European Psychiatry 30 (2015) 583–589

Contents lists available at ScienceDirect

European Psychiatry

journal homepage: http://www.europsy-journal.com

Original article

Cost-effectiveness of intensive home treatment enhanced by inpatient treatment elements in child and adolescent psychiatry in Germany: A randomised trial

I. Boege [a,b,*], N. Corpus [a], R. Schepker [b], R. Kilian [c], J.M. Fegert [b]

[a] ZfP Suedwuerttemberg, Child and Adolescent Psychiatry, Weingartshoferstrasse 2, 88214 Ravensburg, Germany
[b] University of Ulm, Department of Child and Adolescent Psychiatry, Ulm, Germany
[c] University of Ulm, Psychiatry II, BKH Günzburg, Günzburg, Germany

ARTICLE INFO

Article history:
Received 10 December 2014
Received in revised form 27 January 2015
Accepted 27 January 2015
Available online 28 February 2015

Keywords:
Economic evaluation
Community programs
Liaison child psychiatry
Quality of life
Service development

ABSTRACT

Background: Admission rate to child and adolescent mental health inpatient units in Germany is high (54 467 admissions in 2013), resources for providing necessary beds are scarce. Alternative pathways to care are needed. Objective of this study was to assess the cost-effectiveness of inpatient treatment versus Hot-BITs-treatment (Hometreatment brings inpatient-treatment outside), a new supported discharge service offering an early discharge followed by 12 weeks of intensive support.
Methods: Of 164 consecutively recruited children and adolescents, living within families and being in need of inpatient mental health care, 100 patients consented to participate and were randomised via a computer-list into intervention ($n = 54$) and control groups ($n = 46$). Follow-up data were available for 76 patients. Primary outcome was cost-effectiveness. Effectiveness was gathered by therapist-ratings on the Children's Global Assessment Scale (CGAS) at baseline (T1), treatment completion (T2) and an 8-month-follow-up (T3). Cost of service use (health care costs and non–health care costs) was calculated on an intention-to-treat basis at T2 and T3.
Results: Significant treatment effects were observed for both groups between T1/T2 and T1/T3 ($P < 0.001$). The Hot-BITs treatment, however, was associated with significantly lower costs at T2 (difference: −6900.47€, $P = 0.013$) and T3 (difference: −8584.10€, $P = 0.007$). Bootstrap cost-effectiveness ratio indicated that Hot-BITs was less costly and tended to be more effective at T2 and T3.
Conclusions: Hot-BITs may be a feasible cost-effective alternative to long inpatient stays in child and adolescent psychiatry. Further rigorous evaluations of the model are required. (Registration number: ISRCTN02672532, part 1, Current Controlled Trials Ltd, URL: http://www.controlled-trials.com).

1. Introduction

Prevalence of psychiatric disorders in childhood and adolescence is high, ranging between 10% and 20% [17,1,9]. Consequences for children and adolescents with complex mental health problems are severe: inpatient admissions are required frequently, quality of life is reduced [16] and social, familial and school integration are limited. In addition, there is a high risk for chronicity, as illness tends to persist for the next 2–5 years in more than 50% of cases [9]. Early and effective interventions are therefore essential.

Resources for supporting children and adolescents with psychiatric disorders continue to be scarce. Expensive inpatient beds are limited. Many countries throughout Europe as well as the United States have therefore sought alternatives to inpatient treatment [18,22]: Multisystemic therapy (MST) has been found to be more effective than inpatient hospitalisation in decreasing externalising symptoms, as well as improving family functioning and school attendance [8,24]. Wraparound services (team-based service planning and coordination processes) have small to medium effects on outcomes for children and youth with serious emotional and behavioural disorders [29]. Home-treatment (HT) has proven to be as effective as inpatient care [15]. In a second study [26], HT-patients presented at first slightly less stable at discharge from services than inpatients but remained more stable than inpatients upon 1-year follow-up. Even though there are

* Corresponding author. Tel.: +49 751 7601 2405; fax: +49 751 7601 2121.
E-mail address: Isabel.Boege@zfp-zentrum.de (I. Boege).

http://dx.doi.org/10.1016/j.eurpsy.2015.01.009
0924-9338/

many effectiveness studies on intensive outpatients services [12], there is, to our knowledge, hardly any research on modules that combine inpatient and outpatient elements. At the same time urgently needed systematic high-quality research in the field of cost-effectiveness is scant.

Two recent pilot studies assessed a new model of care conjoining inpatient and outpatient elements in a home-treatment setting for children and adolescents with complex mental health problems presenting for inpatient admission: Supported discharge service (SDS; Kent, UK, $n = 30$; [20]) and Home-treatment brings inpatient-treatment outside (Hot-BITs, German acronym: Behandelt Zu Hause Gesund werden [BeZuHG], Ravensburg, Germany; $n = 100$ [3]).

