Title:

The effect of Flexible Assertive Community Treatment in Denmark: A quasi-experimental controlled study

Abstract

Background: A community-based treatment model for patients with severe mental illness called Flexible Assertive Community Treatment (FACT) has been widely implemented despite limited evidence for its effectiveness. We aimed to evaluate the effect of FACT on mental health care outcomes compared with treatment from standard Community Mental Health Teams (CMHTs) or Assertive Community Treatment (ACT) teams in Denmark.

Methods: We conducted a quasi-experimental controlled study from May 2016 to November 2018, comparing outcomes for patients under the care of CMHTs or ACT teams that were reconfigured to FACT teams (CMHT-FACT or ACT-FACT) with patients that remained under the care of CMHTs and ACT teams. A total of 2094 individuals were included and followed up for two years using Danish registries on multiple mental health care outcomes. Patients who received FACT were matched using propensity scores with control patients from CMHTs and ACT teams to balance differences in baseline characteristics.

Findings: The number of outpatient contacts was higher for patients receiving FACT than controls (CMHT-FACT vs CMHT: IRR, 1·15; 95 % CI, 1·10-1·20; ACT-FACT vs ACT: IRR, 1·15; 95 % CI, 1·03-1·29). FACT patients had fewer admissions than controls (CMHT-FACT vs CMHT: IRR, 0·84; 95 % CI, 0·76-0·92; ACT-FACT vs ACT: IRR, 0·71; 95 % CI 0·59-0·85). However, there were no statistically significant differences in total inpatient days, use of coercion or episodes of self-harm.

Interpretation: To our knowledge, this is the first study to investigate the effect of FACT compared with treatment from a CMHT or ACT control group. We found FACT to be associated with more patient contacts and fewer admissions than both CMHT and ACT team care, but there was no difference in total inpatient days. Our results suggest that FACT can provide a more intensive approach in terms of increased outpatient

contacts than CMHT care and, surprisingly, ACT. FACT requires further evaluation through randomised

controlled trials that include a cost-effectiveness component before wider implementation.

Research in context panel:

Evidence before this study: Flexible Assertive Community Treatment (FACT), a community-based

treatment model for individuals with severe mental illness, has been widely implemented despite limited

evidence for its effectiveness. We searched PubMed for studies published in English before May 18, 2020,

that investigated the effect of FACT on mental health care outcomes using the search terms ("Flexible

Assertive Community Treatment") OR ("Function Assertive Community Treatment"). We found seven

studies on FACT published during 2008-2018 from the Netherlands and the UK. Two Dutch studies have

been conducted with use of a control group; however these studies have several methodological limitations.

The first study found that FACT led to an increase in remission if the patients at baseline had an unfulfilled

need for care compared with the control condition. The control group included a mix of patients who

received inpatient treatment, sheltered residential treatment and community treatment making it difficult to

determine what was being compared. The second study found that patients in FACT received more

outpatient contacts and had higher levels of psycho-social functioning than a non-FACT control group.

However, the control group did not receive any specific model of community care nor coordination of

treatment by a case manager. Furthermore, differences in baseline characteristics between the control groups

were not examined. The remaining five studies used a pre-post design evaluating the effect of FACT for

patients who transferred from a standard Community Mental Health Team (CMHT) or Assertive Community

Treatment (ACT). These found FACT to be associated with fewer admissions, inpatient bed days and

outpatient contacts. However, a limitation of studies without a control group is the risk of regression to the

mean. Regression to the mean occurs when a proportion of people in a study naturally show improvement

over time, irrespective of the model of community treatment. In the absence of a control group, the model of

community treatment may mistakenly be perceived as beneficial. Studies with a well-defined control group are therefore required to determine the effect of FACT on mental health care outcomes.

Added value of this study: To our knowledge, this is the first study to investigate the effectiveness of FACT compared with treatment from a CMHT or ACT control group. Unlike previous studies, we did not find FACT to have an advantage over CMHT care or ACT in terms of fewer inpatient days, although FACT patients had fewer admissions. However, FACT teams provided more patient contacts than both CMHTs and ACT teams.

Implications of all available evidence: Our findings represent an important addition to the scientific literature on the effectiveness of FACT. In contrast with previous pre-post studies, we did not find FACT to be associated with fewer inpatient days compared with CMHT or ACT care, but it appears to offer a safe and more intensive service. The relative costs and benefits of FACT need to be evaluated through randomised controlled trials before wider implementation.

