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Original Research Article

Medical Challenge: Assessment of the Impact of Transition on Glycemic Balance in Young People with Type 1 Diabetes

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Abstract

The transition from pediatric to adult care is a critical period for young people with type 1 diabetes. In Djibouti, the Young Diabetic Center has implemented a structured therapeutic education program to support this transition. A one-year prospective study of 100 patients aged 16 to 21 evaluated the impact of this process on glycemic control (HbA1c), autonomy, and satisfaction among young adults. The results show a modest but significant improvement in HbA1c after 12 months, despite the persistence of imbalance in nearly half of the participants. Female gender, low autonomy, and insufficient medical follow-up appear to be vulnerability factors. This experience highlights the importance of a coordinated, multidisciplinary, and patient-centered transition.

Keywords: Transition, Type 1 Diabetes, HbA1c, Adolescents, Autonomy, Therapeutic Education.

INTRODUCTION

The transition from pediatric to adult care is a crucial phase in the lives of young people with type 1 diabetes. This period often coincides with major personal changes such as finishing school, starting university, and gradually becoming independent, all of which can influence the management of chronic disease [1–3]. International studies frequently show a deterioration in glycemic control and a decrease in medical follow-up during this phase [1-3]. The perceived disconnect between pediatric and adult care teams exacerbates this risk, highlighting the importance of effective coordination between pediatric and adult care [1, 2]. In this context, support from nursing and educational teams appears to be crucial in promoting self-management and continuity of care [4, 5]. In Djibouti, the Centre Jeune Diabétique (Young Diabetic Center) has developed an integrated approach to therapeutic education. This multidisciplinary unit brings together paramedics, a pediatric endocrinologist, and general practitioners trained in diabetology. Educational workshops cover diabetes management, nutrition, and functional insulin therapy using practical tools (dummy foods, equivalence tables, apps such as Gluci-Chek). These sessions promote autonomy and empowerment among young patients, in line with the American Diabetes Association's recommendations for the transition of adolescents to adult care [8].

MATERIALS AND METHODS

A prospective observational study was conducted over 12 months at the Djibouti Young Diabetic Center. The study population consisted of 100 type 1 diabetic patients aged 16 to 21 years who were in the process of transitioning to adult care or had recently done so.

Inclusion criteria were informed consent and regular follow-up at the center; exclusion criteria were other types of diabetes or severe comorbidities. The variables studied were age, sex, duration of diabetes, insulin regimen, HbA1c at transition (T0) and at 12 months (T12), hospitalizations for complications, autonomy scores, emotional distress score (PAID-T), frequency of medical follow-up, and patient satisfaction. Statistical analyses were performed using JAMOVI software, using Student's t-tests for paired data and logistic regressions.

RESULTS

The profile of participants showed that the average age was 18 years, with a slight predominance of females (54%). All were following a basal-bolus regimen. Nearly 60% had been living with diabetes for

less than five years. Due to difficulties in accessing continuous glucose monitoring devices in Djibouti, glycemic control was assessed primarily on the basis of HbA1c values. In our series, 56 patients had HbA1c levels ≤ 7%, indicating good glycemic control, while 44 were poorly controlled (HbA1c > 7%). Analysis using a paired t-test shows a statistically significant difference between HbA1c levels before and after 12 months of transition. Nevertheless, HbA1c averages remain overall higher than the recommended clinical target of 7%.

Table I: Comparison of HbA1c levels before (T0) and after 12 months (T12): Student's t-test.

Variable	t de Student	ddl	p-valeur
HbA1c pédiatrique (T0)	8.82	99	< .001
HbA1c après 12 mois (T12)	23.69	99	< .001

Gender appears to be a significant predictor of glycemic control at 12 months, after transition. Girls have a higher risk of glycemic imbalance, with an OR of 4.10 (p = 0.038), compared to boys.

Table II: Association between gender and glycemic imbalance.

