Using Hospital Data and Routines to Estimate Costs and Effects of Integrative Care Programmes for Chronic Pain and Stress Disorders – a Feasibility Study

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Keywords

Complementary therapies · Integrative medicine · Costs · Effects · Pain · Stress

Summary

Background: Evidence of cost and effects for comprehensive hospital-based integrative care (IC) is scarce. The aim of this study was to explore the feasibility of using local hospital data and routines to estimate costs and effects of anthroposophic IC programmes for chronic pain and stress disorders in Sweden. **Methods:** Retrospective analysis of one IC hospital's local administrative registry data. Main outcomes embraced patient demographics, programme duration and costs, patients' health status (EQ-5D index, 0–1) and self-rated health (EQ-5D VAS, 0–100), from hospital admittance to discharge. The use of postal questionnaires for collecting follow-up data after hospital discharge was assessed. **Results:** The IC pain programme had 461 records, all with complete data on costs and duration: average programme cost, EUR 5,925 (95% CI 5,780–6,070), and duration, 17.8 (SD 4.7) days. The IC stress programme had 263 records, all with complete cost and duration data: programme cost, EUR 5,494 (95% CI 5,318–5,671); duration 18.0 (SD 4.7) days. From admittance to discharge, health status improved by 0.23 (95% CI 0.19–0.27) in the pain, and by 0.16 (95% CI 0.12–0.20) in the stress programme. Improvements in self-rated health were 20 (95% CI 18–22), and 21 (95% CI 18–23), respectively. There was a general decrease in questionnaire response rate after hospital discharge, whereby 27–32% of respondents had completed data after 9 months. **Conclusions:** It was feasible to use hospital registry data to estimate costs and show positive effects of anthroposophic IC programmes for pain and stress disorders in Sweden. Clinical implications and the need for long-term follow-up are discussed.

Schlüsselwörter

Komplementäre Therapien · Integrative Medizin · Kosten · Effekte · Schmerz · Stress

Zusammenfassung

Hintergrund: Bislang gibt es kaum Kosten- und Wirkungsnachweise für eine ganzheitliche krankenhausbasierte integrative Gesundheitsversorgung (IC). Daher war das Ziel dieser Studie, Daten und Routinen eines örtlichen Krankenhauses als Quelle zu nutzen, um Kosten und Auswirkungen anthroposophischer IC-Programme für die Behandlung chronischer Schmerzen und Belastungsstörungen in Schweden beurteilen zu können. **Methodik:** Retrospektive Analyse lokaler administrativer Registerdaten eines IC-Krankenhauses. Die wichtigsten Ergebnisse umfassten demografische Angaben, Dauer und Kosten der Intervention, Gesundheitsstatus der Patienten (EQ-5D-Index, 0–1) und Selbsteinschätzung des Gesundheitszustands (EQ-5D VAS, 0–100), von der stationären Aufnahme bis hin zur Entlassung. Die Verwendung postalisch verschickter Fragebögen zur Erhebung von Follow-up-Daten nach Entlassung wurde berücksichtigt. **Ergebnisse:** Das IC-Schmerz-Interventionsprogramm umfasste 461 Einträge, allesamt mit vollständigen Datensätzen über Behandlungskosten und -dauer: Durchschnittskosten 5925 EUR (95% CI 5780–6070), und -dauer, 17,8 (SD 4,7) Tage. Das IC-Stress-Interventionsprogramm umfasste 263 Einträge, allesamt mit vollständigen Angaben zu Kosten und Dauer der Behandlung: Interventionskosten 5494 EUR (95% CI 5318–5671); Dauer 18,0 (SD 4,7) Tage. In der Zeit von der stationären Aufnahme bis zur Entlassung verbesserte sich der Gesundheitszustand um 0,23 (95% CI 0,19–0,27) im Schmerz- und um 0,16 (95% CI 0,12–0,20) im Stress-Programm. Verbesserungen bei der Selbsteinschätzung des Gesundheitszustands lagen bei 20 (95% CI 18–22) bzw. 21 (95% CI 18–23). Die Rückmeldequoten nach der Krankenhausentlassung waren rückgängig; 9 Monate nach Entlassung haben 27–32% der Befragten die Fragebögen vollständig ausgefüllt. **Schlussfolgerungen:** Es war möglich, anhand der Registerdaten des Krankenhauses die Behandlungskosten zu bestimmen und die positiven Effekte der anthroposophischen IC-Programme zur Schmerz- und Stressbewältigung in Schweden aufzuzeigen. Klinische Implikationen und der Bedarf eines Langzeit-Follow-Ups werden diskutiert.