Introduction

Flexible Assertive Community Treatment (FACT) is a Dutch model of community-based mental health care that provides flexible, multidisciplinary support to people with severe mental illness. The model allows staff to provide more intensive support to patients when needed through the use of principles from the Assertive Community Treatment (ACT) approach, described below.[1] When the patient has stabilised, their level of care is downgraded back to standard individual case management. At both levels, the FACT team deliver most of their care through home visits or contacts elsewhere in the community, rather than at the team office.[1]

Until 2016, ACT teams and Community Mental Health Teams (CMHTs) operated separately in Denmark. The management board for Mental Health Services in the Capital Region of Denmark identified a need for reorganising these services due to concerns about unclear discharge processes and limited resources for transitioning patients after a period of stability from ACT to CMHT. Furthermore, clinicians raised the issue that a proportion of patients under the care of CMHTs did not receive the support they needed due to limited possibilities of intensifying the care during periods of instability. A decision was taken to implement FACT by integrating ACT within the standard care delivered by CMHTs to avoid existing barriers to patient transitions and enable more people to access intensive levels of support when needed.

ACT is a well-documented model of community-based mental health care for individuals with the most severe mental illness, who typically have a high use of mental health care and have difficulties engaging with treatment (drop out of services or are not in compliance with their medicine).[2] There is strong international evidence for the efficacy of ACT in reducing patients' use of inpatient care and improving engagement and satisfaction with services.[2,3] Assertive outreach is a central component of the ACT model, which involves a continuous effort to contact and offer services to patients who are reluctant to engage in treatment.[4] To achieve this, ACT teams operate with a team approach (where all staff are familiar with all the team's patients), low caseloads, extended hours of operation, and frequent home visits. In contrast to ACT, CMHTs tend to serve a broader group of patients who are more stable than patients supported by ACT and have

lower use of inpatient care. Support is provided by individual case managers with higher caseloads than ACT staff. Contacts are less frequent than in ACT, with most appointments offered at the team office and within usual office hours.[3]

Although the FACT model has been taken up in many countries[5–7], there is a lack of good quality studies investigating its effectiveness.[8–10] To date, no studies have compared FACT with ACT or CMHT control groups . Drukker and colleagues[11,12] carried out two studies of FACT compared with care from a control group; however, the control group did not receive any specific model of community care nor coordination of treatment by a case manager (as happens in ACT and standard CMHT care). Other studies have evaluated the impact of FACT in pre-post comparisons.[5,6,13,14] These have found FACT to be associated with fewer admissions and inpatient bed days for those previously supported by CMHT or ACT teams. Outpatient contacts are lower for those transferred from ACT to FACT but without any increase in inpatient bed days or contacts with crisis resolution teams.[6,13,14] These results have generally been interpreted positively as supporting a shift in investment from ACT to FACT. A major limitation of the pre-post design is, however, the risk of regression to the mean resulting in an overestimation of the positive effects of FACT.[15]

Aims of the study

The primary aim of this quasi-experimental controlled study was to compare:

1) Differences in mental health care outcomes between patients previously receiving CMHT care who transferred to a FACT team (CMHT-FACT) compared to patients who continued to receive CMHT care.

2) Differences in mental health care outcomes between patients previously receiving ACT who transferred to a FACT team (ACT-FACT) compared to patients who continued treatment with an ACT team.

We hypothesised that:

1) For former CMHT patients (CMHT-FACT), there would be more outpatient contacts, fewer admissions, fewer inpatient bed days, fewer episodes of self-harm, fewer episodes of use of coercive measures, and fewer deaths compared to matched CMHT controls.

2) For former ACT patients (ACT-FACT), there would be fewer outpatient contacts and an increase in the number of admissions, inpatient bed days, self-harm episodes, use of coercive measures, and deaths compared to matched ACT controls.

For our secondary aims, we evaluated the flexibility of FACT to switch between the two levels of care by examining the proportion of FACT patients receiving intensive support and the frequency and duration of these episodes.

Methods

Setting and participants

This study was carried out in the capital region of Denmark. We collected data from the first FACT teams in Denmark; three teams located in an urban area (Copenhagen) and two teams located in a rural area (Frederikssund) that were established by integrating ACT within existing CMHTs on the 1st of May 2016. For the comparison groups, we collected data from two ACT and three CMHT teams located in an urban area (Amager) and two ACT and two CMHT teams located in a rural area (Helsingør and Hillerød). The urban teams had higher caseloads than the rural teams, but the travel distances were shorter, and they could often travel by e-bike to visit the patients. The rural FACT teams had to travel longer distances by car to provide outreach care. FACT and control teams were organised under the same authority (Mental Health Services in the Capital Region). This ensured that the teams had similar profiles and operated according to the same procedures before the study start. Participants received care according to nationally recognised models of CMHT and ACT[16], and FACT teams were implemented according to the Dutch FACT manual.[1] The models used by the three types of teams included in the study are shown in appendix 1, p. 1. Fidelity

was assessed in the five FACT teams 9 months after implementation using the FACT fidelity scale.[17] More details about the fidelity assessments can be found in appendix 2, p. 2.

