Peer support for patients with type 2 diabetes: cluster randomised controlled trial

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ABSTRACT
Objective To test the effectiveness of peer support for patients with type 2 diabetes.
Design Cluster randomised controlled.
Setting 20 general practices in the east of the Republic of Ireland.
Participants 395 patients (192 in intervention group, 203 in control group) and 29 peer supporters with type 2 diabetes.
Intervention All practices introduced a standardised diabetes care system. The peer support intervention ran over a two year period and contained four elements: the recruitment and training of peer supporters, nine group meetings led by peer supporters in participant’s own general practice, and a retention plan for the peer supporters.
Main outcome measures HbA1c; cholesterol concentration; systolic blood pressure; and wellbeing score.
Results There was no difference between intervention and control patients at baseline. All practices and 85% (337) of patients were followed up. At two year follow-up, there were no significant differences in HbA1c (mean difference −0.08%, 95% confidence interval −0.35% to 0.18%), systolic blood pressure (−3.9 mm Hg, −8.9 to 1.1 mm Hg), total cholesterol concentration (−0.03 mmol/L, −0.28 to 0.22 mmol/L), or wellbeing scores (−0.7, −2.3 to 0.8). While there was a trend towards decreases in the proportion of patients with poorly controlled risk factors at follow-up, particularly for systolic blood pressure (52% (87/166) >130 mm Hg in intervention v 61% (103/169) >130 mm Hg in control), these changes were not significant. The process evaluation indicated that the intervention was generally delivered as intended, though 18% (35) of patients in the intervention group never attended any group meetings.
Conclusions A group based peer support intervention is feasible in general practice settings, but the intervention was not effective when targeted at all patients with type 2 diabetes. While there was a trend towards improvements of clinical outcomes, the results do not support the widespread adoption of peer support.
Trial registration Current Controlled Trials ISRCTN42541690.

INTRODUCTION
There has been an increasing focus on involvement of patients in chronic disease care, and the World Health Organization’s action plan for chronic disease management encourages governments to take action to help people manage their own chronic conditions better by providing education, incentives, and tools for self management and care.1 Type 2 diabetes is a chronic disease that is rising in prevalence across the world and placing increasing demands on healthcare systems. WHO has suggested that peer support is a promising approach for diabetes care as it harnesses the ability of patients with diabetes to support each other in managing their everyday lives.2 Peer support has been defined as the provision of support from an individual with experiential knowledge based on a sharing of similar life experiences.3 It is usually provided within a volunteering framework and can be delivered in many ways, including group or individual support or through more remote formats such as telephone or internet based support.

Peer support has been used in various conditions with varied results,4−10 but there is limited evidence to support its effectiveness, particularly for people with type 2 diabetes. There is also substantial variation in the degree of training and level of involvement of the peer supporters or community health workers in these studies, with many having a predominantly educational focus and peer groups being facilitated by health professionals rather than peers themselves.10

We report the results of a pragmatic cluster randomised controlled trial examining the effectiveness of peer support in improving biophysical and psychosocial outcomes for people with type 2 diabetes. The intervention was based on social support theory and was delivered in groups based in the general practices of participating patients.

METHODS
The methods and intervention development have been reported in detail previously.11 12 In brief, this was a cluster randomised controlled trial set in general practices in the Republic of Ireland. Diabetes care in Ireland has generally been unstructured, with more
The peer support intervention had the following components:

Peer supporters

Peer supporters were identified by general practitioners and practice nurses and were trained at a ratio of about one peer supporter to seven or eight patients with type 2 diabetes. The criteria for eligibility were:

- Having had type 2 diabetes for at least one year
- Participation in preventive treatments and judged by the practice team as being generally adherent to treatment and behaviour change regimens
- Capacity and commitment to undergo the training required
- A full understanding of the importance of patients’ confidentiality
- Undertaking to liaise with the practice nurse or general practitioner if unanticipated problems arose during the course of their peer support activity

Peer support training

The peer supporters attended two evening training sessions, which were conducted by the research team. These sessions focused on the basics of type 2 diabetes and issues relating to working with groups and confidentiality.