Prédicteur	Estimation (β)	IC 95%	Erreur standard	Z	p-value	Odds Ratio (OR)
Constante	1.25	[0.611 ; 1.89]	0.327	3.83	< .001	3.50
Sexe	1.41	[0.075 ; 2.74]	0.681	2.07	0.038	4.10

Analysis of factors associated with perceived readiness for transition reveals that emotional distress (measured by the PAID-T score) is not significantly associated with quality of transition readiness (p = 0.196).

Table III: Correlation between emotional stress and transition readiness

Prédicteur	Estimation (β)	Erreur standard	Z	p-value
Ordonnée à l'origine	−0.821	0.362	−2.27	0.023
Score PAID-T adolescents (1 vs 0)	0.570	0.441	1.29	0.196

A significant positive correlation was found between the PAID-T adolescent version score and the psychological assessment at one year using the same questionnaire (r = 0.201; p = 0.045), indicating a certain stability of emotional distress over time.

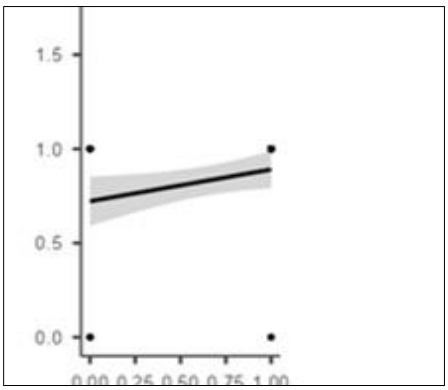

Figure 1: Analysis of the relationship between PAID-T score and psychological well-being at one year.

Autonomy:

The logistic regression model highlights two factors significantly associated with high HbA1c at 12 months: a positive relationship between the patient's level of autonomy (xaxis) and the number of hospitalizations for complications (y-axis); the lower the autonomy (towards 0), the higher the risk of hospitalization.

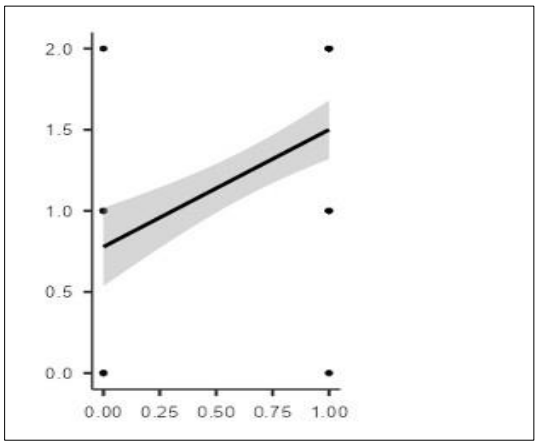

Figure 2: Impact of autonomy on the frequency of hospitalizations for complications.

Medical Follow-Up Showed

A significant positive correlation between the number of followup consultations during the transition period and the score on the perceived readiness for transition questionnaire (r = 0.217; p = 0.030). This suggests that continuity of follow-up reinforces adolescents' sense of readiness.

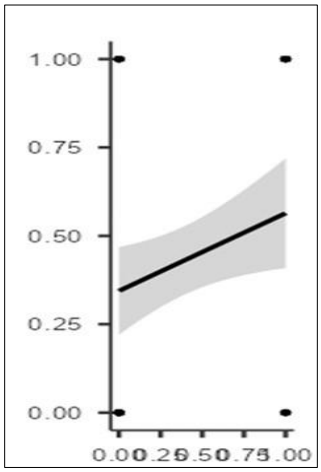

Figure 3: Medical evaluation and transition preparation

DISCUSSION

In our study, the average age of patients was 18, ranging from 16 to 21, which corresponds to data in the literature indicating that the transition to diabetes care generally begins between the ages of 16 and 21. This period is particularly critical from a psychosocial perspective, due to the many changes associated with the end of high school, entry into working life or university, and the quest for independence, all of which can interfere with diabetes management. A slight female predominance was observed, with a sex ratio of 0.85, which is frequently reported in studies of adolescents with type 1 diabetes. This over representation of females may have implications for glycemic control, as discussed below. The majority of patients were from Djibouti City, which may reflect better access to specialized care facilities in the capital, while patients living outside the city, particularly those from Somalia, may encounter greater difficulties in continuing care and regularly attending transition consultations.

