The effects of COVID-19 on self-management behaviours and service experiences in type 2 diabetes mellitus

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Abstract

This study explored the impact of COVID-19 on adults with type 2 diabetes mellitus (T2DM) self-management behaviours and service experiences within an ethnically diverse UK sample.

A cross-sectional survey design was employed. An 18-item survey was administered to suitable patients attending the Lambeth Diabetes Intermediate Care Team (South East London, UK) via text message (n=993) or post (n=62).

A total of 150 participants completed the survey, which revealed that 30% had changed their diabetes medication taking behaviour since the start of the COVID-19 pandemic for a number of reasons. Negative changes in physical activity levels and dietary behaviours were also reported. Of those who received a telephone consultation, high satisfaction levels were reported but a clear preference for face-to-face consultations was still present.

Our findings suggest that the COVID-19 pandemic is having a negative impact on individuals with T2DM physical activity levels and dietary behaviours. Additionally, the findings indicate that although telephone consultations were highly accepted, many would prefer to receive a face-to-face consultation in future.
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Key words

COVID-19; type 2 diabetes mellitus; behaviour change; treatment adherence; self-management; service experiences; UK

Introduction

On 11 March 2020, the World Health Organization declared COVID-19 a global pandemic.[1] Among UK COVID-19 patients admitted to hospitals, diabetes is one of the most common comorbidities.[2,3] Individuals with diabetes are more susceptible to experience severe symptoms and complications from COVID-19 compared to individuals without diabetes, including mortality.[4,5]

Given the evidence, consistent and effective engagement in diabetes medication taking and self-management behaviours are crucial to prevent negative consequences. However, cross-sectional survey studies have reported inconsistent findings; the COVID-19 pandemic has caused both positive and negative changes in diabetes medication taking[6] and/or self-management behaviours related to glycaemic control,[7–11] physical activity,[6–10,12–14] alcohol consumption,[10,14,15] and/or dietary behaviours.[6,8–10,12–16]

To adapt to COVID-19 restrictions, national and international health care systems have switched from face-to-face consultations to remote consultations. Fisher *et al.*[6] found that of US individuals with type 2 diabetes mellitus (T2DM) who switched to telephone or video consultations during the pandemic, 44.0% reported lower satisfaction, 42.2% reported equal satisfaction, while 12.9% reported higher satisfaction, compared to face-to-face consultations.

This study aimed to explore the effects of COVID-19 on adults with T2DM self-management behaviours and service experiences and expectations, within an ethnically diverse UK sample. Specific objectives included determining:

- The extent to which the COVID-19 pandemic impacted upon diabetes medication taking behaviour.
- The extent to which the COVID-19 pandemic impacted upon diabetes self-management behaviours.

• Patients' service experiences and expectations during the pandemic.

Materials and methods

Design, study participants, and recruitment strategy

A cross-sectional survey design was employed. A text message containing the survey weblink (JISC online surveys) was sent to all suitable people (n=993) attending the Lambeth Diabetes Intermediate Care Team (South East London, UK) who had a mobile phone number recorded; for those without (n=62), a postal survey was sent out. Suitable candidates included individuals with T2DM who had been seen by the service in the previous year. The online version of the survey was available for completion from 14 July to 19 August 2020, while the postal version was available for completion from 3–17 August 2020.

Materials

The survey comprised of 18 questions (Appendix 1, available online at https://wchh.onlinelibrary.wiley.com). Six questions were clinical and sociodemographic; 12 questions explored topics relating to changes in diabetes medication taking and self-management behaviours since the beginning of the COVID-19 pandemic, as well as service experiences and expectations. The survey took approximately 5 minutes to complete.

Statistical analysis

SPSS (version 26.0 for Windows) was used to analyse the data. Descriptive statistics were used to report the findings. Chi-square tests of independence were used to compare differences between groups, where appropriate.