Peer support meetings

Peer support meetings were held in the general practice premises at a convenient time for practice staff, peer supporters, and participants. Practices offered various daytime or early evening sessions, depending on patients’ preference. There were nine peer support sessions over two years; at month one, month two, and every three months thereafter. Each meeting was facilitated by the peer supporter, and there were no health professionals present in the meeting room though they were available on site, if needed. Each meeting had a suggested theme and a small structured component. The contents of the meetings were recorded (see appendix 2 on bmj.com). There was also a "frequently asked questions" (FAQs) system—that is, at the end of each session the group fed back questions to the research team who compiled written answers based on the feedback from all groups. The FAQs from all groups were combined and sent back to the groups for the next session.

Retention and support of peer supporters

Formal structures were put in place to ensure peer support workers were supported in their role, including telephone calls from the project manager before and after meetings; a course handbook and resource pack; an annual social or educational event; a protocol to follow if a peer supporter resigned; and travel and related expenses (this was given in the form of a general shopping voucher at the end of each year with a value of €300).
to general practitioner, practice nurse, hospital diabetes outpatient department, and hospital diabetes centre and admissions to hospital. Demographic details, including measures of socioeconomic status (medical card status) and educational attainment, were also collected. Participants completed the questionnaire while waiting to see the practice nurse, who then checked that the questionnaire was filled in and completed the biophysical measures. The nurses extracted data relating to the process of care from the patients’ records and entered all data into a FileMaker Pro database. The project manager double checked the data. Full details of data collection and storage procedures are outlined in the study protocol.

We undertook a process evaluation of the trial and measured treatment fidelity using a framework developed by Bellg et al. This involved consideration of five elements: treatment design, training procedures, delivery of treatment, receipt of treatment, and enactment of treatment skills. This information was collected with peer supporter log diaries, the study managers’ contact records, and focus groups with practice staff, peer supporters, and participants. Parallel qualitative and economic analyses are ongoing and will be reported elsewhere.

Sample size calculation
We aimed to achieve a sample of 400 patients from 20 practices. This incorporated the effect of cluster randomisation and allowed for 80-85% follow-up of patients and a 15% rate of practice attrition. Sample size calculations also incorporated a 20% improvement from
Table 1 | Baseline characteristics of participants with type 2 diabetes allocated to peer support (intervention) or no peer support (control) and peer supporters. Figures are numbers (percentage) of participants unless stated otherwise

| Practice factors at baseline | Intervention group (n=192) | Control group (n=203) | Peer supporters (n=29) |
|-----------------------------|---------------------------|----------------------|----------------------|
| No of practices             | 10                        | 10                   | —                    |
| Mean No of patients/practice| 4830                      | 5800                 | —                    |
| Urban location              | 8                         | 8                    | —                    |
| Mean % of practice population on diabetes register | 1.7% | 1.7% | — |
| Diabetes care*:             |                           |                      | —                    |
| GP only                     | 68 (35)                   | 60 (30)              | —                    |
| GP and specialist           | 60 (30)                   | 73 (36)              | —                    |
| Specialist only             | 62 (32)                   | 65 (32)              | —                    |
| No care                     | 3 (2)                     | 5 (2)                | —                    |
| Participants and peer supporters |                     |                      | —                    |
| Women                       | 88 (46)                   | 93 (46)              | 17 (59)              |
| Mean (SD) age (years) (n=424) | 66.1 (11.11)              | 63.2 (11.04)         | 62.7 (11.3)          |
| Mean (SD) duration of diabetes (years) (n=418) | 7.4 (7) | 6.9 (6.3) | 6.8 (8.1) |
| GMS card†                   | 92 (48)                   | 108 (53)             | 8 (30)               |
| Education status:           |                           |                      | —                    |
| Primary education only      | 79 (41)                   | 98 (48)              | 5 (17)               |
| Complete third level education | 15 (8)                      | 10 (5)               | 9 (31)               |
| Self reported smoking       | 31 (16)                   | 40 (20)              | 4 (14)               |
| Diabetes regimen:           |                           |                      | —                    |
| Diet controlled             | 52 (27)                   | 38 (19)              | 9 (31)               |
| Oral hypoglycaemic drugs    | 133 (69)                  | 160 (79)             | 14 (48)              |
| Insulin                     | 5 (3)                     | 3 (1)                | 2 (7)                |
| Missing                     | 2 (1)                     | 2 (1)                | 4 (14)               |
| Marital status:             |                           |                      | —                    |
| Married/cohabiting          | 134 (68)                  | 113 (59)             | 20 (70)              |
| Single, widowed, separated, divorced | 65 (33)       | 79 (41)             | 9 (30)               |
| Missing                     | 2 (0.5)                   | 0 (0)                | 0 (0)                |
| ≥3 medical conditions       | 134 (70)                  | 129 (64)             | 27 (93)              |

