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Opening up therapeutic access: Acute psychiatric treatment with Soteria elements is suitable and feasible for patients suffering from psychosis with and without comorbid substance use disorder

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Abstract

Summary: We examined for the first time the feasibility of the implementation of Soteria elements in an acute psychiatric ward for patients suffering from psychosis with comorbid substance use disorder (SUD) and without. **Methods:** In a pre-post design, both groups (N=191) were compared with each other in 2016 (before the reconstruction) and 2019 (after the reconstruction) using various treatment parameters. **Results:** For both groups, treatment time in the open ward was significantly increased. In the schizophrenia group without SUD we noticed an increase in early discharges. In the dual diagnosis group, significantly fewer patients had to be discharged against medical advice. Drug dose was reduced in both groups, but failed to reach statistical significance after controlling for covariates. The use of outpatient follow-up care increased for those with dual diagnosis from 63% to 76%. Readmission rates remained unaffected for both groups. **Conclusion:** The Soteria model offers an integrative therapeutic approach in an open setting with a trend towards less medication and improved follow-up care even for dual diagnosis patients usually difficult to integrate.

Keywords: *Soteria, acute ward, psychosis, dual diagnosis, psychosocial interventions*

Introduction

Originating from the anti-psychiatric movement in the USA, the aim of Soteria treatment is to accompany people through acute psychosis in a low-stress, non-hospital setting in a shared apartment with the help of sustainable relationships, embedded in a social network with subsequent community-based care. Antipsychotic medication is supposed to be either avoided or used as little as possible. [1]. The original concept of Soteria treatment and its proof of effectiveness by Mosher and Ciompi [2, 3] aimed exclusively at patients with schizophrenia or psychotic disorders. This is currently still reflected in the *Soteria Fidelity Scale* [4], but also partly in practical care, which defines a comorbid substance use disorder (hereinafter SUD) as an exclusion criterion [5]. A further exclusion criterion for treatment in a Soteria setting is reduced controllability and the associated risk to harm self and others, which necessitates a transfer to a locked ward of standard psychiatric care in around 10-15% of admitted patients [5, 6, 7,].

In a comprehensive review covering a period from 1990-2017 and analysing 123 articles with a sample of N = 165811, Hunt et al. [8] showed that the hard-to-reach clientele of patients suffering from schizophrenia with comorbid SUD accounts for 41.7% of all schizophrenic patients examined. It is associated with an increased risk of early age of onset of schizophrenia, a high number of hospitalisations, homelessness, aggression, violence, imprisonment and suicidal tendencies. Comorbid SUD is a significant predictor of non-recovery [9, 10].

patients are at risk of more severe symptoms and higher relapse rates. At the same time they respond less to antipsychotic medication. Compared to psychosis patients without SUD, these patients are more likely to have experiences of sexual and physical violence as well as significantly more pronounced psychopathology and a higher risk of physical illnesses such as HIV, hepatitis, cardiovascular, gastrointestinal and liver disease [13]. This is accompanied by a comparatively lower level of social functioning and quality of life [10].

Due to the less favorable prognosis of patients with comorbid SUD, research calls for the integration of interventions in order to promote abstinence and discharge planning into the regular treatment of schizophrenia patients and thus positively influences symptom severity, relapse rates, recovery and other therapy outcomes [8, 14]. Thibeault et al. [15] emphasise the relevance of atmosphere and environment on a psychiatric ward. Patients describe it less on the basis of infrastructural aspects but rather on the basis of personal relationships that they were able to establish with the treatment team during their inpatient stay [15]. Interestingly, several reviews could demonstrate that it is not primarily the addiction-specific intervention (motivational interviewing, contingency management) that leads to treatment benefits [16]. It is rather the availability of a therapeutic programme for the patients themselves that improves their prognosis [17, 18]. Offering flexible, low-threshold therapeutic services is experienced less invasive and controlling and appears to increase the intrinsic motivation of these clients to seek treatment [13].

