Contents available at ScienceDirect

Diabetes Research and Clinical Practice

journal homepage: www.elsevier.com/locate/diabres

International Diabetes Federation

Work matters: Diabetes and worklife in the second diabetes attitudes, wishes and needs (DAWN2) study

Bryan Cleal [a,*], *Ingrid Willaing* [a], *Heather Stuckey* [b], *Mark Peyrot* [c,d]

[a] *Diabetes Management Research, Steno Diabetes Center Copenhagen, Copenhagen, Denmark*
[b] *The Pennsylvania State University College of Medicine, Hershey, PA, USA*
[c] *Loyola University Maryland, Baltimore, MD, USA*
[d] *Western Norway University of Applied Sciences, Bergen, Norway*

ARTICLE INFO

Article history:
Received 23 October 2018
Received in revised form
22 January 2019
Accepted 25 February 2019
Available online 27 February 2019

Keywords:
Work
Self-management
Social support
Psychosocial experience

ABSTRACT

Aims: The aim was to understand diabetes-related barriers and successes that people with diabetes (PWD) have in the context of work outside the home.
Methods: The DAWN2 survey of adults with type 1 or type 2 diabetes mellitus contained open-ended items about living with diabetes. All responses to these questions were reviewed and references to worklife were extracted for analysis. An emergent coding schema was developed and validated by two independent coders (kappa = 0.875).
Results: In total, 328 PWD wrote about work, 93 (28%) with type 1 and 235 (72%) with type 2, of whom 90 took insulin. Analysis generated five themes: (1) Work as context for learning about diabetes; (2) Work as an arena for personal achievement and self-identity with diabetes; (3) The demands of work conflict with the demands of diabetes self-care; (4) Discrimination and stigma in the context of work; and (5) Social support in the context of work. Several of these themes identify challenges relating to the impact of diabetes upon work, and vice-versa. However, coping strategies and supportive social relations generated affirmative psychosocial experiences.
Conclusion: The challenges that diabetes, its treatment, and its complications can have for working adults highlights the importance of social support in the work environment.

1. Introduction

Worklife is where most adults spend a large proportion of their waking hours for most of their lives. Not only does it provide a primary source of income, it also is a key context in which social relations are developed and social identity is articulated. For people with chronic illness, worklife is often in tension with the self-care activities needed to manage their condition [1]. In the case of diabetes, self-management is something which PWD have explicitly described as difficult [2]. The balancing act between these different life domains highlights the complexity of managing diabetes in everyday life, something which does not receive adequate attention

* Corresponding author at: Niels Steensens Vej 2, Gentofte 2820, Denmark.
E-mail address: bcle0007@regionh.dk (B. Cleal).
https://doi.org/10.1016/j.diabres.2019.02.025
0168-8227/

from healthcare professionals [3], despite the need to deliver person-centred care to PWD.

One of the primary objectives of the second Diabetes Attitudes, Wishes and Needs (DAWN2) study [4] has been to improve understanding of the unmet needs of adults with diabetes and to identify how different contexts can support a more person-centred approach to diabetes care. Moving beyond an exclusive focus on healthcare systems and professionals, DAWN2 implicates the wider community of which people with diabetes (PWD) are a part as a key stakeholder in the provision of person-centred care. In this article, we draw upon qualitative data obtained from the DAWN2 study [5] to focus on the specific context of worklife.

The potential significance of work for PWD was signalled within the key benchmarking indicators of DAWN2. One-third of PWD reported that diabetes had a negative impact on their work or studies, and less than a third reported that they experienced people at work or school as supportive [6]. A previous publication on results from the open-ended questions posed in DAWN2 covered a range of negative and adaptive psychosocial experiences of PWD [5]. The relationship between work and diabetes emerged as a theme connected with negative psychosocial experiences and, in particular, as an arena in which PWD were likely to experience discrimination.

The fact that diabetes can be challenging in relation to worklife is well supported by epidemiological data, where PWD are observed to be relatively vulnerable to a range of negative work-related outcomes, such as early retirement and lower income [7,8]. Over half of PWD not engaged in full-time employment reported that their diabetes prevented them from undertaking full-time employment [6]. Yet, with few notable exceptions e.g. [9,10], the factors underlying the negative relationship between diabetes and worklife and what can be done to ameliorate them have received relatively little attention. Knowledge regarding the specific challenges faced in the context of worklife and the potential for this context to provide support for diabetes self-management thus represents an unmet need for PWD.

