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Assessment of Type 1 Diabetic Children and Adolescents Satisfaction with Their Healthcare: Review Article

Hoda Ahmed Atwa, Ahmed Galal Omran, Omnia Ahmed Abdu Mustafa*
Department of Pediatrics, Faculty of Medicine, Suez Canal University
***Corresponding author:** Omnia Ahmed Abdu Mustafa, **Mobile: 01017618430, Email:ahmedomnia987@gmail.com**

ABSTRACT
Type 1 diabetes mellitus (T1DM) has become a very crucial topic in the scientific community owing to its impact on public health. It's been estimated that about 79,100 kids below 15 years are diagnosed with T1DM worldwide each year. In fact, the global prevalence of diabetes increased from 108 million in 1980 to 422 million in 2014. The WHO predicts that diabetes will rank as the seventh largest etiology of mortality by 2030. In Egypt, T1DM in children is estimated to affect 8/100,000 per year. Case satisfaction is increasingly significant and widely recognized as an essential indicator of medical care quality. The definition of patient satisfaction in literature has been inconsistent since it's concerned with different settings and aspects of care, and such care is provided by various professions. Patients' satisfaction is affected by the duration and efficiency of care and how empathetic and interactive health care providers are.
Keywords: T1DM**,** Adolescents Satisfaction, Glycemic Control

INTRODUCTION

The goal of management in T1DM is to control hyperglycemia, maintain good general and psychological health, prevent any possible complications, and improve the overall quality of life. T1DM is regarded as a serious condition owing to its potentially devastating complications, such as hypoglycemia and diabetic ketoacidosis (DKA), which can escalate the seriousness of the condition up to death. And hence, it's becoming essential to provide a high quality of care for T1DM to improve their outcomes. Enhancing the quality of care for people with chronic illnesses, such as DM, has become a significant priority for policymakers [1].

Most of the interventions in diabetic control largely depend on the active engagement and participation of patients. Therefore, boosting patients' satisfaction with the service provided can be an important step in improving diabetes care and overall control of the condition. Several behavioral and psychosocial hypotheses have been suggested to explain the relation among cases' satisfaction and their clinical results [1].

The content case is prone to using healthcare services, adhering to treatment regimens, and maintaining monitoring with the medical professional. Understanding patient satisfaction about the healthcare system can be a potentially powerful tool to develop strategies that are able to boost patients' adherence to treatment and disease outcomes. Several studies have assessed patients' satisfaction in a variety of health conditions, and many were focused on T1DM patients' satisfaction with their treatment plan [2]. However, the satisfaction of T1DM patients regarding the provided healthcare service has been limited in the literature.

Therefore, this study assessed the satisfaction of T1DM adolescents and kids and their families with their healthcare service, which may help in enhancing the quality of care provided for them.

Type 1 Diabetes Care

Introduction

Managing type 1 diabetes in young kids within childcare facilities has distinct problems because of the stage of development of the kid. The restricted communication and cognitive abilities, motor skills, and emotional development of young infants may create challenges for even the most seasoned childcare professionals. For example, young kids with hypo- or hyperglycemia might show abnormal irritability or behavior, or they may not. Due to the normal unpredictable behavior in this age range, the childcare provider may fail to identify hypo- or hyperglycemic symptoms and might forget that the behavior is induced by low or high blood glucose levels requiring intervention. The diabetes management plan must be rapidly adjusted depending on the child's rapid growth and development. As the child grows and seeks increased independence, providers and parents/guardians might have difficulties with the toddler's resistance over their diabetes management protocol [3].

Diabetes self-management support and education:

Glycemic Control

Most adolescents and kids with type 1 diabetes are advised to undergo treatment with aggressive insulin protocols, utilizing either several injections every day or continuous insulin delivered via subcutaneous infusion. All adolescents and kids with T1DM must self-monitor the concentrations of glucose in their blood several times a day, involving before meals, before bedtime, and as necessary for safety in particular clinical conditions like driving, exercise, or hypoglycemia symptoms [4].