Bighelli et al. [19] summarise which influencing factors are associated with therapeutic success in the treatment of schizophrenia patients. Based on the data of their comprehensive meta-analysis with 72 studies and 10364 included participants, they emphasise the effectiveness of involving family members in the treatment. It also includes psychoeducation and integrated interventions (mix of cognitive-behavioural therapy, family intervention, community- based care) in order to increase compliance and the social functioning level of those affected and thus avoid re-exacerbation. These results lead to call for an alternative healthcare system for mental illness, including open dialogue approaches, soteria, psychotherapy, cautious prescription of antipsychotic medication, support in maintaining abstinence, establishing peer and social support network [20]. Lichtenberg [21] analysed that the Soteria concept was historically opened up to other diagnoses as early as the 1980s and 1990s, including the START (short term acute residential treatment) model in San Diego, but also the Cedar House in Boulder/Colorado, which admitted patients with dual diagnosis. In the accompanying research of the START model clinical treatment success was also achieved in comparison to standard treatment, while at the same time stigmatisation due to further hospital stays could be avoided which is in line with Mosher's and Ciompi's results [21].

The promising results of effectiveness research concerning the Soteria concept to date [2, 3, 5, 7, 22, 23], including those of our own working group [24, 25] raise the question to which extent treatment with Soteria elements is suitable and feasible specifically for patients with dual diagnoses in standard care. To our knowledge, this is the first time that the effect of the Soteria concept has been investigated separately for patients with and without a dual diagnosis. In order to answer this question, the results of a pre-post comparison before and after the implementation of Soteria elements on the acute psychiatric ward at Hennigsdorf Hospital are reported and statistically evaluated here. This is the only acute ward with a care mandate for the district Oberhavel in the north of Berlin/Germany with a catchment area of 202.000 inhabitants. Patients in need of acute psychiatric treatment must be admitted there; it is not possible to select or even reject patients due to severity of illness. The successful implementation and effectiveness of this intervention at the Hennigsdorf Hospital has already been demonstrated for legally admitted [24] and voluntarily treated patients [25]. The focus is now on the comparison of the treatment outcomes of schizophrenic patients with and without SUD.

[1] [The term 'dual diagnosis' is used in the literature on the one hand as a combination of an existing (non-specific) mental disorder with comorbid substance use disorder (SUD), and on the other hand as a combination of schizophrenia or psychotic disorder with comorbid SUD. Due to the different degrees of severity and need for treatment of the respective diagnoses (see also the platform model by Hauth et al. [11]), schizophrenia cannot be equated with an affective disorder, which makes it necessary to differentiate the results depending on the use of the term dual diagnosis [12]. The research findings presented below and the use of the term 'dual diagnosis' in this article refer to the presence of schizophrenia or psychotic disorder with comorbid substance use disorder.]

Methods

Setting

In a pre-post mirror quasi-experimental design, the treatment results of all psychotic patients with and without SUD who were voluntarily treated on the acute psychiatric ward in 2016 (before implementation of the Soteria elements) and 2019 (after implementation) were statistically evaluated. The transformation process took place in 2017, with the reopening of the new acute psychiatric ward with Soteria-elements in 2018. One special feature that should be emphasized is that we have integrated the Soteria concept into acute psychiatric care at our hospital. A core requirement of the Soteria concept is that compulsory treatment should be separate from the Soteria area, therefore our ward was converted according to the *Soteria Fidelity Scale* in order to meet the criteria. We now have an open-door ward (15 beds) and a small locked psychiatric intensive care unit (6 beds), both of which are connected in terms of construction and staffing. It is now possible for patients to change according to their needs between both units of the same acute ward while meeting the same staff members. At the same time, this is the only way to ensure that no patient is sent away, regardless of the severity of symptoms. Another requirement of the *Soteria Fidelity Scale* is to create a homely atmosphere and minimize the hospital character – a requirement that has recently been incorporated into the current S3 guidelines in Germany [26].

