The Experience of Living with Diabetes Mellitus during the COVID-19 Pandemic: A Systematic Review of Qualitative Studies*

Pulawit Thongtaeng, RN, PhD[1], Junjira Seesawang, RN, PhD[2]

Abstract

Purpose: To identify and synthesize the experiences of people with diabetes mellitus during the COVID-19 pandemic.

Design: A qualitative systematic review following PRISMA guideline.

Methods: A search for qualitative studies published in English between December 2019 and June 2022 was conducted using PubMed, CINAHL, PsycInfo, Web of Science, Cochrane Central, Google Scholar databases. Eight qualitative studies were included in this review. Thematic analysis was used to analyze and synthesize findings from qualitative studies based on Thomas and Harden's steps.

Main findings: The literature described the experiences of diabetic patients during COVID-19 pandemic in six themes: (1) perception toward COVID-19, (2) advantage in diabetes management, (3) psychosocial burden, (4) disrupted diabetes management, (5) getting healthier, and (6) guidance needs.

Conclusion and recommendations: The literature reviewed suggests that patients with diabetes faced with disrupted self-management and adaption to new diabetes routines. Accessibility of healthcare providers for personalized advice should be provided to support suitable diabetes self-management. Nurse should create interventions to provide information and to mitigate negative emotions and improve coping in patients with diabetes. How best to tailor nursing interventions to support patients with diabetes to perform diabetes self-management in COVID-19 pandemic should be explored.

Keywords: COVID-19, diabetes mellitus, experience, pandemics

Nursing Science Journal of Thailand. 2023;41(3):1-19

Corresponding Author: Lecturer Junjira Seesawang, Prachomklao College of Nursing, Phetcharuri, Faculty of Nursing, Praboromarajchanok Institute, 76000 Thailand; e-mail: junjira@pckpb.ac.th

* *This research project is supported by Boromarajonani College of Nursing, Chiang Mai, Faculty of Nursing, Praboromarajchanok Institute*

[1] *Boromarajonani College of Nursing, Chiang Mai, Faculty of Nursing, Praboromarajchanok Institute, Thailand*

[2] *Prachomklao College of Nursing, Phetchaburi, Faculty of Nursing, Praboromarajchanok Institute, Thailand*

Received: 12 September 2022 / Revised: 21 November 2022 / Accepted: 6 December 2022

ประสบการณ์ของผู้ป่วยเบาหวานในสถานการณ์การแพร่ระบาดของโควิด-19 : การทบทวนวิจัยเชิงคุณภาพอย่างเป็นระบบ*

ปุลวิชช์ ทองแตง, ปร.ด.[1] จันทร์จิรา สีสว่าง, PhD[2]

บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาและสังเคราะห์ประสบการณ์ของผู้ป่วยเบาหวานในสถานการณ์การแพร่ระบาดของโควิด-19

รูปแบบการวิจัย: การทบทวนวิจัยเชิงคุณภาพอย่างเป็นระบบ ตามแนวทางของ PRISMA

วิธีดำเนินการวิจัย: สืบค้นหลักฐานเชิงประจักษ์ที่เป็นงานวิจัยเชิงคุณภาพซึ่งตีพิมพ์เป็นภาษาอังกฤษตั้งแต่เดือนธันวาคม ปี ค.ศ. 2019 ถึงเดือนมิถุนายน ค.ศ. 2022 โดยใช้ฐานข้อมูล PubMed, CINAHL, PsycInfo, Web of Science, Cochrane Central, Google Scholar ข้อมูลจากงานวิจัยเชิงคุณภาพจำนวน 8 เรื่อง ถูกนำมาวิเคราะห์และอธิบายโดยใช้การวิเคราะห์แก่นสาระตามขั้นตอนของ Thomas และ Harden

ผลการวิจัย: ผลการสังเคราะห์อธิบายเกี่ยวกับประสบการณ์ของผู้ป่วยเบาหวานในสถานการณ์การแพร่ระบาดของโควิด-19 6 ประเด็น ดังนี้ (1) การรับรู้เกี่ยวกับโควิด-19 (2) ผลได้ในการจัดการกับโรคเบาหวาน (3) ผลกระทบด้านจิตสังคม (4) รบกวนการจัดการกับโรคเบาหวาน (5) มีสุขภาพที่ดีขึ้น (6) คำแนะนำที่ต้องการ

สรุปและข้อเสนอแนะ: การสังเคราะห์นี้มีข้อเสนอแนะว่าผู้ป่วยเบาหวานต้องเผชิญกับการเปลี่ยนแปลงในการจัดการตนเองและต้องมีการปรับตัวใหม่กับการจัดการกับโรคเบาหวาน การเข้าถึงบุคลากรสุขภาพในการให้คำแนะนำที่เหมาะสมกับผู้ป่วยแต่ละราย จึงควรมีให้บริการเพื่อส่งเสริมการจัดการตนเองกับโรคเบาหวานได้อย่างเหมาะสม พยาบาลควรออกแบบรูปแบบการพยาบาลเพื่อให้ข้อมูล เพื่อลดอารมณ์ด้านลบและส่งเสริมการจัดการกับอารมณ์ในผู้ป่วยเบาหวาน การวิจัยในอนาคตควรศึกษาว่าควรออกแบบโปรแกรมการพยาบาลอย่างไร เพื่อส่งเสริมให้ผู้ป่วยเบาหวานมีการจัดการตนเองเกี่ยวกับโรคเบาหวานในสถานการณ์การแพร่ระบาดของโควิด-19

คำสำคัญ: โควิด-19 โรคเบาหวาน ประสบการณ์ การระบาดทั่วโลก

Nursing Science Journal of Thailand. 2023;41(3):1-19

ผู้ประสานงานการเผยแพร่: อาจารย์จันทร์จิรา สีสว่าง, วิทยาลัยพยาบาลพระจอมเกล้า จังหวัดเพชรบุรี คณะพยาบาลศาสตร์ สถาบันพระบรมราชชนก อำเภอเมือง จังหวัดเพชรบุรี 76000, e-mail: junjira@pckpb.ac,th