As is emphasized in DAWN2, however, the onus for positive change cannot be exclusively placed with the healthcare system and healthcare professionals. The wider community to which PWD belong also has a vital role to play; unfortunately, there is evidence to suggest that communities are failing PWD in this area [11]. So while worklife may provide access to social relations and provide a context through which to articulate social identity, PWD also experience worklife as a context in which they experience discrimination and stigmatization [5,11]. Such experiences impact upon psychological well-being, an impact which may, in turn, have a negative influence on diabetes self-management. Participation in worklife has been shown to possess potential for positive outcomes among people with poor health [12] but discrimination and stigmatization negate the potential for worklife to provide benefits to PWD.

In this study we seek to understand the unmet needs of PWD, using the DAWN2 data to investigate how diabetes impacted the worklife of PWD and, conversely, how work and the work environment impacted diabetes self-management.

2. Subjects, materials and methods

The overall design of the DAWN2 study has been described in detail elsewhere [4]. To briefly summarize, it consisted of questionnaires administered in 17 different countries to three distinct samples: (1) adults with type 1 or type 2 diabetes mellitus; (2) adult family members of adults with diabetes; (3) healthcare providers engaged in the treatment of adults with diabetes. Samples in each country were obtained using the same sampling quotas, based on a number of respondent characteristics. For the purposes of this study only the data from PWD are analysed.

The DAWN2 questionnaire asked open-ended questions regarding the following: (1) an experience that had an impact on how participants managed diabetes; (2) challenges participants have faced; (3) successes of participants; (4) wishes for diabetes-related improvements [4]. All responses were, where applicable, translated from the original language into English.

English transcripts were the basis for coding responses with qualitative software (Nvivo 10; QSR). To establish the viability of a specific research focus on worklife, the lead qualitative analyst for DAWN2 (HS) examined 20% of the PWD qualitative data to determine the extent to which the topic of work was addressed. Subsequently the first author (BC) reviewed all PWD qualitative data and extracted all excerpts in which respondents provided comments bearing upon worklife. All authors contributed to the development and refinement of a coding schema, which was subsequently applied to the data by two research assistants with a very high level of agreement ($\kappa = 0.875$). Upon further review the research team decided to discard 43 quotes because they were not sufficiently meaningful to address the relationship of work to diabetes e.g. the participant had simply written the word 'work' as a response. Conversely, the team agreed that 12 quotes could not be adequately described by a single code and were multi-coded as 26 extracts, e.g. statements in which diet and exercise were articulated in a single sentence. The 26 extracts are counted within the final number of codes within the overall coding structure (see Table 2).

After data were coded, a thematic analysis [13] was applied to the codes, in accord with the objective of identifying more general patterns within the data. Codes were organized into themes and themes are exemplified through the use of compelling and indicative extracts which relate the themes back to the original research focus and pertinent literature.

3. Results

In total, 328 individuals commented on some aspect of work via the open-ended questions in the survey and were included in the analysis (see Table 1). People with type 1 diabetes mellitus and men were somewhat overrepresented in this sub-sample compared to the DAWN2 respondents as a whole [6]. The 93 individuals who commented on work constitute 6.8% of the 1368 individuals with type 1 diabetes who participated in the DAWN2 survey. The 235 individuals with type 2 diabetes who commented on work constitute 3.3% of the 7228 individuals with type 2 diabetes who participated in the DAWN2 survey. The fact that proportionally more

Table 1 – Participant characteristics (N = 328).

Diabetes Type and Treatment	Gender	N	Mean Age (yrs)	Mean Diabetes Duration (yrs)
Type 1 diabetes	Men	49	38.5	18.4
	Women	44	41.7	24.7
Type 2 diabetes	Men	58	54.5	14.1
Insulin treated	Women	32	52.1	13.9
Type 2 diabetes	Men	90	56.3	8.5
Not insulin medicated	Women	55	51.6	7.6

people with type 1 diabetes comment upon work may reflect the fact that, due to age at onset, they will generally have a longer exposure to the issues pertaining to diabetes and worklife. Likewise, most people with type 1 diabetes will have insulin-treated diabetes during their worklife and be required to deal with potential challenges pertaining to the intake of exogenous insulin in the worklife context, whereas a much lower proportion of people with type 2 diabetes will confront this situation, either because they did not have diabetes or did not take insulin during their years of work.

Five themes in the data pertaining to the relationship between diabetes and worklife were identified. Ordering of the themes is organized in accordance with the following rationale; acquisition of knowledge about diabetes and the self in the context of work (Themes 1 and 2), challenges associated with worklife (Themes 3 and 4) and the conditions which support PWD managing these challenges (Theme 5). Table 2 presents the codes comprising these themes and the number of times each code appeared in the data, along with a sample excerpt and the profile of the respondent who provided that excerpt.

