The role of teamwork in achieving good patient outcomes for children with type 1 diabetes

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Article points

1. The multidisciplinary team caring for children with diabetes must have a clear coordinated management plan so that a consistent message is conveyed to the child's family.
2. Setting defined targets that each member of the team is aware of can help to improve outcomes.
3. Good, consistent communication with patients and their families is essential. Repetition of the same message from different members of the team can help instil advice more effectively and result in more consistent care and better glycaemic control.

Key words

- Communication
- Coordinated management plans
- Defined targets
- Glycaemic control
- Multidisciplinary team
- Shared goals

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Intensive insulin therapy requires significant understanding and effort from children with diabetes and their families. A multidisciplinary approach is needed to address all aspects of management and an effective team must have experienced professionals, defined treatment targets, coordinated management plans, and clear communication and consensus between all members. Having a coordinated management plan means that every team member, including the patient and their family, needs to understand the process in order to achieve targets such as normalising blood glucose levels. This article argues that a team that is committed to defined targets and coordinated management plans will be better equipped to help families achieve good glycaemic control and avoid complications.

The aims of paediatric diabetes management are to normalise blood glucose levels (BGL) and help the child in everyday activities. Keeping the child's BGLs in the normal range will prevent hypoglycaemia, ketoacidosis and other complications. Doing this in a way that allows the child to have a normal life and lifestyle requires an experienced paediatric diabetes multidisciplinary team (MDT) (International Diabetes Federation, 2011).

The MDT has been well described (de Beaufort et al, 2012a). The team should include experienced health professionals (such as doctors, paediatric diabetes educators, dietitians, social workers, psychologists and ward staff) and non-health professionals involved with the child (such as the family, teachers and coaches). It is now well recognised that the MDT needs to talk and work together in order to achieve good practice and this can be strengthened by using written protocols, guidelines and targets (Brinks, 2010; Goss et al, 2010).

Common sense would suggest that if centres had experienced MDTs and the same access to treatment regimens, then the outcomes should be the same in all centres. However, the Hvidøre Childhood Diabetes Study Group has shown that this is not the case (Danne et al 2001; Swift et al, 2010; de Beaufort et al, 2012b). These studies found marked differences in patient outcomes (based on HbA_{1c} and incidences of hypoglycaemia) in 21 paediatric diabetes centres that were committed to MDT management across 17 countries. Although socioeconomic status, age, regimen type and other factors have been shown to influence individual outcomes, they have not explained the marked differences between these centres. This suggests that there may be fundamental differences in the approaches taken by the MDTs at the different centres that may account for the varied outcomes.

This is supported by the fact that although the Hvidøre Group recognised an improvement in the average HbA_{1c} from 70 mmol/mol (8.6%) in 1995 to 64 mmol/mol (8.0%) in 2009, this was not associated with changes in insulin regimen such as the introduction of analogue insulins or the use of insulin pumps. Instead "non-medical" variables, including

setting targets and effective communication within families, were strongly associated with good metabolic outcomes (Cameron et al, 2013).

It is important to remember that the families receive their diabetes education and BGL targets from the MDT. A study by the SWEET consortium has shown significant differences in the training of MDTs in Europe, suggesting fundamental differences in approach that may contribute towards the different outcomes. The SWEET consortium has recommended that MDTs have clear leadership, philosophies, policies, procedures and evidence-based targets, while the team members need to have clearly defined roles and consistent training and education (Waldron et al, 2012).

One unit's experience

The John Hunter Children's Hospital Diabetes Unit (JHCH) in New South Wales, Australia has three paediatric endocrinologists, one paediatric diabetes educator, one dietitian and one social worker. It provides care to 550 children with type 1 diabetes (350 children in the outpatient setting and 200 in rural outreach settings). Patients are seen four times a year because of staffing limitations. Before 2004, the majority of children and adolescents were on twice daily insulin therapy and the average clinic HbA_{1c} was 70 mmol/mol (8.6%).