* *โครงการวิจัยได้รับทุนจาก วิทยาลัยพยาบาลบรมราชชนนี เชียงใหม่ คณะพยาบาลศาสตร์ สถาบันพระบรมราชชนก*

[1] *วิทยาลัยพยาบาลบรมราชชนนี เชียงใหม่ คณะพยาบาลศาสตร์ สถาบันพระบรมราชชนก*

[2] *วิทยาลัยพยาบาลพระจอมเกล้า จังหวัดเพชรบุรี คณะพยาบาลศาสตร์ สถาบันพระบรมราชชนก*

วันที่รับบทความ: 12 กันยายน 2565 / วันที่แก้ไขบทความเสร็จ: 21 พฤศจิกายน 2565 / วันที่ตอบรับบทความ: 6 ธันวาคม 2565

Introduction

The novel coronavirus disease (COVID-19) denotes one of the greatest current public health challenges. To date, it has affected over 559 million people, imposing more than 6,361,157 victims in worldwide.[1] As the number of deaths from COVID-19 worldwide ranges from 0.1 to 5.7%,[2] people with underlying co-morbidities such as diabetes mellitus (DM) tend to have severe disease, severe complications and increased mortality.[3] People with DM are at a high risk of poor outcomes when admitted to hospital with COVID-19 such as risk of death within 30 days of diagnosis of COVID-19.[4] Consequently, people with DM have to certify good hand hygiene, strictly follow social distancing and keep good glycemic control to prevent the contraction of a disease.

With the rapid spread of the COVID-19 pandemic, this situation had brought many consequences for people with DM. Moreover, the lockdown protocols imposed by government such as in China, there was a travel and outdoor activity restriction, limited number of patients at hospitals and provided fast-track services for acute and chronic patients to reduce contact with multiple providers. Patient only saw provider if needed, one provider saw patient through all services.[5] People with DM struggled with self-management and faced numerous obstacles during the COVID-19 pandemic.[5-6] For example, lack of access to care and food supplies, fear of attending healthcare services due to fear of COVID-19, and limited physical activity because of quarantine were some of the barriers experienced by people with DM.[7-8] Some patients with DM had difficulty in obtaining insulin, blood sugar monitoring and diabetic medications.[8-9] These resulted in poor glucose control that can incite several acute (e.g. diabetic ketoacidosis and hypoglycemia) and chronic complications (e.g. cardiovascular disease, retinopathy, and neuropathy), which presents further challenges to patients and the healthcare system.[9]

Previous studies documented that patients with DM were at risk for serious health complications during COVID-19 pandemic.[3,8-9] COVID-19 can lead to poorer glycemic control and quality of life both in short and long terms. However, there is a lack of knowledge how these patients handle or manage their diabetes effectively during COVID-19 pandemic. Furthermore, no prior systematic reviews or synthesis of qualitative research have been performed. A qualitative systematic review will bring together research on this topic, systematically searching for research evidence from primary qualitative studies and drawing the findings together.[10] It affords understanding how patients with DM experience during COVID-19 pandemic which can help healthcare providers to provide care that meets their needs. A high-quality qualitative systematic review can also uncover new understandings, often helping illuminate 'why'.

To fill the gaps in knowledge, it is, therefore, vital to apprehend and synthesize findings from qualitative studies on the experiences of people with diabetes mellitus during the COVID-19 pandemic to gain a better understanding. Thus, this paper presented a systematic review of qualitative focusing on the experiences of patients with DM during the COVID-19 pandemic. This study will assist in targeting and tailoring interventions for the patients both during and after COVID-19 pandemic.

Objective

This systematic review was performed to synthesize published qualitative research on the experiences of people with DM during the COVID-19 pandemic. This review was to answer the following question: 'how people with DM handled daily life during the COVID-19 pandemic'?

Design

A qualitative systematic review based on PRISMA guidelines[11] was undertaken to present a comprehensive understanding of the experiences of adults living with DM during COVID-19 pandemic.

Eligible Criteria

Qualitative research papers were included for analysis. The criteria used for selection of the studies were presented in Table 1.

Table 1 Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
1) Employing qualitative methods	1) Failing to meet the minimum summary score of .55 as the minimum recommended threshold for methodological quality
2) Providing data on experiences of adults aged 20 years or older with DM during the COVID-19 pandemic; no restrictions on the type, severity, and complications of DM	2) Unable to access the full text of the article
3) Being an original peer-reviewed article published between December 2019 and June 2022 in English	3) Being in any form of conference abstract, poster presentations, reviews, and book chapters

Search Strategy

The databases including PubMed, CINAHL, PsycInfo, Web of Science, Cochrane Central, and Google Scholar were searched. The search terms were 'diabetes mellitus,' 'type 1 diabetes mellitus,' 'type 2 diabetes mellitus,' 'COVID-19,' 'Coronavirus,' 'experiences,' 'life experience,' and 'qualitative research.' The literature search was undertaken by first author between May and July 2022. Hand-searching was also applied through the search engines. It was performed by checking the reference lists of identified articles to identify the relevant studies and complete the non-indexed searching in the databases.

Search Outcome

This review used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines[11] to report the selection and exclusion of studies. The selection of studies is presented in Figure 1.