*According to patient.
†Eligibility for GMS (general medical services) card implies being in 30% of population with lowest income and indicates eligibility for free healthcare.

baseline in the control group and 50% improvement in the intervention group. All calculations were two sided and based on an α of 5% and a power of 80%. Full details are reported in the study protocol.12

**HbA1c**—We needed 130 patients from eight practices to show a clinically significant difference in mean HbA1c between intervention and control groups (that is, a difference of 0.9%24; SD 1.6, intraclass coefficient 0.00124).

**Systolic blood pressure**—We needed 400 patients from 20 practices to show a significant improvement in the proportion of patients with a systolic blood pressure below 160 mm Hg. This was in the context of a treatment target of 135 mm Hg25 based on locally available data indicating that 46% of patients in a previous study in Dublin had a systolic blood pressure >160 mm Hg and the intraclass coefficient was 0.001.24

**Cholesterol**—We needed 410 patients from 20 practices to show a significant improvement in the proportion of patients with a cholesterol concentration <5 mol/L, which was the treatment target for cholesterol at that time.26 Locally available data indicated that 57% of patients had a concentration >5 mmol/L and the intraclass coefficient was 0.06.19

**Wellbeing scores**—We needed 221 patients from 12 practices to show a clinically significant difference in wellbeing scores between intervention and control groups (that is, a mean difference of 5 points, SD 10.3; intraclass coefficient 0.0724).

**Statistical analysis**

The analyses were based on intention to treat and are reported according to the CONSORT guidelines for the reporting of cluster randomised controlled trials.26 We also undertook a sensitivity analysis and a per protocol analysis to estimate the effect of exposure to the intervention or group attendance on outcomes. Pre-planned analyses were also conducted to examine those participants whose risk factors were above target ranges at baseline—that is, HbA1c >7%, systolic blood pressure >130 mm Hg, and cholesterol concentration >4.8 mmol/L. These were the targets presented to the clinicians involved in delivering diabetes care across both intervention and control practices.

We used multilevel linear or logistic regression models with random effects of patients nested within practices. In these models, the primary fixed effect of interest is the differential effect of intervention versus control over time. For the subgroup analysis, we selected individuals deemed out of control at baseline for modelling with practice as a random effect. The effect size in this instance refers to the contrast between the intervention versus the control group at follow-up. For all models, we included additional patient specific (such as age and sex) and practice specific (such as type of practice) covariates. The multilevel analysis was conducted with R (2.11).27

Analysis of secondary outcomes was limited to an intention to treat cluster level analysis apart from analysis of BMI, which achieved a significant effect in this preliminary analysis so was then entered into the multilevel model analysis.