Theme 1: Work as context for learning about diabetes

Work was a context in which PWD acquired and exchanged information about diabetes and diabetes self-care. Work provided a context for learning about diabetes in cases where people were diagnosed at work through routine health checks, or due to health concerns experienced in the act of working ("*I felt dizzy suddenly while working and after having check-up from a doctor I came to know that I have diabetes.*"). Knowledge about diabetes also could be acquired due to the nature of their work (e.g., as a nurse or doctor's assistant). Information about diabetes could be obtained from co-workers, either in the form of direct advice or anecdotes ("*A work colleague told me that one of his father's feet had been amputated because he didn't take care of his diabetes properly. That influenced me a lot.*") or through observation of other PWD at work ("*One of my work colleagues who suffered from diabetes did not take the proper precautions and watching how his health was affected made me determined that it would not happen to me.*"). Finally, when confronted with the prospect of demotion or job loss, work could serve as a motivation for PWD to understand and practice better diabetes self-care:

> *"I started to prepare for getting back to the previous position. I checked sugar level daily. In the morning before eating the level was elevated, after drinking coffee with sugar it got lower. I went to the doctor suggesting that I would lose weight and would stop taking drugs and would start using herbal medicines. I did as promised and lost 9 kilos. I went to the laboratory for checking sugar level every day for a week. Then I went to the doctor with the laboratory results and he provided me with a testimonial that my condition is better. I went to work with the testimonial and after a periodic medical examination they gave my previous job back."*

Theme 2: Work as an arena for personal achievement and self-identity with diabetes

PWD demonstrated ingenuity and resourcefulness in balancing the demands of work with the demands of diabetes. Diagnosis with diabetes could act as a catalyst for changes in lifestyle and attitudes toward work that were more amenable to good diabetes management ("*I only had difficulties in the beginning, later on the challenges went away. My first success was to harmonize the [diabetes] management with my work.*"). In general, balancing the demands of work with the demands of diabetes required considerable forethought on the part of the PWD ("*Planning and management are assets for diabetics at work.*"). For example, PWD could use work as an opportunity for better self-care ("*I've made great progress by increasing my physical activity by, among other things, bicycling to work 15 km each way.*").

Continued participation in work was regarded as a measure of success in terms of their diabetes self-care ("*I take my medicine, work my 37 h a week, and haven't had a single sick day since I was diagnosed.*"). More generally, work success was used as metric for good health ("*When they told me that I'm a type-2 diabetic, it was a surprise. I've worked all my life. I haven't had problems.*"). Aside from the material advantages that accompany being employed, many people attached a symbolic value to work.

Theme 3: The demands of work conflict with the demands of diabetes self-care

The conflict between the demands of work and the demands of diabetes self-care was articulated in a variety of ways. The need to attend regular medical appointments was not always compatible with the demands of employers ("*. . .no measures for visits and treatment are implemented.*"). When present at work, attending to their diabetes (e.g., monitoring blood sugar and taking medication) was often a challenge when such activities required that they, even if only briefly, stepped out of their role as employee. Likewise, food

Table 2 – Data map of themes and codes.