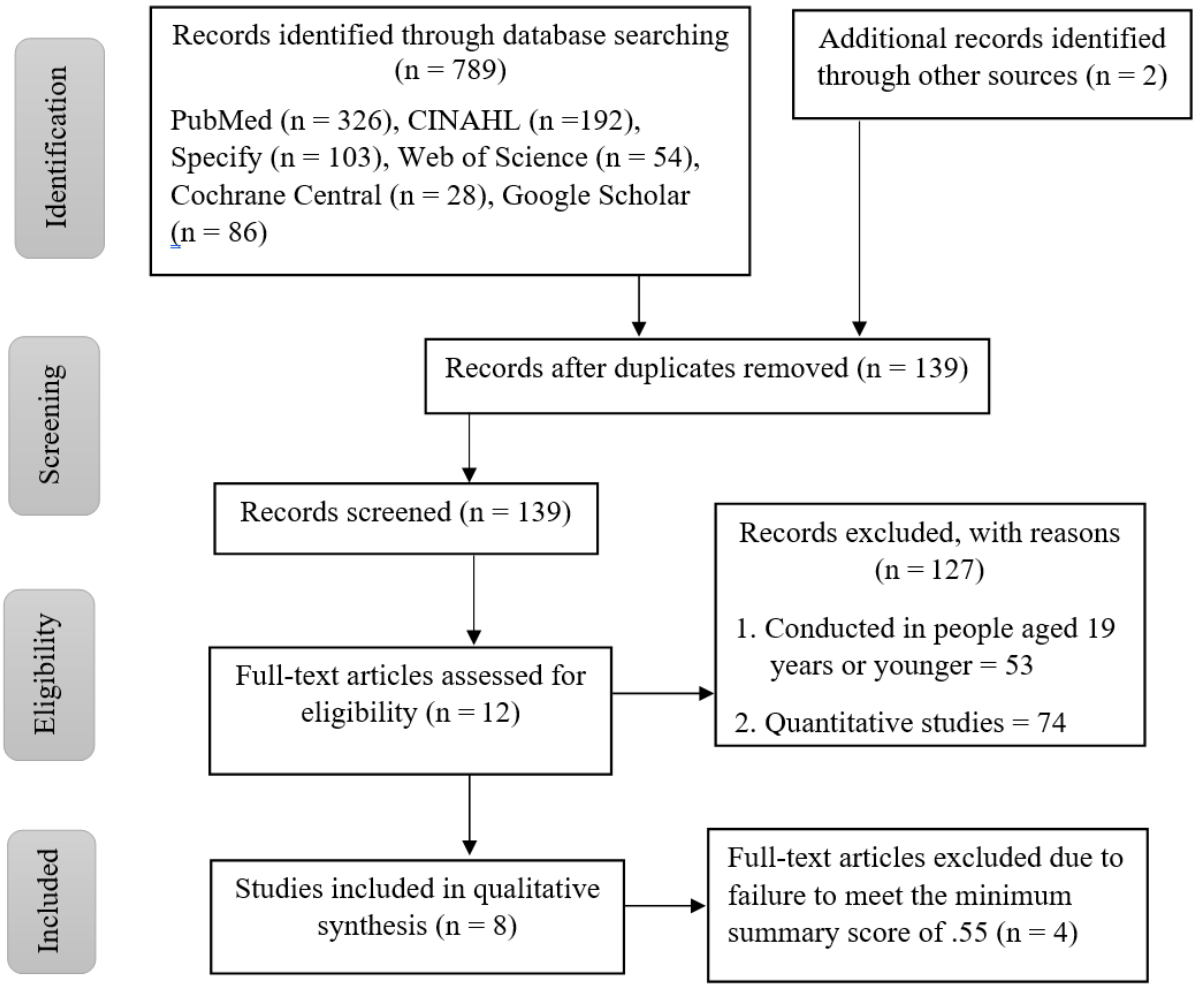

Figure 1 Flow diagram of included studies through review process

The initial search identified 789 studies. Reference lists were hand-searched for 2 additional relevant studies. Then, 650 duplicates were removed. The first author and second author independently screened titles and abstracts for the remaining 139 studies. After that, 127 studies were excluded due to not meeting the selection criteria as they were quantitative studies or conducted in people age 19 years or younger. Twelve studies met inclusion criteria and were reviewed in full. Next, during the preliminary review of full-text of each study, 4 studies were excluded due to failure to meet the minimum summary score of .55. The final set of 8 studies, including 2 generated from hand searching, were included in the synthesis (Table 2).

Table 2 Overview of the studies

Authors/Country	Aim	Study design	Sample	Data collection/analysis
Grabowski, et al.[12] 2020 Denmark	Explore the psychosocial effects of COVID-19 among people with diabetes	Descriptive qualitative	20 participants (8 with T1DM, 11 with T2DM, 1 with LADA): 10 male, 10 female Age: 20-75	Semi-structured interview; radical hermeneutics and Luhmann's operative constructivist systems theory
Shi, et al.[13] 2020 China	Explore the barriers to diabetes self-management perceived by diabetes patients during isolation following their recovery from COVID-19	Phenomenology	12 patients with T2DM: 4 male, 8 female Age: 50-75	Semi-structured telephonic interviews; Colaizzi's seven steps
Grabowski, et al.[14] 2021 Denmark	Discover how diabetes patients managed their illness during the COVID-19 lockdown	Descriptive qualitative	20 diabetes patients: 8 with T1DM, 11 with T2DM, 1 with LADA Age: 20-73	Semi-structured interview; Thematic analysis
Al-Moteri, et al.[15] 2022 Saudi Arabia	Explore the experience of people with diabetes during COVID-19 pandemic lockdown	Descriptive qualitative	12 participants (4 with T1DM, 8 with T2DM): 9 male, 3 female Age: 22-61	Semi-structured interview; Thematic analysis
Cartagena, et al.[16] 2022 Spain	Explore the experiences of T2DM patients staying at home and identify the strategies and resources used in the management of diabetes during COVID-19 pandemic	Descriptive qualitative	10 participants with T2DM: 6 male, 4 female Age: 60-79	Semi-structured interview; Thematic analysis
Mikkelsen, et al.[17] 2022 Denmark	Explore the consequences of the COVID-19 pandemic to self-management in people with T1D	Descriptive qualitative	8 participants with T1DM: 2 male, 6 female Age: 21-50	Thematic analysis
Pleym, et al.[18] 2022 Norway	Explain the experiences of T1DM patients during the COVID-19 pandemic and strategies to cope with the situation	Descriptive qualitative	19 participants with T1DM: 9 male, 10 female Age: 20-60	Semi-structured interview; Clinical incident technique
Upsher, et al.[19] 2022 UK	Explore the lived experiences of people with type 2 diabetes during the COVID-19 pandemic	Descriptive qualitative	29 participants with T1DM: 17 male, 12 female Age: 45-65	Semi-structured interview; Deductive thematic analysis

Note: T1DM = Type 1 diabetes mellitus, T2DM = Type 2 diabetes mellitus, LADA = Latent autoimmune diabetes in adults

Study Selection

Two authors independently screened the title and abstract of all studies. Conflicting judgements were resolved through discussion. Then, the authors independently screened the full text of each article. All studies deemed to have met the inclusion criteria were included. Disagreements were resolved through discussion. Deferral to a third party to resolved disagreements on inclusion decisions was not at either stage.

