

Performance-based economic evaluation of child and family care interventions in two Finnish regional family centers

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Abstract

Introduction: In Finland, the recent development of child and family care services has involved a move from curative services to promotive and preventive services provided by family centers. The aim of this study was to compare the effectiveness, costs, and cost-effectiveness of a multidisciplinary family center model and a decentralized child and family care services model. In addition, the study examined whether information included in client and patient information registers could be applied to the regular monitoring of performance in child and family care services.

Methods: A quasi-experimental case-control framework was conducted in two demographically similar Finnish municipal federations. Performance-based effectiveness was assessed by three indicators: 1) change in the number of psychiatric referrals 2) change in the number of corrective family work episodes and 3) enrolled duration of the intervention. Performance-based cost-effectiveness was analyzed by means of the incremental cost-effectiveness ratio (ICER) and graphical cost-effectiveness planes and cost-acceptability curves.

Results: Our results showed that during the interventions the multidisciplinary family center had less corrective family work episodes and established higher performance-based effectiveness in comparison to the provider of decentralized family care services. Cost-acceptability analysis suggested that performance-based cost-effectiveness in corrective family work was attained at a willingness to pay of EUR 300-350 per outcome unit. Despite of the lower amount of corrective family work, the duration of the interventions in the multidisciplinary family center was on the average 48 days longer than in the comparative organization.

Discussion and Conclusion: A model of service delivery focusing on preventive measures, responsiveness, duration of care episodes and clearly defined service processes supported the attainment of higher effectiveness and improved overall performance. It was also shown that existing client register data were applicable for monitoring cost-performance outcomes, and by inclusion of quality-of-life information would also be extendable to cost-effectiveness analysis of social services, such as family center services.

KEY WORDS: Child and family care; early identification; family center services; performance-based cost-effectiveness; social and welfare services.

INTRODUCTION

In Finland and other Nordic countries the recent development of child and family care services has involved a move from curative services to promotive and preventive services provided by family centers. A family center aims at offering multidisciplinary services that foster the wellbeing and health, including mental health, of children and families. Another priority of a family center is the early identification of health and welfare risks within families and a prompt implementation of supportive interventions.

The Finnish family center model was developed in conjunction with national programmes on building common guidelines for health and social services. The National Social and Health Care Programme 2008-2011 and its second programme phase 2012-2015 (KASTE) aimed at developing health and social services as a coherent whole [1-3]. One of the sub-programs of KASTE concerned the reform of services for children, adolescents and families with children. The objective was to strengthen preventive and early support services by expanding and developing the family

center model in collaboration with families, municipalities and third sector organizations [4]. At the operational level, family center functions were developed and evaluated in several regional projects. The operating models of family centers and the services they provide has varied from one municipality to another. In general, the organizational structure of family centers can be broken down as follows: multidisciplinary family center, welfare center type family center, open early childhood family center and specialized family support center [5]. The multidisciplinary family center forms the basis of current development work. In accordance with the objectives of the recent national programme (Programme to Address Reform in Child and Family Services) regional cross-administrative models of child and family care are being elaborated and increasingly implemented at the local government level [6, 7]. The regional cross-administrative family center service model builds on participatory working methods, promoting parent-child interaction and the comprehensive well-being of children, adolescents and parents. Functions for providing help and

TAKE-HOME MESSAGE

In this Finnish study the provision of child and family care services according to the guidelines of a multidisciplinary family center enabled the achievement of better performance-based effectiveness and welfare outcomes.

Competing interests - none declared.

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support in family problem situations have been reinforced with particular attention for early identification. Reduced fragmentation and improved access to family center services have been promoted by improved networking, coordination and integration as well as the establishment of Meeting Places and e-services [6].

The present study undertook a performance-based economic evaluation of child and family care development projects in two demographically similar Finnish municipal federations. In contrast to the conventional approach of measuring effectiveness outcomes in terms of improvements in health status or quality of life, proxies of family health and welfare enhancing performance were applied as outcome indicators. The performance indicators were chosen on basis of anticipated effects of the interventions on the need for mental health and family care services. In this methodological context, the effectiveness, costs, and cost-effectiveness of a multidisciplinary family center model and a decentralized child and family care services model was compared. In addition, this study examined whether information included in client and patient information registers could be applied to the regular monitoring of performance in child and family care services.