Code	# of Occurrences	Definition	Illustrative Quote	Respondent Profile
Theme 1: Work as a Context for Learning about Diabetes				
Diagnosis of Diabetes at Work	8	Learning about diabetes is related to diagnosis of diabetes at work.	*"It was during one of the approval tests for work. They checked my blood sugar. Surely I was sick before, but I did not know about it. I went to a diabetologist and that's how it all started."*	Polish man aged 61, with type 2 diabetes, not insulin medicated, and living with diabetes for 6 years.
Work as a Source of Knowledge about Diabetes	18	Work provided a context in which people could learn about diabetes and its potential consequences.	*"By chance I learned from a colleague at work, that all her relatives suffer from a severe form of diabetes, they had their feet amputated, and because of that, that colleague of mine and her children have to undergo tests every year. This story made me be more serious about my illness."*	Russian woman aged 60, with type 2 diabetes insulin medicated and living with diabetes for 6 years.
Theme 2: Work as an Arena for Personal Achievement and Self-Identity with Diabetes				
Coping	25	Demonstration of ingenuity in balancing the demands of work with the demands of diabetes self-care.	*"I work part-time as a stocker at a grocery store, but when the manager changed I went from part-time to full-time. I got extremely tired, and thought it was because he wasn't accustomed to the work at first. However, a friend said that I might be getting tired because of diabetes. I learned that I wouldn't get so tired if I took breaks, and I learned the importance of developing self-awareness of the characteristics of diabetes (easily getting tired, etc.)."*	Japanese woman aged 22, with type 1 diabetes, and living with diabetes for 11 years.
Work as an Indicator of Health	32	Work used as an indirect measure of health; (in)ability to continue working as an indication of general health and success in managing diabetes.	*"My diabetic specialist used me as an example to other diabetics, showing them that I had a normal and active life despite my diabetes. I have been in upper management at a large company, I've done multiple business trips abroad, I've lived in the United States, etc."*	French man aged 63, with type 1 diabetes, living with diabetes for 51 years.
Theme 3: Demands of Work Conflict with Demands of Diabetes Care				
Clinical Management	5	Clinical management of diabetes and the time needed to attend to this.	*"I have had some employers in the past that have been really nasty because I have so many doctors' appointments."*	African-American woman aged 24, with type 1 diabetes, living with diabetes for 9 years.
Self-Management	22	The work situation is not amenable to taking time out to medicate or monitor.	*"I work in a courtroom, and cannot leave it if I feel sick, I am stuck there because I am the court reporter. So when I first got diabetes they put me on Glucophage, and it just KILLED me, hurt my stomach from the beginning, and made me get violently nauseated and also got diarrhea so bad that it was unpredictable when I would have to jump and run. Consequently, because I have to work, I couldn't take the meds."*	Hispanic-American woman aged 64, with type 2 diabetes not insulin medicated, living with diabetes for 9 years.
Diet	28	The timely consumption of food is a challenge.	*"I told my employer that I need additional breaks during the early shift in order to eat something. Unfortunately, that is barely possible so that I (I work at the register) have to say I am going to the bathroom, to eat something there. Very appetizing!!!"*	German woman aged 47, with type 2 diabetes not insulin medicated, living with diabetes for 7 years.

(*continued on next page*)

Table 2 – (continued)

Code	# of Occurrences	Definition	Illustrative Quote	Respondent Profile
Energy & Exercise	16	Worklife could take a toll on the physical and mental resources of PWD in meeting the recommended amount of physical exercise.	*"I work nights so it's hard to get enough sleep making it hard to get enough exercise. When I do get enough sleep I am able to control my diabetes with diet and exercise."*	Hispanic-American man aged 51, with type 2 diabetes, not insulin medicated, and living with diabetes for 4 years.
Glucose Control & Hypoglycemia	32	The work context resulted in blood sugar outside of the normal range and was challenging at both practical and emotional levels.	*"At work I'm behind the computer a lot these last two weeks, another job. Normally I do production work that entails a lot of walking. Due to the change in the evening before dinner I have a very high blood sugar level of around 18 (mmol/L). I will have to keep a close eye on this and change it, more insulin, less food. This is a bothersome situation for me."*	Dutch female aged 41, with type 1 diabetes, and living with diabetes for 23 years.
Voluntary Work Termination	8	The challenge of balancing the demands of work with the demands of diabetes had proved too much, leading to a choice to leave their job.	*"Losses? Yes. I had a very good job, and because of my illness I had to quit."*	Polish man aged 50, with type 1 diabetes, and living with diabetes for 21 years.
Theme 4: Discrimination and Stigma in the Context of Work				
Work Exclusion (Not Hired)	23	Difficulty obtaining work as a direct result of having diabetes based upon a view that people with diabetes represented a burden to employers.	*"I think the most life changing thing was when I was a student and I applied to the Police Dept and they denied me and I was told that it was because I was a diabetic. I decided then that I would maintain my health and not let diabetes control my life and dictate what I want to do."*	American male aged 55, with type 1 diabetes, and living with diabetes for 48 years.
Work Downgrading	8	Diabetes had an impact on career trajectory.	*" I worked at the railway, it was a night shift work related to train driving, after the diabetes was diagnosed I was moved away from the action 2 years before retirement. So I got a job where the traffic was more intense but I was supervised."*	Polish woman aged 56, with type 2 diabetes not insulin medicated and living with diabetes for 3 years.
Work Termination (Involuntary)	15	Diabetes as a cause of dismissal from work due to perceived safety concerns or employer antagonism toward having people with a chronic health condition on their payroll.	*"There was once a happy go lucky guy who had to renew his license, since this happy go lucky guy drives trucks he first had to get a medical checkup and that's when they discovered he had diabetes, thus no renewal of his C and D license. The happy go lucky guy was not happy about this, because all of the sudden he was unemployed and sitting at home."*	Dutch man aged 46, with type 2 diabetes, not insulin medicated, and living with diabetes for 1 year.
			"I was employed for the probation period. In the meantime I had an infection. I had to stay in hospital for 2 days. My employment was terminated and no cooperation continued. After I submitted the doctor's leave and justifying my absence the employer decided that he cannot see any possibility of my further employment."	Polish man aged 30, with type 1 diabetes and living with diabetes for 13 years