Data Extraction

The first author read each study and extracted: a) researchers, year of publication, and country; b) research aim; c) study design; d) participants; e) data collection and analysis; and f) themes and sub-themes of the selected articles into the common table. The second author cross-checked the extracted information. Table 2 displayed a summary of the contents and Table 3 presented findings of the studies.

Quality Appraisal

The QualSyst Tool for Qualitative Studies[20] was used to critically evaluate of all articles by the authors. This tool included ten following items: question/objective, study design, study context, a theoretical framework or wider body of knowledge, sampling strategy, data collection methods, data analysis, credibility, conclusions, and evidence of researcher reflexivity. These 10 questions were scored as no = 0, partial = 1, and yes = 2 based on the degree to which the specific criteria were met.

The authors added all the scores for each item to get a total score, dividing this by the total possible score to gain the summary score (Table 3). Studies that failed to meet the minimum summary score of .55[20] were excluded. Overall score ranged from 0.65 to 0.95 (Table 3). Thus, an overall 'good' methodological quality was presented in this review. Common weaknesses within the included articles were the lack of a clear description about the use of verification procedures to establish credibility and reflexibility. Two authors independently assessed the methodological quality of included studies. When there was no agreement among two authors, an external reviewer participated in the process of decision.

Table 3 Themes, sub-themes and quality rating of the included studies

Paper	Main findings	Quality rating
Grabowski, et al.[12] 2020 Denmark	1. Altered self-observations 2. Unclear risk-perceptions 3. Change in relational everyday life	0.75

Table 3 (Cont.)

Paper	Main findings	Quality rating
Shi, et al.[13] 2020 China	Barriers to self-management 1. Inadequate knowledge and behavioral beliefs 1.1 Limited diabetes knowledge 1.2 Confusion about taking medications 1.3 Low adherence to self-monitoring of blood glucose 2. Shortage of resources 2.1 Limited space for physical exercise 2.2 Unavailability of blood glucose monitoring 2.3 Absence of a diabetic diet 2.4 Undersupply of hypoglycemic medications 3. Suffering from health problems 3.1 Hyperglycemia 3.2 Physical discomfort 3.3 Insomnia 4. Negative emotions 4.1 Stigma 4.2 Dissatisfaction 4.3 Anxiety 5. Lack of support 5.1 Lack of professional guidance 5.2 Lack of family support	0.9
Grabowski, et al.[14] 2021 Denmark	1. The changes in and challenges of self-management caused by the lockdown 1.1 Disruption of self-management practices 1.2 Unaffected diabetes routines 2. Different ways of adapting diabetes routines to life during lockdown 2.1 Modification and adaptation in everyday life 2.2 Corona holiday 2.3 Positive side effects of changed conditions for everyday life 3. Worries related to self-management during lockdown 3.1 Fear of infection with COVID-19 3.2 Worrying how lockdown lifestyle affects diabetes management 3.3 Can we still get our insulin?	0.65

Table 3 (Cont.)

Paper	Main findings	Quality rating
Al-Moteri, et al.[15] 2022 Saudi Arabia	1. Facing our fears 1.1 Infection with COVID-19 1.2 Mandatory vaccination 2. The possibility of damage 2.1 Developing complications 3. The challenges of everyday routines 3.1 Maintain balance blood glucose 4. Identifying strengths 4.1 Opportunity to think about health 4.2 Sources of support 5. Looking for and adapting of alternative solutions for everyday routine 5.1 Focus on healthy food 5.2 Maintain physical activities	0.95
Cartagena, et al.[16] 2022 Spain	1. Anxiety, fear, and vulnerability 2. Insufficient diabetes monitoring by the health system 3. Proactive self-care	0.95
Mikkelsen, et al.[17] 2022 Denmark	1. Knowledge and experience make the person with diabetes feel less worried 2. Active choices to maintain good glycemic control 3. Time to immerse and fewer unhealthy temptations	0.7
Pleym, et al.[18] 2022 Norway	**Experiences** 1. Increased psychological burden of T1DM during the COVID-19 pandemic 1.1 Concerns related to COVID-19 and T1DM 1.2 A need for knowledge about T1DM and COVID-19 1.3 Consequences for social relations as results of COVID-19 related restrictions 2. Changed conditions for T1DM treatment during the COVID-19 pandemic 2.1 Altered routines due to COVID-19 affecting T1DM self-management 2.2 Changes in the work or study situation due to COVID-19 affecting T1DM self-management 2.3 Reorganization of the health service due to COVID-19 affecting T1DM treatment	0.75

Table 3 (Cont.)

Paper	Main findings	Quality rating
	Actions	
	3. Actions to handle psychological strain related to T1DM and COVID-19	
	3.1 Practical strategies to avoid being infected with COVID-19	
	3.2 Measures to maintain social contact	
	3.3 Mental strategies to deal with the situation	
	4. Actions to handle changed conditions for T1DM treatment during the COVID-19 pandemic	
	4.1 Creating a safe structure in daily life	
	4.2 Measures to ensure proper T1DM self-management during the COVID-19 pandemic	
Upsher, et al.[19] 2022 UK	1. Information needs of people with type 2 diabetes during the COVID-19 pandemic	0.8
	1.1 Ability to contact healthcare professionals	
	1.2 Perception of using remote healthcare communication	
	1.3 Need for diabetes-specific advice from healthcare professionals	
	2. Concerns about Covid-19 from people with type 2 diabetes	
	2.1 Diabetes as a risk factor for COVID-19	
	2.2 News content affecting concerns regarding COVID-19	
	2.3 Fear of contracting COVID-19	
	3. Diabetes self-management and wellbeing during the Covid-19 pandemic	
	3.1 Change in exercise behavior, diet and weight	
	3.2 Social isolation	

Data Synthesis

Thematic analysis[21] was used for data synthesis. The authors firstly read and immersed themselves in the data from each article to acquire a sense of what it contained by reading the collected studies several times and recording first impressions; then, connected the data by creating, identifying common ideas, and highlighting keywords, and categorized information. Two authors independently coded each line of text according to its meaning and content. Developing codes reflective of categories and concepts reported in all studies was performed. Authors looked for similarities and differences between the codes in order to start grouping them.