METHODS

Study design

The study design involved a quasi-experimental case-control study between two municipal federations with a similar population structure (situated in the region of South Ostrobothnia). In the first municipal federation (trial group), child and family care services were provided by a multidisciplinary family center involving frequented clinic and home visits, preventive family work, and enhanced services of family counselors and psychiatrists. In addition, a pre-assessment approach for the early identification of family problem situations was applied. The other municipal federation (control group) adopted a multiprofessional management network responsible

for organizing child and family care services in the member municipalities, but the activities were not being arranged according to the general guidelines of a multidisciplinary family center. The main services, functions and objectives of the service providers are presented in more detail in Table 1.

Study population and data

The study population consisted of families with children (under school age), whose intervention for preventive family work had come into consideration for the first time between 1.1.2013 and 30.9.2014. The families had resided in the municipal federation at least 365 days before the first intervention. The study groups were assembled so that the youngest child in the trial and control groups belonged to the same age group. The children were divided in three age groups: under 2, 2-4 and 4-6 years. In the final data, there were 61 families in the trial group and 67 families in the control group. The corresponding number of individuals in the groups was 263 and 331. The use of family care and other social and health services was followed for 365 days before and after the beginning of the intervention. Descriptive statistics of the study groups is presented in Table 2.

Utilization data on the municipal federations' child and family services were retrospectively collected in autumn 2016. In addition, individual level data from client and patient information registers (Effica, EPPOTT, Pro Consona) and regional data (SOTKANet) were assembled. Costs were calculated from utilization data including social services, primary health care and specialized care. National unit costs of the services were applied in converting utilization data into monetary values [8]. All costs were discounted to the 2014 level using public services price indices [9].

Data analysis

Performance-based effectiveness was assessed by the following indicators: 1) change in the number of psychiatric referrals 2) change in the number of corrective family work episodes and 3) enrolled duration of the intervention.

Table 1. Services, functions and objectives of the multidisciplinary family center and the provider of decentralized family care services.

	TRIAL GROUP: Multidisciplinary family center	CONTROL GROUP
Services for families with children	Maternity health clinic Family planning clinic Child health clinic Family counselling clinic School and student health care Home services for families with children Preventative work with families Adult health clinic Health promotion and welfare work Health center psychologist Speech therapy Occupational therapy Mental health care and substance abuse unit (within a single municipality) Social services (incl. 2/3 municipalities) Meeting place activities involving early childhood education, non-government organizations, and individuals	Maternity and child health clinic Family planning clinic Family counselling clinic Home services for families with children Resourceful Family –health movement Family work under the Social Welfare Act * Intensive in-home child protection work School and student health care Adult health clinic Health promotion and welfare work Health center psychologist Psychiatric nurses Speech and occupational therapy, incl. children's physiotherapy Social services ** Early childhood education and care Youth outreach work and youth work
Objectives	To improve services by making them more relevant to the needs of modern families in an ever-changing society. A family center is a service package which combines the basic level health, social, and early education services for families with children, as well as the services provided by non-governmental organizations. Transition from an organization-centric to a client-centric approach. Preventive work and early intervention. Actively involving clients and families. Promoting self-determination.	To develop comprehensive services for children, adolescents, and families with children. To prepare a service strategy for children, adolescents, and families with children, and to facilitate the effective exchange of information between authorities regarding the organization and provision of services.
Working methods and active measures	Multi-professional teamwork. Emphasizing quality in family work and increasing the number of client meetings. Consolidating the joint early intervention competencies of employees and managers. Instigation of a formal meeting place service (open early childhood education). Implementation of the Alpakka-initial mapping model and Ponnari-service management tools.	Integration of services and network management (multi-disciplinary management network) as a starting point for the development of services for families with children. In 2014 plan for a multiprofessional family center services for children, adolescents and families (entry in the municipal welfare plan).

*Since 1 April 2015 ** Social Welfare Act implemented on 1 April 2015.

Table 2. Composition of families in the study groups.