Theme 5: Social Support in the Context of Work				
Presence of Social Support	30	Support from employers and/or colleagues could be *practical* (e.g. help with balancing demands of work with demands of diabetes) and/or *emotional*.	*"At my work, I am completely blind sometimes. I had to leave quickly with the help of coworkers and they admitted me quickly. This made me worry more about my diabetes."* *"The thing that I am talking about happened at work when all my colleagues told me that they would always be there for any problems."*	Chinese-American man aged 32 with type 2 diabetes not insulin medicated and living with diabetes for 3 years. Italian woman aged 56, with type 2 diabetes not insulin medicated and living with diabetes for 16 years.
Absence of Social Support	27	The absence of social support from employers and/or colleagues could be *practical* (e.g., not being allowed to take breaks to monitor blood sugar, medicate or consume food) and/or *emotional*, leading to negative feelings.	*"The place I was working at a few years ago, knew I was a Diabetic, and I told them I had to check my sugar often and eat on a regular basis. But, they would not work with me or give me like ten minutes to get it done."*	African-American woman aged 37, with type 1 diabetes and living with diabetes for 13 years.
Social Support in the Context of Hypoglycemia	17	Support (or its lack) in relation to hypoglycemia had an emotional impact.	*"I was at work and got very quiet and physically distant and answered slowly. Was asked whether my blood sugar wasn't too low or whether I was thinking about something. Measured blood sugar, and it was too low and got it corrected. Afterwards we talked about diabetes and a colleague told me, that I "stick out" when my blood sugar is too low. I get quiet and calm at my place of work, easy to "spot me," and in a good way encourage me to control my blood sugar, if I react in this striking way. It's nice with some support, since it can be difficult to recognize when blood sugar can fall so slowly."*	Danish man aged 45, with type 1 diabetes, and living with diabetes for 17 years.

was not always available when needed for optimal glucose management, and breaks were unpredictable ("*It's hard to control my blood sugar at work since I can't always make the time to eat.*"). The work context could also impact diabetes self-care indirectly ("*. . .when I'm busy with work I don't get time to exercise.*").

As with the case of diabetes self-care more generally, the threat of hypoglycaemia was prominent in people's thoughts about balancing the demands of diabetes and work. PWD were concerned about appearing to lose control and act "abnormally" in a work context ("*hypoglycaemia . . . is disabling in my professional life where I often have an active role arranging meetings, conferences.*"). If the balance between work and diabetes self-care was not met, some PWD opted out of specific types of work ("*Unfortunately due to my disease I had to change my job - too tiring and requiring too much physical effort.*").

Theme 4: Discrimination and stigma in the context of work

Any behaviour by PWD that deviated from norms at work could be viewed with suspicion, and lead to negative consequences:

> "*I work in health care and many of my colleagues blame me saying that I am not "safe" as part of a health care team because of my diabetes and that I am a very poor role model for our patients. Others have tried to get me fired. I would never have chosen diabetes or the obesity that led to it, but I now feel trapped and ostracized by my family, my co-workers and even my friends.*"

In some instances, discrimination was experienced through the absence of understanding the needs of diabetes by employers ("*Employers don't seem to realize that workplace stresses and lack of predictability have adverse effects on blood sugar levels. Lows must be dealt with, they are not an excuse to slack off.*"). Direct discrimination was experienced as consequence of direct actions on the part of employers ("*My employer learned I was diabetic and changed my job under the pretext that I would have less stress; I found myself doing a job that was less interesting and with less responsibility.*"). In fact, having diabetes may restrict access to employment. PWD reported being dismissed from work as a direct consequence of having diabetes. Even more discouraging, discrimination was evident in the process of obtaining work ("*When I went to get a job, I was not hired as soon as they found out about my illness. They said that hiring an employee with the disease is not economically justifiable, as it leads to frequent medical leaves.*"). The ramifications of job loss, for whatever reason, impacted directly on income and social status, but could also be felt indirectly, restricting an individual's capacity to make choices that would be beneficial to their health and well-being:

> "*Being out of work I can't afford to see the doctor except when he threatens to cut off my prescriptions if I don't come in and then I make payments for months. I just hope that I'll make it to Medicare age without any worse complications - and that Medicare will still be there. A lot of jobs that I could do require me to be outside and the circulation in my fingers and toes shuts down if I get cold - I live just south of the Canadian border.*"

