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PRACTICAL ASPECTS OF A NURSE'S WORK WITH PATIENTS WITH TYPE 1 DIABETES MELLITUS

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Background. Type 1 Diabetes Mellitus (T1DM) is a chronic autoimmune endocrine disease with steadily increasing prevalence. It is characterized by disturbances in glucose, protein, and fat metabolism caused by insulin deficiency or ineffectiveness. Patients with T1DM require constant blood glucose monitoring, psycho-emotional support, and systematic care to prevent complications. Determining the practical aspects of a nurse's work with T1DM patients is important for analyzing and substantiating the methodology of nursing care, especially given the growing disease trend in Ukraine.

Aim. To systematize the practical aspects and algorithms of a nurse's work in the medical care of patients with type 1 diabetes, and to substantiate the effectiveness and necessity of a comprehensive structured approach to patient care following a defined clinical route and modern clinical recommendations.

Materials and Methods. Information sources PubMed, Scopus, and Google Scholar for the period 2013–2025 were used, as well as clinical protocols and World Health Organization reports. The study was carried out as part of the first author's master's thesis.

Research Ethics. The study was conducted without the involvement of patients; therefore, it did not require approval from an ethics committee or obtaining informed consent from patients.

Results. Based on the literature analysis, six key aspects of a nurse's work with T1DM patients were identified: blood glucose control (training in glucometers, CGM systems); insulin therapy (injection technique, pumps, syringes, pens); diet therapy (bread units, glycemic index); emergency care for hypo- and hyperglycemia; psychological support (screening, distress management, family involvement); and complication prevention (foot care, blood pressure monitoring). A step-by-step nursing algorithm was developed for each aspect. A structured approach improves patient compliance, reduces the risk of complications, and increases quality of life in T1DM patients.

Conclusions. The proposed model of nursing care systematizes the practical aspects of a nurse's work with T1DM patients, demonstrates the effectiveness of a structured approach, and can be implemented in clinical practice in healthcare facilities of Ukraine.

Keywords: *nursing, endocrine system, insulin therapy, nursing care, diet therapy.*

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Introduction

The prevalence of T1DM is increases annually, making it one of the most common chronic diseases among young people. In Ukraine, approximately 1.3 million people have diabetes, of whom more than half have required hospitalization at least once [1]. Chronic decompensation of diabetes is observed in 70% of patients aged 14 years and older, including about 5,000 children and 3,000 adolescents with T1DM [2–5].

The growing morbidity has led to the introduction of new forms of organized medical care. The main regulatory acts in Ukraine include the Order of the Ministry of Health of Ukraine No.507 of December 28, 2002 "On Improving the Organization of Endocrinological Care for the Population of Ukraine", the State Target Program "Diabetes", and the "Unified Clinical Protocol of Primary, Emergency, and Specialized Medical Care "Type 1 Diabetes in Adults"" (Order of the Ministry of Health of Ukraine No.1118 of December 21, 2012) [6–8]. These documents systematize the step-by-step provision of care for patients with autoimmune endocrine disease.

Progress in the treatment and prevention of complications in T1DM is achieved when the nurse adheres to the algorithms for implementing diabetes programs with the active participation of the patient. Existing programs provide a full range of recommendations for T1DM treatment [7; 9]. However, scientific sources and state programs do not pay sufficient attention to systematizing the practical activities of nurses.

The nurse is the main intermediary between the doctor and the patient. She not only performs medical prescriptions but also provides direct psycho-emotional support, teaches patients' blood glucose control, introduces insulin therapy, participates in diet

therapy, explains the concept of bread units (BU) and the glycemic index, prevents complications, and provides first aid for hypoglycemic and hyperglycemic conditions.

The **aim** of this article is to present and systematize the practical aspects and algorithms of a nurse's work with T1DM patients, to substantiate the effectiveness of a comprehensive, structured approach, and to compile a step-by-step guide to the main aspects of nursing care.

Materials and Methods

The study was conducted using the bibliosemantic method and systemic analysis. A literature search was performed in the electronic databases PubMed, Scopus, Coursera, and Google Scholar for the period from 2013 to 2025 using the following keywords: type 1 diabetes mellitus, nursing care, diabetes self-management education and support, insulin therapy, diet therapy, continuous glucose monitoring, psychosocial support, diabetes complications. In addition, WHO clinical reports and national clinical protocols were analyzed.

Research Ethics

The study was conducted without the involvement of patients; therefore, it did not require approval from an ethics committee or obtaining informed consent from patients.

Results

The methodological analysis systematized the main aspects of a nurse's practical activities when working with T1DM patients. The following key areas were identified, each with its own sequence of actions.

1. Blood glucose control.

A nurse should teach patients how to self-measure glucose using a glucometer, Continuous Glucose Monitoring (CGM) systems, and Glucose Tolerance Tests (GTT). The nurse must explain the use of these devices, their advantages and disadvantages.

As part of systematic education, a Diabetes Self-Management Education and Support (DSMES) program is integrated with the qualified assistance of a nurse [9–11]. In addition, patients should be trained to interpret glucose readings and adjust insulin doses according to the doctor's recommendations.

