

Article

Making Psychosocial Vulnerability Visible in Diabetes Care: Identification, Documentation, and Follow-Up

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Abstract

Introduction: As diabetes care becomes increasingly digitalized, stratified, and differentiated, psychosocial vulnerability risks becoming less visible within routine care and documentation. To ensure that differentiated care pathways meaningfully incorporate psychosocial stratification, vulnerability must be identifiable, documented, and revisited as part of routine clinical practice. **Aim:** The aim of this study is to explore how healthcare professionals identify psychosocial vulnerability in routine diabetes care and how such vulnerability is documented and followed up in the electronic medical record (EMR). **Methods:** This quality improvement audit with a descriptive analysis component was conducted at Steno Diabetes Center Copenhagen as part of the development of a new differentiated outpatient pathway. Healthcare professionals across disciplines submitted cases of persons with diabetes whom they considered psychosocially vulnerable. Documentation from the preceding six months was reviewed descriptively in order to find patterns of identification, documentation, care planning, and follow-up. **Results:** A total of 334 referrals representing 275 unique persons with diabetes were submitted. Psychosocial vulnerability extended beyond predefined high-risk categories, as 37% of identified cases did not align with any of the six vulnerability groups described in the Danish VIVE framework. Vulnerability often reflected cumulative everyday-life strain rather than formal diagnoses. While healthcare professionals demonstrated substantial relational attentiveness to psychosocial concerns, this knowledge was not consistently evident in formal documentation. Explicit care plans and longitudinal follow-up were uncommon, and psychosocial concerns were frequently documented as isolated observations rather than as part of structured ongoing care. **Conclusions:** Psychosocial vulnerability was frequently identified through clinical dialogue and professional judgement and often extended beyond predefined vulnerability categories. The findings highlight the importance of developing shared approaches and a shared understanding of psychosocial vulnerability across professional groups. If psychosocial stratification is to become an operational component of differentiated diabetes care, information about what burdens matter to the person must be identifiable, documented, and carried forward across encounters alongside biomedical information.

Keywords: psychosocial vulnerability; psychosocial needs; diabetes care; electronic medical records; relational knowledge; quality improvement



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1. Introduction

Healthcare systems are undergoing substantial transformation, driven by value-based healthcare initiatives and digitalization [1–3]. Concurrently, more people live longer while experiencing chronic illness, multimorbidity, and frailty [4,5].

In diabetes care, there has been an increase in the use of digital devices to monitor and support persons with diabetes [6,7]. Consequently, this digitalization is expected to shape the structural design and user interface of electronic medical records (EMRs) [8].

If EMRs prioritize measurable biomedical indicators, dimensions that depend on clinical judgement and relational understanding risk becoming less visible in routine care [9,10]. From the perspective of the person with diabetes (PWD), it is important for the healthcare system to focus over time on what matters to them and not just what biomarker might seem important for the healthcare professional (HCP) [11–13].

A recent Danish study shows that a strong biomedical orientation can overshadow psychosocial and existential dimensions of care [14].

In 2020, the Danish National Research and Analysis Centre for Welfare (VIVE) published a scientific report based on a systematic review of 147 studies, identifying six groups described as vulnerable within populations living with diabetes:

1. People from ethnic minority backgrounds;
2. People with mental illness;
3. People with multimorbidity;
4. Socially disadvantaged individuals;
5. Young people with type 1 diabetes transitioning from adolescence to adulthood (age 9–22);
6. People with disabilities [15].

Vulnerability is a human condition and, as such, a human experience regardless of whether it is the PWD or the informal caregiver [16,17]. The concept of vulnerability was chosen in this study because it encompasses both PWDs currently experiencing significant psychosocial strain and those where circumstances place them at risk of becoming burdened when confronted with additional challenges. Vulnerability is also broader than the concept of needs, as it may emerge from social, relational, and contextual circumstances rather than residing solely within the individual.

Steno Diabetes Center Copenhagen (SDCC) has initiated a fundamental reorganization of its outpatient care pathway, moving away from a traditional one-size-fits-all approach toward differentiated and more person-centred care, including stratification based on biomedical risk factors, psychosocial vulnerability, and digital competencies. A central component of the new pathway is the use of the electronic medical record (EMR) to support the systematic overview and continuous monitoring of biomarkers [18]. For psychosocial stratification to become operational within a differentiated pathway, psychosocial vulnerability must similarly be visible in routine documentation in ways that support shared understanding and longitudinal follow-up.