Results

Clinical and sociodemographic characteristics

A total of 150 participants completed the survey; 131 completed the online version, while 19 completed the postal version. As no demographic or clinical differences were detected between the two groups, the results presented throughout are of the entire sample (n=150). Clinical and

Clinical and sociodemographic variables		No. (%)
Gender[a]	Male	82 (55.0%)
Mean age, years (SD)[b]		58.6 (11.5)
Medical comorbidities	Yes	119 (79.3%)
Duration of diabetes	<5 years Between 5–10 years >10 years	29 (19.3%) 43 (28.7%) 78 (52.0%)
Medication for glycaemic control	Oral Insulin injections Other injections	129 (86.0%) 96 (64.0%) 38 (25.3%)
Total no. of medications (categories)[c,d]	1 2 3	56 (37.3%) 72 (48.0%) 21 (14.0%)

a = Gender not provided for one respondent; b = Age not provided for two respondents; c = One respondent reported not taking any medicines; d = Categories: Oral; Insulin injections; Other injections.

Table 1. Clinical and sociodemographic characteristics (n=150)

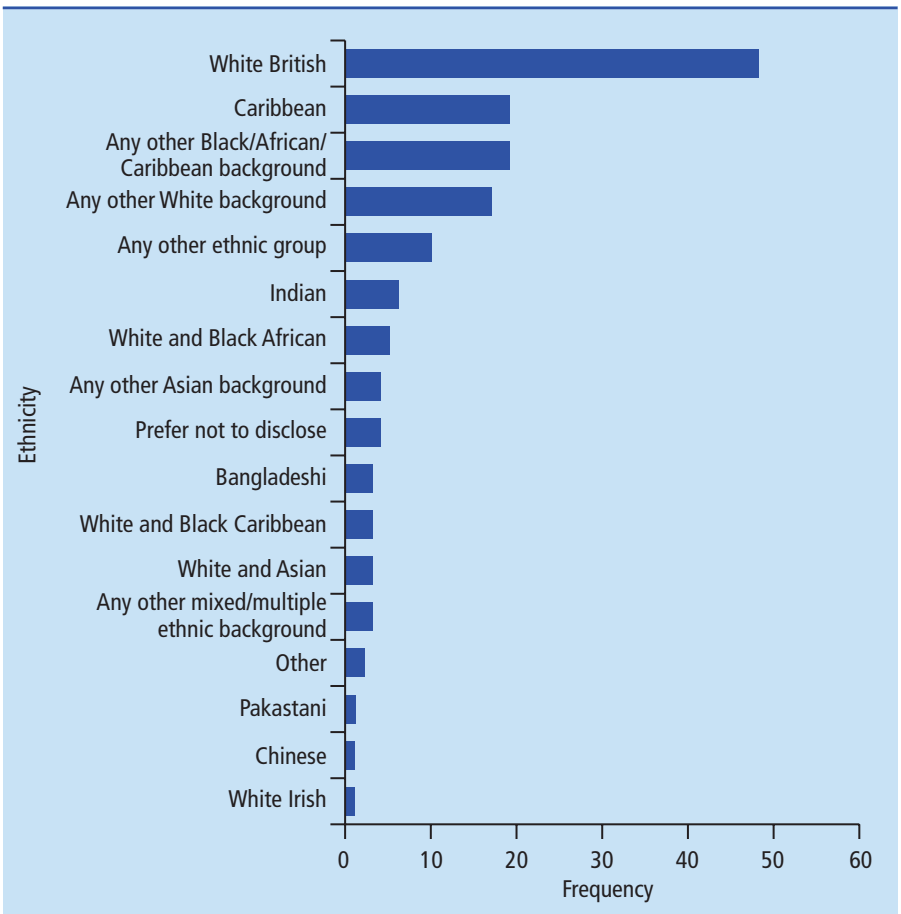

Figure 1. The ethnic distribution of the sample

sociodemographic characteristics are summarised in Table 1 and Figure 1.

The extent to which the COVID-19 pandemic impacted upon diabetes medication taking behaviour

Thirty percent of respondents (n=45) revealed that they had changed their diabetes medication taking behaviour since the start of the COVID-19 pandemic. How and the reasons why are presented in Table 2.