In our locked psychiatric intensive care unit, the therapy programme is deliberately kept general and usually offers two therapeutic groups per day, including physio-, occupational-, art- or music therapy. In a need-adapted manner, depending on symptom-severity, patients can also participate in the therapy program in the open ward. The same milieu therapists are present in both areas. Milieu therapy means all offers that are unintentional, close to everyday life and euthymic. This includes daily occupational therapy and physiotherapy, joint preparation and follow-up of the daily breakfast and dinner buffets, concentration training, creative sessions, cooking and baking groups, joint games and project work with the patients as well as regular everyday support. These groups are led by all team members on a weekly schedule. Since this implementation, our range of therapies has expanded considerably. This enables us to guarantee another core requirement of the Soteria concept despite standard acute psychiatric care: team members (milieu therapists) spend at least 40 - 70% of their working time in direct contact with the patients. Since then, our work has become more interdisciplinary and therefore less hierarchical. Regular communication with relatives is guaranteed by scheduled contact at the beginning and end of treatment, as well as the opportunity for relatives to take part in ward rounds and groups. Relatives' groups and a

“trialogue”[2]

which has been held regularly since 2017, supplement the services on offer.

Overall, the treatment approach is based on a holistic view in which the social environment, the employment situation, the living situation and the patient's everyday life are taken into account from the start of treatment. All patients who were admitted to the acute psychiatric ward after the implementation process received treatment with Soteria-elements. In the presence of comorbid SUD, additional addiction-specific treatment services were integrated, such as motivational interviewing, psychoeducational groups and addiction-specific continuing care services.

The description and evaluation of the successful implementation process [3] has already been published [24, 25, 27, 28].

Data collection

The data were collected retrospectively and anonymized using the hospital's internal information system. On the day of admission, all voluntarily treated patients signed a treatment contract including a declaration of consent in which they agreed to anonymized evaluation of treatment results. The inclusion criteria were:

[2] [The “Trialogue” is a self-help group that involves those affected, relatives and professionals on a topic related to psychosis.],

[3] [The criteria according to the *Soteria Fidelity Scale* as a “ward with Soteria-elements” (51-70 p.) were met in June 2018 and November 2019. Implementation was therefore successful. Recognition by the International Soteria Working Group (IAS) took place in December 2019 (https://soteria-netzwerk.de/soteria-einrichtungen).]

admission to the acute psychiatric ward between January 1 and December 31 of the respective year, main diagnosis: schizophrenia spectrum (F2x.x), psychotic disorder with comorbid addiction disorder (F2x.x + F1x.x) or drug-induced psychosis (F1x.5), continuous voluntary treatment and minimum treatment duration of 24 hours. In order to keep the analysis within a manageable framework, the results of the first hospitalization per year per person were evaluated. Multiple stays per year are included in the variable "readmission rate". For the same reason and due to the reduced interpretability of the statistical analyses, those patients who were treated voluntarily on the acute psychiatric ward in both 2016 and 2019 (F2[4]: n = 11, dual diagnosis: n = 7) were excluded from the analysis.

Comparison groups

Two quasi-experimental comparison groups were formed based on their main diagnosis: all patients with a schizophrenia spectrum disorder without SUD (F2x.x) vs. all patients with a dual diagnosis, i.e. a psychotic disorder with comorbid SUD (schizophrenia spectrum disorder plus SUD, i.e. F2x.x + F1x) or a drug-induced psychosis (i.e. F1x.5). All diagnoses were made by trained and experienced psychiatrists and clinical psychologists according to ICD-10 criteria.

In order to investigate the effect of treatment with Soteria-elements depending on the diagnosis, the treatment results of the respective groups were compared between the two years. The dependent variables examined were the following: Total treatment duration in days, duration of voluntary treatment in the locked area of the ward (in days), duration of voluntary treatment in the open area of the ward (days), dosage of antipsychotic medication (in chlorpromazine equivalents (CPZE), following Benkert and Hippius [29], readmission rate per year, discharge circumstances, outpatient follow-up.

