Knowledge and awareness of type 1 diabetes among primary school initial teacher trainees

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Article points

1. An online questionnaire to assess knowledge of type 1 diabetes was developed and administered to 39 trainee teachers.

2. Only seven participants were deemed to have "satisfactory" awareness and knowledge. Knowing someone with diabetes, receiving previous training/information on diabetes and studying science were associated with higher knowledge scores.

3. It is suggested that basic awareness training should be delivered whilst teachers are at university or even secondary school, with further training for those who are actually teaching young people with diabetes.

Key words

- Education
- Schools
- Teacher training
- Type 1 diabetes

Authors

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New guidelines state that all school staff involved in the care of children and young people with diabetes need to receive training to do so. However, trainee teachers are unlikely to receive this education before they have qualified, even though they may have to support these children while on placement. These authors have developed a questionnaire to assess trainee teachers' knowledge of type 1 diabetes and its management. Applying the questionnaire to three cohorts of trainee teachers revealed inadequate knowledge. Education about diabetes should form part of initial teacher training or even part of secondary education. The questionnaire could also be used to evaluate the effects of diabetes training.

Type 1 diabetes is one of the most common chronic conditions that can develop in childhood. The UK has the fifth highest incidence of type 1 diabetes among children in the world, with 24.5 cases per 100 000 children, or one child per 16–17 classes (based on a maximum class size of 30; Diabetes UK, 2013). With children spending most of their day in school, it is essential that all aspects of type 1 diabetes management can take place there (Boden et al, 2012). Modern insulin regimens can be complex and challenging for children, meaning they often require support from teachers and other school staff (Driscoll et al, 2015). For example, 68% of primary school children report needing assistance with insulin injections (Diabetes UK, 2009). Poor glycaemic control is associated with life-threatening acute and chronic complications, as well as potentially impacting negatively on a child's academic achievement, in terms of both cognitive function and ability to engage in learning processes (Cooper et al, 2016; Semenkovich et al, 2016).

After a series of campaigns about the care received in schools by children with long-term medical conditions, new guidelines have made this training statutory for all school staff caring for young people with diabetes (Department for Education, 2014). To support this, a number of diabetes organisations, including JDRF (2015) and Diabetes UK (2016), have launched support materials for schools, families and teachers. However, there are a limited number of contemporary survey tools available to assess knowledge of diabetes and its management in young people in schools.

The availability and content of type 1 diabetes training for teachers has varied across the UK (Diabetes UK, 2008). As a minimum, a paediatric DSN should visit the school immediately after a child is diagnosed with type 1 diabetes and provide training to the child's teacher and key worker (Boden et al, 2012). However, focussing on training staff in schools arguably fails to cater to the period where most of teacher education occurs: Initial Teacher Training, which includes long periods of teaching practice, during which trainees may have to support young people with diabetes in the classroom.

The aim of this study was to adapt previously published questionnaire tools to bring them into line with current practice standards, and then to use these to assess the knowledge and awareness of trainee teachers. To the authors' knowledge, this is the first study of its type.

Materials

An online, cross-sectional survey using the Bristol Online Surveys tool (University of Bristol) was undertaken in three cohorts of trainee primary school teachers from three universities within the Midlands. Questions on trainees' knowledge were adapted from the updated questionnaire of Bradbury and Smith (1983). A list of myths and facts about type 1 diabetes from the JDRF website was used to provide ideas for questions on awareness. The survey consisted of 21 questions

and was tested for content and case validity by specialist dietitians working within the East Midlands. Questions were split into three sections – the first asked about demographic information and any previous type 1 diabetes information or training received (five questions), the second asked about type 1 diabetes awareness (five questions) and the third asked about type 1 diabetes knowledge (11 questions). A copy of the questionnaire is included in *Figure 1*.

