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Increasing person-centeredness in psychosis inpatient care: care consumption before and after a person-centered care intervention

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ABSTRACT

Background: Patients with psychotic disorders often need hospitalization with long stays. Person-centered care (PCC) has been shown to improve care quality and decrease the length of hospital stay in non-psychiatric settings. We carried out an educational intervention for inpatient staff, aiming to increase person-centeredness at a major Swedish psychosis clinic. The aim of this study was to test if the intervention could be associated with decreased length of hospital stay (LoS), involuntary stay (LoIS), and reduction in rapid readmissions.

Methods: Data from the clinic's administrative registry were compared for patients with a discharge diagnosis within the schizophrenia-spectrum treated during the one-year periods before and after the PCC intervention.

Results: Contrary to our hypotheses, a quantile regression estimated longer LoS post-intervention, median difference 10.4 d (CI 4.73–16.10). Neither age, sex nor diagnostic category were associated with LoS. Of all inpatient days, ~80% were involuntary. While LoIS was numerically longer post-intervention, the difference did not reach significance in the final regression model (median difference 7.95 d, CI −1.40 to 17.31). Proportions with readmission within 2 weeks of discharge did not differ (7.7% vs 5.2%, n.s.).

Conclusions: Increased length of inpatient care was observed after the PCPC intervention. This could reflect an increased focus on the unmet needs of persons with serious psychotic conditions, but it needs to be explored in future research using a more rigorous study design.

Trial registration: This study is part of a larger evaluation of Person-Centered Psychosis Care (PCPC), registered during data collection (after the study start, before analysis) at clinicaltrials.gov, identifier NCT03182283.

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Introduction

Schizophrenia-spectrum disorders affect a person's life profoundly and comprehensive health care is paramount to promote recovery [1,2]. While the focus has shifted towards an outpatient-based practice, acute inpatient care is still necessary for many patients [3]. Persons with psychotic disorders make up a major part of psychiatric inpatient services and are overrepresented among patients with long or repeated stays [4,5]. Moreover, involuntary admission is common [6]. Throughout Europe, 30–50% of all involuntarily admitted persons have a psychosis diagnosis [7]. Involuntary hospitalization is a major violation to a person's autonomy and both quantitative and qualitative data suggest traumatizing and disempowering effects alongside the benefits of needed treatment [8,9]. Although the length of involuntary hospital stay (LoIS) has been suggested to better depict the consumption of involuntary care from a patient perspective than the number of admissions only [10], reports of LoIS are scarce and interventions to reduce LoIS are to our knowledge not explored within hospital settings for persons with schizophrenia and similar disorders.

Parallel to the potential problems with an involuntary inpatient stay, reports show that inpatient care for persons with schizophrenia and similar psychoses lacks in quality and fails to provide a safe space for recovery [11]. Patient accounts of inpatient stays include descriptions of chaotic, depersonalizing, and disempowering environments [12], in which patients spend the majority of their time alone and without therapeutic activities [13]. Inclusion in care planning is low [14]. Staff members' approach and actions are described as detrimental for patients' ability to feel safe and recover [12,15]. Reviews of patients' experiences suggest that inpatient care needs to be improved by creating high-quality, person-centered staff-patient relationships and ward environments that promote healing and minimize coercion [16].

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Person-centered care (PCC) is an approach that focuses on seeing patients as capable and active agents in the care process. This creates possibilities for patients to participate in decision-making about their care, thereby enhancing patient empowerment [17–22]. The overall goal is improved health and wellbeing [23]. The Gothenburg Center for Person-centered Care (GPCC) has concretized the concept by emphasizing three 'routines' to facilitate implementation; (1) initiating a partnership by attaining the patient's narrative, (2) working the partnership through shared decision-making and activation of the patient in the care planning and process, and (3) safeguarding the partnership by documenting agreed upon health plans accessible for the patient [24,25]. Studies of the PCC approach in settings outside the mental health sphere have shown encouraging results regarding the decreased length of hospital stay (LoS) [26–28] and enhancing patients' satisfaction with care quality [29]. In a psychiatric outpatient setting, PCC was associated with reduced re-admittance to inpatient care and shortened LoS [30], possibly by increased patient engagement and improved medication adherence [31,32].

