Title: The Fusion Clinic: integrating the care of people with severe mental illness and diabetes

Short running title: The Fusion Clinic: integrated care for diabetes and mental illness

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Bulleted Novelty Statement

What is already known

- Poor diabetes outcomes in people with coexisting severe mental illness (SMI) and type 2 diabetes can partly be explained by the lack of integrated treatment pathways for diabetes and SMI.

What this study has found

- Establishing a joint clinic that simultaneously offers psychiatric and diabetes treatment by both diabetes and psychiatry healthcare professionals, improves the delivery of diabetes care and the diabetes outcomes of people with coexisting SMI.

What are the implications of the study

- This model of care has the potential to reduce the health inequalities experienced by people with SMI and type 2 diabetes.

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Abstract:

Aim: People with coexisting severe mental illness (SMI) and type 2 diabetes have a shorter life expectancy and poorer diabetes outcomes than those without SMI. This is partly explained by the separate treatment of diabetes and SMI, which occurs in parallel silos in many healthcare systems. The Steno Diabetes Center Sjaelland (SDCS) and Region Zealand established the Fusion Clinic to offer combined psychiatric and diabetes care delivered by both diabetes and mental healthcare professionals. This paper describes how the clinic was established and the initial diabetes outcomes.

Methods: The Fusion Clinic was co-designed by people with diabetes and SMI and healthcare professionals to improve the care of adults with diabetes and SMI. The clinic approach utilised the F-ACT model. The 63 people referred to the Fusion Clinic between 01.02.2020 and 01.01.2022, who attended the clinic for more than 6 months were included in this study. Diabetes outcomes were recorded in the electronic medical records (Sundhedsplatformen EPIC).

Results: There was a high prevalence of diabetes complications at baseline. Furthermore, 70% had one or more additional concomitant diseases as well as SMI and diabetes. Assessment of diabetes complications and measurements of HbA_{1c} and lipid profile improved after referral to the clinic. HbA_{1c} declined during the first 6 months of attendance at the clinic.

Conclusion: This model of service delivery has the potential to improve the quality of care for people with SMI and type 2 diabetes.

Keywords: diabetes, type 1 diabetes, type 2 diabetes, severe mental illness, combined care clinics, psychiatric disorders.

Introduction

The life expectancy of people with severe mental illness (SMI), such as schizophrenia and bipolar illness, is 15-20 years shorter than the general population (1–3). Most of the excess deaths are caused by increased rates of physical illnesses, including type 2 diabetes (4,5). People with SMI have 2-3-fold higher risk of developing type 2 diabetes due to a range of factors, including genetics, lifestyle, and adverse effects from antipsychotic medication (6). People with coexisting SMI and type 2 diabetes have a shorter life expectancy (7), and poorer diabetes outcomes (8–10) than people with type 2 diabetes without SMI.

The management and treatment of diabetes involves multi-faceted challenges for those living with both illnesses and often has broader social implications (11). Furthermore, healthcare professionals and the healthcare system face multiple and complex issues when treating this population (12–15). The poorer diabetes outcomes and higher mortality rates can partially be explained by the separate treatment of diabetes and SMI, which occurs in parallel silos in many healthcare systems, including the Danish health system (16). In addition, specialization of healthcare professionals is limited to one condition (17), which contributes to diagnostic overshadowing, where clinicians attribute symptoms and behaviours to the underlying mental illness, and hence under-diagnose any co-morbid physical illnesses. Mental healthcare professionals lack diabetes management skills leading to inadequate diabetes care (18), while, poor mental health status frequently prevents healthcare professionals from intervening in physical health management (19).

In 2020, Steno Diabetes Center Sjaelland, Denmark and Region Zealand established the Fusion Clinic with the overall aim of improving treatment of coexisting SMI and diabetes. The Fusion Clinic is organised as an outpatient clinic with services delivered by both diabetes and psychiatry healthcare professionals, offering combined diabetes and psychiatric treatment. It is physically located in the Psychiatric Hospital in Slagelse. This paper describes the background and rationale for establishing the Fusion Clinic, the clinical set-up and approaches, and service evaluation of the diabetes outcomes of those attending the clinic during the first three years since its inception.

