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Type 2 diabetes knowledge and self-management

In the fourth of a series of professional education articles based on the results of the *Talking about Health* study, the authors look at how people with type 2 diabetes are self-managing their condition at home.

By Claire Budge and Melanie Taylor

In this article, we use the 2016 (year 1) data from *Talking about Health*, a longitudinal study of people with long-term conditions (LTC) in the Mid-Central region.[1] We aim to:

- Explore the prevalence of type 2 (T2) diabetes and co-morbidities in our sample.
- See how well people with T2 diabetes engage in diabetes-related self-management behaviours and how knowledgeable they are about their own diabetes.
- See how having T2 diabetes relates to ratings of health and quality of life.
- See how well people report self-managing their T2 diabetes and identify what characterises the poorer self-managers.
- Share some diabetes-related advice people offered.

Measurement

Study participants were asked to self-identify whether they had diabetes as an LTC on the initial consent form. General health (GH: single item with poor/fair/good/very good/excellent response options), physical health (PH: four-item scale) and mental health (MH: four-item scale) were measured using the PROMIS Global SF.[2] The effect of LTC/s on quality of life was measured with a single question rated on a scale from 0 (no effect) to 10 (very large effect). A set of questions requiring yes/no responses was used to assess diabetes self-knowledge and management behaviours. In addition, a rating of how well people considered themselves to be managing their diabetes at home overall, using a scale from 0 (not at all well) to 10 (extremely well), was included. We also asked people to rate their "satisfaction with life as a whole" on a 0 to 10 scale ("completely dissatisfied" to "completely satisfied") and their "control over how life turns out" on a 0 to 10 scale ("no control at all" to "complete control"). A healthy behaviours scale was calculated based on the averaged responses to questions about how many days a week people ate a balanced diet, ate too many fatty and sugary foods (both reverse-coded), did gentle exercise, took medication as advised and planned nice things to look forward to.

Results

Prevalence and co-morbidity

Two hundred and seventy six people (48.5 per cent) indicated they had diabetes. As the experiences of those with type-1 are quite different from those with T2, this article focuses on the 252 individuals (91.3 per cent) with T2. The presence of other conditions (co-morbidities) was high: only 24 people (9.5 per cent) had diabetes only; the rest had at least one other LTC. For example, 61.9

per cent had hypertension, 59.9 per cent had chronic pain, 29.4 per cent had a respiratory condition and 19.8 per cent had anxiety or depression related to having an LTC. The number of people having between two and four additional co-morbidities was 64.7 per cent.

Diabetes self-management behaviours and knowledge

Responses to diabetes knowledge and self-management questions are provided in Table 1 (right). Note that the number of responses to each question (N) varies, depending on whether or not the question was applicable and was answered. For example, everyone could potentially test their own glucose levels, so the N is the whole sample (N=252) minus the seven who missed the question out, leaving an N of 245. In another example, only 106 people both used insulin and answered the question about using it as advised, and 95 of them (89.6 per cent, 95/106) said they did. Thus the percentages have been calculated taking into account the number of possible and actual responses.

From Table 1, we can see that about three-quarters of the people with T2 diabetes indicated that they test their blood glucose levels (BGLs) at home. Of these, the majority (around 80 per cent) keep a record and take their records to show a doctor or nurse. A similar number reported understanding what their BGLs mean and slightly more (86.6 per cent) knew what their BG targets were. The frequency with which people test (see Figure 1, p22) is quite varied, with the largest subset (37.1 per cent) stating they test two to four times daily. This group included 45.7 per cent of those using insulin, but also included 13.2 per cent of those not using insulin. More than half (57.3 per cent) tested their BGLs at least once a day.

Fewer than half (42.5 per cent) of the people with T2 diabetes indicated they knew what their target HbA1c (glycated haemoglobin) was. However, despite indicating they knew, some of the reported target levels were clearly not right. This suggests a need for further education and, given the technicality of the term and what it represents, may highlight a health literacy issue.

Under half (43.3 per cent) the participants with T2 diabetes used insulin and most of them (89.6 per cent) said they used it as advised. In comparison with those indicating they did use their insulin as advised, the group who said they did not were more likely to be older, male, less educated and have only just enough income for everyday needs. Just over a third (38.4 per cent) of those using insulin titrated their own doses; BGLs were most commonly used to guide adjustments, followed by activity levels and finally carbohydrate intake. Overall, 15 (39.5 per cent) of the people who titrate insulin reported taking all three factors into consideration when adjusting their doses.