Design

We used a quasi-experimental propensity-score matched design to compare outcomes of patients receiving care from FACT teams with those receiving care from a CMHT or ACT team (figure 1). The assignment to treatment was not determined by the researchers but based on administrative considerations which makes the study a natural experiment [18]. The study population consisted of all patients under the care of any of the FACT teams or control teams on 1st May 2016 (index date). These patients were identified through the Danish Psychiatric Register and followed until the end of the study period - 1st November 2018. Patients were not included in the study after index date. We used an intention to treat approach, where all patients discharged from the teams were retained in the analysis and had a full follow-up (except for those who emigrated from Denmark or died). This means that data from patients who were discharged were included in the analysis regardless of what treatment they received and how long they received the services.

The integration of ACT and CMHT to form new FACT teams required considerable organisational changes. To avoid bias as a result of the transition period to FACT, we defined the baseline date for data collection to be six months after the FACT teams were implemented, i.e. 1st of November 2016.

Figure 1 here

We also collected data from the FACT board in each FACT team. The FACT board is an electronic spreadsheet with data about the individuals that need intensive FACT support which is used to manage transitions between the intensive and standard levels of care within the team. The patient's name is placed on the FACT board when the treatment is intensified, and when the increased support is no longer needed, the patient's name is removed from the board. The Danish FACT teams used ten criteria to assign patients to the board shown in appendix 3, p. 3. Data from the FACT boards could not be retrieved before 1st of January

2017 due to problems setting the system up, so these data were collated over 18 months (January 2017 to June 2018).

The Danish Data Protection Agency approved the project through the Capital Region of Denmark (RHP-2017-006).

Outcomes

For the primary aim, data on the number of psychiatric admissions and bed days, outpatient contacts, self-harm, coercion and death by any cause was collected over a two year follow-up period (1st November 2016 to 1st November 2018). These data were retrieved from Danish registers.[19–22] All Danish residents have a unique personal ID number enabling individual linkage of data across registers. For the evaluation of outpatient contacts, we distinguished between contacts at the team office, outreach, network meetings (a meeting between the community-based mental health team and members from the inpatient clinic or other sectors, e.g. the social service), group therapy and meetings where a relative was present. Coercive measures included involuntary admission, detention, restraint or involuntary treatment. Incidents of self-harm were identified as ICD-10 codes X60-X84. We also included a measure of probable self-harm which covered events of undetermined intent, accidental poisonings, and injuries to the lower forearm (ICD-10 codes Y10-Y34). More information about the definition of the outcomes from the Danish registers can be found in appendix 4, p. 4. Data on socio-demographic characteristics at index date were retrieved from Statistics Denmark.

For the secondary aim, we collected data from the electronic FACT boards. Data from the FACT board included new referrals e.g. patients who were not previously under the care of a CMHT or ACT team. We gathered data on the number of patients on the FACT board, the criteria used for placement on the board and the duration of each FACT board period. The median number of days on the FACT board was calculated, excluding episodes using the criteria "being in inpatient care" or "being a new patient". The personal ID

number of the patients who had an episode on the FACT board was linked with data from medical records to assess whether there had been any previous treatment under an ACT or CMHT team.

Statistical analysis

For our primary analyses, we used exact matching and propensity score matching to control for potential confounding. Each CMHT-FACT patient was matched with one patient in the CMHT comparison group, and each ACT-FACT patient was matched with one patient in the ACT comparison group.

We selected matching variables that were possible predictors of outcomes: age; sex; diagnosis of a schizophrenia spectrum disorder (yes/no); secondary diagnosis of substance abuse (yes/no); the highest level of education achieved (defined as elementary school, high school, higher education, or unknown); born in Denmark (yes/no); the number of self-harm episodes, psychiatric admissions, psychiatric inpatient bed days, and the number of coercive measures in the previous two years. All matching factors were measured in relation to the index date (1st May 2016). Exact matching was performed on sex, substance abuse and diagnosis of a schizophrenia disorder for the CMHT analysis and the remaining variables were used in the propensity score. Due to the smaller sample size in the ACT analysis, exact matching was only performed on the variables sex and substance abuse. Two-sample Wilcoxon tests for non-normally distributed continuous variables and chi-square tests for categorical variables were used to assess whether matching had resulted in comparable FACT and comparison groups.

We calculated incidence rates (IR) and incidence rate ratios (IRR) to quantify continuous outcome variables (number of admissions, bed days and outpatient contacts) using negative binomial regression analysis. A rate model with an offset variable was used to take account of varying lengths of follow-up, with the propensity score as the linear predictor. We calculated hazard ratios using Cox regression analysis for the following events during the two years of follow-up: episodes of coercion; self-harm episodes; and death by any cause. A significance level of 0·05 was chosen. We did not correct for multiple testing.

A sensitivity analysis was carried out to examine the extent to which the results would be affected by starting follow-up six months earlier on the 1st of May 2016 (index date) instead of 1st of November 2016 to include data from patients discharged between May and November 2016.