A non-random, convenience sample of third-year students studying primary education degrees leading to Qualified Teacher Status were selected. This cohort was selected as they were likely to have been on a classroom placement. Invitations to participate were distributed by course leaders on each programme. The survey was open for 7 weeks in autumn 2014. Permission was obtained via email

Page points

1. A survey was set up using the Bristol Online Surveys tool to assess participants' awareness of and knowledge about type 1 diabetes.

2. Participants comprised third-year students studying primary education degrees.

3. Questionnaires were scored according to the number of correct answers, with a maximum score of 28.

Figure 1. Reproduction of the online questionnaire given to trainee primary school teachers.

from the course leaders to allow their students to take part in the research. Ethical approval was granted by the School of Biosciences research ethics committee at the University of Nottingham.

Scoring was based on the number of correct answers. If "unsure" was entered, this was considered unsafe and awarded a zero. A total score out of 28 was calculated. It was decided that participants had "satisfactory" awareness and knowledge if they scored a total of 75% or more correct answers (21–28 points), based on studies by Ludvigsson (1977) and Bradbury and Smith (1983).

All data analysis was conducted using SPSS version 22 (IBM Corporation, New York, NY, USA). Data were assessed for normality using the Shapiro–Wilk test, and appropriate unpaired inferential tests were applied. Categorical data were analysed using cross-tabulation using Cramér's V to assess significance. A P-value of ≤0.05 was considered statistically significant. Cronbach's alpha was calculated to test internal consistency.

Results

A total of 351 students were invited to participate, and a total of 42 responses were received, a response rate of 12%. Three responses were excluded owing to completion errors. Respondents had a median age of 21 years (range, 19–49 years). All had spent some time in schools on placement, for a mean of 20.6 weeks (range, 10–28 weeks). Eight participants (20.5%) reported that they had received previous information or training about diabetes. Among these, the sources of information or training were family members with the condition for three students, health professionals for two, placement for one and school/college for two. Over half of the respondents (n=20) reported that they knew someone with type 1 diabetes.

Questionnaire scores were found to be normally distributed, with a mean score of 16.9±5.2, equivalent to 60%. Only seven participants (18%) had "satisfactory" awareness and knowledge. Those who had received type 1 diabetes information or training scored a mean of 21.4±4.0 compared with 15.8±4.9 in those who had not received any training (P=0.05 for comparison). Analysing awareness and knowledge scores separately, those with previous type 1 diabetes training had a significantly higher awareness score (8.4±1.3) than those without (5.9±2.0; P=0.002). However, previous training had no significant effect on knowledge scores (P=0.20). Knowing someone with type 1 diabetes was associated with a significantly higher mean score (19.5±4.2) compared with those who did not know someone with the condition (14.2±5.1; P=0.002).

Studying science to a higher level was found to be associated with a significantly higher total score (P=0.004; *Figure 2*). *Post hoc* analysis showed there was a significant difference in mean scores between those who attained a science GCSE or equivalent and those who attained an AS or A-Level or equivalent (P=0.017). Analysis of individual science subjects showed that the difference was mostly driven by the level of chemistry studied (*Figure 3*), with a significant
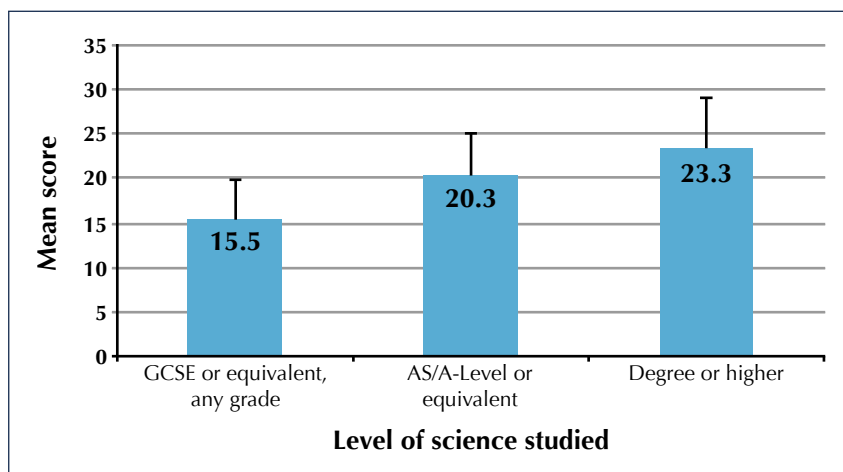

