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Type 1 Diabetes in Pediatric Patients in Baghdad: Diagnosis, Management, and Clinical Outcomes

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Abstract

A rising number of people around the world, especially in Middle Eastern nations, are living with type 1 diabetes mellitus (T1DM), a chronic autoimmune disease. Data on the care and results of children type 1 diabetes in Iraq is sparse, despite the increasing burden. The purpose of this research was to examine the clinical features, diagnostic procedures, treatment plans, and results of type 1 diabetic children who were seen at Baghdad's Al-Yarmouk Teaching Hospital.

In a cross-sectional study that took place between January 2023 and January 2025, 250 children with type 1 diabetes, ranging in age from 1 to 18 years, were included. We gathered information on demographics, clinical features, diagnostic methods, insulin dosages, glycemic control (HbA1c), psychological and social aspects, and acute consequences. Poor glycemic control was defined as hemoglobin A1C levels above 9%. Independent predictors of this condition were identified using multivariate logistic regression.

Males made up 52% of the sample, and the average age of the participants was 10.5 ± 3.2 years. There were 7.5 cases per 100,000 youngsters per year. Diabetic ketoacidosis (DKA) was present in 39.2% of cases at diagnosis, and classic T1DM symptoms were observed in 75% of cases. Cholesterol control at an ideal level (HbA1c $< 7\%$) was only attained by 40%. Insulin pump therapy was utilized by just 15% of patients, whereas 85% of patients took multiple daily injections. A total of 35.2% of patients experienced DKA per year, while 24.8% experienced severe hypoglycemia. Only 8% of patients were able to access continuous glucose monitoring (CGM). Adolescence (aOR=3.84), infrequent glucose monitoring (aOR=3.21), inadequate diabetes education (aOR=2.87), parents with low levels of education (aOR=2.54), and disruption within the family (aOR=2.42) were all independent predictors of poor control.

Due in large part to a lack of diabetes technology and organized teaching initiatives, these results show that Iraqi children with type 1 diabetes continue to have inadequate glucose control and significant complication rates. If Iraq wants to see better results for children with diabetes, they need to do three things: increase diabetes education, make glucose monitoring equipment more widely available, and strengthen support networks that are oriented around families.

Keywords: Type 1 diabetes mellitus; pediatric diabetes; Baghdad; diabetic ketoacidosis; glycemic control; diabetes education

Introduction

Roughly 1.1 million children across the globe are living with type 1 diabetes mellitus (T1DM), and the incidence rate is rising by 2-5% every year [1]. The Middle East and North Africa region is seeing an increasing incidence of type 1 diabetes, however the greatest rates are in Scandinavian nations, such as Finland, where the rate is 60 per 100,000 [2]. Developing nations' healthcare systems are hit particularly hard by this epidemiological shift because of their low resources for managing chronic diseases.

Absolute insulin insufficiency necessitating lifetime insulin therapy is the outcome of type 1 diabetes, which is caused by the autoimmune death of pancreatic beta cells [3]. Atypical symptoms can cause a delay in diagnosis and even lead to the potentially fatal diabetic ketoacidosis (DKA) [4], although the usual clinical presentation includes polyuria, polydipsia, and weight loss. Developing countries still lack access to modern advances like insulin pumps and continuous glucose monitoring (CGM), which have transformed diabetes care in settings with more resources [5].

A growing number of children in Iraq, and Baghdad in particular, have type 1 diabetes, putting a strain on healthcare systems already battered by years of war and economic

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uncertainty [6]. Insulin administration, dietary counseling, diabetes education, psychological support, and complication monitoring are all essential components of an interdisciplinary strategy for the optimal management of type 1 diabetes (7). However, there are a number of obstacles that resource-limited settings must overcome, such as a lack of specialized pediatric diabetes professionals, an inadequate supply of monitoring devices, an absence of insulin analogs, and an inadequate program for diabetes education [8].

A greater number of acute complications and DKA are common among Iraqi children with type 1 diabetes compared to children in Western countries. Iraqi healthcare facilities employ endocrinologists at a rate of 18%, while basic glucometers are lacking in 40% of rural areas, according to national data. Similar delays in diagnosis have been found in published research from the Middle East. For example, in Kuwait, 41% of patients had diabetic ketoacidosis (DKA) upon presentation, and the median diagnostic delay was 3.2 weeks. In Saudi Arabia, the average delay was 28 days in rural areas and 8 days in urban centers [9, 10] Diagnoses in resource-constrained contexts are routinely postponed due to socioeconomic considerations, restricted geographic access, and inadequate primary care capability, as shown by these geographical patterns.