2. Conducting insulin therapy.

Because T1DM requires lifelong insulin therapy, the nurse's responsibilities include initial and ongoing training in insulin injection techniques. This includes the correct use of insulin pumps, insulin syringes, and injection pens, as well as proper skin care and rotation of injection sites.

3. Diet therapy training.

Individualized nutritional therapy is an integral part of diabetes treatment and prevention of complications. Nursing care includes promoting a healthy lifestyle, taking into account the patient's cultural, religious, and personal preferences. The nurse helps the patient achieve and maintain a healthy body mass index, control glycemia, blood lipids, and blood pressure. For underweight or overweight patients, recommendations on energy balance and individualized nutrition plans are provided. The nurse assists in the preparation of the nutrition plan, teaching correct distribution of macronutrients and calculation of the required percentage of proteins, fats, and carbohydrates [9; 12]. Carbohydrate consumption is controlled by insulin intake. The nurse also teaches the patient to use Bread Units (BU) and interpret the glycemic index of products.

4. Providing emergency assistance.

Prevention of complications and early recognition of hypoglycemic or hyperglycemic conditions are important components of the nurse's work. If necessary, the nurse provides first aid during a diabetic coma. The patient is instructed on an independent algorithm of actions to prevent hypo- and hyperglycemia, including specific meal plans, insulin therapy, self-monitoring of glucose levels, and theoretical training on how to act when symptoms occur.

5. Psychological support.

Diabetes is a chronic disease that accompanies the patient throughout life. Therefore,

the DSMES program integrates psychosocial care as part of the nurse's practical activities [9; 10]. The nurse can conduct preliminary screening of the patient's psycho-emotional state, use questionnaires and interviews to identify the patient's attitude toward the illness, and assess the risk of depression or diabetic distress. The nurse may recommend participation in psychosocial programs, initiate seminars, trainings, and support groups for patients with diabetes, and systematically talk with the patient's family.

6. Care and prevention of complications.

The nurse is responsible for informing patients about the importance of foot care to prevent diabetic foot. Preventive measures also include self-monitoring of blood pressure to reduce cardiovascular risk.

A clear structure of practical duties and their systematic implementation help the nurse to develop a logical sequence of actions and to provide information to the patient without worsening the patient's psycho-emotional state or causing resistance to treatment. Stability, complexity, and interconnectedness of actions improve the overall clinical picture of professional activity, help predict results, and prevent complications at an early stage.

At the same time, a lack of structure in the nurse's practical actions when caring for T1DM patients can lead to contradictory actions and omission of important elements of patient care. The absence of a systematic approach makes it impossible to determine which factors influenced the individual results of treatment. This may lead to a deterioration in the patient's well-being and reduce the effectiveness of nursing interventions.

The presented systematized model of a nurse's practical activities serves as a reminder for specialists. Its integration is a preventive step against the reduction of the quality of nursing care for patients with diabetes.

Discussion

The presented systematic analysis outlines the key practical aspects of a nurse's work with patients with T1DM. The proposed algorithm covers six main areas: blood glucose control, insulin therapy, diet therapy training, emergency assistance, psychological support,

and prevention of complications. Each of these components is essential for achieving disease compensation and improving patients' quality of life.

The importance of structured patient education and support is well documented in the literature. According to Peyrot M. & Rubin R.R. (2007) [9], behavioral and psychosocial interventions significantly improve diabetes outcomes, yet they are often underutilized in routine clinical practice. Our algorithm integrates psychological support as a mandatory component, not an optional addition, which aligns with the national standards for diabetes self-management education and support proposed by Davis J. et al. (2022) [10].

Previous studies have demonstrated that technology integration, including CGM and insulin pumps, is more effective when patients receive proper training from diabetes care and education specialists (Isaacs D. et al. (2020) [11]). Our algorithm explicitly includes training in the use of glucometers, CGM systems, and insulin delivery devices, which is consistent with these recommendations.

Nutrition therapy remains a cornerstone of diabetes management. Evert A.B. et al. (2019) [12] emphasized that individualized nutrition plans improve glycemic control and reduce cardiovascular risk. Our algorithm reflects this by including teaching patients to calculate bread units, interpret the glycemic index, and adjust carbohydrate intake according to insulin doses.

Despite the availability of clinical protocols and guidelines – Unified Clinical Protocol (2023) [7]; and Maystruk G. et al. (2022) [8]; many nurses lack a clear, step-by-step framework for daily interactions with T1DM patients. The absence of a structured approach may lead to fragmented care, inconsistent patient education, and missed opportunities for early intervention. Our proposed model addresses this gap by providing a logical sequence of actions that can be adapted to different clinical settings.

However, this study has several **limitations**. First, the proposed algorithm is based on a literature review and methodological analysis rather than on original clinical trial data. The

effectiveness of the structured approach should be tested in prospective studies comparing patient outcomes before and after implementation of the algorithm. Second, the model may require adaptation to local healthcare resources, including the availability of diabetes specialists, educational materials, and financial support for technologies such as CGM or insulin pumps. Third, the algorithm does not address specific challenges of managing T1DM in children, pregnant women, or patients with severe comorbidities, which may require additional modifications.