The extent to which the COVID-19 pandemic impacted upon diabetes self-management behaviours

Blood glucose levels. Although 46.7% (n=70) reported that their blood glucose levels were about the same, 33.3% (n=50) reported they were higher than usual, 14.0% (n=21) reported they were lower than usual, while 5.3% (n=8) reported this was not applicable to them.

Physical activity and alcohol consumption. Reported changes in physical activity and alcohol consumption are presented in Table 3.

Dietary behaviours. Reported changes in dietary behaviours are presented in Figure 2.

Respondents' service experiences and expectations during the pandemic

The majority of respondents (73.3%, n=110) had received a telephone consultation with the Lambeth Diabetes Intermediate Care Team since the beginning of the COVID-19 pandemic. Reported levels of satisfaction are presented in Figure 3. Additionally, preferred consultation media in future are presented in Figure 4. Chi-square statistics revealed there were no differences between the survey groups (i.e. online vs postal) in preference for future consultation media: telephone ($\chi^2(5)=6.499$, p=0.261); video ($\chi^2(5)=6.294$, p=0.279); and face-to-face ($\chi^2(5)=4.275$, p=0.450).

Discussion

This study explored the effects of COVID-19 on self-management behaviours and service experiences within an

A. Changes in medication taking behaviour[a]		No. (%)
Stopped taking my medication		6 (13.3%)
Take less of my medication		12 (26.7%)
Take more of my medication		22 (48.9%)
Other[b]		22 (48.9%)
	Change in medication(s)	3 (6.7%)
	• Change from Humulin to Abasaglar	• 1 (2.2%)
	• Change from Lantus to Toujeo	• 1 (2.2%)
	• Insulin included	• 1 (2.2%)
	Decrease in medication dose	3 (6.7%)
	Low mood (e.g. feelings of depression)	3 (6.7%)
	Issues with memory	2 (4.4%)
	Increase in dose	1 (2.2%)
	Improved medication management	1 (2.2%)
	Routine change	1 (2.2%)
	Change in diet	1 (2.2%)
	Lack of food supply	1 (2.2%)
	Disturbance in vision	1 (2.2%)
	Increase in blood sugar levels	1 (2.2%)
	Inexplicable	1 (2.2%)
B. Reasons for change in medication taking behaviour[a]		**No. (%)**
My health care practitioner advised me to		28 (62.2%)
I did not have a supply		4 (8.9%)
I was worried about complications		8 (17.8%)
I wanted to focus on COVID-19		3 (6.7%)
I forgot to take it as I was worried		5 (11.1%)
I forgot to take it as my routine has changed in the pandemic		8 (17.8%)
I did not feel it was effective for my diabetes		3 (6.7%)
Other		7 (15.6%)
	Improved blood sugar readings/control due to dietary changes	2 (4.4%)
	Improved blood sugar readings/control	1 (2.2%)
	Negative change in blood glucose control due to dietary/routine changes	1 (2.2%)
	Improved medication management	1 (2.2%)
	Lack of medical support	1 (2.2%)
	Inexplicable	1 (2.2%)

a = Multiple choice multiple answer question; b = Missing data for other changes in medication taking behaviours: n=2.

Table 2. How and why respondents' medication taking behaviour changed (n=45)

ethnically diverse sample of adults with T2DM in the UK. Our findings suggest that the COVID-19 pandemic has had negative effects on physical activity levels and dietary behaviours, but indicated that remote consultations experiences were generally positive.

The majority of respondents (70.0%, n=105) reported that they had not changed their diabetes medication taking behaviour since the start of the pandemic. Fisher *et al.*[6] reported similar findings: 51.4–83.2% of their participants with T2DM reported no changes in medication taking. However, it should be noted that 30.0% of our respondents (n=45) revealed that they had changed their diabetes medication taking behaviour and, of these, around 40% had either stopped their medication or were taking less. Reasons for these changes ranged from health care professional advice through to routine change. Together, these findings highlight the need to monitor and support medication adherence during the COVID-19 pandemic.