Comprehensive recommendations for the management of type 1 diabetes are provided by the American Diabetes Association (ADA), the International Society for Pediatric and Adolescent Diabetes (ISPAD), and the National Institute for Health and Care Excellence (NICE) in their international guidelines [11, 12]. These guidelines emphasize the importance of early diagnosis, intensive insulin therapy, structured education, and regular monitoring. Reducing microvascular and macrovascular problems is greatly aided by adequate glycemic control (HbA1c <7.0%), according to research conducted in Europe and North America [13].

Cultural dietary issues, scarce resources, and inconsistent access to technology are some of the distinctive challenges highlighted by Middle Eastern studies [14]. Complication rates are higher in Saudi Arabian, Kuwaiti, and Jordanian juvenile T1DM patients, and 50–70% of these patients had inadequate glycemic management [15, 16]. Clinical features, management techniques, and results data from Iraq is limited, which hinders the creation of evidence-based policies.

There is a lack of published research on the epidemiology, clinical presentation, and management outcomes of type 1 diabetes in Iraqi children, despite the fact that the disease is becoming more acknowledged as a major public health concern in the country. Insufficient evaluation of diagnostic procedures, treatment plans, and psychosocial variables characterizes the majority of the currently available research, which also suffer from tiny sample numbers and single-center designs. Problems with glycemic control and obstacles to optimum treatment have not been thoroughly investigated in this population in any previous research.

The study aims to investigate the prevalence and clinical features of Type 1 Diabetes in children in Baghdad, evaluates current diagnostic and management practices, and examines associated outcomes and complications.

Methods

Study Design and Setting: This observational study was carried out at the Pediatric Endocrinology Department of Al-Yarmouk Teaching Hospital in Baghdad, spanning from January 2023 to January 2025. The hospital functions as a significant healthcare institution, catering to around 2.5 million residents and overseeing the care of more than 300 children with T1DM each year via a dedicated diabetes clinic.

Participants

Children aged 1-18 years with confirmed T1DM receiving regular follow-up were enrolled. Inclusion criteria: (1) age 1-18 years; (2) T1DM diagnosed ≥6 months using ADA criteria (fasting glucose ≥126 mg/dL, random glucose ≥200 mg/dL with symptoms, or HbA1c ≥6.5%); (3) daily insulin therapy; (4) ≥2 clinic visits in preceding 12 months. Exclusion criteria: type 2 diabetes, MODY, other diabetes forms; significant chronic comorbidities; medications affecting glucose metabolism >14 days in preceding 3 months; incomplete records; refusal to participate.

Sample Size

Based on previous studies reporting 60% suboptimal glycemic control [17], with 5% margin of error and 95% confidence, minimum required sample was 215 participants. We recruited 250 patients, providing adequate power for primary outcome assessment and multivariable analyses.

Ethical Approval

The study was approved by the Ethics Committee of Ibn Sina University of Medical and Pharmaceutical Sciences (IRB-2025-345) and the administration of Al-Yarmouk Teaching Hospital. Written informed consent was obtained from parents or guardians, and assent from children aged 7 years and above, in accordance with the Declaration of Helsinki

Data Collection

Standardized case report forms captured data from medical records and structured interviews: (1) demographics (age, sex, residence, parental education/occupation); (2) diabetes characteristics (diagnosis age, duration, presenting symptoms, DKA at diagnosis); (3) family history; (4) diagnostic methods; (5) insulin regimens (type, dose, delivery); (6) self-monitoring frequency; (7) recent laboratory results (HbA1c, lipids, renal function); (8) acute complications in preceding 12 months; (9) chronic complication screening results. Validated Arabic questionnaires assessed psychosocial outcomes: the PedsQL Diabetes Module (15 items, scored 0–100, with higher scores indicating better quality of life) was translated and culturally adapted per WHO guidelines; the Problem Areas in Diabetes Survey—Pediatric (PAID-T; 26 items, scored 0–104) measured diabetes distress in adolescents ≥13 years; the Family Assessment Device (12-item short form, scored 1–4; scores >2.0 indicate dysfunction) assessed family functioning; and diabetes knowledge was evaluated using a 20-item structured questionnaire validated in Iraqi Arabic [18, 19].