Methods

Danish Health System and Steno Diabetes Centers

The Danish health system is an integrated, universal health care system paid through taxation. All physical and psychiatric hospital services are free of charge for all citizens in Denmark without any co-payments. The Steno Diabetes Centers are embedded in the five Danish Regions and are responsible to the elected politicians in each region. They are funded through a ten-year donation from the Novo Nordisk Foundation. The centres undertake development and research activities related to diabetes treatment and prevention.

Steno Diabetes Center Sjaelland (SDCS) was established in 2019 with the specific objective of developing new ways to address the needs of people in vulnerable positions, including those with SMI. Following interviews and three workshops, each involving 30-35 participants, including people with diabetes and SMI (n=2-4), family members (n=1-2), patient organisations (n=5-6) diabetes healthcare professionals (n=5-11) and psychiatry healthcare professionals (n=7-13), researchers (n=3), and representatives from the local municipalities (n=1-2), SDCS established the Fusion Clinic to improve the care of those with diabetes and coexisting SMI.

The population of Region Sjaelland is 850,000 and Psychiatry West based at Slagelse hospital has a catchment area of ~250,000 people residing in six municipalities. In 2022 community psychiatric services in Psychiatry West provided care to ~4,300 people and, based on caseload data, around 1,600 people were receiving community outpatient treatment on any given day. Initially the Fusion Clinic was only offered to people living in Slagelse but was later expanded to five surrounding municipalities. It is estimated that approximately 240 people with a known diagnosis of diabetes and SMI live within this wider catchment area.

Aims for the Fusion Clinic

The specific aims for the Fusion Clinic are to optimize the treatment and health outcomes of people with SMI and diabetes, by:

- Systematic screening, prevention and treatment of diabetes complications
- Optimising treatment prescription to reduce interactions of multiple medications
- Supporting medication taking

- Improving collaboration between mental health and diabetes healthcare professionals, and other providers of health and social care
- Providing a better experience with the healthcare system for people with SMI and diabetes through a combined and integrated treatment approach

Users of the Fusion Clinic

Adults (age ≥18 years) are referred to the Fusion Clinic for optimisation of their diabetes management by their general practitioner, psychiatric inpatient services, other mental health community teams or endocrinology outpatient and inpatient services (see Table 1 for referral criteria).

The professional team and competencies in the Fusion Clinic

The Fusion Clinic team comprises a multidisciplinary team from psychiatric and diabetes backgrounds. A team of ~7 full-time equivalent employees was established prior to the opening of the clinic to ensure that team members received individualised and specialist training in the management of diabetes and SMI before delivering clinical care. In addition to 15 hours of introductory training, the psychiatrist and psychiatric nurses had specific diabetes education, including a 2-day internship in the diabetes clinic. Nurses without a psychiatric background received 8 hours of psychiatric education, which included recognition of suicide prevention. Nurses were trained to take blood samples and perform ECG tests. Two nurses were also trained to take retinal photos. Further ad hoc training was performed as required.

A high staff-to-user ratio was also needed to facilitate home visits to reduce non-attendance at clinic and as the clinic has developed, further members of staff have been added to the team (Table 2).

The Fusion Clinic applies a F-ACT inspired approach

The approaches applied in the Fusion Clinic are inspired by the F-ACT model, which was originally developed in the Netherlands (20). F-ACT is an intensive psychiatric outpatient and recovery-oriented treatment for people with SMI, which involves collaboration with social services and general practitioners. It is widely implemented in multiple Dutch districts (20), and lately, F-ACT has been implemented in several Danish Psychiatric Outpatient Clinics (21–23).

The approach in the Fusion Clinic involves consultations, medication, and guidance. The treatment is adjusted to the specific needs of each person and is continuously modified to the individual's physical and psychiatric condition. The treatment is flexible and outreaching, and allows the F-ACT team to provide treatment in the person's home, if preferred or required. Relatives are invited to take part in the person's treatment plan and recovery process.

When a person is referred to the clinic, they are offered a standard package, which is adjusted and adapted to the individual's needs, condition and preferences (Figure 1). At the first visit, the person with co-existing SMI and diabetes is introduced to all members of the F-ACT team and allocated a care coordinator who oversees and co-ordinates the treatment with rest of the team. Individual treatment plans are developed in collaboration with the user to meet their specific needs, resources and wishes. By the third visit, an agreed treatment plan should be in place.