A PCC intervention, Person-Centered Psychosis Care (PCPC), was created to improve inpatient services for patients treated for psychotic disorders at a psychosis clinic in Sweden [33]. The intervention was associated with increased patient satisfaction [34] and staff experiences reflected positive changes for both patients and staff [35]. The aim of the present study was to test whether the intervention could be related to changes in care consumption. As PCC is expected to improve collaborations with patients and provide more individualized care, thus attending to the specific need of each unique patient and more efficiently support recovery, we hypothesized we would observe reduced LoS and LoIS following the PCPC implementation. Further, we wanted to test whether the proportion with rapid readmissions would change after the PCPC intervention.

Materials and method

Study design

A before and after design, comparing outcomes in patients treated before to patients treated after the PCPC educational intervention for inpatient staff.

Study setting

The Psychosis Clinic provides all care for patients with psychotic disorders in Gothenburg, a major Swedish city, serving a population of ~700,000 inhabitants (2018). The inpatient services include four hospital wards, with a total of 43 beds, all situated in the same building. All four wards participated in the study. On average, a day shift is staffed by 2–3 nurses and 3–5 nurse assistants caring for 11–13 patients. There is one senior psychiatrist and several resident psychiatrists on each ward as well as a social service counselor. Physiotherapists, occupational therapists, and psychologists are available as needed. No major changes to the number of beds, organization of care or medical strategies affecting the setting were reported during the course of the intervention.

The person-centered psychosis care intervention

The overall aim of PCPC was to increase the person-centeredness at the inpatient care wards. Based on previous GPCC interventions [36], an educational intervention influenced by participatory design [37] and Kotter's change theory [38] was launched, involving staff as co-creators in order to achieve sustainable change. The intervention focused on implementing the ethics of person-centered care in staff's thinking, guiding staff to increase person-centeredness in their everyday practice. There were thus no preset PCC routines to implement at the wards, as participants were to create these themselves, but there was a preset structure for the educational intervention [33] and a theoretical framework for the content [24,25]. Facilitators from GPCC guided staff through 6 educational days, spread over a 6-month period, involving lectures, workshops, and reflective sessions to enhance their theoretical knowledge of PCC. Patients and outpatient staff contributed with their perspectives by participating in one of the educational days. Staff also engaged in practical learning on the wards, by attaining the patients' narratives, co-creating care plans with patients and documenting these plans. One-third of all inpatient care staff (all professions and roles represented) participated in the educational days. Staff members not taking part in the educational days were involved in the project through knowledge translation activities to exchange experiences, ideas, and reflections. To ensure that new knowledge was implemented into everyday practice, participants were coached to create and test minor improvement projects on their wards. Examples of projects include a routine to involve patients in creating a care plan, developing information material for patients and their families to facilitate their involvement in the care process, and involving patients in the medical round/treatment discussions. After the educational intervention ended, staff continued to work on the improvement projects, entering an implementation phase. During this phase, PCC lectures were delivered to provide new staff with knowledge about the project and person-centeredness and to provide a booster for experienced staff. There were also supervision sessions for all staff to facilitate continued ethical reflection as well as follow-up on change projects at ward meetings. The educational intervention and implementation are described in further detail in the published study protocol [33]. The intervention resulted in some change projects becoming routines that directly affected the care environment, such as creating care plans with patients and providing better information to patients and next-of-kin. The environment also evolved as person-centered thinking was enhanced. Such changes in the care environment were captured in a focus group study of staff members' experiences of PCPC [35]. Briefly, staff described that the intervention changed their way of thinking about patients; they focused more on the whole person, rather than just the symptoms or specific difficulties. Staff further reflected changing their routines to

better align with PCC, for example, they structured their work to accommodate more opportunities for communication with patients, created new routines for improved information transfer, and regularly wrote health plans together with patients. Staff related that they experienced a positive change in the ward atmosphere after the PCPC intervention.