Characteristics		Trial group (%)	Control group (%)
Number of families		61	67
Number of adults in family	1	6.1	2.4
	2	93.9	97.6
Family size (SD)		4.9 (1.8)	5.5 (2.0)
Age (SD)	Children	3.5 (4.4)	3.9 (3.6)
	Father	34.1 (6.8)	33.5 (5.4)
	Mother	30.4 (6.1)	31.2 (5.0)
Family (%)	Two-parent family	70	95
	Reconstituted family	24	-
	One-parent family	6	5

Note: SD = Standard Deviation

Psychiatric referrals were chosen as an outcome indicator on basis of the perception that timely and well-targeted family center interventions might reduce the propensity of more demanding specialized care services, such as psychiatric care. As for corrective family work, it was expected that a lower amount of these services implied a more beneficial response to preventive and welfare promoting family center activities. Corrective family work episodes consisted of various forms and amounts of remedial services (such as, family worker/counselor, social worker/counselor) arranged as family counseling meetings and could involve collaboration with other authorities. The third outcome indicator, enrolled duration of the intervention, reflected the degree of involvement in the client family's situation and continuity of the client-provider relationship. Performance-based cost-effectiveness was analyzed by means of the incremental cost-effectiveness ratio (ICER), indicating the cost of one additional outcome unit (for example a reduction in corrective family work visits) in the trial group relative to the control group. The ICER was calculated as follows:

$$\text{ICER} = (\Delta C2 - \Delta C1) / (\Delta E2 - \Delta E1), \text{ where}$$

$\Delta C2$ = change in mean costs in the trial group
 $\Delta C1$ = change in mean costs in the control group
 $\Delta E2$ = change in mean performance score in the trial group
 $\Delta E1$ = change in mean performance score in the control group

The statistical uncertainty related to the observed ICER point estimate was analyzed by non-parametric bootstrap simulation, where ICER was estimated from 5,000 re-samples of the original data [10]. The probability distribution of ICER estimates was examined graphically by cost-effectiveness planes and cost-effectiveness acceptability curves. The former indicates the percentage share of the ICER point estimates in each cost-effectiveness quadrant, while the latter depicts the likelihood of cost-effectiveness at different threshold values of the society's willingness

to pay. As the analysis involved a performance-based approach to measure effectiveness, the terms effectiveness and cost-effectiveness were used in the performance context in the following sections.

Ethical aspects

In the conduct of this research an informed consent was administered to all households, who were fully aware of their right to withdraw their participation at any time of the research. The consent explained the aim of the study with clarification about the voluntary participation and confidentiality. Ethical clearance and administrative authorization were admitted by the two municipal federations and the regional Research Ethics Committee.

RESULTS

An overall rise in referrals to psychiatric care occurred during the interventions. The number of referrals increased in both study groups, but slightly less in the trial group (Table 3). On the cost-effectiveness plane, where the black dot represents the observed ICER estimate and the gray dots the distribution of the simulated estimates, about 60 percent of the estimates were located in the upper right quadrant, indicating higher effectiveness and higher costs in the trial group (Figure 1). However, as some 30 percent of the estimates established lower effectiveness and higher costs, the interventions showed no evidence on effectiveness or cost-effectiveness in the number of psychiatric referrals. The right-hand side figure presents the cost-effectiveness acceptability curve, which depicts the probability and incremental costs of attaining a one-unit increase in effectiveness. As the curve approached its maximum value at approximately 65 percent probability level, cost-effectiveness in psychiatric referrals was unlikely to be achieved at any reasonable level of costs.

The number of corrective family work episodes increased by 20 episodes in the control group and decreased by two episodes in the trial group (Table 3). The corresponding change in the costs of these services was +EUR

1,300 in the control group and -EUR 100 in the trial group (Table 3). The incremental cost (including the cost of other social and health services) was EUR 1,900, indicating that the cost of interventions that contributed to avoiding corrective family work was about EUR 85 per effectiveness unit (Table 3, ICER). The cost-effectiveness plane displayed high probability (99.5 %) for performance-based effectiveness in avoiding corrective family work (Figure 1). Along the same lines, cost-effectiveness was attained in the range of EUR 300-350 willingness to pay per effectiveness unit. The mean duration of the intervention was 185 days in the trial and 137 days in the control group (Table 3). At the level of the entire study population, the incremental costs of the interventions in the trial group were EUR 350, corresponding to an additional cost of EUR 7 per enrolled intervention day. In the graphical analysis, practically all ICER estimates were located in the right-hand side quadrants of the diagram, indicating favorable performance-effectiveness arising from a longer duration of the intervention in the trial group. The duration of the intervention was lengthened by one day at an incremental cost of EUR 50 (Figure 1).