A concerning finding was that six participants were taking insulin but not testing their own BGLs and three of these reported adjusting their own

Table 1. Diabetes knowledge and self-management behaviours expressed as frequency of positive responses for people with T2 diabetes

Behaviour	N	'Yes' frequency (%)
Test own blood glucose levels	245	180 (73.5)
Keep a record of BGLs	178	146 (82.0)
Take record of BGLs to health appointments	146	117 (80.1)
Check feet regularly	243	161 (66.3)
Take tablets as advised	190	183 (96.3)
Use insulin as advised	106	95 (89.6)
Adjust own insulin doses	99	38 (38.4)
Think about BGLs when adjusting insulin	38	34 (89.5)
Think about activity when adjusting insulin	38	20 (52.6)
Think about carbohydrate intake when adjusting insulin	38	19 (50.0)
Knowledge	**N**	**'Yes' frequency (%)**
Know target BGLs	186	161 (86.6)
Know target HbA1c	226	96 (42.5)
Understand what BGLs mean	237	192 (81.0)
Know when to seek help based on BGLs	186	161 (86.6)
Understand how tablets work	183	141 (77.0)

insulin doses. Of the 190 people taking oral hypoglycaemic medication for their diabetes, 96.3 per cent indicated they took their tablets as advised and 77 per cent said they understood how they worked. Although it is recommended that people with diabetes check their feet on a daily basis,[3] only two thirds of the participants with diabetes said they checked their feet regularly.

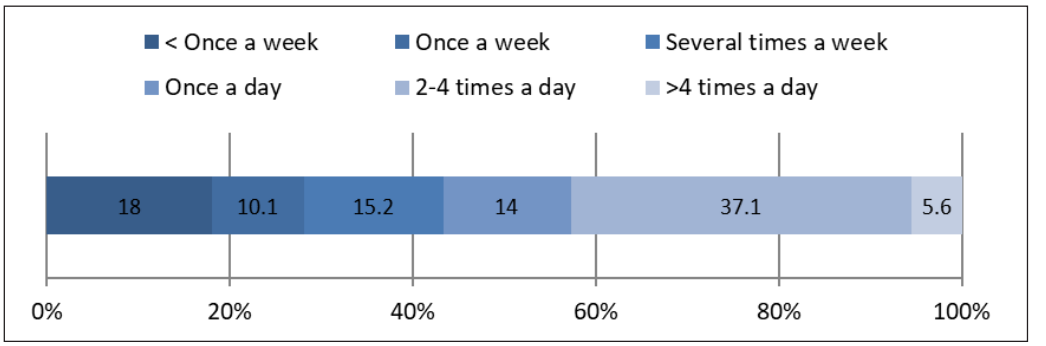

Figure 1. Frequency of blood glucose testing for people with T2 diabetes

Diabetes, health and quality of life

To look at the way having diabetes relates to self-reported health and quality of life, we compared those with T2 diabetes to those without diabetes (see Figure 2, below).

Most of these differences in mean scores were small, but the message is a consistent one: that, on average, people with T2 diabetes reported slightly less good quality of life and health than people without diabetes.

Diabetes self-management (DSM)

Self-reported ratings of how well people were managing their diabetes at home ranged from 0 (not at all well) to 10 (extremely well) (Mean=7.5, mode=8). Pearson's correlations found that self-management scores were positively associated with general health (r=.21), physical health (r=.20), mental health (r=.23), life satisfaction (r=.29), control over life (r=.21) and healthy behaviours (r=.40). The moderate-strength correlation between self-reported self-management and healthy behaviours suggests that people who rate themselves highly on managing their diabetes are also better at eating healthily, exercising and planning positive things to do on a regular basis.

There were 22 people who scored less than 5 on DSM at home. By exploring various characteristics, we found this group consisted of more women than men, who were predominantly New Zealand European (90.9 per cent) and two-thirds were aged less than 65 years. Just over half had no school qualifications (52.4 per cent) and most lived with others. Their mean healthy behaviours score was 4.1, which was notably lower than that of those scoring 5 or more on DSM (M=4.9). The majority had consulted a GP during the last year (90.5 per cent) and most had consulted a practice nurse (66.7 per cent). Fewer than half had seen a specialist nurse/nurse practitioner (42.9 per cent) or an LTC nurse in general practice (28.6 per cent). Only a few of this group (19.0 per cent) indicated they had a written care plan, compared to 25.7 per cent of those with a DSM score of 5 or more. Also, fewer of those with lower DSM scores reported having practitioner support for their health goals (36.8 per cent vs 61.7 per cent).

Advice to others

A number of participants provided diabetes-related advice for other people and a selection of quotes is provided on p23 (opposite).