Participants

Ward logistic data for all patients with a discharge diagnosis within the schizophrenia-spectrum (F20–F29) in accordance with the ICD-10 [39] who received inpatient care at any of the clinic's four psychosis wards during the data collection periods was included. The only exclusion criterion was a hospitalization episode lasting less than one day. The distribution of diagnoses, age and sex during the pre- and post-intervention observation periods is shown in Table 1.

Measures

This study reports two primary outcomes; length of hospital stay (LoS) and length of involuntary stay (LoIS). LoS was defined as the number of days from admission to discharge, for each hospitalization episode, regardless of voluntary/involuntary status. LoIS was defined as the number of days spent at the hospital admitted in accordance with the Compulsory Care Act [40], per hospitalization episode. The law stipulates that a person can be admitted to compulsory psychiatric care if s/he meets the following criteria: (1) has a serious mental disorder, (2) is in acute need of inpatient care, and (3) is reluctant to accept care or not capable of making such a decision. While any registered physician can make the decision of admitting a patient involuntarily (if assessed accordingly), a second confirmational assessment must be made by a senior psychiatrist within 24 h of the admittance to confirm that the patient meets the criteria. When patients have been involuntarily admitted they can be subjected to involuntary procedures. The aim of involuntary admission is to improve the patient's condition to such a degree that s/he can accept voluntary care. Therefore, the need for involuntary care is continuously assessed, and the care is to be transformed to voluntary care as soon as possible.

The secondary outcome reported in this study is rapid re-admission which was defined as admittance to a psychiatric ward within 14 d after discharge from any of the Psychosis Clinic's four inpatient wards. This cut-off was chosen to capture readmittance that could reflect premature discharge or inadequate discharge planning from the inpatient ward.

Procedure

Data pertaining to all eligible patients receiving care at the psychosis inpatient wards was collected for pre- and post-intervention periods (hospitalization episodes for patients discharged between December 2013 and December 2014, and all admissions between May 2017 and May 2018). Year-long data collections were chosen to eliminate the influence of seasonal fluctuations and to attain a fairly large sample. The source of data was the clinics' own administrative register including admission and discharge dates, dates for the use of the Compulsory Care Act to detain patients, patients' identification number (providing information on age and sex) and diagnoses.

The study was approved by the Regional Ethics Board in Gothenburg, registration number 773-13. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008 [41]. The requirement for consent was waived by the ethics committee as data in this manuscript are clinical administrative data only.

Statistical analyses

A quantile regression model was used as data distributions did not allow parametric testing for the length of total and involuntary hospital stays. The model uses medians to test the influence of potential confounders to show group differences adjusted for confounding variables. The SAS (version 9.4) proc quantreg package was used. We performed univariate regression analyses to test the possible confounders age, sex, and diagnostic category. This procedure was used to build regression models selecting only those confounding variables that might be significantly related to LoS/LoIS [42], using only confounders with $p < .25$ in the final regression models. All analyses of LoIS were based on the subsample of hospitalization episodes that included involuntary days (LoIS > 0). To mitigate the number of assumptions for the statistical analysis, i.e. skewness, the *p*-value and the confidence interval were estimated using the resample method.

Table 1. Distribution of age, sex and diagnoses reported for all included hospitalization episodes and episodes with compulsory care during one-year observation periods before and after the Person-centered Psychosis Care intervention.