**RESULTS**

The figure shows the flow of practices and patients through the study. We could not carry out baseline data collection before randomisation of practices as we had to first identify intervention practices so that we could recruit and train the peer supporters, which took place over a six month period. As a result, there was a difference in recruitment rates of patients between intervention and control practice. More potential participants had to be invited to participate in the study in intervention practices. Recruitment of participants took place between November 2006 and April 2007 and the intervention ran from May 2007 until April 2009. Non-participants in both the intervention and control practices were similar in terms of sex, age, and socioeconomic status (as measured by...
eligibility for free primary health care). Follow-up data collection took place between May and June 2009.

Table 1 gives the characteristics of patients in the intervention and control group and the peer supporters. Tables 2 and 3 present the primary and secondary outcomes. They indicate better than anticipated control of risk factors at baseline, though a considerable proportion of patients still had risk factors above target levels. Of the participants, 163/388 (42%) had an HbA1c above 7%; 291/394 (74%) had a systolic blood pressure above 130 mm Hg, and 89/387 (23%) had a total cholesterol concentration above 4.8 mmol/L. These treatment targets for risk factors differed from those used for the original power calculation as there had been changes in the target levels in the intervening years.

Follow-up results
At follow-up we found no significant improvements in any primary or secondary outcomes when we used multi-level modelling that accounted for clustering and other confounding variables (see tables 2 and 3). We also carried out multi-level modelling to examine the subgroups of patients with poorly controlled risk factors at baseline, and, while there was a trend towards clinically relevant improvements in proportions with better blood pressure control, these effects were not significant (table 4).

We carried out additional per protocol analyses as planned to test whether there were any links between group attendance and outcomes. We found nothing relating to attendance versus non-attendance and to numbers of groups attended by participants that could be regarded as a dose effect.

Peer supporters
At baseline data from peer supporters and participants were similar (table 1), though peer supporters had attained a higher level of education. Primary outcomes at baseline for the peer supporters were mean HbA1c 6.8%, mean total cholesterol 4.3 mmol/L, mean systolic blood pressure 140 mm Hg, and mean wellbeing score 27. Primary outcomes at follow-up were mean HbA1c 6.9%, mean total cholesterol 3.7 mmol/L, mean systolic blood pressure 139 mm Hg, and mean wellbeing score 24. Secondary outcomes at baseline and follow-up were also similar in peer supporters and participants. Twenty nine (97%) peer supporters were followed up. The descriptive analysis of the peer supporters at follow-up indicated no significant changes over time apart from some decline in wellbeing (mean score 27 at baseline; 24.1 at follow-up).

Process evaluation
The training and intervention were delivered as planned for the general practitioners, practice nurses, and peer supporters in the protocol. All intervention and control practices implemented structured diabetes care as planned. All the practices and 28 out of the 29 peer supporters were followed up, though only 23 of the peer supporters were retained in their role. The main concern regarding the delivery and receipt of treatment—that is, the intervention—was the low attendance at the group meetings. Participants in the intervention group attended a mean of five peer support meetings, and 18% never attended a meeting and therefore had no exposure to the intervention. This was despite repeated phone calls from practice nurses and a call from the study manager to all non-attenders after the third round of meetings.

Peer supporters were contacted after each meeting and also kept diaries. Appendix 2 on bmj.com provides data collected about the content of peer support meetings. In general, the groups followed and discussed the planned topics.

The process evaluation also highlighted the heavy workload involved in delivering a peer support intervention over two years. There was a mean of 15 contacts between the study manager and the intervention practices relating specifically to the peer support intervention rather than the research process. There was a mean of 25 contacts with the peer supporters during the two year period. These contacts included training sessions, meetings, telephone calls, and letters and indicate that as an intervention peer support requires substantial clinical and administrative input. Most of these contacts related to running the intervention rather than collection of research data.