Introduction

There is a variety of complementary, alternative and integrative medicine providers in Sweden who mainly operate on a small-scale private, for-profit basis outside of conventional health care. However, some are organised as larger ideas-driven non-profit health care providers and take part in the conventional health care system. A leading example of the latter among the Nordic countries is Vidarkliniken, one of the largest anthroposophic hospitals in Europe, located in Järna, Stockholm county [1, 2]. Briefly, care at Vidarkliniken hospital integrates conventional standard care by registered health personnel with anthroposophic and complementary therapies, such as massage, natural remedies, art and music therapy and diet/nutrition in an amplified healing environment [1, 3]. This type of internationally emerging health care service option is commonly referred to as integrative care (IC) [4, 5]. The majority of the patients that receive care at Vidarkliniken are referred by the conventional health care system. These referrals are typically administrated via the patient's general practitioner and the care periods are usually financed by public funding based on formal agreements between Vidarkliniken and major Swedish county councils [6]. 2 of the main rehabilitation programmes at Vidarkliniken provide IC services to patients suffering from chronic pain and stress disorders [7, 8]. In light of the international increase in IC provision in general, and the recent juridical efforts to promote increased pluralism in Swedish health care in particular [9, 10], it is crucial that such developments adhere to evidence-informed health care decision-making in order not to become more costly and less efficient for health care systems. Despite the prevalence of anthroposophic IC services, with approximately 30 hospitals and over 140 anthroposophic outpatient clinics in Europe and internationally [11], the clinical and cost effectiveness remain largely unexplored as there are only a few economic studies [12]. This situation has contributed to the sometimes negative criticism of anthroposophic IC services and its rationale including the lack of its evidence base [13]. In order to increase the evidence base, more research is needed, especially prospective clinical trials. However, such comprehensive research efforts may indeed be costly and encompassing. Thus, before conducting prospective hospital-based clinical trials and comparative effectiveness studies it is appropriate to investigate the feasibility of using local administrative hospital registry data and routines as a basis to estimate costs and effects of rehabilitation programmes. Considering these important aspects of data collection and logistics can create a suitable infrastructure for future clinical research efforts.

The primary aim of this study was to explore the feasibility of using local administrative hospital registry data and routines to estimate costs and effects of anthroposophic IC programmes for chronic pain and stress disorders from hospital admittance to discharge. Additional objectives were to explore

the results and response rates by using hospital-administered postal questionnaires for follow-up evaluations of patient health status after discharge, and to discuss clinical implications and propositions for future research.

Methods

Design and Setting

We conducted a feasibility study using retrospective registry data from the anthroposophic IC hospital Vidarkliniken in Sweden.

Study Population and Inclusion Criteria

Women and men of ≥ 18 years or who were electronically registered in Vidarkliniken's IC hospital programmes for chronic pain and stress disorders from 2006 to 2010 were included.

The Anthroposophic IC Programmes for Chronic Pain and Stress Disorders

The anthroposophic IC programmes can be regarded as part of an overall rehabilitation plan in collaboration with the conventional health care providers referring the patients to Vidarkliniken. In general, the IC programmes at Vidarkliniken emphasize an individual caring approach tailored to the needs of each individual patient, which denotes flexibility in the organization of the treatment plans [7, 8]. The anthroposophic IC programmes traditionally address both physical and mental aspects during the rehabilitation process [7, 8].

The individual treatment plan objectives are formulated in consultation with the patient at hospital admission. In general, the aim is to improve the patient's physical and mental health and quality of life by finding a way to manage residual symptoms and thus empower the patient to identify and mobilise their own inner health resources [7, 8]. In order to achieve this aim, the IC programmes utilise different therapies integrated with conventional care. Such therapies may encompass somatic treatment with anthroposophic herbal medicine, body therapy with topical treatments, such as medical bath therapy, rhythmical massage according to Wegman/Hauschka, mindfulness and physiotherapy. There are also other types of activating empowering therapies, including painting and modelling, singing and curative eurhythmics (movement to speech and music). At discharge, the treatment goals are followed up with the patient, and needs as well as opportunities for continued rehabilitation are formulated by the patient and staff together [7, 8].