Figure 2. Mean scores of knowledge and awareness of type 1 diabetes by level of science studied.
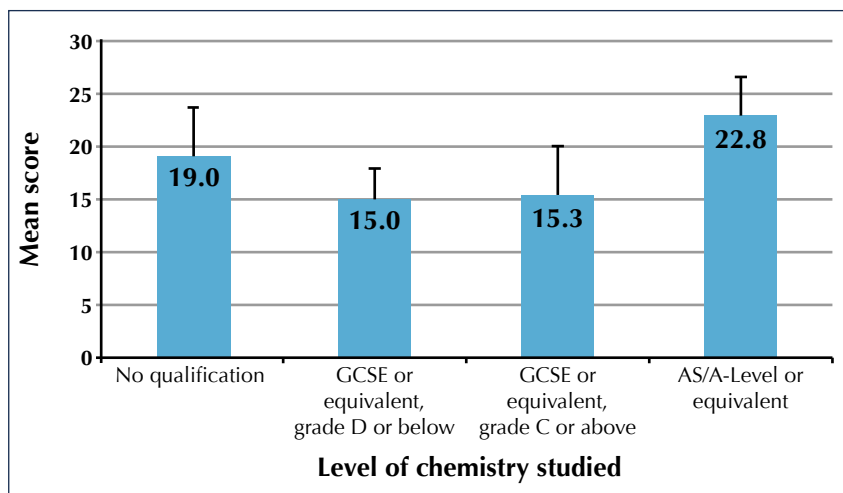

Figure 3. Mean scores of knowledge and awareness of type 1 diabetes by level of chemistry studied.

association between the number of correct answers and the level of education attained in chemistry (chi-squared=102.1, df=3; *P*=0.005]. *Post hoc* tests showed there was a significant difference in mean scores between those with a chemistry AS/A-Level or equivalent and those with a grade D or less in chemistry GCSE or equivalent (*P*=0.041).

The majority of participants (87%) reported that it would be useful to receive more information on supporting children with type 1 diabetes in schools, with most stating they would like to receive information both while at university and once qualified. Cronbach's alpha was 0.618 for the knowledge and awareness questions (questions 6–20), which suggests the study may have had a low internal consistency. Removing question six (True or false? Type 1 diabetes is caused by eating too much sugar) increased Cronbach's alpha to 0.625. Removing other questions did not increase Cronbach's alpha.

Discussion

This study represents the first investigation into initial teacher trainees' knowledge and awareness of diabetes. We have also developed a contemporary questionnaire tool to assess this. The results highlight that, even at a very early stage in their careers, one in 10 of the survey respondents had already taught a young person with diabetes. However, only one in five of the cohort had received training, with much of this being informal and frequently from people they knew who were living with diabetes. Overall knowledge and awareness was poor, with only 18% of respondents achieving a "satisfactory" score of ≥75%. This suggests that trainee teachers have slightly worse scores than have been reported in qualified teachers, in whom 25% of participants scored ≥75%, implying a potential effect of experience (Bradbury and Smith, 1983).