Prior to the transformation of the ward in 2016, "against medical advice" [5] treatment could not be offered in an open-door setting of the acute psychiatric ward due to structural conditions. Patients who were initially admitted to the acute psychiatric ward in 2016 had to be transferred to another open ward as soon as treatment in a locked environment was no longer required. A post-hoc data collection was carried out to allow the comparison of treatment time in the open ward between the years: 28 patients with an F2-diagnosis and 7 patients with a dual diagnosis were identified who were admitted directly to other open psychiatric wards in the hospital in 2016 due to less severe symptoms. These patients were integrated into the analysis in order to obtain a baseline value of treatment time in the open area.

Individual CPZE values for the oral antipsychotics and depot medication were calculated for all patients at the time of discharge.

The discharge circumstances were grouped into "by agreement" (including planned discharge, discharge at the patient's own request, transfer to another ward or another hospital), "early termination" (including termination by the patient and lack of further treatment offer) and

In order to evaluate follow-up outpatient care, the number of patients was determined for whom contact and admission appointments were made during their inpatient treatment. This included for example: day clinic service, the hospital's own psychiatric outpatient service, assisted living facility or, if needed, follow-up treatment of substance use disorder, nursing services or other outpatient psychiatrists. In this analysis only patients with planned discharge were included (N = 151).

Data analysis

Data analysis was performed with IBM SPSS 29. Univariate analyses of variance and covariance (ANOVA and ANCOVA) were carried out to test for group differences in a pre-post mirror quasi-experimental design (including Bonferroni adjustment for multiple testing). The variable "age" was normally distributed, all other metric variables did not fit this assumption. ANOVA and ANCOVA are considered robust with respect to the violation of normal distribution [30]. It should be noted that outliers were not eliminated from the analysis in order to obtain a realistic view of the care situation in which the Soteria-elements were applied. Differences in categorical variables were analyzed using Chi² tests. The effect sizes are also reported for the significant results of the main findings (Table 2).

[4] To improve readability, patients with a schizophrenia disorder without comorbid SUD are abbreviated as "F2" patients in the methods and results part.

[5] („Against medical advice"is a legal term used in Germany. If possible, patients should have signed a corresponding information sheet about the possible risks of premature treatment discontinuation.)

Results

Description of the sample

A total of 191 patients were included into the analysis. Table 1 contains all values of the sample characteristics. A two-factorial ANOVA was performed to examine age differences. The results show a statistically significant difference in age between the comparison years, F (1,187) = 5.315, p = 0.022, as well as a significant difference between the diagnosis groups, F (1,187) = 29.367, p < 0.001. There was no significant interaction between these two factors, F (1,187) = 3.518, p = 0.062. Univariate ANOVAs showed a significant age difference between the years 2016 and 2019 for the group of F2 patients, F (1,115) = 10.213, p = 0.002, but no significant age differences for the group of patients with dual diagnosis, F (1,72) = 0.090, p = 0.765. In both years, the two diagnostic groups differed significantly from each other in terms of age (see Table 1). To control for confounding effects, the variable "age" was integrated as a covariate in the following analyses (ANCOVA). In order to examine this effect more closely, the following age groups were formed: 18-39 years, 40-64 years, 65 years and older. The Chi² test revealed an overall significant increase in the 18-39 age group (X^2(2) = 6.701, p = 0.035). This effect was only detectable in the group of F2 patients. With regard to the gender distribution, the Chi² test showed no significant difference between the two groups, X^2(1) = 1.262, p = 0.261. The ratio between male and female patients in the respective diagnosis groups also remained constant in both years. The dual diagnosis group consisted mainly of male patients, while patients with psychosis only were equally distributed between male and female patients (see table 1).