The health care teams at Vidarkliniken typically consist of physicians experienced and trained in both conventional medicine and anthroposophic IC, registered nurses who also have skills in giving certain topical treatments, massage therapists, hydro therapists, art therapists, licensed physiotherapists and counsellors [7, 8]. Lastly, Vidarkliniken calls attention to its harmonious and caring environment and provides a biodynamic/organic nourishing diet. The official position of the hospital is that it is the appropriate combination of all the aspects of care into a whole which contributes to healing [2].

Outcomes

The main outcomes were patient demographics, the costs and durations of the IC programmes, and changes in patients' health status (EQ-5D index, 0–1) as well as self-rated health (EQ-5D VAS, 0–100) from hospital admittance to discharge. Additional outcomes were the response rates and the patients' health status based on the follow-up postal questionnaires at 3 and 9 months after hospital discharge.

Instrument

EQ-5D is an internationally available standardised instrument and a preference-based measure developed by the EuroQol group since

Table 1. Characteristics of patients and integrative care pain and stress rehabilitation programmes based on hospital registry data

	Pain rehabilitation, n = 461	Stress rehabilitation, n = 263
Gender, % (n)		
Female	92 (424)	91 (240)
Male	8 (37)	9 (23)
Age, years	50.7 (11.3)	49.0 (10.5)
Care period, days	7.8 (4.7)	18.0 (4.7)
Rehabilitation costs, EUR		
Per day	332 (8) ^a	305 (18) ^b
Total care period	5925 (1585) ^c	5494 (1452) ^d
CI = confidence interval.		
^a 95% CI: 332–333.		
^b 95% CI: 303–308.		
^c 95% CI: 5780–6070.		
^d 95% CI: 5318–5671.		
Average (standard deviation) values unless otherwise stated.		

Table 2. Questionnaire response rates and point estimate scores at different time points

	Pain rehabilitation, n = 461		Stress rehabilitation, n = 263	
	% (n)	score	% (n)	score
Patient health status (EQ-5D index, 0–1)				
Admittance (baseline)	88 (404/461)	0.28 (0.31)	92 (241/263)	0.48 (0.28)
Hospital discharge	77 (356/461)	0.51 (0.31)	79 (208/263)	0.65 (0.24)
Follow-up 3 months	60 (275/461)	0.39 (0.35)	53 (140/263)	0.62 (0.26)
Follow-up 9 months	42 (195/461)	0.41 (0.33)	34 (90/263)	0.65 (0.25)
Self-rated health (EQ-5D VAS, 0–100)				
Admittance (baseline)	96 (444/461)	37 (18)	94 (247/263)	40 (19)
Hospital discharge	82 (377/461)	57 (20)	80 (211/263)	61 (19)
Follow-up 3 months	61 (283/461)	47 (21)	55 (144/263)	59 (18)
Follow-up 9 months	44 (203/461)	48 (21)	36 (94/263)	63 (21)
Average (standard deviation) values unless otherwise stated. Higher values indicate better health status (0–1) and self-rated health (0–100).				

the 1990s [14, 15]. It is a well-established generic questionnaire that targets general health status (EQ-5D index, 0–1) as well as self-rated health (EQ-5D VAS, 0–100) and is commonly used in clinical care and medical research, including cost effectiveness studies [16–18]. 3 commonly used methods to assign health state valuations are the time trade-off, the rating scale and the standard gamble techniques [19]. There is no Swedish tariff to obtain values of EQ-5D health statuses, and thus the current study used the UK EQ-5D time trade-off tariff [20].

Data Collection

Anonymous data about each patient's hospital visit from admission to discharge was extracted from Vidarkliniken's registry covering patients' age (years) at admission, gender, type of IC programme (pain or stress), programme duration (days) and costs (Swedish kronor) of IC health care delivery. The hospital registry also included data on health status and self-rated health (EQ-5D) collected by questionnaires onsite at the hospital at admission and discharge, and then by postal administration at follow-up 3 and 9 months after discharge.

Analysis and Statistics

Data from observations with complete records was analysed and presented at group level separately for each IC programme to estimate the

durations, costs and the effects of the rehabilitation programmes for pain and stress disorders.

Descriptive statistics were used to analyse patient demographics, IC programme allocation, duration and costs of health care delivery. Costs were calculated in Swedish kronor and then estimated in euro using an approximate exchange rate of 10 Swedish kronor per 1 euro. No discounting was conducted. The response rates of the EQ-5D questionnaires were analysed in terms of frequencies at each data collection point: admission, discharge and follow-up after 3 and 9 months.