New codes were created to capture the meaning of groups of initial codes. Then, the authors presented the themes in a cohesive manner. First author wrote a draft summary of the findings across the studies which included initial descriptive themes. Second author commented on this draft and a final version was agreed. Then, the findings of each study had been combined into a whole through a listing of themes which described experience of patients with DM during COVID-19 pandemic. This process was repeated until the new themes were sufficiently abstract to explain all of our initial descriptive themes. Overall, this process resulted in the generation of 6 analytical themes (Table 4).

Table 4 Themes with translation of the original study themes

Paper	Perception toward COVID-19	Advantage in diabetes management	Psychosocial burden	Disrupted diabetic management	Getting healthier	Guidance needs
Grabowski, et al.[12] 2020	✓	✓	✓			
Shi, et al.[13] 2020				✓		
Grabowski, et al.[14] 2021			✓	✓	✓	
Al-Moteri, et al.[15] 2022		✓	✓	✓	✓	
Cartagena, et al.[16] 2022			✓	✓	✓	
Mikkelsen, et al.[17] 2022		✓			✓	✓
Pleym, et al.[18] 2022			✓	✓	✓	
Upsher, et al.[19] 2022	✓		✓	✓		✓

Findings

Overview of the Studies

This review included 8 studies involving adult with type 1 and type 2 DM and latent autoimmune diabetes in adults. The study participants ranged in age 20-79 years. Both men and women were included in the studies. Most studies[12,14-19] involved diabetic patients while only one study[13] recruited diabetic patients after contacting COVID-19.

Methodologies used in the reviewed studies were descriptive qualitative (n = 7) and phenomenology (n = 1). These studies were conducted in Denmark (3), Spain (1), Norway (1), UK (1), Saudi Arabia (1), and China (1). The sample sizes varied from 8 to 29 and three studies included patients of both type 1 and type 2 DM. Six themes arose from our analysis and synthesis, and were described below:

Perception toward COVID-19

This theme presented perception of the patients regarding diabetes and COVID-19 as reported in two studies.[12,19] The patients perceived that type 2 DM was not a risk factor for Covid-19. Thus, they did not observe themselves as being at an increased risk and did not acknowledge any remarkable connection between diabetes and COVID-19. One participant mentioned that *"No, you're a person first, and you know a diabetic second…I don't think I'm any more susceptible or the consequences will be any greater to it than any other person of my age."*[19 (p.7)] Some patients were confused about their own risk as they reflected that no one informed them about relationship of diabetes and COVID-19.[12]

However, some patients felt more concerned about COVID-19 due to their diabetes. They perceived themselves as very risky because they were aware that diabetes and its complications could place them at higher risk than other people. One participant said *"Yes, of course, I'm a little worried. It's been difficult to regulate myself. I have a feeling that the more unstable your blood glucose is the worse your immune system is–and that makes me think that the virus might find an easier way in with someone who is poorly regulated. So that's the reason I've been more scared or nervous–I've been poorly regulated."*[12(p.7)]

Advantage in diabetes management

The theme captures the positive effects of COVID-19 on diabetes management, which appeared in three studies.[12,15,17] Some people with diabetes found that they could take advantage of being isolated during the COVID-19 pandemic. They reported that family and social support were their main sources of support in diabetes management during the COVID-19 pandemic. Getting support from their family helped easing the stress from the lockdown. Moreover, they received the support from the healthcare providers. One participant mentioned that *". . . healthcare team was very helpful and supportive during the lockdown . . . they [healthcare team] never stop following my health, they are ready when I need them even during weekends."*[15(p.7)]

The COVID-19 pandemic had provided better opportunities for the patients with DM to control their blood glucose. Being in the vulnerable group, they considered themselves as being in a need of special attention. Due to lockdowns and restrictions, they experienced having more time to focus on their treatment and to think about their general health.[12,15,17] One participant reflected that *"I had more time to either have a bad conscience about having too high blood glucose or more time to find out what this oatmeal actually does to my*

blood glucose, when I need to take some more insulin, and so on. So, in that way, I had time to go a little more in-depth with the treatment, which you don't have time for in everyday life."[17(p.340)]

Psychosocial burden

This theme focuses on the emotional and relational impact of COVID-19 pandemic which presented in 6 studies.[12,14-16,18-19] Most participants described that they were fear, anxiety and worry about COVID-19 infection and diabetes management. For example, they were fear of getting sick from COVID-19 and concerned that suboptimal diabetes control would make them more vulnerable to COVID-19. One participant mentioned that *"I've had difficulties managing my blood glucose levels. I have the feeling, that the more unstable you are, the worse your immune system is. So that way I think that the virus may more easily gain a foothold in people [with diabetes] who have poor or suboptimal diabetes control."*[14(p.8)] Moreover, some participants experienced feeling of loneliness due to social isolation.[19]

The lockdown and the perception of being at risk affected routines and everyday life such as their roles. Some diabetic patients had negative feeling such as regrets and fears due to having everyday life turned upside down. One participant with type 1 diabetes mellitus described that *"I do understand that it's frustrating to live with a diabetic right now, because there's really not a lot I can help him with. Normally we're divided the chores and that's just completely [obscenity] up right now. I don't do any shopping, I don't see any friends, I can't go to work and since I'm working freelance, I make less money. I can't go to university to meet with my study partner 'cause I just think it's too dangerous."*[12(p.9)] Moreover, to avoid bringing the COVID-19 virus into the home, they experienced difficulties socializing with family, friends, colleagues and others.[18]