Discussion

We found the level of engagement in diabetes self-management to be quite variable, but most people reported taking oral medication and using insulin as advised. Three-quarters were testing their BGLs at home, with the majority of those on insulin, and 13.2 per cent of

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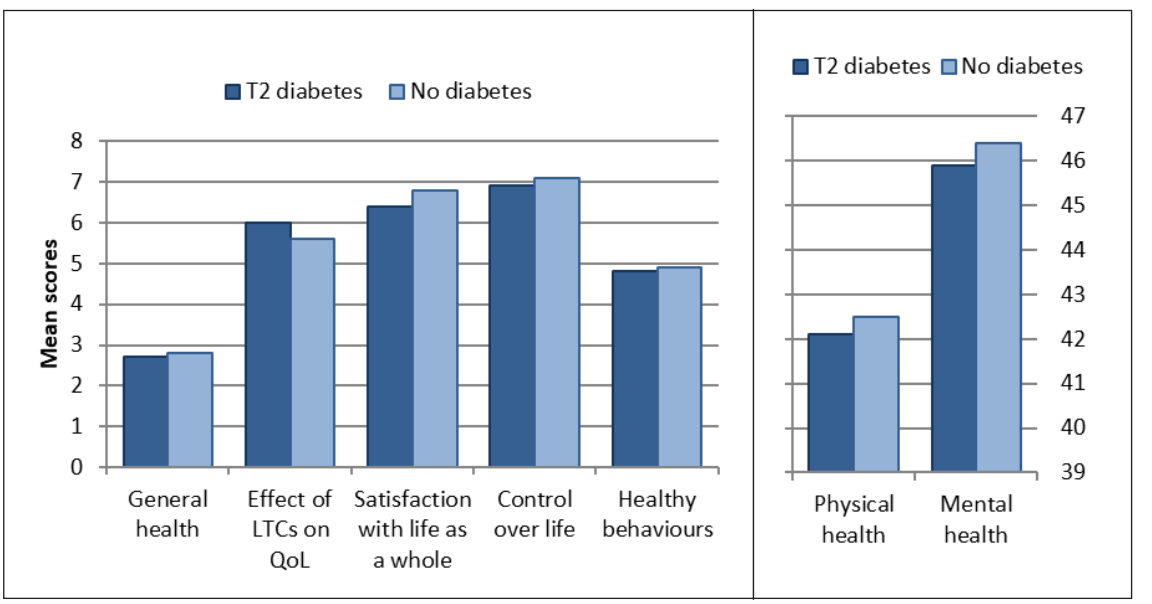

Figure 2. Mean score comparisons for people with and without type 2 diabetes on self-reported health and quality of life variables.

Key points

- ALMOST half the *Talking about Health* participants had diabetes and 90 per cent had at least one other LTC; 19.8 per cent had anxiety or depression related to having an LTC.
- THOSE with T2 diabetes reported slightly poorer quality of life and health.
- AROUND three-quarters of those with T2 diabetes tested their blood glucose levels at home, 37 per cent testing two to four times a day. This number included more of those on insulin than those not. However, almost 15 per cent did not know what their target levels were.
- FORTY-THREE per cent of the people with T2 diabetes were using insulin, but 10 per cent of these said they were not taking it as advised.
- THIRTY-EIGHT per cent of the people using insulin titrated their own doses; 40 per cent of them taking into account their BGLs, activity and carbohydrate intake to do so.
- FEWER than half the people with T2 diabetes indicated they knew their target HbA1c.
- MOST people felt they were managing their diabetes fairly well at home (7.5 out of 10 on average).
- WOMEN, people with limited education and people with less income to meet their everyday needs were over-represented in the group, indicating they were not self-managing well at home (DSM score of <5 out of 10).

- HIGHER self-management scores were weakly associated with health and quality of life, but more strongly associated with healthy behaviours such as eating well (including plenty of fruit and vegetables), not eating too much fatty and sugary food, exercising regularly and planning positive things to do.

'If you are told to exercise, exercise!'

'Go and see your doctor every three months, whether he/she wants to see you or not'

'I write my blood testing results down in a book, then I know where it is'

'I have to self-manage because who else is going to do it?'

ADVICE FROM STUDY PARTICIPANTS

'If your condition requires daily changes or attention, have a place in your house where you can keep all of the items required for treatment together. Then you can set out a workplace and not have to hunt for things'

'When dealing with busy medical folk, ensure that they fully understand all of your symptoms and problems'

'It is also necessary to work hard on motivating oneself, especially on days when blood-sugar levels are erratic'

'Get into the habit of testing your blood sugars from the start!'