Table 1: Sample characteristics: Age and gender

	total	2016	2019	Statistics
N				
Sample size	191	106	85	
F2	117	66	51	
Dual diagnosis	74	40	34	
Age M (SE)				
total	41,19 (1,08)	43,74 (1,45)	38,01 (1,54)	F(1/187) = 5,315, p = 0,022*
F2	45,61 (1,36)	49,27 (1,75)	40,86 (1,96)	F(1/115) = 10,213, p = 0,002**
Dual diagnosis	34,20 (1,43)	34,6 (1,79)	33,74 (2,32)	F(1/72) = 0,090, p = 0,765
	F(1/191) = 29,367, p < 0,001***	F(1/106) = 30,845, p < 0,001***	F(1/85) = 5,424, p = 0,022*	
Gender m/w in %				
total	63,9/36,1	60,4/39,6	68,2/31,8	X²(1) = 1,262, p = 0,261
F2	50,4/49,6	43,9/56,1	58,8/41,2	X²(1) = 2,550, p = 0,110
Dual diagnosis	85,1/14,9	87,5/12,5	82,4/17,6	X²(1) = 0,385, p = 0,535
	X²(1) = 23,664, p < 0,001***	X²(1) = 19,755, p < 0,001***	X²(1) = 5,211, p = 0,022*	

(M = mean value, SE = standard deviation), p < 0,05*,p < 0,01**, p < 0,001***

Total duration of treatment

The mean values of total treatment duration adjusted for the influence of age are shown in table 2. Controlling for age, there was no statistically significant difference in total treatment duration between the two treatment years, F (1,186) = 0.018, p = 0.893, nor between the diagnostic groups, F (1,186) = 2.226, p = 0.137. No significant interaction was found between these two variables, F (1,186) = 1.889, p = 0.171. The comparisons show a significant difference in treatment duration between the diagnostic groups in 2016, F (1,186) = 4.293, p = 0.040: patients suffering from psychosis without SUD spent a total of 28.34 days (SE = 2.88) on the acute ward in 2016, patients with a dual diagnosis merely 18.50 days (SE = 3.57). In 2019, the difference between the diagnostic groups was not statistically significant, F (1,186) = 0.021, p = 0.885 [23.33 days (SE = 3.08) vs. 22.61 days (SE = 3.88)].

Duration of voluntary treatment in the protected (locked) intensive psychiatric care unit:

Controlled for age, the year of treatment had a significant main effect on the duration of treatment in the locked area, F (1,186) = 16.658, p < 0.001. No

significant effect of diagnosis, F (1,186) = 0.760, p = 0.384, and no significant interaction of year and diagnosis, F (1,186) = 1.686, p = 0.196, were found. The comparisons show a significant reduction in the duration of treatment in the locked area for F2 patients, F (1,186) = 17.970, p < 0.001. While this patient group was treated in the locked area of the acute ward for an average of 14.71 days (SE = 2.32) in 2016, the same clientele spent an average of 0.28 days (SE = 2.48) in the locked area in 2019. The age-controlled difference for patients with dual diagnosis did not reach statistical significance, F (1,186) = 3.276, p = 0.072. The mean values of voluntary treatment duration in the locked intensive psychiatric care unit, controlled for age, are listed in table 2.

Duration of voluntary treatment in the open area of the ward

Adjusted for the influence of age, there was a significant main effect of the year, with significantly longer voluntary treatment duration in the open area in 2019 (all mean values controlled for age in table 2). Beyond this, no significant effects were found for diagnostic groups and the interaction between year and diagnosis. The comparisons show a significant increase in days in the open area for patients with psychosis between those years: 13.63 days (SE = 2.39) vs. 23.05 days (SE = 2.56), F (1,186) = 7.231, p = 0.008. Patients with dual diagnosis also spent significantly more days in the open area in 2019 (21.35 days (SE = 3.22) compared to 2016 (9.75 days (SE = 2.96)), F (1,186) = 7.417, p = 0.007.

Discharge medication in chlorpromazine equivalents (CPZE)

Although a descriptive reduction is visible, neither a significant main effect of year, F (1,186) = 1.375, p = 0.242, nor of diagnosis, F (1,186) = 0.062, p = 0.804, was found when controlling for age. No significant interaction effect was found either, F (1,186) = 0.018, p = 0.893. All adjusted mean values are listed in table 2.