Within each rehabilitation programme, the changes in health status and self-rated health over time, from admittance to discharge and follow-up measures, were analysed by using the two-tailed paired samples t-test and the Wilcoxon signed-rank test, with a level of significance set at $p < 0.05$. Health economic modelling or imputation procedures were not conducted considering the feasibility design and pilot trial status of this retrospective registry study. However, EQ-5D data and changes in scores over time are presented to help informing future prospective clinical studies including cost effectiveness studies. Statistical analyses were performed in STATA 12 and Microsoft Excel 2011.

Ethics

The research project was approved by the Regional Ethical Review Board in Stockholm.

Table 3. Changes in health status (EQ-5D index) and self-rated health (EQ-5D VAS) for patients with complete data from hospital admission to discharge

	Pain rehabilitation		Stress rehabilitation	
	mean (SD) score	mean change from baseline (SE; 95% CI)*	mean (SD) score	mean change from baseline (SE; 95% CI)*
Patient health status (EQ-5D index, 0–1)	n = 326		n = 202	
Admittance (baseline)	0.29 (0.31)		0.49 (0.29)	
Hospital discharge	0.52 (0.30)	0.23 (0.02; 0.19–0.27)	0.65 (0.24)	0.16 (0.02; 0.12–0.20)
Self-rated health (EQ-5D VAS, 0–100)	n = 369		n = 204	
Admittance (baseline)	37 (18)		41 (18)	
Hospital discharge	57 (19)	20 (1.15; 17.71–22.25)	61 (19)	21 (1.36; 17.85–23.22)

*Score change from baseline, $p < 0.000$.

SD = standard deviation; SE = standard error; CI = confidence interval.

Higher values indicate better health status (0–1) and self-rated health (0–100). Within groups changes over time for these measures were analysed utilising the two-tailed paired t-test and Wilcoxon signed-rank test, respectively. The level of significance was set at $p < 0.05$.

Table 4. Changes in health status (EQ-5D index) and self-rated health (EQ-5D VAS) for patients with complete data from hospital admission, discharge and follow-up after 3 and 9 months.

	Pain rehabilitation, n = 148		Stress rehabilitation, n = 72	
	mean (SD) score	mean change from baseline (SE; 95% CI)*	mean (SD) score	mean change from baseline (SE; 95% CI)*
Patient health status (EQ-5D Index, 0–1)				
Admittance (baseline)	0.28 (0.31)	–	0.54 (0.28)	–
Hospital discharge	0.54 (0.29)	0.26 (0.03; 0.21–0.31)	0.70 (0.22)	0.17 (0.03; 0.10–0.23)
Follow-up 3 months	0.40 (0.34)	0.12 (0.03; 0.06–0.18)	0.65 (0.26)	0.11 (0.03; 0.05–0.17)
Follow-up 9 months	0.41 (0.33)	0.13 (0.03; 0.07–0.19)	0.66 (0.24)	0.13 (0.03; 0.07–0.19)
Self-rated health (EQ-5D VAS, 0–100):				
Admittance (baseline)	38 (18)	–	45 (17)	–
Hospital discharge	60 (18)	23 (1.74; 19.09–25.97)	67 (16)	23 (1.87; 18.84–26.29)
Follow-up 3 months	48 (21)	10 (1.84; 6.37–13.66)	62 (18)	18 (1.99; 13.58–21.53)
Follow-up 9 months	50 (21)	12 (2.04; 8.29–16.34)	63 (21)	18 (2.46; 13.53–23.32)

*Score change from baseline, $p < 0.000$.

SD = standard deviation; SE = standard error; CI = confidence interval.

Higher values indicate better health status (0–1) and self-rated health (0–100). Within groups changes over time for these measures were analysed utilising the two-tailed paired t-test and Wilcoxon signed-rank test respectively. The level of significance was set at $p < 0.05$.

Results

IC Pain Rehabilitation Programme

The IC programme for chronic pain rehabilitation had 461 records of which all had complete data on programme duration, costs per day and total costs for rehabilitation. Patient and programme characteristics are displayed in table 1.

The response rates and point estimate scores of the EQ-5D questionnaire, collected onsite at the hospital (admittance and discharge) and by postal administration (follow-up after 3 and 9 months), are displayed in table 2.

There were 326 observations (71%) with complete health status data (EQ-5D index) and there were 369 observations (80%) with complete self-rated health data (EQ-5D VAS) at admittance and discharge. The change scores are displayed in table 3.

Considering all EQ-5D data collection points, from admittance to follow-up 9 months after hospital discharge, there were 148 (32%) observations that had complete data. The follow-up scores compared to baseline values for these observations are given in table 4.