Gold Standard and Definitions

T1DM diagnosis followed ADA criteria [20]. Glycemic control used HbA1c (HPLC method, Bio-Rad D-10, NGSP-certified): optimal <7.0%, suboptimal 7.0-9.0%, poor >9.0%. DKA was defined as glucose >200 mg/dL, pH <7.3 or bicarbonate <15 mmol/L, with ketonemia/ketonuria;

classified as mild (pH 7.2-7.3), moderate (pH 7.1-7.2), or severe (pH <7.1) [21]. Severe hypoglycemia required third-party assistance [22].

Statistical Analysis

Data were analyzed using SPSS version 26.0. Descriptive statistics presented continuous variables as mean±SD or median (IQR); categorical variables as frequencies and percentages. Bivariate analyses used chi-square tests, Fisher's exact tests, t-tests, or Mann-Whitney U tests as appropriate. Multivariable logistic regression identified independent predictors of poor glycemic control (HbA1c >9%), with backward stepwise selection retaining variables with p<0.05. Model fit was assessed using Hosmer-Lemeshow test; discrimination by AUC-ROC. Two-tailed p<0.05 was considered significant.

Results

Participant Characteristics

Among 250 participants, mean age was 10.5±3.2 years (range 2-18); 52% male. Age distribution: 11.2% ages 1-6 years, 56.8% ages 7-12 years, 32.0% ages 13-18 years. Urban residents comprised 72.8%. Parental secondary education or higher: 45% fathers, 38% mothers. Family diabetes history: 44.8%. Mean diagnosis age was 8.2±3.5 years; median diabetes duration 3.5 years (IQR 1.8-6.2).

Table 1: Demographic and Clinical Characteristics of Pediatric T1DM Patients (n=250)

Variable	Value
Mean age (years)	10.5 ± 3.2 (range 2–18)
Age groups	
1–6 yrs	11.2%
7–12 yrs	56.8%
13–18 yrs	32.0%
Sex	
Male	52%
Female	48%
Residence	
Central of city	72.8%
Peripheral of city	27.2%
Family history of diabetes	
Yes	44.8%
No	55.2%
Mean age at diagnosis (years)	8.2 ± 3.5
Median duration of diabetes (years)	3.5 (IQR 1.8–6.2)
Father education ≥ secondary	45%
Mother education ≥ secondary	38%

Clinical Presentation:

Classic symptoms occurred in 75.2%: polyuria (92.8%), polydipsia (91.2%), weight loss (78.0%), and polyphagia (68.8%). Atypical presentations (24.8%) included abdominal pain (19.2%), vomiting (16.8%), and enuresis (15.2%). DKA at diagnosis affected 39.2% (16.8% mild, 15.2% moderate and 7.2% severe). Mean symptom duration before diagnosis was 3.8±2.1 weeks. DKA at presentation associated with younger age (6.8 vs. 9.1 years, p<0.001), lower parental education (p=0.008), longer symptom duration (5.2 vs. 2.9 weeks, p<0.001), and rural residence (p=0.015).

Table 2: Clinical Presentation and DKA at Diagnosis

Presentation	Frequency (%)
Classic symptoms	75.2%
Polyuria	92.8%
Polydipsia	91.2%
Weight loss	78.0%
Polyphagia	68.8%
Atypical symptoms	24.8%
Abdominal pain	19.2%
Vomiting	16.8%
Enuresis	15.2%
DKA at diagnosis	39.2%
Mild	16.8%,
Moderate	15.2%,
Severe	7.2%
Mean symptom duration before diagnosis	3.8 ± 2.1 weeks

Diagnostic Practices

Random plasma glucose was used diagnostically in 60% (mean 387±112 mg/dL), HbA1c in 30% (mean 11.2±2.3%), OGTT in 10%. Autoantibody testing in 56.8% showed ≥1 positive antibody in 90.1%: GAD 71.8%, ICA 54.9%, IAA 45.8%, and IA-2 40.8%. Fasting C-peptide <0.2 ng/mL in 80.4% of tested patients. Associated conditions: thyroid dysfunction 12.8%, celiac disease 7.2%.

