opportunities for higher pay and career progression. One way to support such a strategy would be promotion of an inter-professional approach, which involves medical and nursing students learning together during their formative training, so they are better prepared to work together in future professional settings. The health system needs to offer different health professionals an environment that allows them to work together for the benefit of people with diabetes. Intervention alone cannot significantly improve care if perceived barriers from nurses' perspectives are not handled . I was recommended the need for an education program regarding care for patients with diabetic coma . An integrated approach will enable a more contextualized and grounded model, as well as a high empirical dimension, thus aligning inextricably with the ontological assumption of the methodological technical requirements . Nurses also require skills and tools to carry out their tasks in different settings . This approach might involve the use or empowerment of diagnostic tools, inter-professional patient education, supportive supervision, task sharing, training on certain disease areas, and prescribing . Nursing education was recommended by several other authors . It was recommended Diabetes Self-Management Education (DSME) to suit individual educational needs and conditions . The Diabetes Knowledge Test (DKT) has been used for the pre-test / post-test reasoning. Benner's Novice to Expert Theory to describe competency levels related to nursing experience and Knowles's Adult Learning

Theory to describe adult educational assumptions have been discussed to develop a successful intervention program. Holistic training was proven adequate to hide weakness related to the care of specific diabetic complications , which was termed multi-dimensional training. Enhancing knowledge through training could deliberately build higher level self-confidence and locust-of-control in nurses, which are major aspects of intrinsic motivation .

Research gaps

However, the literature is scant on specific reader training, involving only small numbers of trainees and outcomes are evaluated without training specifications. To our knowledge, other than the UK training program, there is no set minimum practical experience required for training diabetic retinopathy readers and none that specifically addresses the performance curve with training experience. Considering that the number of diabetic patient is rising globally and specifically in Cameroon, research becomes significant because it will prepare nurses of on how to assess the diabetic patient for better nursing care actively and proactively, and for good health thereby decreasing complications and the mortality rate of diabetic patients.

CONCLUSION

This systematic review highlighted critical points that should be considered in having a comprehensive view of the assessment of diabetic patients, challenges and opportunities. These range from priority issues to be considered in assessing diabetic patients, guidelines and standards orienting nursing assessment, complications of diabetes to be considered, gaps in practice and performance to be filled as to give equal chance to diabetes patients all over the world, and the need to optimizing the assessment of diabetic patients. These guides have been standardized to meet the requirements of diversified settings. Governments and organisations are advised to consider and take advantage of the comprehensiveness of these guidelines and standards while enhancing research for improvement, good practices and patient's safety culture.

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