The present paper reports on a practice-based quality improvement initiative undertaken to better understand how healthcare professionals identify psychosocial vulnerability in routine diabetes care, and how such vulnerability is documented, structured, and followed up within the EMR.

Aim

The aim of this quality improvement audit with an interpretive analysis study was threefold:

1. To describe and characterize how healthcare professionals identify psychosocial vulnerability in routine diabetes care.

2. To assess how psychosocial vulnerability is documented and followed up in the electronic medical record.
3. To examine how current documentation practices may enable or limit the visibility and continuity of psychosocial vulnerability.

2. Methods

2.1. Study Design and Context

This project was initiated as an internal quality improvement audit at SDCC as part of the development of a new differentiated outpatient care pathway. The purpose of the audit was to improve local understanding of how HCPs identify psychosocial vulnerability in routine diabetes care and how such vulnerability is documented and followed up within the electronic medical record (EMR). The EMR used in SDCC is the EPIC system that is called “Sundhedsplatformen” in Danish.

Following completion of the audit, the findings were considered potentially relevant beyond the local setting and were therefore developed into the present paper.

2.2. Case Identification

All HCP groups at SDCC, including physicians (pediatric and adolescent care, and type 1 and 2 diabetes), nurses (pediatric and adolescent care, and type 1 and 2 diabetes), podiatrists, dietitians, biomedical laboratory scientists, and administrative staff, were invited to submit cases over a three-week period.

Cases were submitted through EPIC In Basket messages. HCPs were asked to identify PWDs whom they considered psychosocially vulnerable, though no formal definition of psychosocial vulnerability was provided. Instead, vulnerability was understood broadly as situations where psychosocial or social circumstances had either contributed to difficulties or where HCPs anticipated that difficulties might arise in the near-future due to psychosocial burden.

The audit was designed to capture vulnerability as recognized in routine clinical practice. HCPs were therefore asked to submit cases encountered during their daily work and were explicitly asked not to conduct systematic screening or review all PWDs affiliated with SDCC. This approach was chosen to reflect routine clinical identification of vulnerability and to avoid additional workload during a period of major organizational restructuring.

A total of 334 referrals were received, representing 275 unique PWDs. The remaining 59 referrals reflected multiple submissions concerning the same individual by different HCPs.

2.3. Data Extraction

All EMR reviews were conducted by the first author (KM). For each of the 275 unique PWDs, documentation from the preceding six months within the EPIC-based EMR system at SDCC was reviewed. Only documentation created within SDCC was included.

Data were extracted into a spreadsheet containing no identifiable patient information, following which the list linking submitted cases to individual PWDs was deleted from the audit workspace in the EMR. Consequently, it was not possible to reconnect the final dataset to individual PWDs or revisit specific records for additional data collection.

Other variables were recorded as categorical data and considered binary (1 = present, 0 = absent) as applicable. Variables included diabetes type, female sex, psychiatric illness, multimorbidity (2 or more chronic illnesses), social disadvantage, disability, age 9–22 years, documented psychosocial needs, documented care plans, and documented follow-up of previously identified plans.

The six vulnerability groups identified in the VIVE literature review were used as the conceptual framework for the audit. However, ethnic minority background was not included in the final analyses, as ethnicity is not systematically recorded in Denmark within the EMR and could therefore not be assessed using sufficiently reliable data. Multimorbidity was defined as 2 or more chronic diseases, not counting diabetes complications.

Psychiatric illness and multimorbidity were identified from the diagnosis list within the EMR. Social disadvantage was recorded when ongoing alcohol or substance misuse was documented either in the diagnosis list or in free-text clinical notes. Additional indicators of social disadvantage, such as homelessness, were identified through review of free-text documentation. Disabilities were identified either from the diagnosis list or from descriptions contained within free-text clinical notes.

In addition, two free-text fields were used during data extraction to summarize identified psychosocial vulnerabilities and documented plans. When available, the referral reason provided by the HCP was also recorded.

Psychosocial needs were considered present when psychosocial or social difficulties were described in the EMR documentation.

A care plan was considered present when documentation described a planned action, intervention, referral, or agreed follow-up related to psychosocial concerns.

Follow-up was considered present when subsequent documentation revisited previously described psychosocial concerns or previously documented plans.

2.4. Analysis

The analysis was descriptive. During data extraction, brief free-text summaries of identified vulnerabilities, referral reasons, and documented plans were recorded. These summaries and referral descriptions were subsequently reviewed to identify recurring patterns related to vulnerability identification, documentation practices, care planning, and follow-up.