Table 2: Comparison of treatment duration, discharge medication and number of hospital stays (N = 191)

	2016	2019	Statistics
Total treatment duration in days *M (SE)*			
total	23,42 (2,21)	22,97 (2,48)	F(1/186) = 0,018, p = 0,893
F2	28,34 (2,88)	23,33 (3,08)	F(1/186) = 1,405, p = 0,237
Dual diagnosis	18,50 (3,57)	22,61 (3,88)	F(1/186) = 0,640, p = 0,425
Total duration of treatment in days *M (SE)*			
Total	11,73 (1,78)	0,77 (2,0)	F(1/186) = 16,658, p<0,001***, η² = 0,082
F2	14,71 (2,32)	0,28 (2,48)	F(1/186) = 17,970, p<0,001***, η² = 0,088
Dual diagnosis	8,75 (2,87)	1,27 (3,13)	F(1/186) = 3,276, p = 0,072
Voluntary treatment duration in the open ward in days *M (SE)*			
Total	11,69 (1,83)	22,20 (2,06)	F(1/186) = 14,460, p<0,001***, η² = 0,072
F2	13,63 (2,39)	23,05 (2,56)	F(1/186) = 7,231, p = 0,008**, η² = 0,037
Dual diagnosis	9,75 (2,96)	21,35 (3,22)	F(1/186) = 7,417, p = 0,007**, η² = 0,038
Discharge medication in CPZE *M (SE)*			
Total	415,37 (35,77)	352,03 (40,20)	F(1/186) = 1,375, p = 0,242
F2	418,86 (46,61)	362,74 (49,95)	F(1/186) = 0,672, p = 0,413
Dual diagnosis	411,87 (57,83)	341,31 (62,85)	F(1/186) = 0,719, p = 0,398
Number of hospital stays per year *M (SE)*			
Total	1,80 (0,13)	1,49 (0,15)	F(1/186) = 2,487, p = 0,117
F2	1,84 (0,17)	1,63 (0,19)	F(1/186) = 0,681, p = 0,410
Dual diagnosis	1,77 (0,22)	1,35 (0,23)	F(1/186) = 1,872, p = 0,173

mean values controlled for age, covariate: age = 41.19, M = mean, SE = standard error, p < 0.05*,p < 0.01**, p < 0.001***

Readmission rate/number of hospital stays per year

The mean number of hospital stays per year, adjusted for age, is shown in table 2. The readmission rates did not differ significantly between the two years evaluated, F (1,186) = 2.487, p = 0.117) or between the diagnoses, F (1,186) = 0.649, p = 0.421). With regard to readmission rates, no significant interaction was found between year of treatment and diagnosis, F (1,186) = 0.285, p = 0.594.

Discharge circumstances

Chi² tests examined the change in discharge circumstances between the two years evaluated depending on the diagnoses. The results indicate a significant change in discharge circumstances between 2016 and 2019 for patients with psychosis only, $X^2(2) = 8{,}520$, $p = 0.014$: The implementation of Soteria-elements (including an open-door ward) led to a significant increase in premature treatment termination by F2 patients in 2019, while the number of discharges against medical advice increased only slightly (see table 3). The difference between the years for the group of patients with dual diagnosis did not reach statistical significance, $X^2(2) = 5.874$, p = 0.053. Nevertheless, it can be seen that patients with a dual diagnosis left the treatment setting with an open ward (2019) more frequently prematurely. At the same time, the proportion of discharges against medical advice was significantly lower in 2019 than in the exclusively locked setting (2016) (see table 3).

Outpatient care follow-up for patients discharged by mutual agreement

In order to evaluate the successful implementation of need-based outpatient care, the patients discharged by mutual agreement were included into the analysis (see Table 3). In a year-on-year comparison using a Chi² test, no significant changes were found with respect to outpatient care, neither for F2 patients, $X^2(1) = 0.101$, $p = 0.751$, nor for dual diagnosis patients, $X^2(1) = 0.962$, $p = 0.327$. Descriptively, outpatient follow-up care increased from 2016 to 2019 in the latter group.