Although nearly half the sample reported that their blood glucose levels were about the same during the pandemic, one-third reported they were higher than usual, while a smaller number reported lower levels. These findings are consistent with other studies.[7,9,11] For example, Barone *et al.*[7] discovered that 59.4% of their participants experienced an increase, a decrease or a higher variability in glucose levels during the pandemic. The reported changes in blood glucose levels in the current study may be related to changes in physical activity and/or dietary behaviours.

Over half of respondents reported that their physical activity levels were lower than usual during the pandemic. This is unsurprising given that, at the time of data collection, gym and pool facilities were still closed, and government-imposed restrictions on outdoor activities were newly relaxed. This finding is consistent with other research.[6,7,9] For example, Fisher *et al.*[6] found that 57.2% of their participants with T2DM reported that they were exercising less than before the pandemic. These findings are a cause for concern as regular physical activity offers health benefits and is a fundamental element of managing T2DM.[17,18]

Just over 40.0% of respondents reported lower alcohol consumption levels during the pandemic; this contrasts with similar studies, which have reported an increase in alcohol consumption among individuals with T2DM.[10,14,15] Additionally, research has reported an increase in alcohol consumption among the general UK

	More than usual; no. (%)	About the same; no. (%)	Lower than usual; no. (%)	Prefer not to say; no. (%)
Physical activity[a]	27 (18.1%)	45 (30.2%)	77 (51.7%)	–
Alcohol consumption[b]	6 (4.1%)	48 (33.1%)	63 (43.4%)	28 (19.3%)

a = Missing data for one respondent; b = Missing data for five respondents.