In 2004, following the annual International Society for Pediatric and Adolescent Diabetes (ISPAD) scientific meeting in Singapore, the JHCH team decided that good control was critical and that clinic outcomes needed to be improved urgently. The team held meetings and decided that a multidisciplinary approach with defined treatment targets and coordinated management plans was required to improve patient outcomes. By 2007, all patients were on intensive insulin regimens, the average HbA_{1c} was 62 mmol/mol (7.8%) and severe rates of hypoglycaemia were decreased (consistent with findings from the Hvidøre study [Danne et al, 2001]). This was achieved without increased resources or more staff. In 2013, the average clinic HbA_{1c} had decreased to 56 mmol/mol (7.3%) without increased rates of severe hypoglycaemia.

The "spacing effect" model of education

The "spacing effect" is where people remember and retain facts more consistently when they are repeated a few times spaced over a long time span (spaced presentation) rather than repeated in a short span of time (massed presentation) (see http://en.wikipedia.org/wiki/Spacing_effect [accessed 04.12.13]).

The JHCH began using this concept in diabetes education. All MDT members were involved in development of coordinated management plans. Each team member (within their specialty area) discusses the management plan with the child and family. This means that patients and their families hear the same messages repeated over a longer time span. Hence, the patient and family receives a cohesive and coordinated management plan addressing all aspects of daily diabetes care (*Table 1*).

Role of the multidisciplinary team

In order for an individual and their family to perform the daily tasks that are involved in diabetes care, they must believe that their actions will produce outcomes that outweigh any inconvenience. The primary role of the MDT is to deliver a specifically tailored plan that meets the needs of the individual and their family. For the individual and their family to act on the plan, the MDT must develop and present a plan that is consistent, achievable and believable. If the MDT is to achieve this it must have appropriate team members, defined treatment targets, a coordinated approach and clear channels of communication.

Team members, such as paediatric diabetes educators, dietitians and social workers, need to be appropriately qualified and be specialised in paediatric diabetes (Waldron et al, 2012). The management of paediatric diabetes involves an appreciation of family dynamics, child psychology and the science behind the care of a child with diabetes. Professionals who are not specifically trained in paediatric diabetes may not appreciate the subtleties of these interplays. For example, ward-based paediatric nurses are available to help families while the child is in hospital, but the nurse may have limited experience of children with diabetes and may end up giving them inappropriate or conflicting advice.

At JHCH, the ward paediatric nurses are trained to educate families on some aspects of management, including insulin administration and carbohydrate counting. The nurses are educated on training days and during ward in-services. Only nurses that have had the training are allowed to care for children

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with diabetes and this ensures that the families receive consistent and appropriate education which is invaluable in reinforcing what they have learnt from the team.

Defined treatment targets

The Hvidøre International Study Group demonstrated that the patient's perceived ideal HbA_{1c} closely correlated to their actual HbA_{1c}. Additionally, they showed that a clinic's average HbA_{1c} was lower in centres where the MDT members had agreed on an HbA_{1c} target (Swift et al, 2010). Hence, it is important that teams define their targets.

Defined treatment targets are goals that are clearly stated and agreed to by all members of the management team. Targets cover a range of aspects of management, such as type of regimen to be used, BGL targets, frequency of reviews and dietary

Table 1. An example of how multidisciplinary teamwork is more effective when every member of the team uses the same targets and approaches.

Case background: Megan (12 years old, type 1 diabetes for 3 years, managed with multiple daily injections using insulin aspart and insulin glargine) comes to clinic with her family. She has joined a tennis club and is going to train on Wednesdays and play matches on Saturdays. She wants to know how to manage her diabetes on these days. There are three possible multidisciplinary teams (A, B and C).