DISCUSSION AND CONCLUSION

The study compared the performance-based effectiveness, costs, and cost-effectiveness of a multidisciplinary family center with a provider of decentralized child and family care services. The results indicated that in the course of the interventions, the multidisciplinary family center had a lower amount

of corrective family work and according to this indicator established higher performance-based effectiveness in comparison to the provider of decentralized family care services. Cost-acceptability analysis suggested that performance-based cost-effectiveness in avoiding corrective family work was attained at a willingness to pay of EUR 300-350 per effectiveness unit. Despite of the lower amount of corrective family work, the duration of the interventions was on the average 48 days longer in the multidisciplinary family center. The multidisciplinary family center's aim to reduce the need for corrective family work by investing in preventive activities seemed to enhance effectiveness in child and family care services. Efforts to emphasize the quality and continuity of customer relations was supported by the longer duration of the interventions in the multidisciplinary family center.

The increase in psychiatric referrals during the interventions was unexpected in relation to the objectives of early intervention and other preventive family work measures. The reason may be that the intervention involved a more effective identification of latent problem situations in the families, leading to more accurate diagnosing and increased discharges to psychiatric care.

Certain limitations of the study should be mentioned. First, the framework for carrying out the cost-effectiveness analysis was restricted to only those effectiveness indicators that were available in the patient information registers. While these data were of high quality and rather easily accessible, the study design

Table 3. Performance-based effectiveness and cost-effectiveness.

Performance indicator	Outcome measure	Trial group	Control group	Incremental costs (€)	Incremental effectiveness	ICER
a) Psychiatric referrals	Change in the number of referrals	10.9	13.8	1,722	2.9	592
b) Corrective family works services	Change in the number of episodes	-1.8	20.4	1,903	22.2	85.7
c) Corrective family work services	Change in costs	-112	1,312	1,903	1,422	1.3
d) Duration of the intervention (days)	Difference in the duration of the intervention	185	137	344	48	7.2

was for this part *a priori* determined which narrowed the range of potential effectiveness indicators. Secondly, as the interventions formed an integral part of the service delivery

‘packages’ of the child and family care providers, the distinct effects of individual services were not tractable. In this respect the set-up differed from conventional cost-effectiveness