Table 3: Diagnostic Practices

Diagnostic Test	% Patients	Key Findings
Random glucose	60%	Mean 387 ± 112 mg/dL
HbA1c	30%	Mean 11.2 ± 2.3%
OGTT	10%	–
Autoantibody testing	56.8%	≥1 positive in 90.1% (GAD 71.8%, ICA 54.9%, IAA 45.8%, IA-2 40.8%)
Fasting C-peptide <0.2 ng/mL	80.4%	–
Thyroid dysfunction	12.8%	
Celiac disease	7.2%	

Management Strategies

Multiple daily injections (MDI) were used by 85.2%; insulin pumps by 14.8%. Mean total daily insulin dose: 0.82±0.28 units/kg/day, varying by age (p<0.001). Self-monitoring ≥4 times daily: 27.2%; 2-3 times daily: 40.8%; <2 times daily: 32.0%. Cost was primary barrier (78.4%). CGM/flash monitoring: 8.0%. Structured diabetes education: 38.0%. Mean diabetes knowledge scores: 62±18% (parents), 54±22% (adolescents).

Table 4: Management Practices

Management Aspect	Value
Insulin regimen: MDI	85.2%
Insulin regimen: Pump	14.8%
Mean insulin dose (units/kg/day)	0.82 ± 0.28
Self-monitoring ≥4/day	27.2%
Self-monitoring 2–3/day	40.8%
Self-monitoring <2/day	32.0%
CGM/Flash use	8.0%
Structured diabetes education	38.0%
Knowledge score (parents)	62 ± 18%
Knowledge score (adolescents)	54 ± 22%

Glycemic Control

Mean HbA1c: 8.7±1.9%. Optimal control (<7.0%): 40.0%; suboptimal (7.0-9.0%): 34.0%; poor (>9.0%): 26.0%. Adolescents had highest HbA1c (9.4±2.1%) versus school-age children (8.5±1.7%) and younger children (7.9±1.6%), p=0.003. In bivariate analysis, insulin pump users demonstrated better HbA1c (7.8% vs. 8.9%, p=0.012); however, after multivariable adjustment for socioeconomic status, parental education, and SMBG frequency, this association did not reach significance (aOR=1.52, 95% CI: 0.68–3.41, p=0.31), suggesting confounding by patient selection rather than device superiority.

Table 5: Glycemic Control

Control Category	% Patients	Mean HbA1c (%)	p- value
Optimal (<7%)	40.0%	–	0.065
Suboptimal (7–9%)	34.0%	–	
Poor (>9%)	26.0%	–	
Mean HbA1c overall	–	8.7 ± 1.9%	
HbA1c by age group	1–6 yrs: 7.9 ± 1.6; 7–12 yrs: 8.5 ± 1.7; 13–18 yrs: 9.4 ± 2.1		0.003
Pump vs. MDI HbA1c	7.8% vs. 8.9%		0.012

Acute Complications

DKA in preceding 12 months: 35.2% of patients, 132 total episodes (0.53 episodes/patient-year). DKA severity: 36.4% mild, 43.9% moderate, 19.7% severe. Precipitating factors: missed insulin (51.1%), infections (36.4%), and pump malfunction (9.1%). Severe hypoglycemia: 24.8% of patients, 95 episodes (0.38 episodes/patient-year), with 4.8% requiring emergency treatment. Common triggers: inadequate carbohydrate intake (67.7%), excessive activity (45.2%), incorrect dosing (29.0%).

Table 6: Acute Complications in Past 12 Months

Complication	% Patients	Episodes (per patient-year)	Severity/Triggers
DKA	35.2%	132 (0.53)	Mild 36.4%, Moderate 43.9%, Severe 19.7%; Triggers: missed insulin 51.1%, infection 36.4%, pump malfunction 9.1%
Severe hypoglycemia	24.8%	95 (0.38)	Triggers: low carb intake 67.7%, excessive activity 45.2%, incorrect dosing 29.0%

Chronic Complications (n=80 with duration ≥5 years):

Retinopathy: 15.0% (mild non-proliferative: 11.3%, moderate: 3.7%). Microalbuminuria: 22.5%; macroalbuminuria: 3.8%. Peripheral neuropathy: 10.0%. Complications associated with longer duration and poor glycemic control (p<0.05).

Table 7: Chronic Complications (n=80, duration ≥5 yrs)

Complication	% Patients
Retinopathy	15.0% (11.3% mild, 3.7% moderate)
Microalbuminuria	22.5%
Macroalbuminuria	3.8%
Peripheral neuropathy	10.0%

Psychosocial Factors: Mean PedsQL Diabetes Module score: 64.2±15.8, lower in adolescents (58.3±16.2) and poor control (57.9±17.1). Adolescent PAID-T score: 42.8±18.6; 43.8% showed clinically significant distress. Family dysfunction: 19.2%, associated with poor control (p<0.001). Depression symptoms: 11.2% overall, 22.5% in adolescents. Anxiety: 16.8% overall, 32.5% in adolescents. Only 4.8% received psychological treatment.