	Team A: Members have different targets and approach is not aligned	Team B: Members have the same targets but approach is not aligned	Team C: Members have the same targets and approach is aligned
Doctor	"It is great you are going to play tennis. We want your blood glucose levels (BGLs) to be 3.9–8 mmol/L before, during and after the exercise. Talk to the diabetes educator and dietitian about what to do."	"It is great you are going to play tennis. We want your BGLs to be good before, during and after the exercise. Test regularly during and after exercise. Talk to the diabetes educator and dietitian about what to do."	"It is great you are going to play tennis. We want your BGLs to be 3.9–8 mmol/L before, during and after the exercise. Your BGL will go down during and after playing. You will need to eat carbohydrate (CHO) during exercise, monitor your BGL and you may have to decrease the insulin. Talk to the diabetes educator and dietitian about what to do."
Educator	"This is great. Tennis is fun. The biggest concern is hypoglycaemia. We will aim to have your pre-game BGL over 10 mmol/L (then you won't have to test your BGL). We will decrease your insulin to help prevent hypos."	"We need to get the BGLs to be 3.9–8 mmol/L before playing. We will decrease your aspart insulin before you play and the glargine in the evening."	"It's great you are playing tennis. It is important that your BGLs are 3.9–8 mmol/L. Exercise uses glucose and your BGL will drop during and after. When you play, check your BGL and have 15 g of CHO and do this every 30 minutes. You may have a late hypo so test BGLs overnight. Call me next week."
Dietitian	"High glycaemic index (GI) foods bring the BGL up fast. You should check your BGL regularly while exercising."	"When you play the BGLs should be in the 4–8 mmol/L range. Have high GI food before and during the exercise. Have a low GI snack before bed."	"Wow, it is great you are going to play tennis. Athletes perform better when their BGL is 3.9–8 mmol/L. The body uses glucose rapidly during exercise. Have 15 g of high GI CHO at the start and every 30 minutes after that. Monitor your BGL regularly during and after exercise. You may need to change your insulin dose."
Social worker	"So you are worried about hypos. Tell me how you are feeling about the tennis."	"It is great that you are going to play sport. Tell me what you are thinking about playing tennis."	"Tennis is a lot of fun. It is important that you have extra CHO, test regularly and you may need to decrease your insulin. How do you feel about the tennis?"

principles. When targets are clearly defined it improves the team's ability to develop a coordinated plan (*Box 1*). For instance, if team members do not agree on BGL targets before exercise then divergent advice will be given to families. When MDT members have defined treatment targets the individual and their family will hear the targets regularly. Repetition improves learning and changes beliefs (Cunningham et al, 1984; Foster et al, 2012). When MDT members do not have consistent targets they may inadvertently undermine what other team members are saying (*Table 1*).

Coordinated management plans

Coordinated management plans are required for everyday issues such as approaching exercise, managing hypoglycaemia and sick-day management. Defined treatment targets underpin the development of management plans. For example, if the treatment target was to have BGLs between 3.9–8 mmol/L then this is the target BGL before exercise and directly influences how carbohydrate and insulin are adjusted for activity.

A coordinated management plan occurs when all team members have decided how to approach an issue and each member reinforces the other team members' message. When all team members repeat the same message it results in improved message retention by the family and also gives subconscious validity to the message (Cunningham et al, 1984; Foster et al, 2012). A lack of a coordinated plan causes the family to receive varied recommendations from different team members. The family then have to decide themselves whose advice they will follow.

The family is the critical lynch pin in paediatric diabetes management as they provide the day-to-day care. Hence, it is critical that they and significant others, such as staff at the child's school, are involved in the plan development. Families of children with diabetes are often required to understand quite complex information, so it is important that messages are consistent, repeated and work appropriately for the individual.

Communication

Clear channels of communication are essential for teams to set targets and to establish coordinated management plans. All members must be committed to the targets and management plans. This is essential if the families being seen by the team are to believe in the approaches that are recommended.

JHCH uses a number of communication strategies, including planning days, weekly team meetings, case conferences, clinics, ward rounds and individual discussions. The development of guidelines and education resources (*Box 2*) also ensures continuity, particularly when new staff members join the MDT.

Planning days are used to discuss and determine overall management philosophies and strategies. For example, "we will aim for all BGLs to be in the normal range 80% of the time" and "this will be achieved by use of multiple daily injections and insulin pumps". Weekly meetings are used to discuss approaches to specific issues, such as

Box 1. The John Hunter Children's Hospital approach to intensification of insulin therapy for children with type 1 diabetes (2004 onwards).

Team agreement on intensification

This was achieved by round-table discussions at the annual team planning day.

Team agreement on glycaemic targets

This was achieved by discussions at weekly team meetings. HbA_{1c} target 53 mmol/mol (7%) and blood glucose level (BGLs) 3.9–8 mmol/L at all times.

Implementation of intensification by the team in clinics and on wards

Families were informed (through clinics, update evening, newsletters).

Ward staff were informed and supported (using policies, guidelines, in-services).

