

Comparison Of Alternating Home Telemedicine Consultations With Regular Face To Face Consultations In Type 1 Diabetes



Replace or Augment ?

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Background

With advancing telecommunication technology improving accessibility to medical services in rural Australia, the possibility exists of telemedicine replacing routine face to face clinical consultation for young people with Type 1 Diabetes (T1DM). A literature review failed to find any research on telemedicine in replacement of face to face consultations for young people with T1DM though some success has been found in a large proportion of adults with T1DM. (1) The use of telemedicine as a supplement to routine visits in a paediatric population with T1DM usually supports an outcome of improved glycaemic control. (2,3,4,5)

The Gippsland Paediatrics Diabetes Team (7) cares for most children and young adults with T1DM in Eastern Victoria. The team currently manages 81 patients in Gippsland, Geelong, and Melbourne with 27 (33%) young adults over 18yrs. The current mean HbA1C is $7.99\% \pm 1.58$ (median 7.6%) with 46% at or under target HbA1c of 7.5%. 85% of patients are managed with insulin pump therapy. The rate of DKA in 2013 was 3.7 per 100 patient years and severe hypoglycaemia 2.4 per 100 patient years.

Gippsland Paediatrics is also very proactive in provision of general paediatric telemedicine services, from clinic to home in distant locations. The author averages over 10 general paediatric telemedicine consultations per week, all being follow up consultations using Skype technology. Virtual paediatric clinics to regional health centres in Orbost (160km), Lakes Entrance (108km) and Bairnsdale (71km) are established and functional. Since 2011 we have increasingly facilitated supplemental consultations for young people with T1DM in distant locations.

Hence enthusiasm developed to explore the possibility of telemedicine replacing regular 3 monthly face to face consultations for patients with T1DM using videoconference to home via Skype or occasionally FaceTime. Some alternative telemedicine models such as linking to distant teams with either Diabetes Nurse Educator (DNE) and/or General Practitioner were limited by lack of paediatric skilled (especially pump trained) DNEs in East Gippsland and logistics of arranging suitable time and training for General Practitioners.

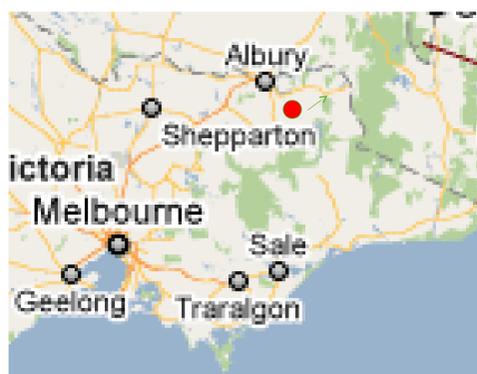


Aim

To examine whether telemedicine consultations can successfully replace or augment regular face to face consultations in young rural patients with T1DM by comparing a model of alternate home videoconference consultations/face to face consultations with regular face to face consultations and by evaluating supplemental consultations performed by videoconference.

Methods

A 12 month non randomized controlled trial was performed in 2013 comprising a cohort of children, adolescents and young adults with T1DM from the immediate local region compared with a similar cohort from a region greater than 70 Km away.



The local (control) cohort continued with 3 monthly face to face appointments as previously established.

The distant cohort (>70km away) had 6 monthly face to face consultations, alternating with 6 monthly formal videoconference consultations to their homes.

Supplemental visits for review of insulin pump settings, continuous glucose monitoring results or to assist compliance or co-morbid conditions were conducted as face to face consultations for the local group and were managed via videoconference in the distant group.

The eligibility criteria for the study were to be a patient of the Gippsland Paediatric Diabetes clinic with Type 1 diabetes for over 1 year.