Monitoring of continuous glucose needs to be considered for adolescents and youngsters with T1DM, regardless of whether they utilize continuous insulin delivered via subcutaneous infusion or injections, as an

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additional instrument to enhance glycemic control. The advantages of continuous glucose monitoring are associated with consistent utilization of the apparatus. Automated insulin administration systems enhance glycemic regulation and diminish hypoglycemia in adolescents and must be contemplated for those with T1DM, with an A1C target of <7.5% (fifty-eight millimoles per mol) advised for all pediatric age groups [4].

Type 1 diabetes may negatively impact cognitive function throughout childhood and adolescence. Factors that adversely affect the progression and functioning of the brain involve young age or diabetic ketoacidosis at the outset of T1DM, severe hypoglycemia before the age of six, and chronic hyperglycemia. The aim of blood glucose (BG) point-of-care testing (POCT) is to deliver diagnostic information essential for clinical decision-making quickly. Self-monitoring of blood glucose (SMBG) refers to the utilization of point-of-care testing by cases to manage and monitor their glucose levels. The provision of more immediate point-of-care testing for glucose readings can enhance glycemic management outcomes [5]. To meet American Diabetes Association (ADA) objectives for therapy, SMBG must be conducted at a minimum of three to four times per day for cases utilizing several insulin pumps or insulin injections treatment. In several cases, an increased number of daily assessments is necessary to achieve care objectives. Self-monitoring of blood glucose allows cases to assess their personal response to treatment and determine if they are meeting their glycemic objectives [6].

Ketone

Ketone bodies are synthesized by the liver via fatty a` metabolism. during periods of significantly low plasma insulin concentrations. Ketone bodies predominantly consist of acetoacetate and β-hydroxybutyrate, with acetone being included. It is advisable to measure ketone bodies in cases with Type 1 diabetes throughout acute illness, when blood glucose levels exceed three hundred milligrams per deciliter, or when symptoms of ketoacidosis are present. Cases with type 2 diabetes may also have ketoacidosis, although less frequently, typically related to significant sickness and severe insulin resistance. The primary point-of-care test for ketosis quantifies β-hydroxybutyrate in capillary blood, providing greater sensitivity and quicker detection of ketoacidosis compared to urine dipsticks for ketone bodies [7].

Microvascular Complications

Nephropathy, retinopathy, and neuropathy are infrequently documented in prepubertal adolescents and those with a diabetes length of only one to two years; nonetheless, they may manifest post-puberty or following five to ten years of diabetes [8].

Diabetic Kidney Disease

Cases with diabetes frequently have kidney damage manifested as diabetic nephropathies. A preliminary indicator of diabetic nephropathy is an elevation in urine albumin excretion. Annual albuminuria screening using a random spot urine sample to determine the albumin-to-creatinine ratio must start at puberty or at age ten years or more, whichever occurs first, after the kid has been diagnosed with diabetes for a period of five years. When a persistently raised urinary albumin-to-creatinine ratio (above thirty milligrams per gram) is confirmed in a minimum of two of three urine samples, the initiation of therapy with an angiotensin receptor blocker or angiotensin-converting-enzyme inhibitors could be appropriate with dosage adjusted for keeping blood pressure within the suitable-for-your-age normal range [4]. An assessment of glomerular filtration rate (GFR), derived from glomerular filtration rate calculating equations utilizing sex, age, serum creatinine, and height, must be assessed at baseline and thereafter repeated as determined by age, treatment regimens, length of diabetes, and clinical status. Enhanced methodologies are required to detect early glomerular filtration rate decline, as calculated GFR is imprecise at levels above 60 ml/min/1.73 m^2. The AdDIT research in adolescents with T1DM established the safety of angiotensin-converting enzyme inhibitors, although it didn't alter the urine albumin-to-creatinine ratio during the research's duration [4].

Retinopathy

A fully dilated eye examination is advised for youths with type 1 diabetes after three to five years of diagnosis, dependent upon being at least ten years old or having commenced puberty, whichever occurs earlier. Following the initial assessment, annual routine monitoring is typically advised. Infrequent examinations, conducted every two years, could be considered acceptable with the recommendation of an eye care specialist and dependent upon risk factor evaluation [4].

