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Beyond the Data:
the expert diabetes nurse in therapeutic education transforms technology into care

According to recent data from the International Diabetes Federation (IDF), diabetes constitutes a global health emergency: more than 589 million adults are currently living with diabetes—nearly 1 in 9—and projections indicate that this number will continue to rise in the coming decades, underscoring its status as a noncommunicable global pandemic. For many years, glycated hemoglobin (HbA1c) has been the reference indicator for metabolic control. Although useful, HbA1c provides no information on glycemic variability or the risk of hypoglycemia. In recent years, continuous glucose monitoring (CGM) has provided precise, real-time information on glycemic profiles. This progress has led to the development of new metrics—such as time in range and coefficient of variation—that have transformed the global understanding of metabolic control in people with diabetes. CGM, together with other technologies such as insulin pumps and hybrid closed-loop systems, has made it possible to improve diabetes control and follow-up.

Technology has revolutionized diabetes treatment. Sensors, insulin pumps, and automated systems now generate thousands of data points that help anticipate glucose fluctuations and enable safer living. Yet among algorithms, alarms, and figures, one essential element ensures that all this progress truly makes sense: the **expert nurse in therapeutic diabetes education**.

The effective use of technology requires specific knowledge, the ability to interpret complex data, strong pedagogical skills, and a holistic view of the individual and their context. The diabetes nurse trained in technology is a key figure in the care process, acting as the link between the patient, the multidisciplinary team, and the technological system.

Table 1 illustrates the nurse's main areas of competence.

Through a systematic review, the role of the nurse specialized in diabetes technologies was analyzed. A systematic review is a comprehensive and structured search of all available scientific evidence on a specific topic. The results show the main advanced technologies used in diabetes care, their clinical and psychosocial impact, the role of the specialized nurse, and the key competencies required.

1. Advanced Technologies in Diabetes Management (1, 3-5). The most widely used technologies today include:

- Continuous glucose monitoring

- Insulin pumps

- Hybrid closed-loop systems

- "Smart" insulin pens with memory and connectivity

- Mobile applications and web platforms

With appropriate use of technology and structured therapeutic education, HbA1c can be reduced by approximately 0.3 to 0.8 percentage points compared with conventional treatment. Time in range increases, glycemic variability decreases, and severe hypoglycemia is reduced. Numerous studies also report improvements in quality of life, perceived control, and treatment satisfaction (1, 4, 9). However, **technology has no voice, no gaze, and cannot ask or listen**. This is where the essential figure becomes indispensable: the nurse specialized in diabetes and technology walks alongside the person so that technology is not merely a device, but a tool for managing life with diabetes. Several studies emphasize that while technology offers enormous potential, its real impact depends largely »

COMPETENCY AREA	DESCRIPTION	EVIDENCE
1. Advanced clinical competencies	Treatment management, interpretation of clinical parameters, risk assessment, self-care education, and management of complications.	(1, 4, 9)
2. Technological competencies	Expert use of CGM, insulin pumps, AID/HCL systems, smart pens, and data-download platforms; patient training in their use.	(1, 4, 9)
3. Data interpretation	Analysis of trends, variability, hypoglycemic and hyperglycemic events; treatment adjustment in collaboration with the care team.	(5–8)
4. Therapeutic education	Structured self-care education, personalized learning, and adaptation to different profiles and contexts.	(1, 4, 9)
5. Ongoing support and psychosocial care	Identification of fears, insecurity, or emotional burden related to technology use; close and continuous support.	(1, 4, 9)
6. Care coordination	Design of technology implementation pathways, referrals, continuity of care, and incident resolution.	(9, 10)
7. Resource management and leadership	Participation in clinical and organizational decision-making; development of protocols and educational programs.	(9, 10)
8. Training of other professionals	Education of health care staff in technologies, therapeutic education, and patient safety.	(9, 10)
9. Equity and accessibility focus	Identification of social, economic, or cultural barriers; adaptation of care and support for vulnerable populations.	(9, 10)
10. Research and continuous improvement	Participation in projects, audits, outcomes analysis, and scientific updating.	(9, 10)

TABLE 1. Key Competencies of the Nurse Specialized in Diabetes and Technologies.
CGM: continuous glucose monitoring; AID/HCL: automated insulin delivery/hybrid closed-loop systems.

THE SPECIALIST NURSE IN THERAPEUTIC EDUCATION IS THE ONE WHO GUIDES, GIVES MEANING TO DATA, AND TRANSFORMS IT INTO ACTIONS THAT IMPROVE HEALTH AND QUALITY OF LIFE. SHE LOOKS BEYOND THE NUMBERS: SHE KNOWS EACH PERSON'S HISTORY, FEARS, STRENGTHS, AND CHALLENGES

» on how it is introduced, supported, and maintained in daily practice.