Theme 5: Social support in the context of work

Many PWD noted that the impact of diabetes on worklife was heavily influenced by the degree to which the PWD felt support in the work environment from employers and/or colleagues. Social support could be experienced and expressed at an emotional level ("*The thing that I am talking about happened at work when all my colleagues told me that they would always be there for any problems.*"). However, social support at work was mostly through instrumental or practical help. Although the last theme contained examples of PWD not receiving support at work, some PWD found support through their employers in managing diabetes ("*My employers cook something for me when it is particularly stressful so that I avoid hypoglycaemia.*"). In other instances, support was a response to the PWD confiding in colleagues who might help, especially when dealing with the symptoms of hypoglycaemia. In addition to providing and receiving emotional and practical support, PWD also described positive experiences when providing support for each other in the context of work:

> "*Last month a person at my job that also has diabetes was preparing a speech to the board at our job and I was helping her... I was telling her that she need not let her condition stop her from what she wants or, better yet, what she needs. . . Hearing myself talk about diabetes actually uplifted myself because I felt like a mentor. I was making a difference with someone else because of my experiences.*"

4. Discussion

The themes identified in this paper reflect a range of psychosocial experiences expressed in the relationship between diabetes and work. While PWD face a number of specific challenges related to worklife, they also indicate resourcefulness in dealing with these challenges. To a large extent coping at work related to strategies used to avoid hypoglycaemia. For some this meant that they carried something with sugar at all times; yet, there were also PWD who needed to "sneak" into the restroom to eat. As seen in previous qualitative research [9], some actively maintained higher levels of blood sugar while at work to avoid "abnormal" behaviour. In some cases, coping was also a question of coming to terms with certain limitations brought about by living with diabetes. The recognition of one's limits may prove to be an important means to maintain a functional worklife [14]. The fact that PWD were prepared to go to great lengths to remain active in the labour market was, in part, driven by financial concerns. The value extracted from work was, however, more than material. Work can also be applied as a "subjective marker and reference point through which people construct narratives about value, worth and capabilities" (p. 286) [15].

It is a subjective marker of health, understood in the broadest sense [16].

Instances of discrimination and its opposite, social support, were both prevalent in the data. Social support provides a buffer against psychological distress [17] and individuals who perceive the relationship with their supervisor to be supportive and who experience high levels of involvement at work were more likely to report a positive adaptation to diabetes [18]. Social support at work also has been linked to healthier dietary behaviours and better self-care among people with type 2 diabetes and lower perceived disease burden among people with type 1 diabetes [19]. Conversely, workers with diabetes report feeling fatigue more frequently when colleagues and direct superiors show little support [20].

The support of a supervisor can have direct effects on diabetes management behaviours, but also potentially promotes a sense of self-efficacy [21] which may, in turn, reduce the perceived difficulties of managing diabetes at work. Various forms of social support – emotional, appraisal, informational and practical-instrumental [22] – are important for people with diabetes in their work environment. The degree and quality of support is vital [17], as is the timing, since there is a risk that support will dissipate over time [23]. While the DAWN2 data revealed several common psychosocial experiences for people with diabetes, types of social support needed at work varied. People with type 1 diabetes entering the labour market for the first time may experience challenges in adapting their diabetes management to the expectations of worklife [24], while the challenges of older people with type 2 diabetes may relate to the management of symptoms from diabetes and comorbid conditions [25].

The importance of a positive psychosocial environment of work for PWD has been emphasized in a number of recent epidemiological studies indicating that mental health conditions are a major source of work disability among PWD [26]. Although distress is common among PWD generally [27], our findings indicate that a large degree of distress derived from work [28] is potentially preventable, and suggest that the inclusion of line managers and colleagues [18] as sources of social support might contribute to alleviating work-related burdens for PWD.

The findings of this study emphasise the importance of the wider community in providing support for PWD and indicate how everyday worklife concerns impact self-management practices. Knowledge of the challenges PWD confront in the context of work and the means by which these challenges may be avoided or alleviated can have practical utility in the clinical encounter. That is, to the extent that HCPs are able to dialogue with PWD about work-related challenges, they will be better equipped to provide person-centred-care that supports self-management in everyday life.

Strengths of this study include the large sample size, participant heterogeneity, the multinational sample, and the rigorous coding process. Moreover, the data allowed us to capture experiences and opinions of those who, because they are out of work, often are overlooked in studies examining the impact of diabetes on worklife [29].