Disrupted diabetes management

This theme focuses on how diabetes management had been affected by COVID-19 pandemic which reported in 6 studies.[13-16,18-19] Diabetic patients had to change their daily routine due to the lockdown that affected diabetes self-management. For example, they might not be as motivated or know how to manage their diabetes as they used to. This made it difficult for them to stay healthy and lead a normal life. They described difficulties in maintaining a healthy lifestyle such as healthy diet and physical activities.[14-15,18-19] They ate less healthy food, ate more snack and decreased their usual amount of exercise. One participant said that *"it (lockdown) has impacted my life ...as I am just sitting for a long time . . . it has become my habit now. I think balancing sugar-to-physical activity . . . is a bit more difficult now."*[15(p.6)]

Experience health problems such as hyperglycemia, physical discomfort, and insomnia during the isolation after contracting COVID-19 disheartened diabetic patients from self-managing the diabetes and decreased their motivation to self-manage their

diabetes. One participant described that *"I cannot fall asleep at the isolation site. The more I want to sleep. the less I can fall asleep. This makes me feel very tortured ... I have little energy to maintain good diabetes self-care behavior."*[13(p.3719)]

Moreover, higher level of stress due to financial insecurity from lockdown, stigma, dissatisfaction, and anxiety toward COVID-19 led to fluctuation of blood glucose level. Some of diabetic patients had to find the right insulin dose. One participant mentioned that *"We're in a situation now where we barely move, like when you're working from home like I am. Then you need much more insulin, and that just happened from one day to another...but you don't know how much [insulin you need], it's not something you can calculate, so you just have to guess."*[14(p.4)]

The shortage of resources during COVID-19 pandemic was an important barrier experienced by most participants. For example, on-site care for chronic illnesses was postponed and shortage of hypoglycemic medications and lack of diabetes diet at the isolation sites were expressed.[13,16] One participant mentioned that *"During the pandemic no diabetes care was available. And even now, there were some people who were being told over the phone that it wasn't important ... they're told not to come because no tests were being done."*[16(p.6)] The lockdown and shortage of health service leaded to a lack of professional guidance and family support which challenged diabetic patient on self-management. One participant expressed that *"Every morning, [healthcare providers] only ask if we feel comfortable and measure our body temperature... blood glucose is not monitored at the isolation site."*[13(p.3720)]

Getting healthier

This theme presented the actions that diabetic patients applied to handle changed conditions for diabetes management and psychosocial strain related to COVID-19 and diabetes mellitus which reported in 6 studies.[14-19] During the lockdown, diabetic patients tried to change their bad dietary habits and focus on healthy food. Furthermore, some of them discovered alternative ways for maintaining their physical activities such as walking and gardening.[14-15,17,19] One participant described that *"well due to the lockdown, my routine has been disturbed. You see I have a tight schedule, but I've never missed outside walking... now I am getting time but then also I am unable to go outside for long walk. I missed that I have made a shift from outside to short yard walking and found myself accepting that."*[15(p.7)]

Many participants had chosen to focus on their mental well-being. They acquired supports and joy within their family and used positive thinking as the main strategies to cope with situation.[18] They had stopped following the news of COVID-19 or tried to keep themselves busy.[17-18] One participant said that *"After all the worst-case scenarios that were presented in the beginning, I stopped following the news. I just felt like it was getting to be too much for me. So, I stopped reading about the research that came*

out."[17(p.339)] In addition, some of them used social media platform for maintaining social interaction.[14,18]

Most of participants applied personal protective equipment such as hand washing, working at home, ventilation of the home, and social distancing.[16,18] One participant mentioned that *"I kept away because I thought I was much more likely to infect them than they were to infect me ... so to avoid contagion I kept away from them 8:17."*[16(p.8)]

Guidance needs

This theme focused on what patients with DM needed for managing their condition, which presented in 2 studies.[17,19] They reflected that they preferred diabetes-specific advice from healthcare professionals regarding COVID-19. They thought diabetes-specific advice would prevent them from COVID-19. One participant said that *"I think it [diabetes-specific information] would be helpful and so because we can take extra precautions you know... [information] from the GP would be advisable because they are the closest contact with us.*[19(p.6)]

Others experienced a feeling of lacking information about diabetes and the pandemic and support from their nurses and doctors. Thus, they reflected that to get a better understanding of how to think about their own risk, the nurses and doctors should reassure them about COVID-19 risk factors. One participant said that *"It has been nice to get a clarification, but I just think that clarification came a little late.*[17(p.338)]

Discussion

This qualitative systematic review brought the evidence concerning people with diabetes's experiences during COVID-19 pandemic. They recognized themselves as belonging to risk groups or being vulnerable. This perception seemed to be both good and bad in relation to diabetes. Some diabetic patients ignored themselves as a risk group, which turned into negative views on diabetes identification and negative self-understandings. Negative views of patients with diabetes from this review were in line with the experience of older adults during the midst of COVID-19 crisis that was presented in a previous study.[22]

The finding from this review about an increased psychological burden of patients with DM during the COVID-19 pandemic is consistent with other studies.[23-24] We covered that psychological burden among these patients during COVID-19 pandemic increased over time such as fear and anxiety. This could led to diabetic distress which refers to a psychological condition related to the burden of living with diabetes and might be a general stress from the severity of the pandemic situation.[2 5] Based on a previous study, diabetes stress was linked to poorer psychological health in patients with diabetes during the COVID-19 pandemic.[2 6] However, in our review, the positive actions taken by patients with diabetes included actively avoiding media, thinking positive about lockdown, and complying with advices on infection control.