'Look after what you eat and take medication in time'

Practice points

- HEALTH literacy should always be considered when supporting people to self-manage any LTC. Diabetes in particular presents a multitude of self-management challenges requiring good understanding and confidence. As a starting point, the Health Quality & Safety Commission has produced a guide for health professionals, *Three steps to better health literacy.*[7]
- ASKING people to rate how well they think they are managing their diabetes at home could lead into useful discussions on what they were thinking about when making the rating. A lack of understanding of the condition and necessary treatment combined with the costs associated with self-management (eg eating healthily, attending a gym/swimming pool, diabetes consumables) could be prohibitive, leading to poorer self-management.
- PEOPLE with a lower level of education are likely to need simpler and more prescriptive advice than those with a higher level of education.
- IT would be worth talking to people who are testing their BGLs at home to be sure they know why they are testing, and to understand their readings and the targets they are aiming for. Use of a monitoring diary, which could have targets for specific times of day added by a doctor/nurse, might help with tracking and interpreting BG results.
- ENCOURAGING people to bring their test meters to appointments can help you (a) know they are copying their readings across accurately, (b) check their recent readings if they are not using a log book, and (c) check meters are working (and being used) properly.
- NOT everyone on insulin was using it as advised and a few people were not testing their BGLs at home, some of whom said they were adjusting their own insulin doses. It is important to check that people understand the importance of BG testing when taking insulin – particularly if they are adjusting their own dose rates.
- SELF-MANAGEMENT courses for people with diabetes are provided through primary health organisations, district health boards and community organisations such as Diabetes NZ, Diabetes Trust and Diabetes Auckland.
- THE Health Navigator site (healthnavigator.org.nz) provides diabetes information on topics including driving, diabetes in pregnancy, diabetes complications and sick day planning, as well as useful diabetes apps.

those not on insulin, testing more than once a day.

There was evidence that some people are testing their BGLs at home without knowing their targets, which raises questions about their understanding of why they are testing and what they do with the results. It also suggests a need for self-management support in this area. Fisher and colleagues note the importance of individualising the frequency and timing of testing to best inform both patient and practitioner and to encourage self-efficacy.[4]

However, the health literacy levels of people with diabetes also need to be understood and accommodated. A study of people with non-insulin-treated T2 diabetes found that people with limited health literacy had poorer glycaemic control than those with adequate health literacy, despite BGL testing more regularly. This suggests that they may be following advice to test daily without understanding their results or knowing how to translate the findings into appropriate action. Reasons provided for not engaging in daily BGL testing were: not having been advised to; the cost; the pain associated with testing; and not understanding the importance of testing.[5]

A qualitative study of people with T2 diabetes found that although participants all felt responsible for self-management, those with a lower educational level wanted to follow instructions, whereas those with higher education were more inclined to make their own rules for daily management.[6] •

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References

1) Taylor, M., & Budge, C. (2020). Talking about Health: Study overview and self-care challenges experienced by people with long-term conditions. *Kai Tiaki Nursing New Zealand, 26*(2), 20-23.
2) Hays, R. D., Bjorner, J., Revicki, D. A., Spritzer, K. L., & Cella, D. (2009). Development of physical and mental health summary scores from the patient-reported outcomes measurement information system (PROMIS) global items. *Quality of Life Research, 18*(7), 873-80.
3) Diabetes New Zealand. (n.d.). *Feet.* Retrieved from www.diabetes.org.nz/complication-feet
4) Fisher, W. A., Cornman D. H., Kohut, T., Schachner, H., & Stenger, P. (2013). What primary care providers can do to address barriers to self-monitoring of blood glucose. *Clinical Diabetes, 31*(1), 34-42. https://doi.org/10.2337/diaclin.31.1.34
5) Alvarez, P. M., Young, L. A., Mitchell, M., Blakeney, T. G., Buse, J. B., Vu, M. B., . . . Donahue, K. E. (2018). Health literacy, glycemic control, and physician-advised glucose self-monitoring use in type 2 diabetes. *Diabetes Spectrum, 31*(4), 344-347. https://doi.org/10.2337/ds17-0064
6) Fink, A., Fach, E-M., & Schröder, S. L. (2019). 'Learning to shape life' – a qualitative study on the challenges posed by a diagnosis of diabetes mellitus type 2. *International Journal for Equity in Health, 18,* 19.
7) Health Quality & Safety Commission. (2014). *Three steps to better health literacy: A guide for health professionals.* Retrieved from www.hqsc.govt.nz/assets/Consumer-Engagement/Resources/health-literacy-booklet-3-steps-Dec-2014.pdf