Diabetes management followed Danish guidelines. Structured diabetes education was provided by an experienced diabetes nurse within the context of a broader group-based psychoeducational intervention that also included sessions covering a) an introduction to recovery, b) self-efficacy, c) coping during stress and crisis situations, d) networking and relationships, e) living with diabetes and a mental illness, and f) self-evaluation. In addition, continuous glucose monitoring system was offered to clinic attendees to improve engagement with diabetes self-management. The Fusion Clinic team offered advice on cardiovascular risk management, including regular dietary and physical activity advice. People were offered support to quit smoking and provided with the contact details of smoking cessation services. The clinic liaised regularly with primary care teams to optimise care plans, including blood pressure and lipid management.

When other co-morbidities were identified, users were referred to appropriate specialist services. The Fusion Clinic staff then supported people to attend these appointments and ensure that treatment plans were followed through.

Intensive team care

The F-ACT board is the tool that enables the whole team to provide more intensive care when needed (Table 3). People on the board are discussed daily with perspectives from different healthcare professionals, to make sure that all team members have updated information about status of the individual. As the condition improves, the person is removed from the board and followed by the personal care coordinator again.

Treatment in the Fusion Clinic is based on collaboration with multiple partners

The Fusion Clinic team promotes cross-sector collaboration. Care-coordination meetings to develop treatment plans are arranged with all relevant partners for the user, e.g., relatives, the general practitioner, and social workers in the municipality and at home. The Fusion Clinic team maintains a close collaboration with the psychiatric hospital. When a person from the Fusion Clinic is admitted to the psychiatric hospital, the Fusion Clinic team visits the individual during admission, ideally in the Psychiatric Emergency Department to share knowledge on medical and personal history and collaborate with the in-patient staff. The care coordinator will visit the ward at least once a week and offer support and help to facilitate early discharge and a smooth transition back to the outpatient setting in the Fusion Clinic.

Adaptation of the Clinic based on User Feedback

Clinic attendees were invited to provide feedback based on their experiences. Users described how the clinic met their needs and how they felt supported by the Fusion clinic. Users often requested not to be discharged despite optimisation of their treatment. Initially care was offered by a named nurse, but this was relaxed after users stated that they were happy to receive care from any nursing member of the team provided they were familiar with the case history. The users emphasised the importance of combining mental and diabetes care rather than focussing on one condition (18). This challenge was also recognised by the Fusion Clinic team. Regular team meetings were used to promote learning from peers and increase the opportunities for combined care. Consultation styles with a high level of user involvement were also used to promote increased levels of combined care.

Oversight

The clinic leadership team had regular meetings with the Steno Management who reviewed quality indicators on a quarterly basis and provided support and suggestions for developments in service configuration.

DATA COLLECTION AND STATISTICAL ANALYSIS

Data sources

Data were obtained from the electronic medical records (Sundhedsplatformen EPIC). Data on diagnoses (ICD-10 codes) and most diabetes outcomes measures, e.g., blood samples, body mass

index (BMI), foot examinations were extracted electronically. Other clinical outcome measures, e.g., diabetes duration, blood pressure and smoking habits, were extracted manually.

Study population

The first person attended the clinic at the beginning of February 2020. Everyone referred to the Fusion Clinic from 01.02.2020 until 01.01.2022, who attended the clinic for more than 6 months was included in this study.

Variables and outcome measures

Demographics of the study population includes sex and age at referral. Diabetes duration in years was defined as date of onset of diabetes to 2022. Characteristics of the participants' morbidity included several mental and physical chronic illnesses coded in ICD-10 (appendix 1).

Clinical outcome measures were extracted from laboratory results and clinical examinations recorded in the medical records. Examinations and procedures were recorded as done (yes/no). HbA_{1c} and LDL-cholesterol were retrieved from routine blood samples and urinary albumin/creatinine ratio from urine samples. Office blood pressure was measured and smoking habits reported by the participants at baseline. Retinal photographs taken in or outside the Fusion Clinic in a hospital setting in Region Zealand were included.