All patients were treated with a basal-bolus regimen, the standard therapy for type 1 diabetes, which allows for some flexibility but requires strict self-monitoring of blood glucose levels. Regarding the duration of diabetes, 57% of patients had been diabetic for less than 5 years and 43% for more than 5 years. This distribution may influence glycemic control, since newly diagnosed patients may still benefit from a honeymoon phase, while those with longer standing disease are often more prone to complications or therapeutic fatigue. In terms of glycemic balance, 56 patients had HbA1c ≤ 7%,

while 44 had glycemic imbalance, a proportion comparable to that observed in several international studies, where HbA1c tends to increase during the transition phase [1].

Analysis of changes in glycemic control after 12 months of transition showed a significant improvement in HbA1c, although the overall average remained above the recommended clinical target of 7%. These results confirm that, even when structured, the transition does not always achieve optimal glycemic control. Several studies have highlighted that the posttransition period is often marked by a deterioration in glycemic control, linked to a decrease in the frequency of consultations, still incomplete autonomy in treatment management, and a decrease in parental support [2]. Independent living, higher education, or entering the workforce complicate diabetes self-management. Faced with this reality, many authors advocate for individualized, multidisciplinary transition programs that integrate coordinated medical follow-up, personalized educational support, and psychosocial support tailored to each patient's specific needs [3–6].

In our study, no significant association was observed between the level of emotional stress, as assessed by the PAID-T score, and the perceived quality of preparation for the transition. This result may seem counterintuitive, but the literature shows that the link between emotional stress and preparation for transition is not linear. Some adolescents who are highly involved in their diabetes management report both high stress and a high level of preparedness for transition, suggesting that emotional distress can coexist with strong engagement in care [3]. Other studies indicate that successful transition depends less on emotional stress than on systemic and relational factors, such as the quality of coordination between pediatric and adult teams, the level of autonomy, family support, and nursing care [2-4]. These observations suggest that emotional stress alone is not a reliable indicator of readiness for transition and that a multidimensional assessment incorporating self management skills and social and family support is necessary [7–9].

The chronological age of patients was not found to be a significant predictor of glycemic imbalance at 12 months, in line with the work of Schwartz *et al*., [10], who emphasize that psychosocial maturity, family support, and self-management skills are more decisive than age alone. On the other hand, female gender emerged as a significant risk factor, with an odds ratio of 4.10, consistent with the literature [11, 12]. Adolescent girls have a higher prevalence of anxiety and depression, negative perceptions of the disease, and hormonal variability that can affect glycemic balance. These factors, combined with greater social pressures, make the daily management of diabetes more complex, justifying differentiated care that includes targeted psychological support and appropriate therapeutic education sessions. The number of hospitalizations for complications and the level of perceived autonomy are also associated with high HbA1c, a link that has been confirmed by several studies [2–14], showing that an ill-prepared transition increases the risk of glycemic imbalance and acute decompensation.

Finally, a positive correlation was observed between the number of follow-up consultations during the transition period and the perceived preparedness score, supporting the recommendations international guidelines on the need for a well-structured transition program with regular and adequate follow-up to prepare adolescents for the transition to adult care [15].

CONCLUSION

The transition to adult care remains a major challenge for young people with type 1 diabetes. The study by the Djibouti Young Diabetic Center shows that structured, multidisciplinary support focused on therapeutic education can improve glycemic control and increase autonomy. However, disparities persist according to gender and level of preparation. The implementation of transition programs adapted to the local context, incorporating psychological support and continuity of care, appears essential to ensure a smooth transition during this critical stage.

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