Neuropathy

Initiate a comprehensive foot examination at the onset of puberty or at age ten or older, whichever occurs first, after the youth has been diagnosed with type 1 diabetes for a period of five years. Diabetic neuropathy is infrequently observed in prepubertal adolescents or within the first one to two years of diabetes; nonetheless, data indicate a seven percent frequency of distal peripheral neuropathy among 1,734 youths with T1DM, correlated with a history of cardiovascular disease risk factors. An annual complete foot examination, involving inspection, palpation

of posterior tibial pulses and dorsalis pedis, and evaluation of vibration, proprioception, and monofilament feeling, must be conducted alongside an evaluation of neuropathic pain complaints [9].

Physical activity

Physical activity is commonly acknowledged as an essential component of a healthy lifestyle for everyone, including adolescents and kids with diabetes mellitus. Besides physical health advantages, regular exercise was demonstrated to promote progress in school, cognitive function, and overall life quality. The American Academy of Pediatrics (AAP) advises that all kids, including those with DM, participate in a minimum of sixty minutes of daily physical exercise beginning at five years of age **[10]**. An effective strategy for optimizing glycemic control during exercise and the peri-exercise interval includes meticulous monitoring of blood glucose, prompt supplementation of carbohydrates, and appropriate insulin modifications. The construction of a comprehensive 'Diabetes Care Plan' can handle all these issues, utilizing a team approach to balance carbohydrate consumption and administration of insulin to achieve stable glycemia throughout physical exercise, or as close to it as possible. [11]**.**

Diabetes Mellites Medical Plan (DMMP):

The kid's written care plan, including the diabetes mellitus medical plan, enables effective management of diabetes and is crucial for attaining optimal glycemic control. The diabetes mellitus medical plan comprises the medical orders that base the delivery of care within the childcare environment and constitutes the kid's personalized care plan. It is prepared by a kid's diabetes healthcare professional with contributions from the parent or guardian [3].

The ADA Standards of Care delineate general nutritional concepts for diabetes, applicable to cases with T1DM, especially concerning suitable growth and progression in youth and the preservation of a healthy body weight throughout all age groups. Specifically, concerning patients with type 1 diabetes, concerns like meal composition and carbohydrate counting must be addressed. For people proficient in carbohydrate counting, instruction on the effects of protein and fat on glycemic excursions must be integrated into diabetes treatment. Cases who are obese or overweight could derive advantages from losing weight counseling [12]**.**

Psychosocial Issues

It is advisable to evaluate psychosocial issues and familial stresses that may affect adherence to diabetes control at the time of diagnosis and throughout routine monitoring and to provide suitable referrals to qualified mental health specialists, ideally those with experience in pediatric diabetes. Mental health professionals are essential members of the team of multidisciplinary pediatric diabetes and must promote developmentally suitable family participation in management tasks of diabetes for adolescents and kids, detecting that early diabetes transfer care to the child may lead to nonadherence and a decline in glycemic control [4].

Assessing psychosocial distress and mental health issues is an essential component of continuous treatment. It is crucial to evaluate the influence of diabetes on life quality, including the emergence of mental health issues associated with diabetes distress, fear, anxiety symptoms, disordered eating habits, and eating disorders, as well as symptoms of depression. Evaluate youth for diabetes discomfort, typically commencing at seven or eight years of age. Evaluate the implementation of screenings for depression and disordered eating behaviors utilizing existing screening instruments [13]**.**

Quality of care

Introduction:

The quality of care is an essential concept in quality assurance and quality enhancement efforts within the healthcare sector. The significance of quality in the healthcare sector was acknowledged; however, it was expedited in the past decade by the implementation of quality enhancement programs, quality insurance, and cases' agendas. Quality of Care (QOC), as stated by the Institutes of Medicine, refers to healthcare that is 'safe, effective, case-centered, timely, well-organized, and equitable. It is influenced by various factors, involving the case’s physician experience, health status, preferences of the case and parents, geographic location, as well as socioeconomic status **[14]**. Considering the economic and psychosocial ramifications of T1DM in kids and adolescents, it is advantageous to comprehend the effects on youngsters with T1DM and their families residing in rural or medically underserved areas. At now, minimal research has been documented in this area [15].