	Before		After	
	All included hospitalization episodes, *n* = 366	Episodes involving compulsory care, *n* = 247	All included hospitalization episodes, *n* = 385	Episodes involving compulsory care, *n* = 265
Age, years; *M (SD)*	49.4 (13.8)	49.8 (14.0)	44.2 (15.1)	42.9 (15.3)
Sex, women; *n* (%)	176 (48.1)	113 (45.7)	175 (45.5)	112 (42.3)
F20 Schizophrenia, *n* (%)	155 (42.3)	108 (43.7)	133 (34.5)	89 (33.6)
F21 Schizotypal disorder	1 (0.3)	–	3 (0.8)	2 (0.8)
F22 Delusional disorders	46 (12.6)	38 (15.4)	42 (10.9)	28 (10.6)
F23 Brief psychotic disorder	22 (6.0)	14 (5.7)	24 (6.2)	21 (7.9)
F25 Schizo-affective disorder	91 (24.9)	54 (21.9)	73 (19.0)	51 (19.2)
F29 Unspecified psychosis	51 (13.9)	33 (13.4)	110 (28.6)	74 (27.9)

A Chi-square test was performed to test group differences in proportions with rapid re-admission, using SPSS, version 12.

Results

The pre-intervention sample comprised 366 individual hospitalization episodes while the post-intervention sample included 385, representing 49% and 51% of the total 751 episodes included respectively. The pre-intervention hospitalization episodes were consumed by 275 unique patients and the corresponding figure post-intervention was 299 patients, and a total of 527 patients for the entire sample as some patients were represented in both groups. A previous analysis excluding individuals represented in both samples showed similar results to the analysis including these individuals. Therefore, we chose to include all individuals in the analysis. Across both groups, 21% of all inpatient days were consumed by 5% of the patients and almost 80% of all inpatient days were spent in accordance with the Compulsory Care Act. Slightly over two-thirds of all care episodes involved care in accordance with the Compulsory Care Act (67.5% of the pre-intervention hospitalization episodes and 68.0% of the post-intervention episodes). This yielded 247 pre-intervention episodes and 265 post-intervention episodes for the comparison of LoIS. Patients in the post-intervention sample were on average ~5 years younger, a slightly greater proportion were males and Unspecified psychosis (F29) was more common (Table 1).

The pre-intervention sample had a median LoS of 25.2 d, with an interquartile range (IQR) 8.9–53.5 and a total range 1.1–665.5, while the post-intervention sample had 34.2 d (IQR 15.9–61.2, total range 1.1–270.1).

Univariate analyses indicated that neither age nor sex had significant associations with LoS while the diagnostic category fell within the 25% cut-off (Table 2) and was included in the final multivariate regression model. This model estimated that LoS was 10.4 d (CI 4.73–16.10, p = .0003) longer in the post-intervention sample as compared to the pre-intervention sample. None of the diagnostic categories showed significant associations with LoS in the final model although F23 showed a strong tendency towards having shorter LoS than F20 (−7.77, CI −15.69 to 0.16, p = .055.

With regard to involuntary care, the pre-intervention sample had a median LoIS of 28.0 d (IQR 15.6–59.0, total range .4–664.9) and the post-intervention sample 39.0 d (IQR 23.8–76.4, total range 1.0–213.0). Univariate analyses suggested that the diagnostic category was associated with LoIS (Table 2). Therefore, this variable was included in the final multivariate regression model. Although there was a tendency towards longer LoIS in the post-intervention sample, this result did not reach significance (median difference 7.95 d, CI −1.40 to 17.31, p = .095). The diagnostic group showed no significant association with change in length of involuntary stay in the final model.

We decided to further explore the outcomes in LoIS by examining the proportion of hospital days spent in accordance with the Compulsory Care Act in the LoIS sub-sample, using a crosstab and calculating the risk difference for spending a day at the ward involuntarily. The explorative analysis did not indicate a significant difference between the groups with the finding of a 0.003 risk difference (90.6% vs 90.3%), CI of the difference = −0.006 to 0.012.

While the proportion of hospital episodes followed by rapid readmission was numerically lower after implementation, the difference did not reach significance (pre-implementation 7.5% vs post-implementation 5.1%, χ^2 (1, n = 385) = 3.4, p = .065). A post hoc analysis excluding patients represented in both groups showed similar results, (7.5 vs 5.1%, χ^2 (1, n = 313) = 2.57, p = .109).