Table 3. Reported changes in physical activity and alcohol consumption

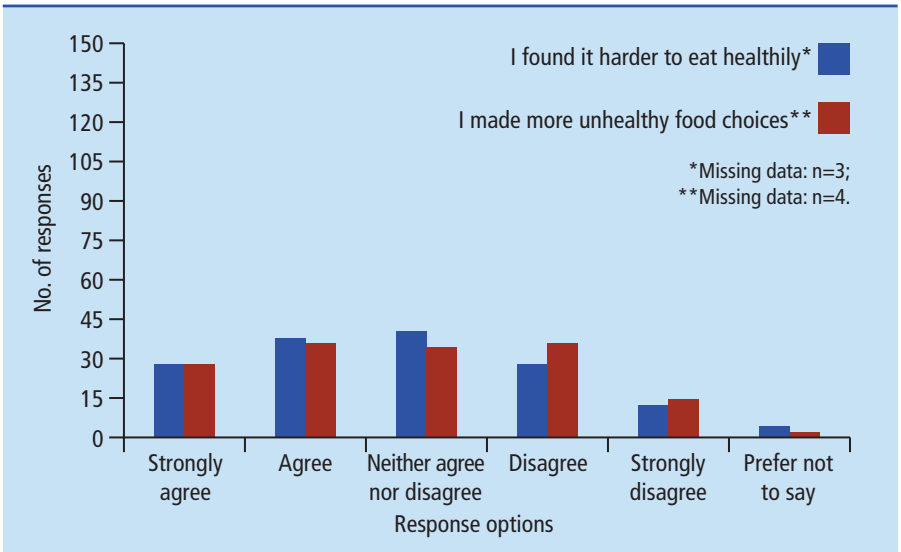

Figure 2. Reported changes in dietary behaviours

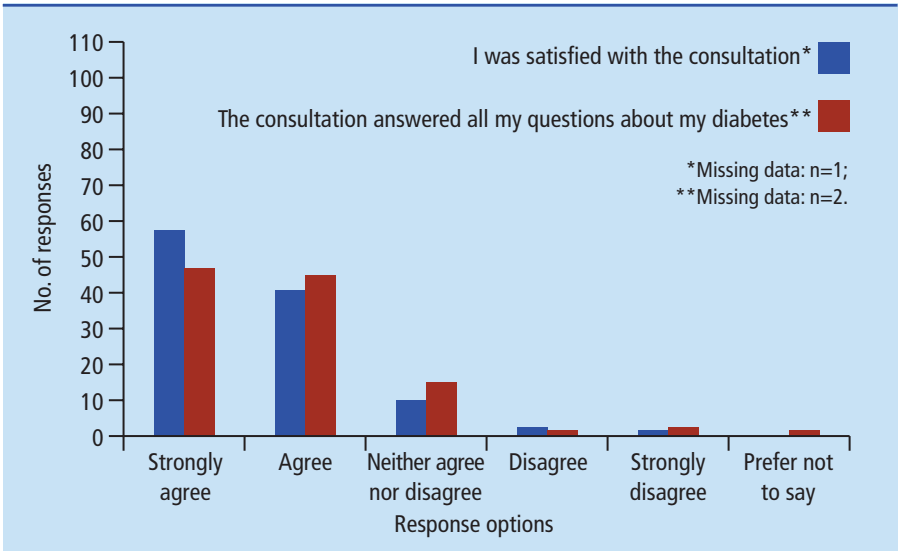

Figure 3. Reported levels of satisfaction with telephone consultation

population.[19,20] However, Alcohol Change UK[20] also found that one in three individuals were drinking less during lockdown, a finding similar to ours. Potential reasons for this reduction in alcohol consumption may be intrinsically motivated (e.g. prioritising one's health) and/or extrinsically determined (e.g. the closure of pubs).

Our findings also suggest that the COVID-19 pandemic had some impact upon dietary behaviours of people with T2DM, which is consistent with existing research.[6,9,10,13–16] For example, Ruiz-Roso *et al.*[16] found an increase in sugary food and snack consumption among individuals with T2DM during the COVID-19 lockdown. These findings are not surprising as excessive consumption of unhealthy foods has been linked with stressful situations and emotions such as boredom.[21]

The majority of respondents (73.3%, n=110) had received a telephone consultation with the local Community Diabetes Team since the beginning of the pandemic. Reported satisfaction levels were high (51.8% [n=57] strongly agreed, 36.4% [n=40] agreed). In contrast, Fisher *et al.*[6] found that 44% of people with diabetes in the US who switched to telephone or video consultations during the pandemic reported lower satisfaction. Nevertheless, the majority of our respondents expressed a preference for face-to-face consultations in the future.

Our study has made a novel contribution to the limited research evidence base on the impact of COVID-19 on T2DM self-management behaviours and service experiences in the UK. However, there are study limitations. First, given the design, we are unable to conclude causality and the results may be subject to self-report bias. Second, as this survey had a modest sample size from a single diabetes community service, the results may not be generalisable and may be subject to selection bias. Thus, future research should consider collecting data from multiple diabetes services. Third, we recognise that the low participation uptake rate (i.e. 14.2%) further limits the generalisability of the findings. The low participation uptake rate may be explained by a multitude of factors, such as fears that survey responses would affect usual care; a fear which may have already been heightened due to the pandemic. To prevent this limitation, future research should gauge interest in study participation from eligible participants prior to study initiation.

Our findings suggest that the COVID-19 pandemic has had a negative impact on physical activity levels and dietary behaviours in individuals with T2DM. Additionally, although telephone consultations are highly accepted, many would prefer to receive a face-to-face consultation in future. These findings suggest the need for national and international health care systems to continually improve peoples' experiences of remote consultations via regular service evaluation.