For our secondary aims, two-sample Wilcoxon tests for non-normally distributed data were used to analyse the difference in length of FACT board episodes between previous CMHT and ACT patients. Analyses were conducted using R version 3.6.1 (R Foundation for Statistical Computing).

Role of the funding source

The funder had no role in study design, data collection, data analysis, data interpretation, or writing of the report. The corresponding author had access to all study data and had final responsibility for the decision to submit for publication.

Results

On 1st May 2016, 887 CMHT patients and 130 ACT patients were enrolled in the five newly established FACT teams. We identified a total of 1210 CMHT patients and 333 ACT patients in the comparison services. Fidelity assessments 9 months after implementation of FACT showed that one team had insufficient fidelity while the remaining four teams had reached good fidelity (data shown in appendix 2, p. 2).

Baseline characteristics before and after propensity score matching

Baseline characteristics before and after matching between FACT and the two comparison groups are shown in Table 1. A total of 887 CMHT-FACT patients were matched (1:1) with a CMHT patient, and all 130 ACT-FACT patients were matched (1:1) with an ACT patient. Matching resulted in a study population of 2034 individuals and an improved balance between the FACT groups and the comparison groups on matching variables. However, differences remained in the number of bed days, admissions and previous experience of coercive measures between CMHT-FACT patients and the matched CMHT control group.

Table 1 here

Out of the 2034 patients included in the study, 80 individuals died, seven emigrated, and two changed their ID number during the study period. In total, 1060 patients were discharged from the community teams (CMHT-FACT, n: 480; CMHT control, n: 446; ACT-FACT, n: 69 and ACT control, n: 65) over the two years. The mean duration of treatment during the follow-up period was: CMHT-FACT, 551 days (SD 239); CMHT control, 568 days (SD 231); ACT-FACT, 571 days (SD 222); and ACT control, 580 days (SD 224).

Inpatient service use

Table 2 shows the adjusted incidence rate (IR) per person-year and incidence rate ratio (IRR) for the use of mental health care. During the two years of follow-up, individuals under the care of FACT teams had a lower rate of psychiatric admissions compared with matched CMHT and ACT controls (CMHT-FACT vs CMHT: IRR, 0·84; 95 % CI, 0·76-0·92; ACT-FACT vs ACT: IRR, 0·71; 95 % CI 0·59-0·85). However, there was no difference in the number of inpatient bed days between CMHT-FACT patients compared with CMHT patients or FACT-ACT patients compared with ACT patients.

Table 2 here

Outpatient contacts

Overall, there was a higher rate in the total number of outpatient contacts for FACT patients compared with CMHT and ACT matched controls (CMHT-FACT vs CMHT: IRR, 1·15; 95 % CI, 1·10-1·20; ACT-FACT vs ACT: IRR, 1·15; 95 % CI, 1·03-1·29).

CMHT-FACT patients had more outreach contacts than CMHT patients (IRR, 1·67; 95 % CI 1·53-1·82), but no difference in the rate of contacts at the team office or meetings with a relative compared with CMHT controls. However, CMHT-FACT patients had a lower rate of group therapy (IRR, 0·70; 95 % CI 0·60-0·82) and network meetings (IRR, 0·50; 95 % CI 0·44-0·57) than CMHT controls.

ACT-FACT patients had a higher rate of contacts at the team office (IRR, 1·33; 95 % CI 1·13-1·55) and contacts with relatives (IRR, 1·36; 95 % CI 1·16-1·59) compared with ACT controls. There was no

difference in the rate of network meetings between the two groups. An analysis of group therapy could not be conducted for comparison of ACT-FACT and ACT because there were too few group therapy events in the ACT group.

Self-harm, coercion and death

Table 3 shows the hazard ratios (HR) for episodes of self-harm, the use of coercive measures, and death. There was no difference between CMHT-FACT patients and matched CMHT controls in the rate of deliberate or probable self-harm. There were too few cases of self-harm to compare these outcomes for the ACT-FACT and ACT control groups. There was no difference between CMHT-FACT patients and CMHT controls or between ACT-FACT patients and ACT controls in the rate of use of coercive methods or death by any cause.

Sensitivity analysis

The sensitivity analysis with start of follow-up on the 1st of May 2016 did not alter the direction or statistical significance of the results (data shown in appendix 5, p. 5-6).

Table 3 here

Users of more intensive FACT support

Table 4 shows the characteristics of FACT patients who received the more intensive service during the 18 months of this component of the study. During this period, 96 former ACT patients (74 % of the ACT patients transferred to FACT) and 320 former CMHT patients (36 % of the CMHT patients transferred to FACT) received at least one episode of more intensive FACT service. The criteria for receiving the more intensive service "current admission" and "new patient" were used most frequently (26 %) followed by "recently discharged from inpatient care" (22 %).