Descriptive data are presented with count and percentage or as median (range). Mean and standard deviation were applied for $HbA_{1c,}$ BMI and blood pressure. To investigate for statistically significant changes in HbA_{1c}, Student's t-test function in Excel was used.

Baseline HbA_{1c} is based on an average of all measures of HbA_{1c} within 40 days before and after enrolment in the Fusion Clinic. The same 40 days rule is applied for 6 months follow-up.

The national Danish Quality Standards for diabetes care were chosen: $HbA_{1c} \leq 53$ mmol/mol, $HbA_{1c} \geq 70$ mmol/mol, LDL-cholesterol ≤ 2.5 mmol/L, urinary albumin/creatinine ratio measured annually, if urinary albumin/creatinine ratio is >30 mmol/mol renin- angiotensin-aldosterone-system (RAAS) blockade should be prescribed, annual foot and eye examination.

Changes in medication compares prescribed medication before entering the clinic, or after start in the Fusion Clinic based on ATC-codes (appendix 1).

To assess whether there were improvements in the clinical service with time, we audited the diabetes care processes using specific cut-off dates of 1 April in 2021, 2022 and 2023 and

recorded whether HbA_{1c}, lipid profile, uACR, and foot and eye examinations had been performed within the previous year of these dates.

This study was approved by the local executive management of psychiatric hospital Slagelse and also by Region Zealand's research board (REG-068-2022).

RESULTS

71 people were referred to the Fusion Clinic between 01.02.2020 and 01.01.2022, of whom 63 remained in the clinic for more than 6 months and were eligible for this study. The characteristics at referral are shown in Table 4. The eight people, who were seen for less than 6 months in the Fusion Clinic, dropped out for various reasons. Two people stopped attending because they moved out of area, with one emigrating. The treatment of one individual was optimised within 6 months and care reverted to the referring centre. The five other people chose to return to their original healthcare facility for personal reasons.

Diabetes complications were prevalent in this population and probably underestimated at baseline, since many participants had not been investigated for all microvascular complications (27-57%), nor for diabetes-related foot problems (68%) prior to attending the clinic. 70% had one or more additional concomitant diseases in addition to SMI, diabetes and its complications.

Clinical Diabetes Care Processes

Attendance at the clinic improved the delivery of diabetes care processes. HbA_{1c} and lipid profile were measured for all or almost all attendees (Table 5). Collection of urine samples for measurements of urinary albumin/creatinine ratio was more difficult, but a continuous focus on this and on foot examination and retinal photographs showed progressive improvement in performance over the first three years of the clinic (Table 5).

Diabetes Outcome Measures

Table 6 shows the change in HbA_{1c} over time for the 45 participants, with baseline and 6 months HbA_{1c}. On average, the HbA_{1c} declined after referral during the first 6 months of attendance at the clinic. A corresponding decrease was observed in the number of people with an HbA_{1c} above 70 mmol/mol. Data from 26 people with HbA_{1c} measurements after 12 months follow-up suggests that the major decline occurred within the first 6 months as there was no further

redcution in HbA_{1c} between 6 and 12 months (mean HbA_{1c} at baseline: 71 ± 15 mmol/mol; at 6 months: 63 ± 15 mmol/mol, and at 12 months: 64 ± 18 mmol/mol).

Average blood pressure was normal at baseline and remained unchanged through follow-up. BMI was elevated at baseline and did not change, 34 ± 8 vs 33 ± 7 kg/m^2 (n=47).

More people were prescribed GLP-1 receptor agonists and insulin after attending the Fusion Clinic (Table 7). Furthermore, if possible, psychiatric treatment was changed or optimised towards drugs with a lower propensity to worsen glucose.

Long-term data confirm that the number of people with high HbA_{1c} (≥70 mmol/mol) declined over time, as did the percentage of people not prescribed relevant kidney protective treatment with RAAS blockade (Table 5).

Discussion

This paper describes the establishment of a novel and unique joint clinic for people with co-morbid diabetes and SMI. It follows an established theoretical model (F-ACT) for managing people with severe mental illness and was developed in conjunction with people living with diabetes and SMI.