Hot-BITs treatment: all patients, aged 5.0 to 17.11 years, received a shortened inpatient stay (Ø47.65 days) followed by 12 weeks of Hot-BITs treatment. Discharge from inpatient treatment took place as soon as the patients had reached a stable basic level of functioning (targeted by assessment of improvement on the children global assessment scale [CGAS] ≥ 40). Treatment in Hot-BITs followed a standardised procedure, which included:

- thorough assessment, a relevant component for reducing (re)hospitalisation [13];
- focus on building the therapeutic alliance early at best before discharge from the unit;
- early discharge;
- establishing individualised treatment plans, which were discussed with the family during their first appointment at home. Main elements offered in Hot-BITs treatment were:
  - home-treatment (case management, individual therapy, family therapy, psycho-education and/or supervision of phamacotherapy), with up to 3 appointments/week,
  - clinical elements (day hospital, hospital schooling, supportive therapies such as: group therapy, occupational-therapy, music therapy),
  - cooperation with social services, schools, and physicians;
- biweekly review of treatment plans by the supervising Child and Adolescent Psychiatrist;
- crisis management available 5 d/10 h by a Hot-BITs team member in addition to a 7 d/24 h doctor on-call.

Patients in the control group received a regular length inpatient stay (Ø69.41 days), with treatment consisting of individual therapy, family therapy pharmacotherapy, group therapy, occupational therapy, music therapy, hippotherapy and/or physical therapy.

Patients of both treatment groups attended low frequency outpatient services (1×/month), after treatment completion according to need.

Cost-effectiveness studies taking direct (medical) cost as well as indirect (non-healthcare) costs [2] such as parental absences from work [21], costs to the public sector for social services, additional supports in educational systems [28] and to the justice system in account are scant. [6]. Grimes et al. [7] postulated that intensively integrated services (comprising all clinical, social, forensic and educational services) have the potential to be cost-effective when all systems cooperate. In a study with an intervention group of $n = 100$ and a reference group of $n = 20{,}183$, she demonstrated that the total medical expenses for youth in the intervention group with cooperating services was substantially lower than in patients receiving treatment as usual (TAU). Knapp et al. [11] analysed service use and associated costs in 2461 children aged 5–15 years. They concluded that variation in cost can indicate poor targeting, inequality and inefficiency in the way that mental health, education and social care systems respond to emotional and behavioural problems. Their results underline the importance of bundling resources (including the resources of patient and family) in order to reduce cost.

Rehberg et al. [23] have shown the positive therapeutic and economic effects of multisystemic therapy (MST). Further studies have found that MST has a scope for cost-savings by reducing the use of intensive medical services [5,4]. A similar treatment-concept, the Mental Health Service Program for Youth (MHSPY), demonstrated cost-effectiveness for an intensively integrated, family and community-based intervention [7].

The aim of the present study was to evaluate total cost to the health system and to the social care system for the Hot-BITs model. We wanted to gain information on cost-effectiveness and even though we are well aware of the differences in mental health systems throughout Europe cautiously draw conclusions for mental healthcare planning in children and adolescents.

2. Method

2.1. Sample and procedure

A total of 550 patients were consecutively admitted to the department for child and adolescent psychiatry, ZfP Suedwuerttemberg, Ravensburg, Germany between October 2011 and January 2013. Of these 550 patients, 164 patients were eligible for the present study. Inclusion criteria were: an inpatient hospital stay for > 72 hours, psychiatric diagnosis at admission (ICD10), child/adolescent living in a family setting (biological parents, relatives, foster family, single parent), the family living within the catchment area (maximum 1 hour of travel), IQ > 70 and sufficient language skills in families whose first language was not German. Three hundred and eighty-six patients had to be excluded, because they did not live in a family setting ($n = 233$), stayed less than 72 hours on the unit ($n = 76$), were readmissions of patients already enrolled ($n = 26$), had been admitted for a specific therapeutic program, that conflicted with the concept of supportive discharge ($n = 17$), did not live in our catchment area ($n = 25$) or had to be excluded for other reasons ($n = 20$). Of the 164 families who met inclusion criteria, 100 consented to participate in the study. Families who consented to participate did not differ from non-consenters in age, gender or illness severity (Fig. 1).

After informed consent, an independent researcher randomised patients into either the control group ($n = 46$) or an intervention group ($n = 54$) via a computer-generated list. Eight patients decided to opt-out (control group: $n = 5$; intervention group: $n = 3$). A final sample of 92 patients was evaluated at T1 (within 2 weeks after randomisation) and T2 (discharge from either treatment). Follow-up data was available on 78 patients (82.6%) after 8 months while 15 families did not agree to the follow-up interview, or could not be reached. Analyses at T3 was done on an intention to treat basis.

The ICD 10 diagnosis was elicited at admission, and the DSM IV diagnosis was obtained within the first 2 weeks via the K-SADS-PL (Kiddie schedule for affective disorders and schizophrenia for school-age children – Present and lifetime, a semi-structured diagnostic interview to obtain severity ratings of symptomatology, and assess current and lifetime history of psychiatric disorders).

2.2. Expenditures for services received during the study until follow-up

Treatment cost was calculated for each patient individually according to service utilization during treatment and follow-up period. The regular standardised insurance rates for hospital days, day care services, group therapy rates and staff cost/per hour/per professional group were applied. Cost for social services, educational services and further non-healthcare-costs were added