Patients with diabetes experienced a disruption in their usual everyday life that challenged them for adapting to a changed daily life and having to adjust to new diabetes management routines. Because of the lockdown, the patients had adopted a rather sedentary lifestyle. Alteration of daily routines brought challenges such as less physical activity and an increased amount of unhealthy food. To account for the lack of physical activity, they acknowledged and implemented new ways of physical activities that complied with social distancing requirements. This finding was in line with a study[27] showing that patients living in the countryside or with outdoor spaces in the surroundings continued to carry out physical activity such as walking and attending to the garden or animals because the activities did not involve contact with other people and took place near their house. Moreover, increased in food intake or unhealthy food turned to decrease with increasing the adherence to the dietary recommendations[27] These methods were implemented to improve control of blood glucose level.

Even though patient with diabetes applied many strategies to maintain healthy lifestyle and good blood glucose levels, they acknowledged various barriers too. A shortage of resources was mentioned as the key factor that impeded diabetes self-management. The patients experienced, for example, unavailability of blood glucose monitoring resources, limited space at the isolation sites, and lack of standardized diabetic diet at the isolation sites. Such limited resources were in accordance with a previous study indicating that the absence of safe exercise environment and limited healthy food in the community might be a barrier to diabetes self-management.[28] Thus, this finding recommends that creating a favorable environment for self-management of chronic illness at the isolation site is important for promoting self-management.

The lack of professional guidance from healthcare providers was another barrier to diabetes self-management. Healthcare providers play a role in delivering person-centered diabetes self-management education and also assisting patients to undertake protective self-care behavior.[29] A previous study revealed similar finding that difficulty in obtaining information and seeing their healthcare provider regularly was a challenge when managing diabetes during COVID-19 pandemic.[30] It can be seen that there was insufficient support to encourage diabetic self-management during pandemic. Thus, electronic blood glucose records and a remote consultation system to provide realistic diabetes self-management education and support should be established.

Strengths and limitations of this review

As many studies conducted in different countries were identified, this synthesis would help to provide recommendation for future clinical practice. A limitation

of this review was that a single author initially screened records, which could have led to the possible exclusion of relevant studies. Nevertheless, any questions on inclusion or exclusion were discussed with a second author who also checked that all full-text articles selected for this review. Moreover, another limitation is that this review included only published paper in English and excluded unpublished paper in other language or grey literature. The rigor of the synthesis was enhanced by a second author completing independent dual data extraction of include studies and discussing about the emergence of themes.

Conclusion and Recommendations

This study highlighted that during COVID-19 pandemic, patients with diabetes experienced difficulties in diabetic self-management and psychosocial burden. They perceived risk of COVID-19 infection. Following the lockdown, it was a huge challenge for everyday routine practices to maintain balance blood glucose among diabetic patients. They faced with some barriers to diabetic self-management such as inadequate knowledge, lack of support, and negative emotions. Thus, some coping strategies adopted by these patients were highlighted to take control of their condition. Moreover, support, especially from families, was also important.

Implications for practice

Research indicates that many patients with diabetes lived under increased stress during the COVID-19 pandemic. Thus, accessibility of healthcare providers for personalized advice should be provided to decrease distress and support suitable diabetes self-management. As patients with diabetes required information about ways to manage diabetes during COVID-19 pandemic and experienced many barriers, thus devising interventions to improve information and formulating targeted strategies for the patients to overcome barriers are important to promote successful self-management. Nurse should create interventions to improve coping with negative emotions in these patients. We recommend that rehabilitation for patients with diabetes after contracting COVID-19 should be integrated in nursing care.

Implications for further study

Future research is needed to explore more about management of diabetes in situations that require a degree of isolation. Researchers should focus on how best to tailor nursing interventions to support the patients to perform diabetes self-management during COVID-19 pandemic. In addition, how patients with diabetes experience and manage after COVID-19 treatment and what the support needs of these patients living with post COVID-19 should be investigated.

References

1. World Health Organization. WHO Coronavirus (COVD-19) dashboard [Internet]. Geneva: World Health Organization; 2022 [cited 2022 Jul 19]. Available from: https://covid19.who.int/

2 . The Johns Hopkins Coronavirus Resource Center. Mortality analyses [Internet]. Maryland: The Johns Hopkins Coronavirus Resource Center, Johns Hopkins University & Medicine; 2022 [cited 2022 Jul 19]. Available from: https://coronavirus.jhu.edu/data/mortality.

3. Pal R, Yadav U, Verma A, Bhadada SK. Awareness regarding COVID-19 and problems being faced by young adults with type 1 diabetes mellitus amid nationwide lockdown in India: a qualitative interview study. Prim Care Diabetes. 2021;15(1):10-5. doi: 10.1016/j.pcd.2020.07.001.

4. Chidnayee S. Nursing care people with diabetes: nurses' role in pandemic of Covid 19. Boromarajonani College of Nursing, Uttaradit Journal. 2021;13(1):30-46. (in Thai).

5. Shi C, Zhu H, Liu J, Zhou J, Tang W. Barriers to self-management of type 2 diabetes during COVID-19 medical isolation: a qualitative study. Diabetes Metab Syndr Obes. 2020;13:3713-25. doi: 10.2147/DMSO.S268481.

6. Quinn LM, Davies MJ, Hadjiconstantinou M. Virtual consultations and the role of technology during the COVID-19 pandemic for people with type 2 diabetes: the UK perspective. J Med Internet Res. 2020;22(8): e21609. doi: 10.2196/21609.

7. Wicaksana AL, Hertanti NS, Ferdiana A, Pramono RB. Diabetes management and specific considerations for patients with diabetes during coronavirus diseases pandemic: a scoping review. Diabetes Metab Syndr. 2020;14(5):1109–20. doi: 10.1016/j.dsx.2020.06.070.

8. Banerjee M, Chakraborty S, Pal R. Diabetes self-management amid COVID-19 pandemic. Diabetes MetabSyndr.2020;14(4):351-4. doi: 10.1016/j.dsx.2020.04.013.