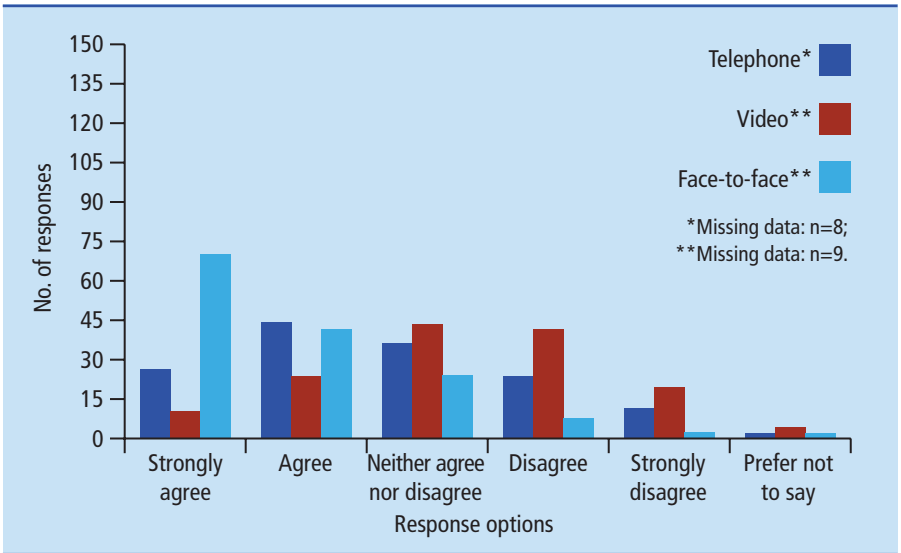

Figure 4. Preferred consultation medium in future

KEY POINTS

- Self-management behaviours of patients living with type 2 diabetes mellitus, including medication taking behaviours, physical activity, alcohol consumption and dietary behaviours, have changed since the start of the COVID-19 pandemic
- Physical activity and dietary behaviours were negatively affected, alcohol consumption levels were lower than usual, while blood glucose levels remained the same for the majority. Increased medication use, under health care practitioner advice was common
- Continued access to health care practitioners during the COVID-19 pandemic is important to ensure the appropriate management of long-term conditions such as type 2 diabetes mellitus. While telephone consultations were acceptable, face-to-face consultations were preferred. Health care services should evaluate and review their consultation delivery method to comply with current restrictions while meeting patient preferences, where possible

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Declaration of interests

There are no conflicts of interest declared.

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Background information questions	
Q1	Gender.*
Q2	How old are you?**
Q3	To which of these ethnicity groups do you belong?*
Q4	What other medical conditions do you have?**
Q5	How long ago were you diagnosed with diabetes?*
Q6	What diabetes medications are you prescribed? (Please tick all that apply and if possible list their names)***
Diabetes self-management questions	
Q7	If you self-monitor your blood sugar levels, in general how have they changed during the COVID-19 pandemic?*
Q8	Has the way you take your diabetes medication changed since the start of the COVID-19 pandemic?**** (If you answered No, please go to Q11)
Q9	Please indicate how the way you take your diabetes medications has changed since the start of the COVID-19 pandemic. (Please tick all that apply and if possible list their names)***
Q10	Please tell us why you have changed the way you take your diabetes medication. (Tick all that apply and if possible list the names of the medication)***
General lifestyle questions	
Q11	Please indicate to what extent the following have changed since the beginning of the COVID-19 pandemic.* (I.e. 11.1 Physical activity; 11.2 Alcohol consumption)
Q12	To what extent do you agree with the following statements about your diet since the start of the COVID-19 pandemic?* (I.e. 12.1 'I have found it harder to eat healthily'; 12.2 'I have made more unhealthy food choices')
Service experiences questions	
Q13	Have you had a telephone consultation with the Lambeth Community Diabetes Team since the start of the COVID-19 pandemic?**** (If you answered No, please go to Q15)
Q14	If yes, please indicate how much you agree with the following statements.* (I.e. 14.1 'I was satisfied with the consultation'; 14.2 'The consultation answered all my questions about my diabetes')
Service improvement questions	
Q15	Due to the COVID-19 pandemic we have to change the way we run our service. We want to make sure that these new ways work for you. Please indicate how much you agree with the following statements.* (I.e. 15.1 'I would prefer a telephone consultation in the future'; 15.2 'I would prefer a video consultation in the future'; 15.3 'I would prefer a face-to-face consultation in the future')
Q16	We would like to offer sessions on how healthy eating and physical activity can help you manage your diabetes. Which of the following would work for you? Please tick all that apply.***
Q17	Thinking about your diabetes, what is the most important thing you would like us to help you with at the moment?**
Q18	Please provide any suggestions on how we can improve our service.**
Note. * = Multiple choice single answer question; ** = Free text question; *** = Multiple choice multiple answer question; **** = Binary choice question.	

Appendix 1. Survey questions