IC Stress Rehabilitation Programme

The IC programme for rehabilitation of stress disorders had 263 records that all had complete data on programme duration, costs per day and total costs for rehabilitation. Patient and programme characteristics are displayed in table 1.

Similarly, the response rates and point estimate scores of patients' health status and self-rated health, at each given time point, are displayed in table 2.

There were 202 (77%) observations with complete health status data (EQ-5D index) and 204 (78%) with complete self-rated health data at admittance and discharge (table 3).

Twenty-seven percent of the observations (72/263) had complete EQ-5D data over all measurement points (table 4).

For both IC rehabilitation programmes, the improvements in patients' health status and self-rated health between hospital admission and discharge were statistically significant ($p < 0.000$; tables 3 and 4). There was a general decrease in questionnaire response rate over time from all measurement points, reaching 27–32% after 9 months (table 4).

Discussion

The primary aim of this study was to explore the feasibility of using local administrative hospital registry data and routines to estimate costs and effects of anthroposophic IC programmes for chronic pain and stress disorders from hospital admittance to discharge.

The results show that it was feasible to derive data from local administrative hospital registry to estimate the local costs and effects of each of the 2 hospital-based IC rehabilitation programmes for pain and stress disorders. Both programmes embraced similar patient demographics, costs and durations and lead to statistically significant improvements in health status and self-rated health from hospital admittance to discharge. However, after discharge the assessment of follow-up data by postal questionnaires resulted in low response rates. Thus, it may not be an effective procedure for collecting follow-up data after discharge.

The patients that received care at Vidarkliniken's hospital programmes for pain and stress disorders had the same age and gender characteristics as being described common for anthroposophic patients in literature, i.e. 30–50 year-old women [12]. The current study does not confirm other common characteristics of anthroposophic patients, such as higher education or prior negative experiences of side effects from conventional care [12]. However, previous research indeed indicates that Vidarkliniken's patients have higher education than conventional care patients, although dissatisfaction with conventional care is less common [21]. The same study also found that the 2 main reasons for patients to seek anthroposophic IC were a positive attitude towards holistic care and expectations of being cared for [21]. Importantly, findings have also shown that patients admitted to Vidarkliniken are worse off in terms of lower self-reported quality of life compared to matched control patients in conventional care [22]. However, this finding was true for breast cancer patients and little is known regarding pain and stress patients. Based on these findings it is possible that anthroposophic patients generally may differ from conventional care patients in several aspects.

Patients in the pain programme had generally very low health status and self-rated health at hospital admission. These

values had improved at discharge. Compared with persons living with pain in general population, patients admitted to Vidarkliniken's IC programme seem to have worse health status in the corresponding age groups [23]. Patients receiving care in the IC programme for stress had somewhat higher health status than patients in the IC programme for pain, but both groups had markedly lower health status compared to general population levels of persons living with distress or pain in Sweden [23]. The latter also holds true for the admitted stress patients compared with patients receiving conventional care for major depression in Sweden [24]. At discharge, the patients in both IC programmes had improved significantly and their levels were closer to those living with chronic impairments in general population. It is currently unknown if this improvement may have an impact on health care utilisation, drug use and other factors of importance for coping with chronic disease.

Patients from both anthroposophic IC programmes reported improved health benefits after rehabilitation. This may be due to the patients' abilities to not only change, but also maintain and perhaps improve lifestyle habits after receiving IC. Previous research attests to the fact that anthroposophic IC rehabilitation at Vidarkliniken may help patients to initiate new attitudes and change and improve their lifestyle habits, which in turn may facilitate an improvement in general health over time [21]. It remains to be explored if the outcomes of IC rehabilitation processes have important long-term implications, not only in terms of individual health benefits for persons living with chronic conditions, but also from a societal perspective in terms of having an impact on public health, health care utilisation, sick-leave and costs.