2. Clinical and Psychosocial Impact of Technology. The most relevant benefits reported in the literature include:

- Improved glycemic control

- Reduced hypoglycemia

- Improved quality of life and emotional well-being

- Greater patient engagement in self-care

3. Role of the Nurse Specialized in Diabetes Technologies. A review of practice documents, job descriptions, and experiences from different health systems identifies several dimensions of the nursing role:

a) Therapeutic Education and Technological Literacy (1, 4, 9). The specialized nurse is usually the reference professional for diabetes education. In the technological domain, this includes:

- Teaching basic device operation.

- Explaining key concepts such as time in range (TIR), coefficient of variation (CV), and time in hypoglycemia.

- Helping configure alarms and interpret downloaded reports.

- Supporting patients, resolving doubts, and reinforcing skills.

Many people report that sensors and pumps are intimidating at first. Alarms, numbers, and treatment changes can be frightening. The specialized nurse supports the process with closeness and trust, explaining step by step, helping interpret data, recognize patterns, and understand why glucose rises or falls. She does not simply teach how to use a device—she teaches confidence in both the technology and oneself, **translating information into real-life decisions** and providing support on days when diabetes feels overwhelming.

b) Data Interpretation and Shared Decision-Making (5-8). CGM and hybrid closed-loop reports can be complex. The specialized nurse develops specific competencies to:

- Detect patterns of recurrent hypoglycemia, postprandial hyperglycemia, or the dawn phenomenon

- Relate these patterns to concrete habits (diet, exercise, schedules, shift work, stress, etc.)

- Propose treatment adjustments in coordination with the medical team

- Help people with diabetes translate information into realistic behavioral changes (portion adjust-

ment, bolus modification, activity planning, etc.)

Technology provides a vast amount of information, but an integrating figure is essential to make it meaningful in daily life. Research consistently shows that the best outcomes occur when device use is combined with professional support and continuous, structured education (1, 4, 9). **The specialist nurse in therapeutic education is the one who gives meaning to data and transforms it into actions that improve health and quality of life**—seeing beyond numbers to understand each person's story, fears, strengths, and challenges.

c) Leadership in Implementation and Care Coordination (9, 10). The introduction of new technologies requires clear pathways for candidate selection, initial training, and follow-up. In many centers, the specialized nurse:

- Designs and delivers group sessions prior to device initiation

- Coordinates schedules to ensure continuity of care

- Acts as a reference for resolving technical issues and professional queries

- Participates in protocol development and outcome evaluation

Reports from several health systems »

» show that the presence of specialized nursing optimizes resource use and speeds resolution of technology-related issues (9; 10).

d) Reducing Inequities and Supporting Vulnerable Groups[9],[10]. Not all patients begin with the same level of digital literacy, economic resources, or social support. Due to her proximity to patients and the community, the specialized nurse is ideally positioned to:

- Identify access barriers

- Adapt educational materials and learning pace

- Coordinate with community and social resources

In doing so, the specialized nurse humanizes care.

4. Key Competencies of the Specialized Nurse (9, 10). Essential competencies can be grouped into four domains:

- Advanced clinical competencies

- Technological competencies

- Educational and communication competencies

- Leadership, research, and continuous improvement competencies

The role of the specialized nurse is so decisive that many health care teams recognize that the success of technology is directly related to her presence. **D**

CONCLUSIONS

- Despite the importance of the expert nurse in therapeutic diabetes education, challenges remain: not all individuals have access to a nurse specialized in technology, and this role is not yet fully recognized within the health care system.

- Technology applied to diabetes has proven to be a powerful tool, generating data, alerts, and alarms that help people better manage life with diabetes. Yet it is the nurse who connects science with real life—transforming numbers into safe decisions, reassurance, and well-being.

- Technology has arrived to transform diabetes care, but real change occurs only when it is accompanied by a professional who understands that behind every device, every glucose value, every alarm, and every data point, there is a person and a story that deserves to be heard.

- Technology shows the path, but the expert nurse in therapeutic diabetes education is the one who helps walk it.

- Advancing toward care models in which this role is clearly defined and recognized—with specific training, protected time, and participation in clinical and organizational decision-making—is essential. Only then can technology truly serve as a tool for safer, more efficient, and more humanized care, with the person with diabetes remaining at the center and the specialized nurse acting as guide and ally throughout the entire process.

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