Conclusions

The role of the nurse in caring for patients with T1DM contributes to effective disease control, improves the patient's psychosocial state and quality of life, helps adaptation, and prevents possible complications. The effectiveness of treatment is achieved through active interaction among medical professionals, the patient, and the family; fulfillment of medical prescriptions; and psychological and educational support provided by the nurse.

Adhering to a systematic algorithm of actions provides the patient with a positive attitude and motivation to follow all medical recommendations, helps the patient to accept changes in daily routine and new individualized nutrition plans, gradually implement an active and healthy lifestyle, and promote self-control of glucose levels at home. Interdisciplinary interaction between the nurse and the patient, consistently structured in a logically based system of necessary actions, has an undeniable prospect of further improvement, which will help identify new methodological algorithms for the practical aspects of a nurse's work with T1DM patients.

Prospects for further research

Future research should focus on validating the proposed algorithm in real-world clinical settings, assessing its impact on patient adherence, glycemic control, and quality of life, and developing training programs for nurses to facilitate its implementation. In addition, the integration of telemedicine and digital health tools into the structured care model could further enhance patient support, especially in remote or resource-limited areas.

Declarations

Conflict of interest is absent.

All authors have given their consent to the publication of the article under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License and a public agreement with the publisher, to the processing and publication of their personal data. The authors of the manuscript state that in the

process of conducting research, preparing, and editing this manuscript, they did not use any generative AI tools or services to perform any of the tasks listed in the Generative AI Delegation Taxonomy (GAIDeT, 2025). All stages of work (from the development of the research concept to the final editing) were carried out without the involvement of generative artificial intelligence, exclusively by the authors.

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Authors' Contributions

Contribution	A	B	C	D	E	F
Authors						
Harkusha S.	+	+	+	+	+	+
Kuzmenko N.			+	+		+

Notes:

A – concept;

B – design;

C – data collection;

D – statistical processing and interpretation of data;

E – writing or critical editing of the article;

F – approval of the final version for publication and agreement to be responsible for all aspects of the work.

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ПРАКТИЧНІ АСПЕКТИ РОБОТИ МЕДИЧНОЇ СЕСТРИ З ПАЦІЄНТАМИ ХВОРИМИ НА ЦУКРОВИЙ ДІАБЕТ ПЕРШОГО ТИПУ

Актуальність. Цукровий діабет першого типу (ЦД-1) – хронічне автоімунне ендокринне захворювання, поширеність якого активно зростає. Він характеризується порушенням обміну глюкози, білків і жирів, зумовленим дефіцитом або неефективністю інсуліну. Пацієнти з ЦД-1 потребують постійного контролю рівня глюкози крові, психоемоційної підтримки та систематичного догляду для запобігання ускладненням. Визначення аспектів практичної діяльності медичної сестри при роботі з пацієнтами з ЦД-1 є важливим кроком для узагальнення, аналізу та обґрунтування методології сестринського супроводу, особливо з огляду на зростання захворюваності в Україні.

Мета. Систематизувати практичні аспекти та алгоритми роботи медичної сестри при сестринському супроводі пацієнтів з цукровим діабетом першого типу, обґрунтувати ефективність та необхідність комплексного структурованого підходу до супроводу пацієнтів відповідно до визначеного клінічного маршруту та сучасних клінічних рекомендацій.

Матеріали та методи. Використано інформаційні джерела PubMed, Scopus та Google Scholar за період 2013–2025 рр., клінічні протоколи та звіти ВООЗ. Дослідження проведено в межах виконання магістерської роботи першого автора.

Результати. На основі аналізу літературних джерел визначено шість ключових аспектів роботи медичної сестри з пацієнтами з ЦД-1: контроль глюкози крові (навчання користуванню глюкометром, системами моніторингу глюкози); проведення інсулінотерапії (навчання техніці ін'єкцій, використанню pomp, шприців та ручок); навчання дієтотерапії (розрахунок хлібних одиниць, глікемічний індекс); невідкладна допомога при гіпоглікемічних та гіперглікемічних станах; психологічна підтримка (скринінг стану, робота з дистресом, залучення родини); догляд та профілактика ускладнень (догляд за стопами, контроль тиску). Для кожного аспекту розроблено алгоритм дій медсестри. Структурований підхід покращує дотримання лікування, знижує ризик ускладнень та підвищує якість життя хворих на ЦД-1.

Етика дослідження. Дослідження проведено без участі пацієнтів, тому не потребувало отримання схвалення етичних комісій та інформованих згод пацієнтів.

Висновки. Виділено поетапність алгоритмів сестринського супроводу, представлено практичні підходи до медичного супроводу пацієнтів із ЦД-1 та обґрунтовано ефективність узагальненої моделі сестринської допомоги.

Ключові слова: медсестринство, ендокринна система, інсулінотерапія, сестринський супровід, дієтотерапія.

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