All EMR reviews were conducted by a single reviewer (KM). To strengthen interpretation, emerging observations and preliminary interpretations were discussed within interdisciplinary clinical standard-group meetings at SDCC, where complex clinical issues are routinely discussed, and educational activities take place.

In addition, ongoing dialogue with the healthcare professionals submitting cases provided opportunities to clarify uncertainties and discuss emerging observations. These discussions were used to challenge and refine interpretations and to assess whether identified patterns were recognizable across professional groups and clinical settings.

2.5. Ethics and Data Governance

The project was initiated as an internal quality improvement audit and approved through local clinical leadership at Steno Diabetes Center Copenhagen (SDCC).

Data extraction was performed by the first author (KM), a physician employed at SDCC with authorized access to the medical records reviewed and subject to professional confidentiality obligations.

The decision to develop the audit into a scientific manuscript was made only after completion of the audit and anonymization of the dataset. No additional medical record review, data extraction, or patient-level data collection was performed following this decision.

No patient consent was obtained. The project was originally conducted as an internal quality improvement audit based on routinely collected clinical data and was only subsequently developed into a scientific manuscript after completion of data extraction and anonymization; all results presented are based exclusively on data collected as part of the original internal quality improvement audit.

The authors acknowledge the methodological limitations associated with the audit-based design, including the non-systematic identification of cases and the inability to perform additional validation after anonymization. However, the findings were considered sufficiently relevant to contribute to ongoing efforts to improve identification, documentation, and follow-up of psychosocial vulnerability in diabetes care.

Although the project was not originally designed as research, the findings were considered potentially valuable beyond the local quality improvement context. Sharing such practice-based findings may support learning and quality improvement beyond the local setting [19,20]. The purpose of this manuscript is therefore not to provide definitive estimates of psychosocial vulnerability, but to transparently report practice-based findings, including their limitations, to inform future quality improvement initiatives and research.

3. Results

3.1. Case Characteristics

A total of 334 referrals concerning 275 unique individuals with diabetes were submitted across professional groups. Nurses accounted for the largest proportion of referrals, followed by physicians and pediatric/adolescent care conferences (Table 1).

Table 1. Referrals by various healthcare professionals.

Professions	Number of Referrals
Nurses	148
Physicians	59
Child/adolescent care conference	73
Dietitians	20
Patient coordinators	19
Podiatrists	10
Biomedical laboratory scientists	5

The mean age of referred individuals was 37 years (range 1.5–89 years). The number of EMR notes per individual within the six-month review period ranged from 1 to 88, reflecting substantial variation in contact frequency and documentation intensity.

Characteristics of the included PWD are presented in Table 2.

Table 2. Characteristics of persons with diabetes identified as psychosocially vulnerable and included in the audit.

Person with Diabetes	Percentage of Included
Sex: female	52%
Type 1 diabetes	82%
Type 2 diabetes	18%
Children under age 9	5%
Young (age 9–22)	17%
Psychiatric illness	15%
Multimorbidity	25%
Socially disadvantaged	10%
Disabilities	3%

Given the submission process, Table 2 does not represent prevalence in SDCC but only in this study population of 275 individuals.

3.2. Psychosocial Vulnerability Within and Beyond Predefined Categories

Many submitted cases aligned with one or more of the six vulnerability groups identified in the VIVE literature review, and overlapping vulnerabilities were common. A total of 123 individuals were categorized within only one group, 41 within two different groups, and 9 within three groups.

However, a heterogeneous group emerged consisting of individuals who did not clearly fit predefined high-risk categories: 102 (37%) of the 275 PWDs did not fit any of the predefined VIVE vulnerability groups.

In these 102 cases, vulnerability was often embedded in everyday-life circumstances rather than formal diagnoses. For example, a 68-year-old man with type 1 diabetes was repeatedly non-attending despite stable employment and life in general. Similarly, vulnerability in a single mother was documented as having a busy everyday life, that puts herself last despite wishing otherwise. In another case, a 36-year-old woman with type 1 diabetes faced multiple cumulative stressors such as unexpected pregnancy loss in a close family member.

In pediatric care, vulnerability sometimes reflected broader family strain rather than the child's diabetes. This could be a child with an older sibling who has psychiatric disorders. The child with diabetes feels sorry for their parents and wishes to help them more.

3.3. Discrepancy Between Clinical Concern and Formal Documentation

A recurring pattern was the difference between referral language and EMR documentation. Referral messages frequently conveyed explicit, often emotional, concern, for example, *"This is a girl I am extremely worried about."*

Or

"Difficult to help."