Research evidence has shown that global self-rated health is an independent predictor of mortality, independent of other variables [25]. This may indicate that hospital programmes or other rehabilitation interventions that can help patients improve their self-rated health might also have an impact on the patients' relative risk of mortality. Recent findings from a retrospective analysis of insurance data in the Netherlands showed emerging evidence in this direction [26]. It was found that patients that were cared for by general practitioners having knowledge of anthroposophic and other complementary therapies tended to live longer and used health care less compared with patients that were cared for by conventionally practising physicians [26]. Such challenging results warrant replication in terms of large cohort studies, especially if the diseases under investigation, such as chronic pain and stress, are not imminently lethal, but may nonetheless be of high interest and relevance for many stakeholders. The Swedish health care system has promising infrastructure to explore hypotheses in this area further – notably by means of health care registries that track all publicly funded health care visits and drug prescriptions, as well as the possibility to link these types of data to registries covering sick-leave and mortality. Interestingly, pilot studies have shown that the impact of short intense lifestyle programmes that enable patients to improve and

maintain lifestyle changes may also have positive impacts on gene expression [27] and telomerase activity [28], which may be prognostic biomarkers of disease risk and progression. Coincidentally, the type of short intense lifestyle programmes that have been part of these studies share at least some components with the IC programmes at Vidarkliniken, such as diet/nutrition and lifestyle changes, including activity-based physical interventions. If verified, such results may have significant impact on policy- and decision-making with relevance for diagnosis, prognosis and rehabilitation procedures.

It was not possible to make direct comparisons of the investigated anthroposophic IC programmes with conventional hospital programmes for the same target groups of patients as there was no access to local registry data or hospital reports from other hospitals. Nonetheless, taken together with emerging evidence from international studies [26, 29–37] the study results are in support of continued clinical provision and further investigations of anthroposophic IC compared to conventional standard care models. Priorities for future research include comparative effectiveness studies by means of high quality external registry analysis as well as prospective pragmatic clinical trials to inform evidence-based health care services reforms. Such studies involving anthroposophic IC and conventional care are currently being conducted in Sweden.

Limitations

The generally low rate of EQ-5D responses after hospital discharge, i.e. missing questionnaire data over time, was a major limitation in the feasibility of gathering local hospital administrative registry data to estimate the effects of care. Subsequently, this may have implications for conductive trustworthy follow-ups and evaluations of care. However, it should indeed be recognized that the mere fact that Vidarkliniken do follow-up their patients after discharge is highly valuable. This type of quality assurance is certainly important for internal self-evaluation as well as external audit and health technology assessments. Currently, it may be regarded as highly unusual for Swedish hospitals in general to follow-up patients for up to 9 months after discharge. The comparative effectiveness of IC and conventional rehabilitation programmes would indeed be more straightforward if such quality assurance initiatives could be rewarded and implemented on a wider basis.

The difficulties for hospital personnel to maintain contact and keep tracking patients after hospital discharge may be due to reasons related to administrative and resource limitations. Low response rates over time may also imply that the current EQ-5D effect estimates should be interpreted with caution and that future clinical efforts should focus on seeking increasing response rates in order to improve interpretation and trustworthiness of findings. A follow-up period of 1 year could also be desirable. Hence, the presented tracks of changes in patients' health status over time following IC rehabilitation might best be used for generating hypotheses being examined in future prospective studies.

An additional problem in using local administrative registry data in its current form for evaluation was the lack of integration of clinical care data into the registry. For example, adding or linking individual patient data covering rehabilitation plans including specific details of given treatments, prescribed drugs and administered care may significantly improve the infrastructure for programme evaluation. Indirect costs and use of resources beyond IC hospital programmes were also not available for analysis. Integrating such data may enable more sophisticated analysis of clinical data including cost effectiveness modelling. Notably, the direct costs for rehabilitation, such as those shown in this study, are typically only a small fraction of total costs incurred in chronic disease management. Future clinical studies as well as health economic modelling scenarios should address both direct and indirect costs, including costs for sick-leave absence, to be able to compare the cost effectiveness of IC and conventional rehabilitation from a societal perspective.

In practice, it remains to verify whether the current costs and improvements in health status shown with IC rehabilitation are generalizable to longer durations, whether they match study populations in conventional care and whether such approaches are within acceptable levels for implementing new technologies in health care. Finally, future prospective controlled trials are needed to draw causative conclusions regarding the comparative benefit of anthroposophic IC over conventional hospital rehabilitation programmes.

Conclusions

It was highly feasible to use local hospital administrative registry data to estimate costs and durations of IC hospital programmes for pain and stress disorders. It was also feasible to estimate the health status and self-rated health of patients, which had significantly improved during the rehabilitation period. Following discharge, the use of postal questionnaires for follow-up data generally resulted in low response rates. Hence, it was not feasible to estimate long-term outcomes on patients' health status. The clinical implementation of follow-up of patients after discharge is desirable and should be further improved. The integration of high-quality clinical care data into local registries should be considered to improve the infrastructure for hospital programme evaluations. Studies involving detailed external registry data on a national level, prospective clinical trials and comparative effectiveness studies are warranted.

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