Prior to establishing the Fusion Clinic, there was very limited evidence on interventions aiming to combine and integrate the treatment of diabetes and SMI on which to base the clinic model (22). Previous integrated care models for people with coexisting diabetes and mental illness have often specifically excluded those with SMI (23–25). Interventions targetting people with SMI have largely focussed on one condition at a time (22). For example, a review by Grøn et al. 2018 describes how interventions have aimed to improve diabetes-related outcomes, such as nutrition, exercise, and reduction of HbA_{1c} or decline of symptoms of the mental illness. Perhaps unsurprisingly, these interventions had limited clinical impact (22,26).

The rationale for the clinic was inspired by the opinions of people with SMI and diabetes, who believe that the two conditions are highly dependent and combined care is likely to lead to improved outcomes (13,27). Interventions with a balanced focus on both conditions appear to have positive effects on self-management, user experience, HbA_{1c} and mental health (22,27). However, previous attempts to integrate care across sectors have proven challenging (22,26).

Without a prior model on which to base the clinic, we adapted the F-ACT model, that had been used in the treatment of SMI. This model has proven acceptable to both service users and healthcare professionals working in the Fusion Clinic. In the clinic, the provision of diabetes care processes improved with meaningful changes in glycaemic management, particularly for those with marked hyperglycaemia at the point of referral. Improvement of glycaemic levels is an ongoing process and additional antidiabetes medication are frequently needed. The modest reduction in HbA_{1c} observed after only 6 month reflects this. Some diabetes care processes were easier to achieve than others, namely blood testing for HbA_{1c} and cholesterol, but progressive improvements in other processes such as measurement in uACR and foot examination were also seen as staff became more acquainted with the techniques and following feedback of performance results. The eye camera was introduced in Spring 2022 in the Fusion Clinic and required staff training before retinal screening could be implemented in the clinic. This may explain the dip in screening rates for retinopathy in 2022 before improvements were seen in 2023. The prescription of renin-angiotensin system antagonists was problematic because of the lack of familiarity of these drugs among mental health team workers and the issues relating to polypharmacy in those with SMI.

The clinic population was typical of people with coexisting SMI and diabetes with the exception of a higher proportion of people with type 1 diabetes. The rates of type 1 diabetes are not increased in people with SMI (6) and the higher than expected proportion with type 1 diabetes likely represents referral from the adjacent diabetes clinic. Although the Fusion Clinic was designed for people with SMI, careful clinical evaluation from the psychiatric team led to a change in diagnosis in several attendees, predominantly to behavioural and emotional disorders, and their treatment.

There were several challenges in establishing the links with community, specialist and in-patient services. The geographical spread of Region Sjaelland meant that some community services were located at a distance to Slagelse hospital and it took time to build trust with primary and secondary care doctors, particularly when managing complex situations. The high prevalence of other co-morbid conditions necessitated close links with other specialist services and there are plans to incorporate cardiology sessions with the clinic because of the high burden of cardiovascular disease. Initially in-patient psychiatric staff were anxious that they would receive criticism about their lack of diabetes knowledge and management skills. However, the regular

visits from the Fusion Clinic team built trust that has allowed educational opportunities to improve in-patient diabetes care. A further challenge was ensuring the Fusion Clinic staff felt comfortable with managing people with conditions outside their discipline and did not focus on their own area of expertise (18). This was overcome by regular staff meetings that allowed sharing of best clinical practice as well as diverse perspectives.

There are limitations to this report. As ethnicity is not systematically registered in the Danish healthcare setting, we were unable to record this. This is relevant because of the known health inequalities faced by Black, Asian, and Ethnic minority people, especially around mental health and chronic conditions like diabetes. We were also unable to determine how many people quit smoking because of a lack of follow-up data. We have not formally assessed psychiatry relapses, readmissions or involuntary detentions; this was because of the difficulties in doing so, given the small population and variety of diagnoses. A further limitation is the lack of a cost-effectiveness analysis. More than 80% of the costs are related to staff and the initial staff-to-user ratio was likely unaffordable in the long-term. However, this report describes the establishment of the service and the clinic has continued to accept referrals (144 people as of 1 October 2023, of whom 80 are under active follow-up). The numbers are still growing and a final staff-to user ratio of ~17-20 is envisaged. This is similar to other psychiatric settings in Denmark and although the expected costs are high, they are not outside the acceptable level that the Danish health authorities would fund. Further evaluation concentrating on psychiatric outcomes and cost effectiveness are warranted.