By contrast, corresponding EMR entries were typically neutral in tone and embedded within standardized biomedical documentation.

Although psychosocial themes were sometimes recorded, they were rarely structured as explicit problems requiring ongoing attention. In several cases, the basis for perceiving an individual as vulnerable was not clearly identifiable from the EMR alone.

In several cases, concerns expressed in referral messages were not identifiable from the corresponding EMR documentation.

3.4. Limited Documentation of Care Plans and Follow-Up

When psychosocial concerns were documented, explicit care plans were infrequent, and longitudinal follow-up was rarely visible only in 37 of the 275 patients (13%).

For example, an intensive care admission for diabetic ketoacidosis was described as traumatic. However, subsequent documentation focused exclusively on biomedical markers without revisiting the psychosocial traumatic impact. In another case, family strain was described alongside a request for help, but later entries did not indicate whether support had been initiated nor did they revisit how the family was doing. In a third case, no follow-up on a son's suicide attempt was noted.

Psychosocial observations thus most often appeared as isolated entries rather than as components of structured, ongoing care plans.

3.5. Variations Across Clinical Settings

Differences in documentation style were observed between pediatric/adolescent and adult care settings. Pediatric and adolescent records more frequently included contextual and relational descriptions, including documented recognition and even praise of effort.

Adult documentation more often centred on biomedical indicators, though relational elements were not entirely absent.

4. Discussion

Given the audit-based design and the non-systematic case identification process, the resulting population cannot be considered representative of the general diabetes population. Findings should therefore be interpreted as reflecting HCPs' identification of psychosocial vulnerability in the population at SDCC rather than the prevalence of psychosocial vulnerability among PWDs.

This study explored how psychosocial vulnerability is identified and documented within routine diabetes care during the development of a differentiated outpatient pathway. There were three main findings.

4.1. Psychosocial Vulnerability Extends Beyond Categorical Risk Definitions

In this study, the six predefined VIVE vulnerability groups were identified in the majority of identified PWDs. However, a substantial proportion (37%) of the identified vulnerable cases did not fit within these categories. This indicates that reliance on these predefined groups alone may be insufficient when healthcare professionals' concern is used as an indicator of vulnerability.

A proportion of referrals involved children younger than 9 years (5%), and 17% were in the age group of 9–22 years, potentially reflecting an attentiveness to vulnerability within pediatric and adolescent care. However, the majority of referrals concerned adult PWDs with type 1 diabetes, while relatively few (18%) involved PWDs with type 2 diabetes. These differences may reflect variation in how healthcare professionals assess and identify vulnerability across settings and patient groups, suggesting that recognition may rely more on individual judgement than on institutionalized approaches.

The findings suggest that psychosocial vulnerability in diabetes cannot be fully captured through diagnostic or sociodemographic classification alone. Rather, this study indicates that it emerges relationally in the interaction between treatment demands, life circumstances, and healthcare structures. This suggests that strains such as treatment fatigue, competing responsibilities, fear of hypoglycemia, or diffuse life stress are not reliably captured by biomedical markers or current automated data extraction methods. Their identification depends on clinical space and time for person-to-person dialogue and professional assessment.

These findings illustrate that psychosocial vulnerability, as identified in clinical practice, extends beyond categorical definitions and was often associated with the cumulative burden of integrating diabetes management into normal, yet complex, human life situations. Because identification relied on individual clinical assessment rather than structured screening, the distribution of such patterns cannot be determined from this dataset.

4.2. A Gap Between Clinical Awareness and Formal Documentation

Second, the audit revealed a discrepancy between clinical concern and formal documentation. Referral communications frequently expressed explicit concern or uncertainty, whereas corresponding EMR documentation was typically neutral, standardized, and limited in psychosocial structuring. These findings suggest that healthcare professionals may experience an emotional impact when working with psychosocial vulnerability, highlighting the potential importance of this area not only for PWDs but also for HCPs.

Concerns were often implied or episodic rather than framed as longitudinal problems with explicit plans in the EMR. One possible explanation, discussed by a HCP when asked, was that patient access to medical records may influence how psychosocial concerns are

documented. Whether this observation reflects experiences among healthcare professionals more broadly cannot be determined from the present study.

However, if this is the case, transparency that strengthens autonomy may also shape what is formally recorded.

One possible consequence is fragmentation of knowledge and not necessarily absence of care. When relational insights are not structured in ways that remain visible across consultations, continuity risks depending heavily on individual memory rather than shared documentation.