Table 2. Associations between LoS or LoIS and group, age, sex or diagnostic category as estimated by univariate quantile regressions.

	Sample estimate (median difference, days)	CI of median difference	p
Length of total stay (LoS)			
Post intervention group[a]	8.95	2.97 to 14.93	.003
Age	−0.07	−0.25 to 0.11	.470
Sex, man[b]	−1.97	−7.27 to 3.32	.465
Diagnostic category			
Delusional disorders (F22)[c]	6.46	−5.03 to 17.96	.270
Brief psychotic episodes (F23)[c]	−8.47	−19.76 to 2.82	.141
Schizoaffective disorders (F25)[c]	−1.45	−9.04 to 6.14	.707
Unspecified psychosis (F29)[c]	−1.53	−9.04 to 5.98	.689
Length of involuntary stay, LoIS			
Post-intervention group[a]	11.00	2.69 to 19.31	.009
Age	−0.18	−0.54 to 0.17	.318
Sex, man[b]	−3.69	−13.22 to 5.84	.447
Diagnostic category			
Delusional disorders (F22)[c]	2.56	−10.03 to 15.15	.690
Brief psychotic episodes (F23)[c]	16.12	−1.78 to 34.02	.076
Schizoaffective disorders (F25)[c]	4.56	−6.60 to 15.71	.422
Unspecified psychosis (F29)[c]	6.58	−7.50 to 20.66	.359

[a]As compared to the pre-intervention group.
[b]As compared to women.
[c]As compared to Schizophrenia (F20).

Discussion

Contrary to our hypothesis, the length of stay was longer during the year that followed the implementation of PCPC. The length of involuntary stay tended to be longer after the intervention, but the results were not significant when adjusted for the diagnostic category. We observed no significant change in the proportion of patients with rapid re-admission.

Our LoS findings differ from those of PCC studies based in other hospital settings [26,27]. Results are not directly comparable considering that the remission process as well as discharge procedures might differ in these settings compared to hospital care for psychotic illness. Ekman et al. [26] observed that the reduction in LoS after a PCC intervention for chronic heart failure patients was smaller than that reported from a PCC intervention involving orthopedic surgery patients. They discussed how the trajectory of a more diffuse illness with less clear rehabilitation goals might help to explain the discrepancy. Remission goals might be even more diffuse in persons with psychotic disorders, and thus more difficult to target, which could impact on LoS in the psychosis care setting. Both Ekman et al. [26] and Olsson et al. [27] further describe adopting PCC in a very structured manner, focusing on the practical aspects and utilizing

patient participation to optimize discharge planning. Discharge planning was not a specific focus of our PCPC intervention. Future interventions to reduce LoS could include a greater emphasis on co-operation with family and outpatient services which have been suggested to reduce LoS in psychiatric settings [43,44].

While our study design does not allow us to make conclusions regarding causation, it is possible that the observed increase in length of stay actually was related to the PCPC intervention. This could be the case if staff increase their understanding of the patient as a person, with numerous unmet needs, which was suggested in our qualitative exploration of staff experiences of the PCPC project [35]. Another consideration is that the involvement of patients in shared decision-making regarding medication strategies could delay the initiation or change of antipsychotic treatment. Such a delay was recently shown to substantially increase the length of hospital stay [45]. While we have no data suggesting the shared decision-making for initiation of treatment specifically was affected in our project, adhering to a patient's wish to postpone changes of medications would be in line with PCC and staff worked to include patients in shared decision-making throughout PCPC [35].