Limitations include the fact that there were no opportunities to follow-up with respondents regarding their comments about work, and the number of extracts pertaining to work was relatively small. However, the theme of work was emergent in the minds of respondents, as the issue of work was unsolicited. Most of the survey questions were about diabetes self-management and the psychological impact of diabetes, and only two of the hundreds of survey questions addressed work. Given that over a third of people in the DAWN2 study reported that diabetes had negatively affected worklife [6], work is clearly an important element of living with diabetes. Moreover, work was a topic of concern represented by every nationality in the DAWN2 study, by people with type 1 and type 2 diabetes, and by people who were insulin-treated and not-insulin-treated.

In line with previous publications analyzing the DAWN2 qualitative data, this analysis sought to identify themes common to the different participating nations and the different types of diabetes. There are important differences between countries and types of diabetes pertinent to the relationship between diabetes and worklife (e.g., the country with the highest percentage of PWD reporting that diabetes negatively affected worklife scored three times as high as the lowest country); however, these are not captured in our analysis due to the lack of sufficient data on work in each country or each clinical population. Further studies looking into the significance of these distinctions are encouraged.

Our respondents stressed the general importance of work, both in itself and as a marker of health and wellbeing. Success or failure at work was frequently used as a proxy measure of intangible value. In this way, work generated value in people's lives that is both material and symbolic, which indicates an important benefit to finding ways to improve and support the working lives of PWD.

The DAWN2 data pertaining to work indicate that much of what it experienced as burdensome by PWD may be preventable or manageable. Social support moderates (ameliorates or exacerbates) work-related burdens, a point that highlights the importance of the wider community of which PWD are a part and its influence on psychological wellbeing. The results of this study indicate that the extent to which the physical and social aspects of the work environment are supportive of PWD, the conflict between the demands of work and the demands of diabetes self-care can be diminished. Future research should focus on developing, implementing, and evaluating the strategies resulting from this study to improve the quality of worklife for PWD.

Acknowledgements

The authors acknowledge the contribution of the International Diabetes Federation, and the numerous other international and national experts and patient advocates who have contributed directly to the design of the DAWN2 study during 2010–11. The complete list of study experts and 'people with diabetes' advisers is available at www.dawnstudy.com. The authors would also like to acknowledge the contribution of Kristoffer Panduro Madsen and Anne Martine Aaberg Mortil for their assistance in the coding of data. The DAWN2 study was funded by Novo Nordisk A/S. Bryan Cleal and Ingrid Willaing are shareholders in Novo Nordisk A/S but have no declarations in relation to this article. Mark Peyrot has recently

received research grants and/or consulting fees from Calibra, Eli Lilly, and Novo Nordisk. He has received speaking honoraria from Novo Nordisk and Valeritas, and has participated in advisory panels for Calibra, Eli Lilly, and Novo Nordisk. He has received financial support from Novo Nordisk for his participation as Principal Investigator for the DAWN2 study. He has no disclosures in relation to this article. Heather Stuckey has received financial support from Novo Nordisk for her participation as lead qualitative analyst for the DAWN2 study. She has no disclosures in relation to this article.