Service excellence

Service excellence revolves around three factors: patient, organization, and doctor.

Doctor

Without a doubt, the doctor is responsible for two distinct responsibilities: providing the case with the highest quality of care and guiding the team or organization toward the objective of ensuring the case's satisfaction. There are a few "house rules" that can be used to ensure that the case is satisfied and does not complain. These rules include making eye contact, smiling, calling people by name, and expressing concern with words. Demonstrating courtesy through polite words and kind gestures makes the case very comfortable. Listen and

understand by encouraging cases to discuss their problem; inform and explain, which enhances compliance. People are less anxious when they are aware of the situation. Additional methods include assigning an equal share of the responsibility, providing undivided attention, maintaining confidentiality and privacy, maintaining dignity, remembering the patient's family, and responding rapidly to their care requests [16].

Patients

A case's liking the doctor has a lot to do with the case becoming better. The predications of a case regarding excellent service are based upon the case's age, sex, nature of disease, hour of the day, attitude toward the problem, and circumstances. In general, cases predict that their physicians will adhere to the established schedules, communicate in their language, and exhibit cordial behavior. In addition to a professional job, they predict courtesy, concern, and care. There is a specific tip that may assist a physician or hospital in better understanding a case, such as: Recognizing that patients predicts a personal relationship that demonstrates care and compassion, as well as acknowledging that the case has specific rights. A chart of rights for cases has been drawn by different regulatory authorities and hospitals [16].

Hospital

Frequently, problems remain with the presence of a competent physician and an acceptable patient due to the regulations, organizational culture, and attitudes exhibited by the workplace. Historically, hospitals have maintained distinct functional services, including laboratory, dietary services, housekeeping, and pharmacy. Regrettably, this specialization has resulted in the provision of substandard customer service, prohibitively expensive care, and increased fragmentation. According to an investigation, between fifty and sixty employees could interact with a case throughout a typical three- to four-day stay in a large hospital [17].

Doctor-patient interaction

This indicator is potentially the most critical in determining the case satisfaction result. The enhancement of the physician's interpersonal skills is likely to have a beneficial impact on health results and management adherence, as it may lead to elevated case satisfaction. Comorbid psychological problems are present in as many as one quarter of cases. Cases like this need more time from the dermatologist. Doctors often find themselves prescribing an increased number of medications and conversing with patients less often. In a single investigation, psoriasis cases recognized inadequate communication as a significant factor contributing to their dissatisfaction with their therapy [18].

Patient education

Today's case is generally more educated, computer-savvy, and much richer than their predecessors. It is crucial to explain all of their doubts, whether they are wrong or right, with a great deal of compassion and patience. In a survey conducted by the National Research Corporation (NRC), cases listed the willingness to provide explanations as the most critical factor in their decision to choose a doctor, on a scale of 10. The investigation also took into account telephone access, reasonable fees, a pleasant office, convenient appointments, and a convenient location. The willingness to explain things has been rated at 9.6, which was significantly higher than the other factors tested. Dissatisfaction, particularly in the context of chronic and cosmetic disorders, might result from unrealistic expectations and objectives that are the result of incomplete, improper, and inadequate communication [16].

Problem solving

This is potentially the most critical of all case-related concerns. Hospitals must establish an effective complaint management system in order to obtain accreditations from organizations such as NABH, ISO, and JCAHO. In accordance with the JCAHO manual, the organization is required to establish a complaint mechanism, inform cases of their right to complain and the mechanism, address significant complaints, and take suitable action. Cases are prohibited from being penalized for complaining, and all health care facility providers need to record complaints of cases and their responses [16].

Roughly one complaint in five is considered to be serious. In other words, approximately 780 of the 3900 complaints are classified as serious. If fifty percent of individuals with severe complaints elect to seek treatment elsewhere in the future, this implies that 390 individuals will select an alternative physician or facility upon their next visit. In the coming twelve months, it is predicted that forty percent of these cases or their family members would require hospitalization. Consequently, the financial implications will be heavy for both the organization and the physician [19].