Table 4 here

FACT patients who experienced a period of being placed on the FACT board had a median of one episode (range 1-14) with the more intensive service (excluding episodes using the criteria "patients new to the team" or "admission to inpatient care"). The median length of more intensive FACT episodes was 12 days (range 0-366) for former CMHT patients and 11·5 days (range 0-155) for former ACT patients. There was no statistically significant difference in the median number of days receiving more intensive FACT support between former ACT and CMHT patients (p-value = 0·879).

Discussion

To our knowledge, this is the first study comparing outcomes for patients receiving FACT with controls under the care of CMHTs and ACT teams.

For former CMHT patients, moving to the more intensive FACT model was associated with fewer admissions. However, as there was no statistically significant difference in total bed days, it appears that admissions were longer for those who transferred to FACT than CMHT controls. We also found no advantage for these FACT patients over CMHT care with regard to episodes of self-harm or coercion contradicting our hypothesis that reconfiguring CMHT care to FACT would have a significant benefit on these outcomes. However, our results support our hypothesis that CMHT-FACT patients received a higher number of outpatient contacts compared with CMHT controls. These contacts seem to have been delivered through more outreach visits that may be especially beneficial for the group of former CMHT patients who had experienced periods of destabilisation. Data from the FACT board showed that one third (36%) of the former CMHT patients had episodes where they received the more intensive FACT support. These findings suggest that, in keeping with the rationale for implementing FACT in Denmark, FACT can address unmet needs for more intensive care amongst CMHT patients.

For former ACT patients, the move to what was supposed to be a less intensive model of care (FACT), turned out to provide more intensive treatment. However, the additional outpatient contacts were mainly office-based rather than more outreach. There were fewer admissions for those who transferred from ACT to FACT but no difference in total inpatient days compared with those who continued under an ACT team. Furthermore, there was no negative impact in terms of the use of coercive measures or deaths (it was not

possible to assess differences in self-harm as there were too few episodes). These findings contradict our hypothesis that moving ACT patients to FACT would have a negative impact on coercive measures and deaths. However, we acknowledge that the sample available for some of these comparisons may have been too small to allow firm conclusions to be drawn.

Comparison with other FACT studies

Our results on the use of psychiatric inpatient care do not corroborate those of other studies which have reported FACT to be associated with fewer inpatient days, admissions and outpatient contacts. However, previous studies have lacked control groups for comparison.[5,6,13,14] Our results on the use of outpatient care echo the findings of a single study by Drukker et al. (2013), who found that patients in FACT used more outpatient contacts compared with two control groups.[12] These control groups, however, received treatment without case management, which is different from ACT and CMHT. Data from the FACT board showed that the median duration of a FACT board episode was only 12 days, considerably shorter than results of other studies of FACT conducted in the Netherlands and Sweden; Nugter el al.[5] reported a median of 12·6 weeks, and Svensson et al.[7] reported a mean of 6 months. A possible explanation could be a larger caseload in the Danish teams compared with that recommended in the Dutch FACT manual. This potentially makes it difficult for the teams to provide intensive care over a longer period. Results of our study also show that a considerable proportion of patients were discharged from the teams during the two years, indicating a high flow of patients in the teams. Based on staff experience, most of these patients were referred to primary care with support from outreach staff within social services. However, we do not have exact numbers to confirm this.

Strengths and limitations

A main strength of the study was the use of a propensity score model to balance the differences in baseline characteristics between FACT and the comparison groups. The use of national registers reduced selection bias and ensured minimum loss to follow-up. Furthermore, confounding by indication does not appear to be a problem in this study as the service reconfiguration required to implement FACT was an administrative,

rather than clinical decision. However, our study has some limitations. First, randomisation was not practically feasible. Randomisation is a more robust approach to control for confounding than propensity score matching due to better control of unknown or unmeasured confounders. Location of services could potentially be an unmeasured confounder in our study as we did not match on this variable. Second, fidelity assessment of ACT and CMHT teams were not conducted, so we cannot comment on how well these control groups were practising according to their defined models of care. Furthermore, the FACT fidelity scale had not been developed into a Danish version when the assessments were made, so some items were difficult to score. Third, potential differences in registration practice (e.g. the registration of self-harm) could be a source of information bias.

Implications for practice and future research

ACT has been proven to be effective in keeping contact with individuals who find it hard to engage in mental health care services.[23] However, it was not possible in this study to evaluate whether ACT was more effective than FACT in maintaining contact with such patients. We recommend that future studies of FACT include measures of patient engagement with services to examine if there are any biases resulting from unmet care needs.[24] In continuation of this, it is also important to assess the needs of the patients discharged from the teams and the reasons for discharge. Furthermore, we recommend that ongoing research consider clinical outcomes such as functional or symptomatic outcomes, quality of life and client satisfaction.