Conclusion

The health outcomes of people with SMI and diabetes remain worse than the general population. In part, this is because of a lack of coordination and collaboration between the mental health and physical healthcare systems. Consequently, there is an ongoing need for individually tailored support for the mental and physical needs of the person, which fluctuate over time to achieve optimal health outcomes. The Fusion Clinic provides a model that has the potential to improve diabetes outcomes for those living with diabetes and SMI.

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Figure 1: Care processes offered in the Fusion Clinic.

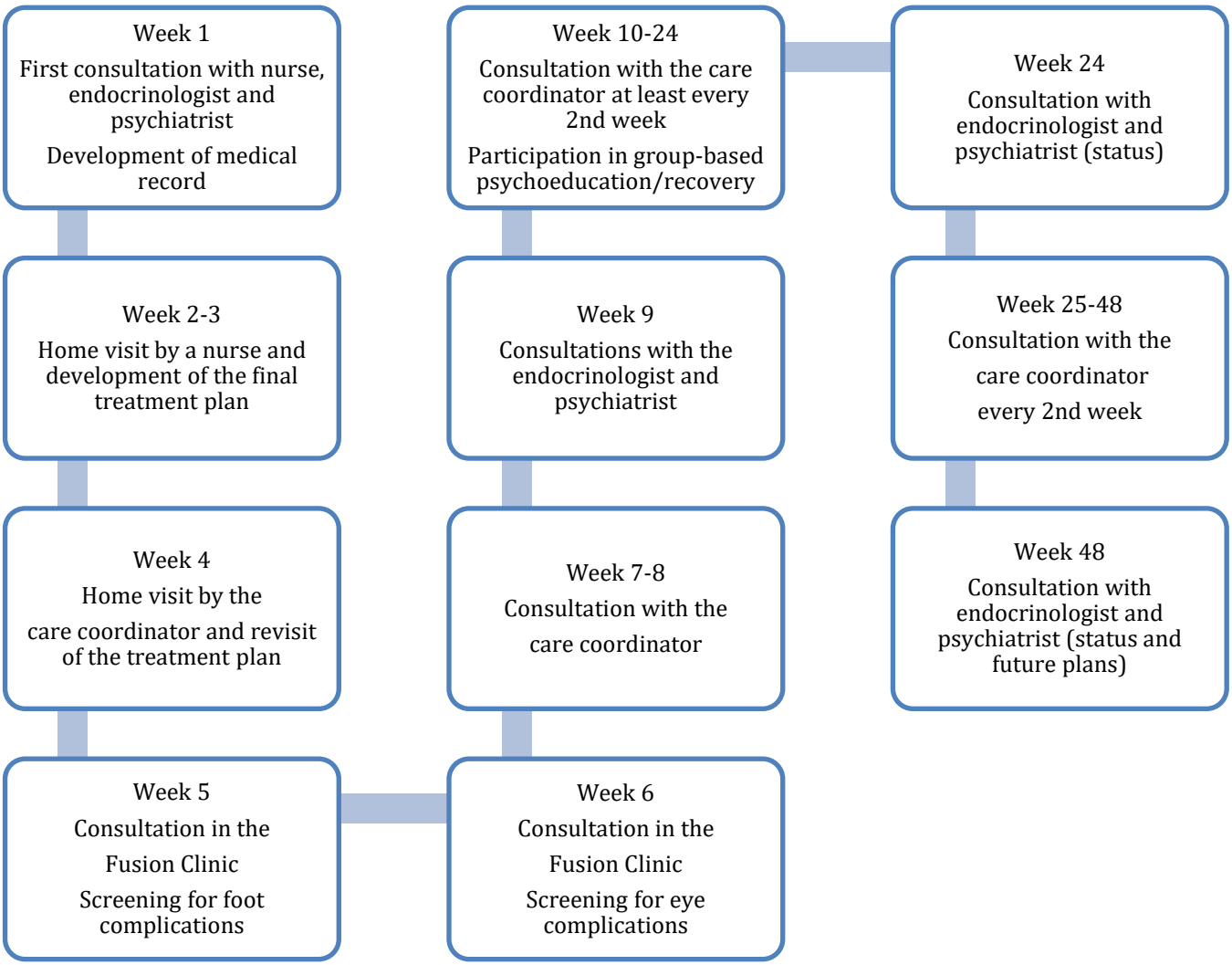

Table 1: Referral criteria for the Fusion Clinic

- Diagnosed with diabetes
- Diagnosed with severe mental illness, defined as: schizophrenia spectrum and other psychotic disorders, affective disorders such as bipolar affective disorder and severe depression, and severe personality disorders
- Requiring optimization of diabetes treatment
- Meeting the minimum criteria for referral to Community Mental Health Teams in Region Zealand West or to Endocrinology Outpatient Clinic or both (psychiatric and diabetes-specific)
- Living in one of six municipalities in proximity of the Fusion Clinic: Kalundborg, Odsherred, Holbaek, Slagelse, Soroe, or Ringsted municipalities.

Referrals were not accepted if:

- the individual had untreated substance abuse or progressive dementia or intellectual disabilities
- the mental illness and/or diabetes could be satisfactorily treated in primary care
- the person was receiving treatment in the Regional Forensic Psychiatry Unit

Table 2: Staffing working in the clinic at inception and currently in October 2023

Staff at Clinic inception	Hours per week	Staff in October 3023	Hours per week
Psychiatrist	37	Clinical Lead (Psychiatric Nurse)	37
Endocrinologist	15	Psychiatrist	37
Nurses	37 (n=4)	Endocrinologist	15
Medical secretary	30	Nurses	37 (n=3), 30 (n=4)
Social worker	18	Medical secretary	30
Podiatrist	7	Social worker	18
		Podiatrist	7
		Dietician	10
Total number of whole time equivalent employees	6.9		9.9