Table 3: Frequency distribution of discharge circumstances and further outpatient care (N = 191)

	2016	2019	Statistics
discharge circumstances			
F2x,x			
By mutual agreement	95,5%	78,4%	X²(2) = 8,520, p = 0,014*
Premature termination	1,5%	13,7%	
Against medical advice	3,0%	7,8%	
Dual diagnosis			
By mutual agreement	67,5%	61,8%	X²(2) = 5,874, p = 0,053
Premature termination	10,0%	29,4%	
Against medical advice	22,5%	8,8%	
Outpatient follow-up care for patients discharged by mutual consent (N=151)			
F2x,x (n=103)			
Yes	61,9%	65,0%	X²(1) = 0,101, p = 0,751
No	38,1%	35,0%	
Dual diagnosis (n=48)			
Yes	63,0%	76,2%	X²(1) = 0,962, p = 0,327
no	37%	23,8%	

Table 3, p < 0,05*,p < 0,01**, p < 0,001***

Discussion

Treatment with Soteria-elements is feasible for all patients with schizophrenic disorders, including patients with dual diagnoses who are more difficult to reach - even in an acute psychiatric ward for this catchment area. Compared to standard care, a shorter stay in the locked area and a longer treatment time in the open-door ward are possible amounting to the same overall treatment duration. Less antipsychotic medication doses are required, possibly due to the less restrictive and less stressful setting. Increasing early discharge rates do not lead to an increase in readmission or poorer outpatient care. The latter shows a tendency towards better follow-up care, especially for the group of dual diagnoses.

Patients suffering from psychosis only were significantly younger in 2019. The number of 18–39-year-old patients increased significantly, which is in line with the *Soteria Fidelity Scale* [4]. Especially for younger people and their relatives we assume that

the offer of a Soteria orientation reduces concerns about acute psychiatric care, without having carried out a detailed analysis though. We saw no change in the age composition of dual diagnosis patients. In both years, dual diagnosis patients were on average 7 years younger. This is consistent with the research findings demonstrating earlier age of onset of psychosis for substance-using patients [8]. Also in line with the literature [8], both diagnostic groups differed in gender distribution with a significantly larger proportion of male patients in the dual diagnosis group.

By comparing the treatment outcomes of psychosis patients with and without SUD before and after the implementation of Soteria-elements in an acute ward, we could show that the structural changes did not lead to an increase in treatment duration. The voluntary treatment time in the locked psychiatric intensive care unit was even drastically reduced for both diagnostic groups, although the difference was not statistically significant for patients with dual diagnosis. At the same time, it was possible to treat both patient groups for significantly more days in the open-door ward. This is particularly noteworthy for dual diagnosis patients, who are more difficult to reach with therapeutic treatment [9, 10, 13].

Drug dose at the time of discharge was not significantly influenced by the changes made to the treatment rationale. Descriptively, however, a reduction of around 70 CPZE was observed for both diagnostic groups (this corresponds to a daily dose of around 1.5mg risperidone, for example). These results are in line with other empirical studies evaluating the impact of the Soteria approach on prescribed drug dose [2, 3, 23, 25]. Once again this shows that the more open, less restrictive and hierarchical treatment setting made it possible to reduce antipsychotic medication.

Treatment with Soteria-elements on an acute ward with an open-door setting led to more premature treatment terminations. While this difference between the years evaluated was significant for patients suffering from psychosis only, it did not reach statistical significance for the group of patients with dual diagnosis. Nevertheless, there was a clear increase in premature discharges. A phenomenon that has also been described occasionally in the literature for open-door projects [31] and it also occurred in a prospective, quasi-experimental study in one of two intervention wards [32]. Fortunately, however, these premature treatment terminations are not associated with serious subsequent events (such as acute danger to self or others) and are an acceptable “side effect” if the use of coercion can be reduced at the same time. The fact that we were also able to significantly reduce the use of coercive measures by applying the Soteria concept has already been published elsewhere [24]. The authors Schreiber et al. [32] summarize that the 100% opening of ward doors in the acute psychiatric sector “by fair means” (i.e. without premature leaving, increasing medication or compensation with the help of other coercive measures) may be doubted.