Table 8: Psychosocial Outcomes

Factor	Finding
Mean PedsQL score	64.2 ± 15.8 (lower in adolescents: 58.3 ± 16.2; poor control: 57.9 ± 17.1)
PAID-T distress score (adolescents)	42.8 ± 18.6; 43.8% clinically significant
Family dysfunction	19.2% (linked to poor control, p<0.001)
Depression symptoms	11.2% overall; 22.5% adolescents
Anxiety symptoms	16.8% overall; 32.5% adolescents
Receiving psychological care	4.8%

Access and Economic Burden

Government insulin supply interruptions: 31.2% of families. Test strip rationing (50 strips/month) inadequate for recommended frequency. Glucagon kits available to 18.0%. Mean clinic visits: 4.2±1.8/year (below recommended quarterly visits). Mean monthly out-of-pocket expenditure: $127±68 (22.4% of median income). Financial hardship reported by 27.2%.

Table 9: Access and Economic Burden

Variable	Value
Insulin supply interruptions	31.2%
Test strip rationing	50 strips/month
Glucagon kit availability	18.0%
Mean clinic visits/year	4.2 ± 1.8 (recommended ≥4)
Mean monthly out-of-pocket costs	$127 ± 68 (22.4% of median income)
Financial hardship	27.2%

Predictors of Poor Glycemic Control

Multivariable logistic regression identified independent predictors of HbA1c >9.0%:

- Adolescent age (13-18 years): aOR 3.84 (95% CI: 1.92-7.68), p<0.001
- Infrequent SMBG (<2 times/day): aOR 3.21 (95% CI: 1.65-6.24), p=0.001
- Lack of structured education: aOR 2.87 (95% CI: 1.48-5.56), p=0.002
- Low parental education: aOR 2.54 (95% CI: 1.32-4.89), p=0.005
- Family dysfunction: aOR 2.42 (95% CI: 1.15-5.09), p=0.020

Model demonstrated good fit (Hosmer-Lemeshow p=0.52) and discrimination (AUC-ROC=0.78).

Table 10: Independent Predictors of Poor Glycemic Control (HbA1c >9%)

Predictor	aOR (95% CI)	p-value
Adolescent age (13–18 yrs)	3.84 (1.92–7.68)	<0.001
SMBG <2/day	3.21 (1.65–6.24)	0.001
Lack of structured education	2.87 (1.48–5.56)	0.002
Low parental education	2.54 (1.32–4.89)	0.005
Family dysfunction	2.42 (1.15–5.09)	0.020
Model performance	Hosmer-Lemeshow p=0.52; AUC-ROC=0.78	

Discussion

This research shows that treating type 1 diabetes in children in Baghdad is quite difficult. This year's predicted incidence of 7.5 per 100,000 youngsters is significantly higher than previous statistics and is in line with worldwide trends [25]. Problems with early identification and illness management are highlighted by the high prevalence of DKA at presentation (39.2%) and during follow-up (35.2% yearly). Adolescents fared even worse, with only 40% achieving ideal glycemic control. Significant obstacles surfaced, including a lack of resources for formal instruction, psychosocial support, and technology. Key variables of glycemic control, as revealed by multivariate analysis, include the frequency of glucose monitoring, diabetes education, and family functioning.

Our results are in line with those of neighboring Middle Eastern nations. Our 40% HbA1c target is at or below 7.0%, which is comparable to 32% in Saudi Arabian research [25]. Almost the same as our percentage, 41% DKA was recorded in Kuwait at presentation [26]. Similar to our trend, 58% of Jordanian children had inadequate control, with the worst outcomes seen in adolescents [27]. In this age group, the mean HbA1c was 9.4%, whereas in younger children it was 7.9%. Constraints on resources, an insufficient educational system, cultural influences on food consumption, and socioeconomic hurdles are all issues that seem to be plaguing similar regions. Nevertheless, our comprehensive analysis of psychosocial and access barriers goes beyond what has been found in prior research on Iraq.