The relative costs and benefits of the FACT model need to be evaluated particularly considering that our results suggest its implementation may facilitate more intensive support to be delivered but no reduction in bed days. Finally, we recommend that the findings from this study are validated through a randomised controlled trial. Rapid and universal roll-out of FACT in several countries have hindered the opportunities to randomly assign patients between FACT and control groups so we suggest that researchers engage early and carefully consider the realities of the organization in which FACT is introduced.[25]

Conclusion

The FACT model aims to deliver a flexible model that can support people more effectively in times of crisis, leading to a decreased need for inpatient care. Our study found that FACT patients had fewer admissions than controls but no significant difference in total inpatient days. The FACT approach provided more contacts for former CMHT patients than CMHT controls received, and, surprisingly, more contacts for former ACT patients than ACT controls. Future studies should also assess engagement with services and the relative costs and benefits of FACT, ideally through randomised controlled trials with fidelity assessments of the teams.

Contributors

All authors were substantially involved in the design of the study, the interpretation of data, critical reviews of the paper and composition of the final manuscript. CMN and CH conducted the data analysis.

Declaration of interests

The authors declare no competing interests.

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Figure 1 illustrates the design of the study with the comparative analyses: 1) Former CMHT patients who transferred to FACT were compared with CMHT control patients, and 2) Former ACT patients who transferred to FACT were compared with ACT control patients.

Comparison of CMHT-FACT versus CMHT control patients

FACT-team (CMHT-FACT)
n = 887
(urban, n = 567 and rural, n = 320)

Baseline
CMHT patients in the Capital Region of Denmark

Two-year follow-up
Comparison of outcomes
CMHT-FACT vs. CMHT

CMHT control group
n = 887
(urban, n = 532 and rural, n = 355)

Comparison of ACT-FACT versus ACT control patients

FACT-team (ACT-FACT)
n = 130
(urban, n = 100 and rural, n = 30)

Baseline
ACT patients in the Capital Region of Denmark

Two-year follow-up
Comparison of outcomes
ACT-FACT vs. ACT

ACT control group
n = 130
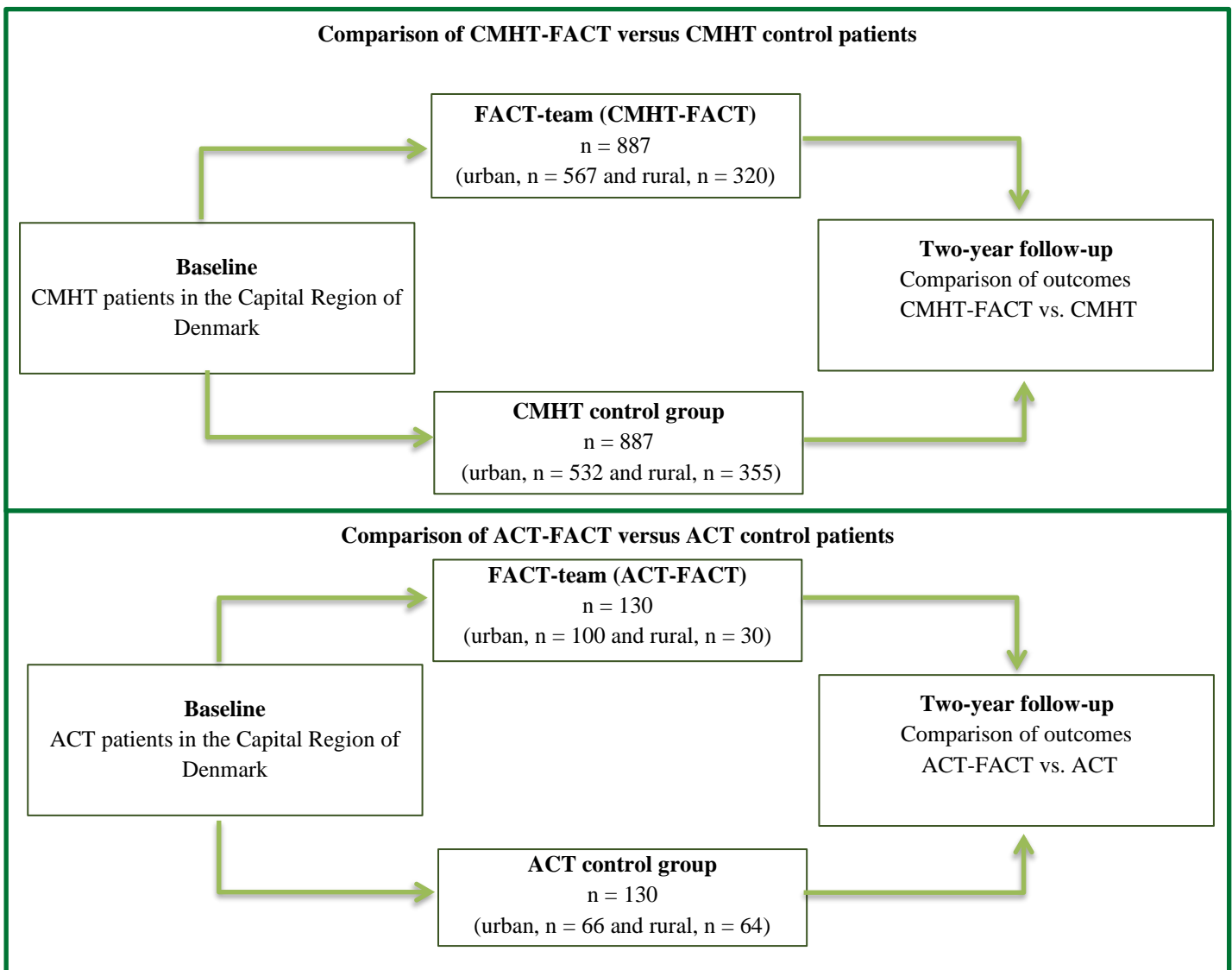(urban, n = 66 and rural, n = 64)