Finally, it was also possible in this study to discharge significantly fewer dual diagnosis patients against medical advice. In other words, with improved patient control, the hospital stuff was less likely to consider legal protection necessary. In this context the trend towards reduction of readmission rate should also be considered. It did not change significantly for either diagnostic group, but showed a clear trend towards fewer stays per year, particularly for the group of dual diagnosis patients. The data regarding the readmission rates can be considered valid, since the acute ward with Soteria- elements was responsible for the complete catchment area in both years studied. One explanation for the reduced number of readmissions per year and the more frequent medically responsible discharges, could be that the holistic treatment approach with Soteria-elements succeeds in involving the support network in treatment at an early stage. Hence, this establishes helpful structures for the period after discharge preventing or delaying readmission. The results of Friedländer's research group [22] also point to this direction, showing that the Soteria concept can significantly and superiorly strengthen the therapeutic alliance compared to standard care. Involving the families and educating them is not only a central concern of the Soteria concept [6], it has also proven a significant effective factor in the treatment of dual diagnosis patients [19].

The initiation of further outpatient care for patients who were discharged by mutual agreement did not differ significantly between the years, although there was a positive trend for dual diagnosis patients. While in 2016 around two thirds of patients with dual diagnosis could be placed in further outpatient care, in 2019 they comprised already 76% of this patient group. This is a notable success, as patients with dual diagnosis are generally more difficult to keep in treatment [8, 16] and the connection to therapeutic services has proven a favorable prognostic factor [19].

Limitations

The results of this study are based on a retrospective

pre-post design of treatment outcomes before and after the implementation process of Soteria-elements in the county's only acute psychiatric ward.

The establishment of Soteria-elements is a complex intervention program. As mentioned above, the *Soteria Fidelity Scale* comprises 30 items. These include, for example, an open ward concept, present milieu therapy, defined time with the patient, treatment by constant therapists, flat hierarchies, restrained use of neuroleptics and a homely environment. The changes described after the transformation are therefore difficult to attribute to a single effective factor. Which of the factors mentioned is particularly effective would have to be investigated in the future. With ongoing care for acutely ill patients, this is certainly an ambitious project. Qualitative data could provide an initial direction.

Objective measures to assess the change in the general level of functioning (Global Assessment of Functioning, GAF) and measured psychopathology were not completely available for all the patients retrospectively and were therefore not included into the analyses. Both, quantitative and qualitative data on the patients` treatment satisfaction would be helpful in order to contextualize the available results, especially those on discharge circumstances. Unfortunately, it was also not possible to make any statements about the continued abstinence of the dual-diagnosis patients studied. The data analyzed are based on routine key figures and documentation rendering them valid and rater-independent.

The initiation of further psychosocial care services does not yet provide any information as to whether patients have actually used them for a longer after discharge. We assume that the dropout rates do not vary systematically between 2016 and 2019. An optimistic interpretation could be allowed in connection with the readmission rates.

The study period used in this study referred to a one-year period. In some studies, effects of Soteria treatment only became apparent in the long-term course after 2 or even 5 years [2, 3, 23]. The use of the help system facilitated by the Soteria concept [21] appears to develop its superiority over conventional treatment in the long-term course. Future long-term studies could clarify this assumption.

Conclusion

The results reported here show that it is both feasible and effective to introduce the Soteria concept into standard care and thus offer individual, recovery-oriented inpatient treatment for all psychotic patients. The milieu-therapeutic and thus non-intentional and low-threshold therapy offer is a valuable addition to the established psychosocial interventions also for dual diagnosis patients, who can certainly benefit from non-invasive, non-addiction-specific offers [13, 17, 18]. The focus is on establishing a therapeutic working alliance, to which the person- and recovery-oriented Soteria approach continues to provide valuable impetus.

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