REFERENCES

[1] Corbin J, Strauss A. Managing chronic illness at home: three lines of work. Qualit Sociol 1985;8(3):224–47.
[2] Hinder S, Greenhalgh T. "This does my head in". Ethnographic study of self-management by people with diabetes. BMC Health Serv Res 2012;12:83.
[3] Funnell MM, Anderson RM. Empowerment and self-management of diabetes. Clin Diabetes 2004;22(3):123–7.
[4] Peyrot M, Burns KK, Davies M, Forbes A, Hermanns N, Holt R, et al. Diabetes Attitudes, Wishes and Needs 2 (DAWN2): a multinational, multi-stakeholder study of psychosocial issues in diabetes and person-centred diabetes care. Diabetes Res Clin Pract 2013;99(2):174–84.
[5] Stuckey HL, Mullan-Jensen CB, Reach G, Kovacs Burns K, Piana N, Vallis M, et al. Personal accounts of the negative and adaptive psychosocial experiences of people with diabetes in the second Diabetes Attitudes, Wishes and Needs (DAWN2) study. Diabetes Care 2014;37(9):2466–74.
[6] Nicolucci A, Kovacs Burns K, Holt RI, Comaschi M, Hermanns N, Ishii H, et al. Diabetes Attitudes, Wishes and Needs second study (DAWN2): cross-national benchmarking of diabetes-related psychosocial outcomes for people with diabetes. Diabet Med 2013;30(7):767–77.
[7] Breton MC, Guenette L, Amiche MA, Kayibanda JF, Gregoire JP, Moisan J. Burden of diabetes on the ability to work: a systematic review. Diabetes Care 2013;36(3):740–9.
[8] Minor T. An investigation into the effect of type I and type II diabetes duration on employment and wages. Econ Hum Biol 2013;11(4):534–44.
[9] Ruston A, Smith A, Fernando B. Diabetes in the workplace - diabetic's perceptions and experiences of managing their disease at work: a qualitative study. BMC Public Health 2013;13:386.
[10] Detaille SI, Haafkens JA, Hoekstra JB, van Dijk FJ. What employees with diabetes mellitus need to cope at work: views of employees and health professionals. Patient Educ Couns 2006;64(1–3):183–90.
[11] Schabert J, Browne JL, Mosely K, Speight J. Social stigma in diabetes: a framework to understand a growing problem for an increasing epidemic. Patient 2013;6(1):1–10.
[12] Waddell G, Burton AK. Is work good for your health and well-being? London: TSO; 2006.
[13] Braun V, Clarke V. Using thematic analysis in psychology. Qualit Res Psychol 2006;3(2):77–101.
[14] Abma FI, Bultmann U, Varekamp I, van der Klink JJ. Workers with health problems: three perspectives on functioning at work. Disabil Rehabil 2013;35(1):20–6.
[15] Vassilev I, Rogers A, Sanders C, Cheraghi-Sohi S, Blickem C, Brooks H, et al. Social status and living with a chronic illness: an exploration of assessment and meaning attributed to work and employment. Chronic Illn 2014;10(4):273–90.
[16] WHO. The Ottawa Charter for Health Promotion: First International Conference on Health Promotion, Ottawa, 21 November 1986. Geneva: The World Health Organization; 1986.
[17] Baek RN, Tanenbaum ML, Gonzalez JS. Diabetes burden and diabetes distress: the buffering effect of social support. Ann Behav Med 2014;48(2):145–55.
[18] Trief PM, Aquilino C, Paradies K, Weinstock RS. Impact of the work environment on glycemic control and adaptation to diabetes. Diabetes Care 1999;22(4):569–74.
[19] Weijman I, Ros WJ, Rutten GE, Schaufeli WB, Schabracq MJ, Winnubst JA. The role of work-related and personal factors in diabetes self-management. Patient Educ Couns 2005;59(1):87–96.
[20] Weijman I, Ros WJ, Rutten GE, Schaufeli WB, Schabracq MJ, Winnubst JA. Fatigue in employees with diabetes: its relation with work characteristics and diabetes related burden. Occup Environ Med 2003;60(Suppl 1):i93–8.
[21] Munir F, Randall R, Yarker J, Nielsen K. The influence of employer support on employee management of chronic health conditions at work. J Occup Rehabil 2009;19(4):333–44.
[22] van Dam HA, van der Horst FG, Knoops L, Ryckman RM, Crebolder HF, van den Borne BH. Social support in diabetes: a systematic review of controlled intervention studies. Patient Educ Couns 2005;59(1):1–12.
[23] Yarker J, Munir F, Bains M, Kalawsky K, Haslam C. The role of communication and support in return to work following cancer-related absence. Psycho-Oncol 2010;19(10):1078–85.
[24] Balfe M, Brugha R, Smith D, Sreenan S, Doyle F, Conroy R. Why do young adults with Type 1 diabetes find it difficult to manage diabetes in the workplace? Health Place 2014;26:180–7.
[25] Miller E, Gonzalez R, Kim JH. Vocational rehabilitation outcomes among older adults with diabetes. J Vocat Rehabil 2014;44:109–21.
[26] Ervasti J, Virtanen M, Lallukka T, Pentti J, Kjeldgard L, Mittendorfer-Rutz E, et al. Contribution of comorbid conditions to the association between diabetes and disability pensions: a population-based nationwide cohort study. Scand J Work Environ Health 2016;42(3):209–16.
[27] Fisher L, Gonzalez JS, Polonsky WH. The confusing tale of depression and distress in patients with diabetes: a call for greater clarity and precision. Diab Med 2014;31(7):764–72.
[28] Hakkarainen P, Moilanen L, Hanninen V, Heikkinen J, Rasanen K. Work-related diabetes distress among Finnish workers with type 1 diabetes: a national cross-sectional survey. J Occup Med Toxicol 2016;11:11.
[29] de Backer G, Leynen F, de Bacquer D, Clays E, Moreau M, Kornitzer M. Diabetes mellitus in middle-aged people is associated with increased sick leave: the BELSTRESS study. Int J Occup Environ Health. 2006;12(1):28–34.