4.3. Limited Structural Support for Longitudinal Psychosocial Continuity

Third, psychosocial concerns were rarely accompanied by explicit care plans, assignable follow-up responsibilities, or systematic revisiting in subsequent notes. Even when emotionally significant events were described, continuity of psychosocial care was seldom visible.

This pattern could point to structural limitations within current EMR architecture, or it may also reflect clinical workflows, local documentation culture, time constraints, or professional documentation practices.

One possible interpretation is that current documentation systems and practices are better suited to tracking biomedical parameters than psychosocial strain or vulnerability. For differentiated care pathways to be meaningful, continuity in care must be supported, even when continuity of individual providers is not possible. Such continuity in care, not persons, depends on systems capable of preserving and transmitting a shared understanding of the person across encounters.

At the system level, EMRs could benefit from evolving toward supporting a more person-centred overview in which biomedical, psychosocial, and contextual information complement each other. This study suggests that patient goals, social context, psychosocial concerns, and other person-centred dimensions are often less systematically represented than biomedical information within SDCC EMR systems is. Such integration will support a more shared and longitudinal understanding of the person across encounters [9,10].

4.4. Strengths and Limitations

This study is grounded in real-world clinical practice and includes perspectives from multiple professional groups. It captures vulnerability as identified through lived clinical assessment rather than predefined screening instruments.

However, this study has important limitations. Case identification was based on voluntary submission, precluding estimation of prevalence, and introducing selection bias. The EMR review was conducted by a single author, increasing the risk of interpretive bias despite ongoing discussions with clinical staff. Furthermore, only documentation within SDCC was examined; psychosocial follow-up may have occurred in other healthcare settings.

The findings should therefore be interpreted as practice-based insights into documentation patterns rather than statistically generalizable conclusions.

5. Conclusions

In this local quality improvement audit, psychosocial vulnerability was most often identified through clinical dialogue and professional judgement and frequently extended beyond predefined vulnerability categories. While healthcare professionals appeared attentive to psychosocial concerns, these concerns were not always clearly visible in formal documentation, care plans, or longitudinal follow-up.

The findings suggest that psychosocial stratification in diabetes care cannot rely solely on predefined risk groups or biomedical information. To ensure that psychosocial needs are

identified, organizational structures and professional competencies must support person-to-person conversations addressing these issues. Furthermore, a shared understanding of what constitutes psychosocial needs and vulnerability should be developed across professional groups and clinical settings.

If psychosocial vulnerability is to become an operational component of differentiated care pathways, healthcare professionals need shared approaches to identifying, documenting, and revisiting psychosocial concerns over time. This audit highlights the importance of ensuring that information about what burdens, concerns, and matters are important to the person can be carried forward across encounters with the same continuity as other clinically relevant information.

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Institutional Review Board Statement: Ethical review and approval were waived for this study, as it was conducted as an internal quality improvement audit at Steno Diabetes Center Copenhagen, approved through local clinical leadership. Under Danish law (Komitéloven, lovbekendtgørelse nr. 1268 af 28 November 2024), only health science research projects are subject to notification to a regional scientific ethics committee (Regional Committee on Health Research Ethics). Quality assurance and quality improvement activities are explicitly exempted from this requirement, as clarified in Vejledning nr. 11052 af 2 July 1999, which states that such activities do not aim to generate new knowledge about the value of a treatment but instead assess the functioning of a clinical unit. As the present project examined documentation and care-planning practices rather than the effect of a treatment, it satisfies the fundamental premise underlying this exemption. The project was initiated and conducted exclusively as a quality improvement audit, and no ethics committee approval or exemption certificate was therefore required or obtained.

Informed Consent Statement: No patient consent was obtained. The project was originally conducted as an internal quality improvement audit based on routinely collected clinical data and was only subsequently developed into a scientific manuscript after completion of data extraction and anonymization; all results presented are based exclusively on data collected as part of the original internal quality improvement audit.

Data Availability Statement: The original contributions presented in this study are included in the article. Further inquiries can be directed to the corresponding author.

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Conflicts of Interest: MD Kristoffer Marsaa reports lecture fees from GlaxoSmithKline, AstraZeneca, Novartis, Boehringer Ingelheim, Kyowa Kirin, and Norgine outside the submitted work. MD Jonatan Ising Bagger reports research collaborations, lecture fees, and advisory relations to Novo Nordisk, Astra Zeneca, Bayer, Lexicon, Zealand Pharma, and Boehringer Ingelheim.

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