9. Tao J, Gao L, Liu Q, Dong K, Huang J, Peng X, et al. Factors contributing to glycemic control in diabetes mellitus patients complying with home quarantine during the coronavirus disease 2019 (COVID-19) epidemic. Diabetes Res Clin Pract. 2020;170: 108514. doi: 10.1016/j.diabres.2020.108514.

10. Seers K. Qualitative systematic reviews: their importance for our understanding of research relevant to pain. Br J Pain. 2015;9(1):36-40. doi: 10.1177/2049463714549777.

11. Moher D, Liberati A, Tetzlaff J, Altman DG, PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. Ann Intern Med. 2009; 151(4):264-9. doi: 10.7326/0003-4819-151-4-200908180-00135.

12. Grabowski D, Meldgaard J, Rod MH. Altered self-observations, unclear risk perceptions and changes in relational everyday life: a qualitative study of psychosocial life with diabetes during thee COVID-19 lockdown. Societies. 2020;10(3):63. doi: 10.3390/soc10030063.

13. Shi C, Zhu H, Liu J, Zhou J, Tang W. Barriers to self-management of type 2 diabetes during COVID-19 medical isolation: a qualitative study. Diabetes Metab Syndr Obes. 2020; 13:3713-25. doi: 10.2147/DMSO.S268481.

14. Grabowski D, Overgaard M, Meldgaard J, Johansen LB, Willaing I. Disrupted self-management and adaption to new diabetes routines: a qualitative study of how people with diabetes managed their illness during the COVID-19 lockdown. Diabetology. 2021;2(1):1-15. doi: 10.3390/diabetology2010001.

15. Al-Moteri M, Plummer V, Youssef HAM, Yaseen RWH, Al Malki M, Elryah AAI, Karani AA. The experiences of people with diabetes during COVID-19 pandemic lockdown. Int J Environ Res Public Health. 2022;19(1):340. doi: 10.3390/ijerph19010340.

16. Cartagena MV, Tort-Nasarre G, Romeu-Labayen M, Vidal-Alaball J. The experiences of patients with diabetes and strategies for their management during the first COVID-19 lockdown: a qualitative study. BMC Nurs. 2022;21(1):124. doi: 10.1186/ s12912-022-00911-4.

17. Mikkelsen KZ, Rosholm A-SH, Lee K, Grabowski D. Improved self-management in people with type1 diabetes: a qualitative study of sense of coherence in daily life one year after the efirst COVID-19 lockdown in Denmark. Diabetology. 2022;3(2): 334-47. doi: 10.3390/diabetology3020024.

18. Pleym K, Iversen MM, Brostrom A. Experiences and actions related to living with type 1 diabetes during the COVID-19 pandemic in Norway: a qualitative study conducted during July to December 2020. BMJ Open. 2022;12(4):e056027. doi: 10.1136/bmjopen-2021-056027.
19. Upsher R, Noori Y, Kuriakose L, Vassiliadou I, Winkley K, Ismail K. Needs, concerns and self-management experiences of people with type 2 diabetes during the COVID-19 pandemic: a qualitative study. Diabet Med. 2022;39(8): e14883. doi: 10.1111/dme.14883.
20. Kmet LM, Lee RC, Cook LS. Standard quality assessment criteria for evaluating primary research papers from a variety of fields. Edmonton, Alberta: Alberta Heritage Foundation for Medical Research; 2004. 22 p.
21. Thomas J, Harden A. Methods for the thematic synthesis of qualitative research in systematic reviews. BMC Med Res Methodol. 2008;8:45. doi: 10.1186/1471-2288-8-45.
22. Sadang JM, Palompon DR, Suksatan W. Older adults; experiences and adaptation strategies during the midst of COVID-19 crisis: a qualitative instrument case study. Ann Geriatr Med Res. 2021;25(2):113-21. doi: 10.4235/agmr.21.0051.
23. Vasigar P, Mahendran R, Mohan R. Experience of type 2 diabetes mellitus patients during COVID-19. Int J Community Med Public Health. 2021;8(4): 2042-44. doi: 10.18203/2394-6040. ijcmph20211278.
24. Missel M, Bernild C, Christensen SW, Dagyaran I, Berg SK. It's not just a virus! lived experiences of people diagnosed with COVID-19 infection in Denmark. Qual Health Res. 2021;31(5):822-34. doi: 10.1177/1049732321990360.
25. Fisher L, Hessler D, Polonsky W, Strycker L, Masharani U, Peters A. Diabetes distress in adults with type 1 diabetes: prevalence, incidence and change over time. J Diabetes Complications. 2016; 30(6):1123-8. doi: 10.1016/j.jdiacomp.2016.03.032.
26. Joensen LE, Madsen KP, Holm L, Nielsen KA, Rod MH, Petersen AA, et al. Diabetes and Covid-19: psychological consequences of the COVID-19 pandemic in people with diabetes in Denmark-what characterizes people with high levels of COVID-19-related worries? Diabet Med. 2020; 37(7):1146-54. doi: 10.1111/dme.14319.
27. De Maria M, Ferro F, Vellone E, Ausili D, Luciani M, Matarese M. Self-care of patients with multiple chronic conditions and their caregivers during the COVD-19 pandemic: a qualitative descriptive study. J Adv Nurs. 2022;78(5):1431-47. doi: 10.1111/jan.15115.
28. Smalls BL, Gregory CM, Zoller JS, Egede LE. Direct and indirect effects of neighborhood factors and self-care on glycemic control in adults with type 2 diabetes. J Diabetes Complications. 2015; 29(2):186-91. doi: 10.1016/j.jdiacomp.2014.10.008.
29. Bullen B, Young M, McArdle C, Ellis M. Overcoming barriers to self-management: the person-centred diabetes foot behavioural agreement. Foot (Edinb). 2019;38:65–9. doi: 10.1016/j.foot. 2019.01.004.
30. Purvis RS, Moore RA, Ayers BL, Felix HC, Riklon S, Andersen JA, et al. Diabetes self-care behaviors and barriers to clinical care during COVID-19 pandemic for Marshallese adults. Sci Diabetes Self Manag Care. 2022;48(1):35-43. doi: 10.1177/26350106211065390.