Table 3: Criteria for inclusion on the F-ACT board for intensive treatment

- Worsening psychiatric symptoms
- Worsening diabetes-related symptoms
- Disturbed or threatening behaviour
- Lack of self-care
- Non-attendance at consultations
- Hard to contact
- Hospitalization
- Newly discharged from hospital
- Need for intensive medical follow-up
- Life crisis

Table 4: Clinical baseline characteristics of the first 63 people enrolled in the Fusion Clinic.

Baseline characteristics	
Age (years)	47 (22;70)
Sex	33 men (52%) 30 women (48%)
Type of diabetes	
Type 1 diabetes	13 (21%)
Type 2 diabetes	46 (73%)
Secondary diabetes	3 (5%)
Duration of diabetes (years) (n=57)	10 (1;33)
Mental illnesses	
Schizophrenia, schizotypal and delusional disorders	33 (52%)
Mood affective disorders	12 (19%)
Neurotic, stress-related and somatoform disorders	5 (8%)
Emotionally unstable personality disorder	5 (8%)
Pervasive developmental disorders	2 (3%)
Behavioural and emotional disorders	4 (6%)
Other mental disorders resulting from brain damage, brain dysfunction or physical illness	2 (3%)
BMI (kg/m^2) (n=62)	32 (8)
Systolic blood pressure (n=55)	130 (17)

Diastolic blood pressure	84 (12)
Diabetes complications	
Retinopathy	
None	26 (41%)
Non-proliferative	18 (29%)
Proliferative	2 (3%)
Unknown	17 (27%)
Nephropathy	
Normoalbuminuria	19 (30%)
Microalbuminuria	7 (11%)
Macroalbumiuria	1 (2%)
Unknown	36 (57%)
Neuropathy	
None	27 (43%)
Present	17 (27%)
Unknown	19 (30%)
Diabetic foot ulcer	
None	13 (21%)
Present	7 (11%)
Unknown	43 (68%)

Cardiovascular disease and risk factors	
Ischaemic heart disease	7 (11%)
Stroke	2 (3%)
Peripheral arterial disease	2 (3%)
Atrial fibrillation	1 (2%)
Heart failure	5 (8%)
Hypertension	11 (17%)
Dyslipidaemia	5 (8%)
Other diseases	
COPD/Asthma	3 (5%)
Dyspnoea	6 (10%)
Cancer	3 (5%)
Obstructive sleep apnoea	4 (6%)
Musculoskeletal disease	16 (25%)
Concomitant disease burden (including DM and SMI)	
Diabetes and SMI only	18 (29%)
3 diseases	22 (35%)
4 diseases	6 (9%)
5 diseases	9 (14%)
6 diseases or more	8 (13%)
Smoking	

Non-smoker	24 (38%)
Smoker	29 (46%)
Unknown	10 (16%)

Data are median (min;max), n (%), and mean (SD).