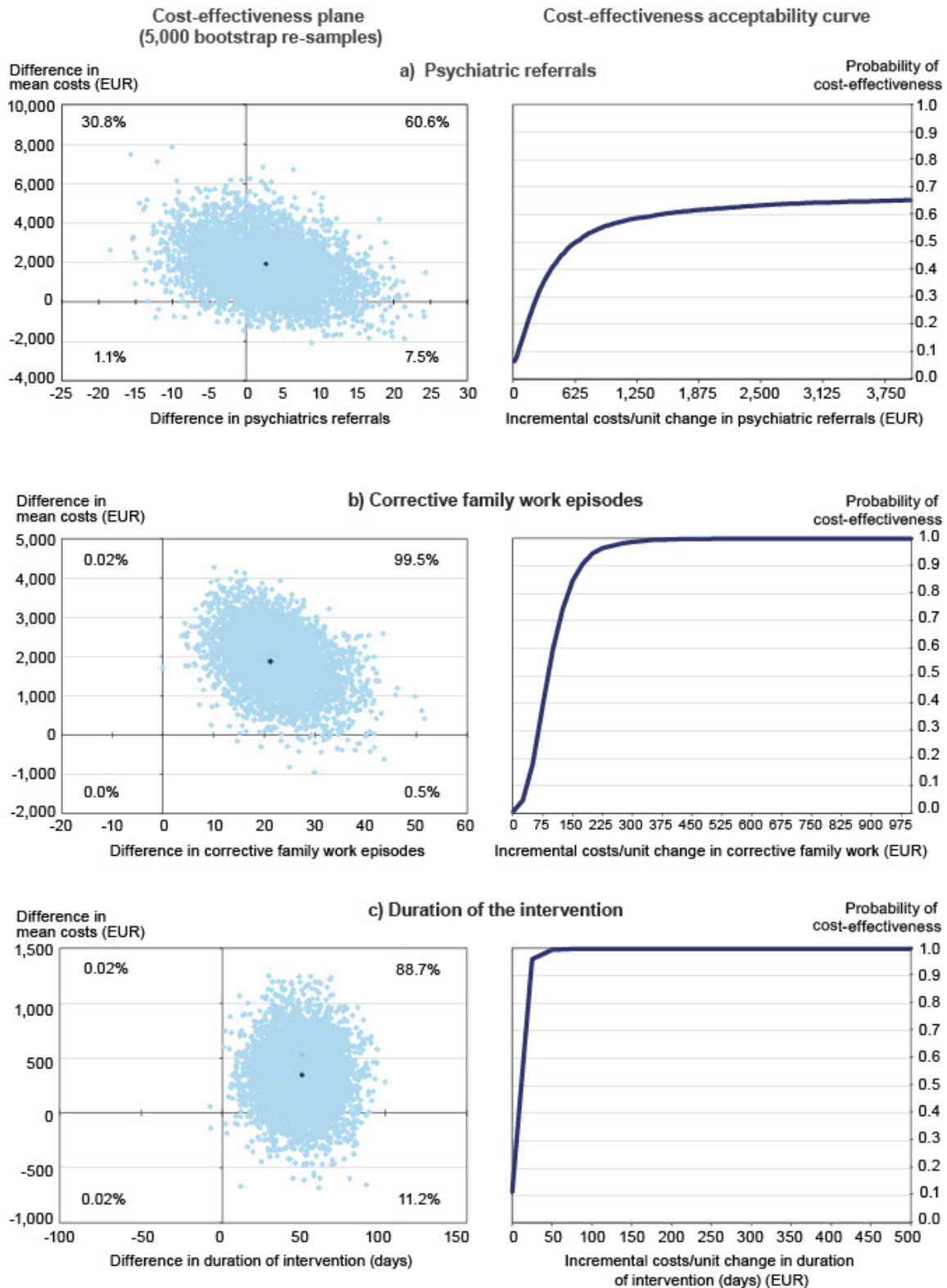


Figure 1. Cost-effectiveness planes and acceptability curves.

analysis, where the costs and effectiveness of a particular intervention in the trial group are compared to those observed in the control group. Instead, the study involved a comparison of the effects of independently implemented interventions carried out by two provider organizations with different concepts for delivering child and family care services. Lastly, the reference period involving a follow-up of 365 days before and after the beginning of the intervention may have involved temporal asymmetry within and between the study groups. On the other hand, the patient information register data enabled a long follow-up period and was not sensitive to the effects of recall error typical for cost-effectiveness analysis based on survey data. Another advantage of utilizing register data was that information on the examined indicators is collected on continuous basis, which allows the possibility to update or extend the present analysis at a later instance.

Our study indicated that child and family care services provided in the multidisciplinary family center displayed beneficial performance for promoting health-related effectiveness in child and family care at rather low additional costs. A model of service delivery focusing on preventive measures, responsiveness, duration of care episodes and clearly defined service

processes supported the objectives of higher effectiveness and improved overall performance. The analysis provided support for the general objectives and earlier experiences related to family centers in Finland and other Nordic countries. For example, the Swedish model of child and family services has been recognized for its comprehensive range of multidisciplinary services as well as the continuity and duration of provider-client relations [11–13]. Also in Denmark and Norway, the multidisciplinary family center currently conducts the direction of development work in child and family care services [14, 15]. Given the availability of adequate register data sources, the methods presented in this study would be applicable to regional or country-level economic evaluation and comparative analysis of family centers also in a broader Nordic setting. This research established a methodological framework for applying cost-effectiveness analysis to the economic evaluation of social services, such as child and family care services. While current patient information register data restricts the availability of potential effectiveness indicators, it offers an abundant, easy-access and high-quality data source for the development of long-term performance indicators for social services.

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