In the event of a service lapse, it is crucial to accept and acknowledge the mistake with grace. Although the lapse is acknowledged, the regret is solely directed at the process. Making an apology doesn't mean that one has accepted their guilt. A series of measures must be taken to prevent the recurrence of such lapses [16].

Quality of care in rural areas

Obtaining diabetes care that aligns with current clinical practice recommendations is even more challenging for cases residing in rural or medically underserved communities. Furthermore, individuals with diabetes who reside in rural areas are at an elevated

possibility of developing complications associated with their condition. These disparities in quality of care (QOC) require addressing, especially in the rural pediatric diabetes population, where there is inadequate documentation regarding quality of care [14].

The complexity of medical treatments of diabetes has risen significantly over the past two decades, and intensive therapy for diabetes has consistently been demonstrated to lead to enhanced results and a decreased likelihood of complications [20]. Among youths who have type 1 diabetes, intensive treatments of diabetes, including therapy with insulin pumps or several daily injections, are related to enhanced glycemic control and a low probability of adverse effects. The paradigm that highlight the assessment of quality of care is that of Avedis Donabedian, who identified three structural categories of quality of care: structure of care: the relatively stable characteristics of the provider, such as resources, equipment, and the organizational and physical settings (e.g., staffing ratios, hospital facility); process of care: the actual actions taken during the process of giving and receiving care (e.g., practitioner defining diagnosis, patient seeking care, suggesting therapy); and results: the impact on the health status of the cases (e.g., medical complications, health-related quality of life), cases knowledge, and the level of case satisfaction. These three domains are interconnected. To put it simply, good results are the result of effective structure and process. Nevertheless, results are additionally dependent upon a variety of other factors that are beyond the practitioner's control [21].

Comprehensive medical evaluation:

It is advised that a comprehensive medical assessment be conducted during the initial visit to verify the diagnosis, categorize diabetes, and assess for possible comorbid conditions and complications. Review prior therapies and risk factor control of cases with established diabetes, engage the cases in the development of a care treatments plan, and create a plan for continuous care [4]. Furthermore, the majority of the initial comprehensive medical evaluation's components, such as: evaluation of drug use and interval medical history, must be included in a monitoring visit [4].

Patient Satisfaction About Health Care

Introduction:

Case satisfaction is a critical indicator of healthcare quality, as it provides data on the provider's ability to fulfill the expectations of the client that are most relevant to them and is a significant factor in determining the behavioral intention of cases. The satisfaction of cases is associated with critical results, including improved compliance, reduced use of medical services, reduced malpractice litigation, and improved prognosis. The decision of the case to return to a doctor is positively correlated with the case's consultation experience. Empirical literature indicates that cases who are dissatisfied are more inclined to forgo consultations with physicians whom they perceive as incompetent. Similarly, dissatisfied cases often report delays in seeking medical advice and self-medication. Cases from lesser socioeconomic backgrounds continue to look for consultation at the same clinic in scarce resource settings, regardless of their dissatisfaction, as substitutes aren't available [22].

Factors affecting patient satisfaction:

A few investigations have tried to associate the health status of the cases with factors like the performance of the healthcare system or other economic and demographic factors. Some investigators have suggested that defining quality enhancement from the perspective of cases provides better value for their money by improving accessibility, safety, comprehensiveness, and equity of care. From the perspective of a provider, quality enhancement might be more effective, providing more efficient services to a higher number of consumers with a reasonable level of satisfaction, which is sufficient for customer retention [23].

To be more specific, **Bleich *et al.*** [23] discovered that with regard to case satisfaction and for 21 EU countries for the year 2003, approximately twenty-five percent of the difference can be due to the healthcare system itself as well as to health status, immunization coverage, cases expectations, and type of care. In addition, another investigation investigates socio-demographic factors like occupation, sex, income, education, employment status, and age, and results indicate that income is the only socio-demographic factor that was observed to have an effect on the satisfaction of the cases [23].