Consistent team messages were given to families

Examples:

- Insulin pump therapy or flexible multiple daily injections with pre-meal insulin matched to carbohydrate intake to manage type 1 diabetes.
- BGL targets are 3.9–8 mmol/L at all times.
- A minimum of 4 BGLs per day with two 3 a.m. BGLs per week.
- Routine eating behaviours are important.
- Always bolus before eating (including toddlers).
- No grazing – to ensure an appetite at meal time and to encourage all food boluses to be given.
- Avoid over-treatment of hypoglycaemia.

Team reinforcement of messages

Development of educational materials for families and diabetes healthcare professionals.

Patient education booklet.

Team outcomes

Glycaemic outcomes of all age groups were monitored and published (Anderson, 2009). Current average clinic HbA_{1c} is 56 mmol/mol (7.3%).

Clinic carbohydrate knowledge published (Smart et al, 2010).

Box 2. An example of guidelines authored by all team members and given to families as a laminated A4 sheet.

Ten top tips for a person with diabetes on injections

1. Insulin injections:
- Inject before you eat at breakfast, lunch and dinner with quick-acting insulin.
- Take your long-acting insulin every day.
- Always rotate your injection site.
- Where possible before every meal your blood glucose level (BGL) and bolus dose should be checked by an adult. This is to prevent accidental overdoses or missed doses.

2. Check your BGL at least four times a day and overnight at 2 a.m. at least once a week. Record all results in a diary:
- Aim for BGLs in range 3.9–8 mmol/L.
- If your BGLs are usually over 6 mmol/L, then you may need to increase your insulin.

3. Aim for your HbA_{1c} to be below 53 mmol/mol (7%).

4. If your BGL is over 13 mmol/L at morning tea, afternoon tea and supper then give an injection.

5. Families should share the diabetes load, talk to each other and express their feelings in a positive way.

6. Parents need to remain involved in diabetes care, even for teenagers.

7. Have three nutritious meals each day and if snacks are needed ensure they are small. Exercise daily and limit your "screen time" to less than 2 hours a day.

8. Treat hypos early:
- Check your BGL and treat if less than 3.9 mmol/L or if you feel "hypo".
- Immediately take 125 mL (1 exchange) fruit juice or regular cordial and rest.
- If after 20 minutes you still feel "hypo", retest your BGL and retreat if needed.
- Give glucagon if a person is unable to drink or unconscious.

9. If sick or vomiting:
- Give sips of fruit juice or regular cordial diluted to one quarter of the usual strength.
- Monitor your BGL hourly.
- If your BGL is low OR your vomiting lasts more than 1 hour OR your blood ketones are more than 4 mmol/L OR urine ketones are "high" OR you are worried, contact the diabetes team or hospital.

10. Visit your diabetes doctor every 3 months and at least once a year see your diabetes educator, dietitian and social worker.

whether to use juice rather than jelly beans when a child is recovering from hypoglycaemia. Case conferences are used to discuss how particular problems should be approached. For example, using regular overnight BGL monitoring to help maintain good control and prevent nocturnal hypoglycaemia.

Clinic and ward rounds allow members of the team to see what the other members are saying to patients and how they are addressing issues, and allows team members to clarify how other team members address issues. Resources and guidelines are written to help the team ensure conformity to the team message. For example, "ten top tips" for people on injections (*Box 2*) is used by the MDT as the basis for all advice. This A4 sheet is laminated and given to families to put on their fridge door.

For communication to be effective it is essential that all members of the team are valued and respected equally. This must be perceived not only by the team members but also by the patients and their families. It is a common misconception by families that one particular team member (such as the doctor) has more to contribute than other members. Discussing the roles of each team member in a positive and constructive manner highlights their importance to the family. Emphasis on team management should occur from the first meeting with the family. Families who only listen to the doctor may miss out on the benefits that being treated in a multidisciplinary setting can bring. Part of the doctor's role is to ensure this does not occur.

Conclusion

Members of an MDT must be trained paediatric specialists who communicate regularly to ensure defined treatment targets and coordinated management plans. When MDT members communicate the same messages to patients and families, then the families receive consistent, reinforced and functional messages, which help them achieve glycaemic control and quality of life. ■

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