Outcome was measured by:

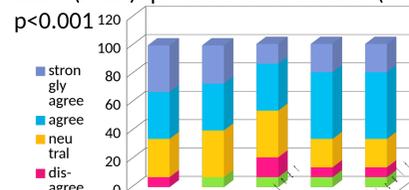
- Comparison of HbA1c between the two groups before, during and after the intervention
- Comparison of missed or rescheduled visits with the previous 12 months
- A patient satisfaction survey completed by the distant cohort examining the logistic issues of telemedicine consultation from the patient perspective
- Review of logistics from the medical team perspective

Results

30 patients (mean age 18.3 ± 5.1 years) in the control group (2012 mean HbA1c $8.4\% \pm 1.4$) were matched with 29 patients (mean age 17.2 ± 5.0 years) in the intervention group (2012 mean HbA1c $8.3\% \pm 1.4$) (NS).

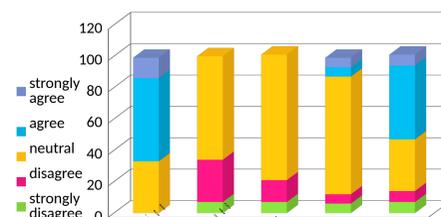
During the intervention period there remained no significant difference in glycaemic control between both groups (control $8.7\% \pm 1.26$, intervention $8.5\% \pm 1.74$). ($p=0.31$) Upon return to regular 3 monthly appointments in 2014, no significant change in HbA1c occurred between groups, with control $8.4\% \pm 1.24$ and intervention $8.6\% \pm 1.96$. ($p=0.63$)

Missed or rescheduled appointments occurred more in the telemedicine group during the study. The control group attended 179 consultations for the year and missed 24 (7%). The telemedicine intervention group attended 167 consultations and missed 47 (28%). $p=0.01$ Compared to 2012, missed appointments increased in 2013 in both local ($n=14$) $p=0.08$ and distant ($n=8$) $p<0.001$



Patient Satisfaction - Logistics

Patient satisfaction was strong for 4 measures of convenience (time of day, home location, accessibility to other parent/partner and time off school/work) but with major inconvenience accessing HbA1c testing. The major disincentive was lack of personal interaction. Most were neutral about ease of discussing difficult issues.



Patient Satisfaction - Quality

The diabetes team noted limited technology to home systems reduced their ability to read patient's and parent's emotions. Some families displayed less commitment to the videoconference appointments.

While patient convenience was improved, the video-consultation model was less convenient for professional co-consultation and team meetings. The team considered the major limiting factor for the home tele-consultation model currently was technical - sound and vision quality, drop out, and internet access which usually is of lesser standard in more remote regions.

Discussion

This is the first study to examine the possible use of replacing face to face consultations with telemedicine consultations in young people with T1DM.

Previous telemedicine studies have examined the effect of increased contact of diabetes team with patient, family or school. (2-6) Glycaemic control generally but not always improves during intense contact using telemedicine, and may deteriorate once intense contact is ceased. (2,8)

Tele-psychiatry has much to offer the remote families but most studies use far superior technology than is currently and freely available to home computer users (9). For adolescents with T1DM receiving behavioural health care via Skype versus in-clinic management, in-person interaction created a more personal patient/provider atmosphere. (10) This is consistent with other research demonstrating that working alliance may be more predictive of outcomes when providing face-to-face care. (10)

For adults, tele-consultation can substitute for a large proportion of in-person specialist consultations for people with diabetes. (1) However our study suggests that for young people with T1DM, home tele-consultation using current technology is inferior to quality face to face consultations though it has real value augmenting regular in person consultations.

Conclusions

➤ Replacing regular face to face consultations with direct home videoconference using current technology should be done with caution.

➤ Home tele-consultations are associated with

- more difficulty accessing HbA1c tests,
- more missed appointments and
- more difficulty reading emotional cues during consultations
- potential inconvenience to diabetes team

➤ Augmenting rather than replacing regular face to face appointments with home telemedicine to discuss dose/ setting adjustment or troubleshooting is valuable and convenient for rural families and young adults with T1DM.

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