The addition of the recent obligation on school governors to train staff about supporting the young people with long-term conditions in their care highlights the need for training, not just for those in the classroom but also for those who are preparing to start teaching. This support is essential to help ensure that all young people with long-term medical conditions, including type 1 diabetes, are properly supported in school

to reach their full academic potential and remain healthy (Department for Education, 2014). In our study, there were only eight participants (20.5%) who reported that they had received information or training on type 1 diabetes, and this was associated with improved overall knowledge and awareness. These findings suggest that this survey could be useful in assessing the training of both teachers and trainees with respect to diabetes. The introduction of the obligation to train school staff has been supported by diabetes associations and charities, including Diabetes UK and JDRF. Along with support materials and training packages, Diabetes UK has developed a recognition scheme for schools. Additionally, NICE (2015) guidance has recently been updated to reflect the need to provide education and support to teachers and school staff.

Having personal experience of people with diabetes was associated with an improved knowledge and awareness score, and it may have also been linked to receiving training, with three respondents reporting that their families were a source of their training. Twenty participants (51%) reported knowing someone with type 1 diabetes. This concurred with the findings of earlier studies of qualified teachers (Bradbury and Smith, 1983; Warne, 1988; Rowe, 2012). Although training appeared to improve scores overall, it did not significantly improve knowledge scores, suggesting that more robust and standardised training may be required.

Knowledge and awareness of diabetes appeared to be strongly linked to having studied science, and especially chemistry, to AS-Level or beyond. This was partially in agreement with previous work (Bradbury and Smith, 1983; Rowe, 2012). However, unlike in surveys of qualified teachers, studying physical education did not seem to be linked to better knowledge of diabetes. This could imply that knowledge and awareness can be raised theoretically in scientific teaching, but that experience from working as a teacher may have been the factor in improving knowledge of qualified teachers of sport and physical education in the previously published literature.

In common with previous work, a strong demand (87% of respondents) for further training was apparent. This interest is in line with previous

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"Trainee teachers maybe already have contact with young people with diabetes in their classrooms; however, most do not appear to have an appropriate level of awareness and knowledge to provide effective support."

calls by paediatric DSNs to provide yearly training in schools for teachers of children with type 1 diabetes, in addition to training immediately after a child is diagnosed (Halpern and Agwu, 2009; MacMillan et al, 2015). However, this approach may miss trainee teachers and changes to school staff; therefore, training to improve awareness of chronic conditions in schools perhaps should be included at university.

An important consideration is that many schools will have times when there are no young people with diabetes on the school roll (Boden et al, 2012). Therefore, rather than educating all trainee teachers in the management aspects of type 1 diabetes, it may be more worthwhile to train them in type 1 diabetes awareness, such as identification of the symptoms of type 1 diabetes. Our study provides evidence that information or training significantly increases awareness, and providing this information or training across the UK could have many benefits in terms of identifying the condition as early as possible.

The effectiveness of any type 1 diabetes training that does take place is often either inadequately assessed or not evaluated at all (Boden et al, 2012). Evaluation is an essential aspect of training to enable improvements to be made. This study has produced an up-to-date tool to assess type 1 diabetes awareness and knowledge, which can be used to evaluate training. It is recommended that type 1 diabetes training evaluation takes place yearly (Department for Education, 2014). In our study, the questionnaire was used to assess awareness and knowledge of trainee teachers, but it could potentially also be used with qualified teachers.

The findings of this study should be considered with caution, as the sample was relatively small. Future studies could consider ways to improve the response rate; for example, also including a paper version of the survey with pre-paid addressed envelopes or, ethics permitting, offering incentives to take part.

Furthermore, respondents in our study may have self-selected for a greater interest in diabetes. This could be reflected by the slightly higher than expected number of respondents who either reported knowing someone with type 1 diabetes or who had taught a young person with the condition.

This bias could have been partially resolved by interviewing the participants; however, this was not possible owing to the availability of students and their placement commitments.

Conclusion

Trainee teachers may already have contact with young people with diabetes in their classrooms; however, most do not appear to have an appropriate level of awareness and knowledge to provide effective support. Awareness training should be delivered to trainee teachers, with additional education delivered should they be required to teach young people with diabetes. Awareness training should be delivered whilst they are at university or even, perhaps, within a secondary school curriculum. ∎

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