Table 5: Completion of diabetes care processes during the first three years of the Fusion Clinic.

Period	2021	2022	2023
HbA_{1c}			
Measured	98%	100%	100%
≤53 mmol/mol	27%	35%	29%
≥70 mmol/mol	41%	34%	30%
LDL-cholesterol			
Measured	75%	95%	95%
≤ 2.5 mmol/L	70%	69%	71%
uACR			
Measured	51%	74%	81%
> 30 mmol/ml	12%	23%	28%
Missing RAAS blockade	17%	29%	22%
Foot examination	0%	24%	61%
Eye examination	41%	13%	78%

RAAS: renin-angiotensin-aldosterone-system.

Table 6: Change in HbA_{1c} in people attending the Fusion Clinic for 6 months (n=45).

	Baseline	6 months
HbA_{1c} mmol/mol	72 (19)	67 (17)
HbA_{1c} ≤53 mmol/mol	9 (20%)	11 (24%)
HbA_{1c} ≥70 mmol/mol	25 (56%)	22 (49%)
Change in HbA_{1c}	-	5 (15)*

Data are mean (SD) and n (%). *P<0.0001.

Table 7: Change in medication during follow-up in the Fusion Clinic (n=63).

	Before	After attendance
Lifestyle alone	2 (3%)	2 (3%)
Oral anti-diabetes agents	50 (79%)	52 (83%)
GLP-1 receptor agonists	23 (37%)	43 (68%)
Insulin	33 (52%)	40 (63%)
Antipsychotics	56 (89%)	59 (94%)
Antidepressants	37 (59%)	44 (70%)
Anxiolytics	15 (24%)	29 (46%)
Other	17 (27%)	19 (30%)

Data are n (%).

Appendix 1

SMI was defined as schizophrenia, bipolar affective disorder, and depression. Participants were categorized as; Schizophrenia, schizotypal and delusional disorders (F20-F29); mood affective disorders (F30-F39); neurotic, stress-related and somatoform disorders (F40-F49); emotionally unstable personality disorder (F603); pervasive developmental disorders (F84); behavioural and emotional disorders (F90-F99) and other mental disorders resulting from brain damage, brain dysfunction or physical illness (F06).

Type 1 diabetes was defined as E10, and type 2 diabetes was defined as E11. Secondary diabetes was defined as E13-E14.

Diabetes-related complications; retinopathy, were categorized as non-proliferative (H360H, H360K), proliferative (H360J), and nil. Neuropathy (E104, E114). Nephropathy (E102, E112) were categorised as: normoalbuminuria ≤ 30 mg/g, microalbuminuria > 30 and < 300 mg/g, macroalbumiuria UAE ≥ 300 mg/g. Diabetic foot ulcer was registered as (E105B, E115B, E135B, E145B). Cardiovascular disease was defined as ischaemic heart disease (I20-25); Stroke (I61-I64, I67); peripheral arterial disease (I70-I79), atrial fibrillation (I481, I489), and heart failure (I501, I509). Hypertension (I10, I119, I12, I131, I139, I15) and dyslipidaemia (E78). Other diseases were defined as chronic obstructive pulmonary disease (COPD) and asthma (J40-47, DJ96), dysphoea (R060), cancer (Cxxx); obstructive sleep apnoea (OSA) (G473) and musculoskeletal disease (Mxxx). Concomitant diseases are presented as the total number of disease burden.

Medication changes used ATC-codes and were defined as: Oral anti-diabetes agents (A10A), GLP-1 receptor agonists (A10BJ), Insulin (A10A), Antipsychotics (N05A), Antidepressants (N06A), Anxiolytics (N05B) and Other (N03A). Lifestyle management, were defined as only lifestyle advices given and no medicine towards diabetes.