Table 1. Baseline characteristics between FACT and the comparison groups after propensity score matching.

CMHT-FACT patient characteristics compared with all CMHT patients and the matched sample.

	CMHT-FACT (n=887)		Unmatched CMHT (n=1210)		Matched CMHT (n=887)		
	n	%	n	%	n	%	p-value[a]
Female sex	401	45·2	579	47·9	401	45·2	Exact match
Schizophrenia spectrum disorder	515	58·1	639	52·8	515	58·1	Exact match
Substance abuse	162	18·3	179	14·8	162	18·3	Exact match
Born in Denmark	669	75·4	982	81·2	698	78·7	0·114
Highest attained education							0·851
Elementary school	430	48·5	560	46·3	439	49·5	
High school or higher	415	46·8	593	49·0	410	46·2	
Missing	42	4·7	57	4·7	38	4·3	
	median	range	median	range	median	range	p-value[a]
Age	44	18-79	44	18-92	44	18-85	0·955
Psychiatric admissions[b]	0	0-46	0	0-60	0	0-20	0·026
Psychiatric bed days[b]	0	0-413	0	0-589	0	0-589	0·023
Outpatient contacts[bc]	25	0-195	22	0-291	24	0-282	0·841
Coercive measures[b]	0	0-731	0	0-731	0	0-731	0·002
Self-harm [b]	0	0-9	0	0-11	0	0-11	0·095

ACT-FACT patient characteristics compared with all ACT patients and the matched sample.

	ACT-FACT (n=130)		Unmatched ACT (n= 333)		Matched ACT (n= 130)		
	n	%	n	%	n	%	p-value[a]
Female sex	66	50·8	133	39·9	66	50·8	Exact match
Schizophrenia spectrum disorder	104	80·0	252	75·7	107	82·3	0·751
Substance abuse	35	26·9	93	27·9	35	26·9	Exact match
Born in Denmark	86	66·2	248	74·5	88	67·7	0·895
Highest attained education							0·607
Elementary school	56	43·1	179	53·8	50	38·5	
High school or higher	72	55·4	138	41·4	79	60·8	
Missing[d]	d	d	d	d	d	d	
	median	range	median	range	median	range	p-value[a]
Age	44	20-84	45	19-84	43	18-72	0·406
Psychiatric admissions[b]	1	0-12	0	0-78	1	0-19	0·688
Psychiatric bed days[b]	22	0-481	30	0-660	42	0-660	0·237
Outpatient contacts[bc]	35	0-233	35	0-522	33	1-300	0·783
Coercive measures[b]	0	0-731	0	0-731	0	0-731	0·955
Self-harm[b]	0	0-1	0	0-11	0	0-2	0·991

[a] p-values are calculated for FACT and matched comparison groups based on two-samples Wilcoxon test for non-normally distributed continuous variables and chi-square tests for categorical variables
[b] bed days, outpatient contacts, coercive measures and self-harm are calculated as the number of episodes over the two years before the index date (1st May 2016)
[c] Outpatient contacts include contacts at the team office, outreach, network meetings, group therapy and meetings with relatives
[d] Under the Danish data protection law, it is not allowed to show estimates from registers based on fewer than four individuals