DISCUSSION
For people with diabetes a group based peer support intervention is feasible in general practice settings. While there was a trend towards improved management of clinical risk factors, however, peer support did not significantly improve physical and psychosocial outcomes for people with type 2 diabetes. One
Table 3 | Secondary outcomes at baseline and follow-up in participants with type 2 diabetes allocated to peer support (intervention) or no peer support (control). Figures are mean (SD) scores except where indicated

| Variable                  | No of people    | Outcome at baseline | Outcome at follow-up | Mean difference | Pvalue |
|---------------------------|-----------------|---------------------|-----------------------|-----------------|--------|
|                           | (baseline/follow-up) | Intervention | Control | Intervention | Control | | |
| BMI                       | 191/164         | 200/168            | 30.3 (1.5)         | 31.8 (1.2)      | 30.3 (1.5) | 31.7 (1.1) | 1.4 | 0.56*  |
| MARS score‡               | 184/157         | 197/163            | 23.9 (1.7)         | 23.8 (1.8)      | 24.1 (0.3) | 23.9 (0.4) | 0.2 | 0.13   |
| Social support score§     | 192/148         | 199/152            | 23.8 (9.2)         | 22.4 (8.4)      | 23.6 (2)   | 23 (4.3)   | 0.6 | 0.7    |
| SDSCA score¶              | 191/146         | 201/137            | 119 (26.6)         | 112 (26.5)      | 117.1 (12.1)| 117.5 (8.1)| 0.4 | 0.9    |

*Adjusted with multilevel modelling as P<0.03 in simple cluster level analysis.
†Medication adherence score, range 0-25, higher scores=better adherence.
‡Range 0-60, higher scores=more social support experienced.
§Summary of self care activities score, range 0-7, higher score=higher level of self care.

There was a non-significant reduction in wellbeing in the intervention group, and, while this is also clinically relevant, it is important to consider that peer support could have a detrimental impact on wellbeing if groups focused on negative experiences. In relation to social support, it was difficult to find a measure that reflected the type of social support that a group based intervention might provide. The measure used might have failed to detect the type of social support that peers provide compared with the support provided by family and friends, which existing measures consider. This is possible as the qualitative analysis indicated that participants valued the meetings and were positive about the support they had received from their leaders and fellow group members (G Paul, personal communication). An alternative social support outcome measure would be the Lubben social network scale.24 While this scale does focus on broader social, less disease oriented social support networks, it has been used only in older patients.

Comparison with other studies
Our results are consistent with those of other studies published on peer support for type 2 diabetes, which have also failed, in general, to show a significant impact on glycaemic control as measured by HbA1c.9 10 29-32 Lorig et al recently published a randomised controlled trial of their chronic disease self management programme adapted for people with diabetes.33 While they found improvements in depression and in healthy eating, there was no effect on HbA1c. Studies examining peer support have not specifically targeted patients with poorly controlled type 2 diabetes, and such patients might benefit most from a peer support intervention. Our qualitative analysis also indicated that participants thought they would have benefited from peer support around the time of diagnosis (G Paul, personal communication). The logistics of running a trial of a peer support intervention for people with a new diagnosis would be more challenging but perhaps worth pursuing.

While most of the studies of peer support for type 2 diabetes to date have shown no benefit for participants in terms of glycaemic control, benefits in terms of personal gains [training and satisfaction of helping people] for peer supporters have been reported.33 In this study, however, the peer supporters showed some decline in wellbeing at follow-up, though this might be a chance finding as numbers were small. This raises concerns...
that the role of peer supporter could be demanding and stressful for the peer supporters themselves, particularly if participants fail to attend group meetings. This has been described previously in other peer support settings.34