The long-term trend in hospitalization for psychotic illness is a dramatic decrease in LoS [3] possibly resulting in more frequent readmissions [44]. This might imply that a more thorough care effort is needed. While shortening hospitalization episodes could mean less exposure to recovery-hampering patriarchal inpatient routines, and short-term economic gains, prolonged LoS in person-centered practices could reflect more qualitative and thorough care. Larger, long-term follow-ups on recovery outcomes and readmission are needed to further evaluate the potential of PCC in the inpatient care of persons with schizophrenia and similar psychoses.

We must keep in mind that numerous circumstances may influence LoS and the observed increase in this study could well be explained by factors beyond the scope of our intervention. Descriptive analysis showed that a small proportion of patients (5%) consumed one-fifth of all hospital days, which aligns with previous studies reporting that the top 5% of service users accounted for up to 30% of all care consumption [5]. These figures suggest that individual circumstances may have a major impact on care consumption outcomes. The samples compared in this study might have differed in factors known to affect hospitalization duration, such as symptomatology, duration of untreated psychosis [3,43], involuntary admission and social or cognitive functioning (having relationships, independent living, or employment) [46], or medical comorbidity [47,48]. Although having included all patients during two year-long observation periods, thereby avoiding selection bias, we lack data to compare the groups for these possible confounders. This is due to the use of the clinic's administrative registry, in which the content is focused on care consumption and limited to age, sex and diagnosis in terms of individual-level characteristics. None of those variables were significantly related to LoS in this study.

Our hypothesis that LoIS would decrease was not supported, instead a tendency towards prolonged LoIS was shown. When trying to understand such a finding the factors discussed above in relation to increased LoS are relevant also here, as a major part of the LoS days consisted of involuntary days (almost 80%). Previous studies have shown associations between compulsory admission and both younger age, male gender, and delusional disorder [6,49]. In our study, none of these factors were related to LoIS. Methodological issues, as well as differences in the organization of inpatient care might help to explain some of this disparity.

There are other characteristics previously associated with involuntary admission, which might have influenced the length of stay in our population. We lacked data to control for characteristics such as lack of relationships, unemployment and reliance on social welfare [6], or care-related factors including lack of insight, lack of treatment adherence and previous experiences of involuntary hospitalization [6]. These care-related factors might impact on patients' ability to engage when staff attempt to provide more person-centered care. The role of insight would be of particular interest in our sample considering the large proportion of involuntary hospital days, as previous study findings have shown that insight improves less in patients who are involuntarily hospitalized (as compared to voluntarily admitted patients) [50]. Staff and patients with compulsory care may experience difficulty in finding common ground throughout the care episode. Future studies could thus consider a measure of insight when evaluating person-centered interventions of similar approaches based on partnerships.

The high proportion of involuntary care days, ~80%, and proportion of involuntary admission, ~68%, found across both groups is worth discussion. Previous reporting of European involuntary admissions suggests that Sweden has the largest proportion of involuntary admissions with ~30% in general psychiatric populations (including but not exclusively psychosis) [7]. Comparison across studies and nations should be cautiously interpreted as figures will differ depending on what patient populations is included and how involuntary care is measured [10,51]. Potentially higher proportions in Swedish samples could however be a consequence of the high psychiatric burden in patients prioritized for inpatient treatment in a system with low numbers of psychiatric beds/capita. Sweden has a low number of hospital beds, 2.1 beds/1000 inhabitants, as compared to the OECD average of 4.4 [52]. Of those 2.1 beds, .3 are psychiatric beds [53]. Such an argument is supported by the fact that the shift from hospital-based to outpatient care drastically decreased the number of voluntarily admitted patients in Sweden during 1990–2010, from ~9000 (/100,000 inhabitants) to ~2000, while the number of involuntary admissions was less affected with a ~47% decrease [54].