Table 2: Incidence rates (IR) per person-year and incidence rate ratios (IRR) for mental health care use

	adjusted IR	adjusted IRR[a] (95% CI)	p-value (IRR)
Inpatient contacts			
Admissions			
CMHT	1·01	1	
CMHT-FACT	0·85	0·84 (0·76-0·92)	< 0·001
ACT	2·20	1	
ACT-FACT	1·60	0·71 (0·59-0·85)	< 0·001
Bed days			
CMHT	11·84	1	
CMHT-FACT	10·09	0·85 (0·57-1·27)	0·416
ACT	33·79	1	
ACT-FACT	25·52	0·76 (0·37-1·53)	0·435
Outpatient contacts			
Office			
CMHT	15·25	1	
CMHT-FACT	15·90	1·04 (0·99-1·10)	0·125
ACT	11·31	1	
ACT-FACT	15·03	1·33 (1·13-1·55)	< 0·001
Outreach			
CMHT	4·68	1	
CMHT-FACT	7·82	1·67 (1·53-1·82)	< 0·001
ACT	18·95	1	
ACT-FACT	19·30	1·02 (0·87-1·19)	0·819
Network meetings			
CMHT	0·20	1	
CMHT-FACT	0·10	0·50 (0·44-0·57)	< 0·001
ACT	0·21	1	
ACT-FACT	0·26	1·24 (0·88-1·78)	0·216
Group therapy			
CMHT	1·30	1	
CMHT-FACT	0·91	0·70 (0·60-0·82)	< 0·001
ACT	0·00	1	
ACT-FACT	0·34	[b]	[b]
Outpatient contacts with relatives			
CMHT	0·58	1	
CMHT-FACT	0·56	0·96 (0·89-1·04)	0·291
ACT	0·82	1	
ACT-FACT	1·11	1·36 (1·16-1·59)	0·001
All outpatient contacts[c]			
CMHT	22·02	1	
CMHT-FACT	25·34	1·15 (1·10-1·20)	< 0·001
ACT	31·36	1	
FACT	36·08	1·15 (1·03-1·29)	0·0155

[a] Negative binomial regression model with observation days as offset variable and the propensity score as linear predictor

[b] Counts were too low to be calculated in negative binomial regression

[c] Office, outreach, network meetings, group therapy and meetings with a relative

Table 3: Hazard ratios for events of self-harm, coercion and death during the two years of follow-up

	events (n [%])	adjusted HR[a] (95% CI)	p-value (HR)
Deliberate self-harm			
CMHT	9 (1·0%)	1	
CMHT-FACT	7 (0·8%)	0·70 (0·25-1·92)	0·485
ACT	[b]	[b]	
ACT-FACT	[b]	[b]	[b]
Probable self-harm			
CMHT	17 (1·9 %)	1	
CMHT-FACT	13 (1·5 %)	0·72 (0·34-1·50)	0·378
ACT	[b]	[b]	
ACT-FACT	[b]	[b]	[b]
Any coercive measures			
CMHT	107 (12·1%)	1	
CMHT-FACT	146 (16·5 %)	1·05 (0·81-1·36)	0·710
ACT	53 (40·8%)	1	
ACT-FACT	46 (35·4%)	0·77 (0·51-1·15)	0·195
Involuntary admission			
CMHT	29 (3·3%)	1	
CMHT-FACT	44 (5·0%)	1·32 (0·82-2·14)	0·256
ACT	20 (15·4%)	1	
ACT-FACT	13 (10·0%)	0·60 (0·30-1·23)	0·165
Death by any cause			
CMHT	30 (3·4%)	1	
CMHT-FACT	42 (4·5%)	1·36 (0·84-2·18)	0·208
ACT	4 (3·1 %)	1	
ACT-FACT	4 (3·1 %)	0·95 (0·23-3·89)	0·939

[a] Cox regression model with observation days as underlying time and the propensity score as the linear predictor

[b] Under the Danish data protection law, it is not allowed to show estimates from registers based on fewer than four individuals

Table 4: Characteristics of patients receiving intensive FACT service and the use of criteria to intensify the services

	n	%
Characteristics of patients receiving intensive FACT services (n = 1278)		
Sex		
Male	661	52
Female	617	48
Age: mean and SD	41	14
Primary diagnosis		
Organic disorder	21	2
Schizophrenia or other psychotic disorders	604	47
Bipolar disorders	95	7
Depressive disorders	86	7
Anxiety disorders	96	8
Personality disorders	108	8
Other	85	7
Unknown	183	14
Previous treatment[a]		
Community Mental Health Treatment (CMHT-FACT)	320	35
Assertive Community Treatment (ACT-FACT)	96	8
New referrals (not previously under a CMHT or ACT)	862	67
The use of criteria to intensify the services (n of episodes = 3292)		
Criteria used for intensification of FACT service		
1 Worsening of symptoms	330	10
2 Disturbed or threatening behaviour	31	1
3 Serious lack of self-care	19	1
4 No-shows	35	1
5 Limited or no contact	123	4
6 Current admission	846	26
7 Discharged recently from inpatient care	719	22
8 Close follow-up of medication	73	2
9 Life crisis	266	8
10 Patients new to the team	850	26

[a]Treatment the 1st of April 2016 - one month before implementation of FACT