Instead, **Zhao *et al.*** [24] conducted a relevant investigation that investigates the willingness to pay (WTP) per Quality-Adjusted Life Year (QALY) for a sample of chronic prostate cases. The WTP is related to demographic factors of cases, including gender, marital status, education, and age, as well as economic factors, including income and employment. Satisfaction of the cases is affected by numerous factors. The responses of cases are influenced by case demographics, including sex, general health status, income, age, and socioeconomic status. The interactions with cases are also influenced by the characteristics of the medical provider, such as their experience and demographics [24].

Patient satisfaction evaluation:

The satisfaction of cases deserves to be incorporated in assessments of the quality of care, as they are participants in healthcare—with perceptions and opinions of their own as to whether care is good or bad [24]

When it comes to specific aspects of care, like interpersonal relationships, they are the best judges. Additionally, there are ideological causes for their inclusion. In order to understand case' concerns and identify areas for enhancement, such as enhancing communication among cases and doctors, case satisfaction surveys are frequently utilized. The outcomes of the survey record improvement and enable doctors and staff to preserve high standards [24].

Despite the fact that payer systems utilize the outcomes of case satisfaction surveys to profile individual doctors and direct physician compensation, an investigation revealed that less than twenty-five percent of primary care doctors observed the profiles to be beneficial for enhancing case care, and even fewer utilized the profiles for changing [24]. Health-related quality of life (HRQOL) is frequently assessed, and validated questionnaires are provided. The Diabetes Treatment Satisfaction Questionnaire (DTSQ) is one of the validated questionnaires that evaluates satisfaction with therapy. Additionally, there are versions that have been modified to accommodate adolescents and parents. Nevertheless, there are a limited number of published investigations that explore the perspectives of patients and parents regarding pediatric diabetes care. Additionally, an examination of empirical literature demonstrated that there is a scarcity of research on the satisfaction of diabetes cases worldwide. The investigation criteria for previous satisfaction investigations on diabetes mellitus were as follows: the type of diabetes mellitus (type 1 and 2), the mode of therapy, the duration of the disease (newly diagnosed and long-term case), and the health results [22].

The Patient Satisfaction Questionnaire (PSQ) was established by **Ware and his colleagues** [22] to assess the satisfaction of cases with four chronic illnesses, like diabetes. In order to investigate the satisfaction of cases in oncology, scholars utilized modified versions of the Patient Satisfaction Questionnaire, which exclude subscales that aren't relevant to this research. The satisfaction of cases is determined by the dimensions of medical interaction, including interaction, resources, technical expertise, availability, time, convenience, and communication, as per Ware's framework [22].

Patient-centered collaborative care:

To optimize health-related quality of life and case health results, a case-centered communication style that utilizes person-centered and strength-based language, elicits case preferences and beliefs, and active listening, and evaluates literacy, numeracy, and possible barriers to care must be implemented [4].

Beneficial interactions among the care team and the cases are essential for a successful medical assessment. The Chronic Care Model demands a close working relationship among the case and clinicians included in management planning, as it is a case-centered approach to care. An interdisciplinary team of healthcare professionals, including nurses, doctors, practitioners, podiatrists, physician assistants, exercise specialists, pharmacists, dietitians, mental health professionals, and dentists, should provide care to individuals who have diabetes. It is imperative that individuals who have diabetes take an active role in their own care. Together, the case, doctor, family or support persons, and health care team must develop a plan for management that involves lifestyle treatments [25].

One critical psychosocial factor that contributes to enhanced diabetes self-management and treatment results is cases' perceptions of their own ability, or self-efficacy, to self-manage diabetes. This factor must be the focus of continuous evaluation, education for cases, and planning for therapy [26,27].

CONCLUSION

Type 1 diabetes mellitus (T1DM) has become a very crucial topic in the scientific community owing to its impact on public health. In fact, the number of people with diabetes has risen worldwide from 108 million in 1980 to 422 million in 2014. In Egypt, T1DM in children is estimated to affect 8/100,000 per year. Patients' satisfaction is of increasing importance and is widely recognized as an important indicator of the quality of medical care. A satisfied patient is more likely to utilize health care services, comply with the medical treatment and continue to follow up with the health provider. Understanding patient satisfaction about the healthcare system can be a potentially powerful tool to develop strategies that are able to boost patients' adherence to treatment and disease outcomes.

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