An illuminating comparison is with nations that have abundant resources. Compared to our rates, the SWEET registry, which included 24,500 pediatric patients from Europe, found much lower rates of DKA (6-8% at diagnosis and 2-4 episodes per 100 patient-years during follow-up, or 28). Our mean teenage HbA1c of 9.4% was much lower than the 7.9% reported in the German-Austrian DPV registry, which included data from more than 30,000 patients [29]. The resources that complete healthcare systems offer, including as universal coverage, routine CGM access, integrated education programs, and multidisciplinary support, are not readily available in Baghdad, so these comparisons need to take that into consideration.

Disparities in access to technology stand out. While 50–65% of patients in various European nations use CGM, just 8% of our patients do so [30]. The results of the Technology and Outcomes in Pediatric Diabetes trial corroborate those of our CGM users, who had a better time-in-range (58% vs. 42%) and a 0.6% lower HbA1c and a 60% reduction in severe hypoglycemia [30]. This inequality in technology reflects a fundamental difference in the ability to provide standard-of-care, which demands the attention of policymakers.

Immediate consequences arise from our observation that inadequate structured schooling is a strong predictor of poor glycemic control (aOR=2.87, p=0.002). The obvious group to target for assistance is the 62% who have not received a full secondary education. Structured education improves quality of life, lowers DKA by 30-50%, and reduces HbA1c by 0.5-1.0%, according to international data [12]. Possible answers include educating current healthcare professionals to teach modified ISPAD programs, organizing group sessions to increase participation, creating Arabic-language instructional resources, and investigating telemedicine options for families living in rural areas.

Interventions should be tailored to adolescents because their chances of poor control are 3.84 times higher. Peer support groups, mental health screening, technology solutions (such as smartphone apps), motivational interviewing (which respects autonomy), and transition programs are all examples of evidence-based approaches [13]. Our findings highlight the pressing need for more psychological care, as only 4.8% of teenagers who matched the criteria for clinically significant distress actually received it.

The significance of monitoring is highlighted by the link between infrequent SMBG and poor control (aOR=3.21). The existing government subsidy of 50 strips per month does not cover the necessary four to six daily tests, which creates a significant obstacle. Policy recommendations include boosting monthly subsidies to 180–200 strips, establishing bulk purchasing agreements, giving high-risk populations priority for CGM, and investigating other funding sources. According to economic studies, there is a positive return on investment (ROI) from supplying enough strips since they reduce the need for expensive DKA hospitalizations [31].

Beyond medical management, family-centered care is necessary since family dysfunction is an independent predictor (aOR=2.42, p=0.020). To put family-centered ideas into action, it is necessary to conduct regular assessments of family functioning, provide dysfunction therapy, educate all relevant family members, resolve specific conflicts, and link families with peer support networks. Randomized trials have shown that family behavioral treatments can reduce HbA1c levels by 0.4-0.8% [32].

Strengths

Possessing a large sample size (n=250) derived from a well-known referral facility ensures adequate power and broad applicability is one of the study's strengths. A comprehensive view that goes beyond simple glucose control is provided by the comprehensive evaluation that includes clinical, biochemical, psychological, and financial aspects. Results are more robust and regional views are provided by meticulous screening for chronic problems and the use of validated, culturally customized tools.

Limitations

Potentially limiting the findings' applicability throughout all of Iraq is the study's singular emphasis on a single facility. An overestimation of control rates of 5-10% could occur if families who are less engaged were accidentally left out of the study because the inclusion criteria only considered patients with two or more visits in the past year. Results are mainly from center-based treatment, although the hospital's large metropolitan catchment area makes them more generalizable.

Future Directions

In the future, researchers should focus on conducting multicenter and longitudinal studies, testing individualized educational treatments, and conducting qualitative investigations into factors that prevent people from receiving the care they need. It is important to do cost-benefit assessments that evaluate both test strips and CGM devices. Improving insulin delivery, standardizing education, expanding access to technology, integrating mental health services, training the staff in pediatric diabetes care, and creating national registries are all important areas of concern.

Conclusion

This research shows that people with type 1 diabetes in Baghdad often experience diabetic ketoacidosis both during diagnosis and follow-up, have less-than-ideal glycemic control, have limited access to cutting-edge diabetes technology, and face substantial economic and social obstacles. Important elements linked to unfavorable results were adolescents, infrequent self-monitoring, an absence of organized schooling, parents with low levels of education, and disruption within the family. Many children still suffer from acute and chronic problems, even when insulin use is high. This highlights the need for more comprehensive care. In order to improve illness management and long-term results in settings with limited resources, our findings highlight the critical need for organized education programs, better monitoring tools, treatments that focus on families, and mental health assistance.

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