**Strengths and limitations**

This cluster randomised controlled trial of group peer support for patients with type 2 diabetes included detailed analysis of the peer supporters as well as participants. Follow-up of practices and participants was high, and there was clearly defined structured diabetes care across both intervention and control practices so that changes in diabetes care could not have been attributed to differences in healthcare delivery as we were trying to assess the potential effectiveness of the peer support intervention itself. A full process evaluation was carried out that indicated the intervention was largely delivered as planned. It also highlighted the considerable workload involved in supporting the intervention. The differential recruitment rate between intervention and control practices and the lower than expected attendance rates indicate that group based peer support is not attractive to all patients with type 2 diabetes and reduced the external validity of this study.35 Other modes of provision of peer support might need to be offered in parallel with group meetings. It might also be important to consider flexible approaches to providing peer support, such as having drop-in groups available when patients need support rather than providing scheduled courses that take no account of individual needs.36 Other issues relating to external generalisability include resourcing of practices. We provided a grant to practices to recognise the work involved in setting up peer support groups and providing ongoing informal support to the peer supporters. The workload of the study manager was considerable and that role is essential to the running of a peer support intervention and needs to be considered if peer support is to be introduced on a larger scale.

One limitation was our inability to conceal allocation. Practices had to be randomised before we collected baseline data so that peer supporters could be identified and trained in intervention practices. This reduced the internal validity of the study as did the lack of blinding of outcome data. Practice nurses collected outcome data and so were not blind to group allocation. For three of the four primary outcomes, however, data were collected with automated tests or devices so this minimised the risk of detection bias. The study performed well in relation to the other features of internal validity for cluster randomised trials described by Eldridge et al.35 A further potential limitation is that the presence of a peer support intervention within a practice could have motivated the entire team to provide better diabetes care. The process evaluation and the data relating to prescribing, however, did not suggest differences in delivery of diabetes care between intervention and control practices.

**Conclusion**

This cluster randomised controlled trial indicates that it is feasible to implement a peer support system for patients with type 2 diabetes attending general practices, though not all patients will be interested in participating. The intervention was not effective in improving biophysical and psychosocial outcomes for individuals with type 2 diabetes, when targeted at all such patients. While there was a trend towards improvements of clinical outcomes, particularly for systolic blood pressure, our results suggest that peer support should not be widely adopted in clinical practice until further research is carried out. The Peers for Progress organisation is currently carrying out several trials and demonstration projects of peer support for type 2 diabetes across the world.37 Future research could focus on alternative models of delivering support or targeting support to those with poorly controlled risk factors.

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**WHAT IS ALREADY KNOWN ON THIS TOPIC**

Peer support could be a promising approach for diabetes care as it harnesses the ability of patients with diabetes to support each other in managing their everyday lives.

There is limited evidence to date supporting its effectiveness.

**WHAT THIS STUDY ADDS**

Though peer support group meetings can be introduced in general practice settings, many patients were not interested in participating, and 18% of those who agreed to participate never attended any meetings.

There was a trend towards improvements in clinical care but no significant improvements in diabetes or psychosocial outcomes.

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**Table 4 | Risk factors above target at baseline and follow-up in participants with type 2 diabetes allocated to peer support (intervention) or no peer support (control)**

| Risk factors     | No (%) at baseline | Odds ratio (95% CI) | P value |
|------------------|---------------------|---------------------|---------|
|                  | Intervention       | Control             |         |
| HbA1c >7%        | 76/187 (41)        | 87/201 (43)         | 1.84 (0.60 to 5.59) | 0.28 |
| Systolic BP >130 mm Hg | 143/192 (74) | 148/202 (73)           | 0.25 (0.05 to 1.34) | 0.09 |
| Cholesterol >4.8 mmol/L | 30/186 (16) | 59/201 (29)           | 0.25 (0.05 to 1.34) | 0.09 |

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**Contributors:** SMS, DLW, EO’s, and TO’D conceived the study and together with GP and AK participated in the design of the trial and intervention. All authors participated in the acquisition and analysis of the data and in the writing of the report.
data and in critical revision of the manuscript and have seen and approved the final version. SMS is guarantor.

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Competing interests: All authors have completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare: no support from any organisation that might have an interest in the submitted work in the previous three years, no other relationships or activities that could appear to have influenced the submitted work.

Ethical approval: This study was approved by the research ethics committee of the Irish College of General Practitioners and informed written consent was given by all patients and peer supporters.

Data sharing: Additional data can be obtained from the corresponding author for the purposes of secondary research.

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