As our hypothesis on reduced LoIS was unsupported, and the prolonged LoIS was not significant we wanted to further explore the LoIS data. Therefore, we tested (post-hoc) the risk of inpatient days being involuntary to see whether the intervention could be related to a reduction in the ratio of involuntary days to total days. We found no significant difference between the groups. We observed however that a high percentage of the time spent in the hospital was involuntary (~90%) across samples, suggesting that patients who

are involuntarily admitted spent almost their entire hospital stay under coercion. This is an interesting finding since, in Sweden, according to the Compulsory Care Act, psychiatrists are stipulated by law to continuously consider whether compulsory care can transition to voluntary care. It relies on psychiatrists actively assessing the patient's ability to accept voluntary care and this decision should be based on interaction with the patient. PCPC targeted staff attitudes and customs, factors that have been shown to contribute to variation in rates of involuntary admissions across Europe [55]. However, it remains unclear how PCPC might influence psychiatrists' decisions to transition from involuntary to voluntary care. While psychiatrists were involved as participants in the PCPC educational intervention, and routines for more frequent patient-doctor talks were tested to provide better working relations with patients [33], some staff reported in focus groups that they experienced limited engagement among ward psychiatrists, and this was seen as a barrier for PCC [35]. Studies focusing on LoIS and psychiatrists' decision-making process when considering conversion to voluntary care are needed to identify future intervention targets. This is an important area for further research as the reduction of coercive care, along with the enhancement of patient participation and empowerment, are emphasized to align inpatient psychosis care to recovery-oriented practices.

Although the rapid readmission rate was nearly 30% lower post-intervention, the difference did not reach significance. This might be a power problem as the numbers of rapid readmissions were low in both groups. While it could be argued that the new approach did not significantly increase or decrease the need for rapid rehospitalization, the limitations of the study design must be taken into consideration. We lacked individual-level data (illness severity, complexity of discharge planning and available support after discharge) to control for differences possibly affecting this outcome between the pre- and post-intervention groups. Differences in bed occupancy or admittance rates between the two time periods could also be considered possible confounders as pressure to make room for new patients could affect decisions for discharge. Theoretically the prolonged LoS might reflect fewer premature discharges, possibly leading to a reduced need for rapid readmission, but we cannot make such conclusions from our data. It is however important that future studies explore the effects of efforts to enhance person-centeredness in inpatient care in both short- and long-term perspectives to evaluate effect and cost-effectiveness.

Methodological considerations

The uncontrolled before and after the design of the study is a major limitation, and conclusions about causality are inappropriate. We could not randomize wards for a controlled design as ward logistics sometimes require movement of both patients and staff between wards, which could result in 'contamination'. A cluster-randomized trial or a stepped wedge design would provide for more rigorous testing but that would take the project to financial and organizational levels beyond what was feasible. Further, the limited scope of the clinic's administrative register limited our ability to check for confounders. As recommended when assessing complex interventions under suboptimal research conditions [56], we applied different types of methods to understand the output of the PCPC project [34,35], in accordance with our study protocol [33].

Another important limitation is the lack of measurement of the degree of person-centeredness of the care delivered, which leaves the level of successful implementation unknown. While focus group data on staff experiences [35] suggest increased person-centeredness, robust measures are lacking.

The choice was made to use hospitalization episodes as the base for analysis, rather than patients to present a picture of all care consumption. Using patients as a base would introduce difficulties in how to handle multiple admissions by the same patient. Previous authors have described how patients admitted early during the data collection period would be able to accumulate more days due to readmission than patient admitted later in the process [57]. Excluding patients already represented by one admission would on the other hand not mirror actual care consumption at the clinic.

Despite the caveats outlined above, we consider that our findings make a relevant contribution to the sparse intervention literature, in a time of global interest in person-centered care for persons with serious mental illness.

Conclusion

The PCPC intervention was associated with increased LoS which might possibly be attributed to an increased focus on the unmet needs of persons with serious psychotic conditions. Future projects in the field of person-centered hospital care for persons with schizophrenia spectrum disorders should include a measure of person-centeredness and strive for more robustness in design to further explore the effects of PCC on the consumption of both voluntary and involuntary care.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

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Data availability statement

The data that support the findings of this study are available from the corresponding author, KA, upon reasonable request.

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