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Rationale, design and baseline data of a mixed-methods study examining the clinical impact of a brief transition programme for young people with juvenile idiopathic arthritis: The DON'T RETARD project

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ABSTRACT

Objectives: To describe (1) the content of a transition programme for youngsters with juvenile idiopathic arthritis (JIA) designed as a brief intervention, (2) the rationale and design of the evaluation of this transition programme using mixed-methods, and (3) to provide baseline data. We hypothesised that the transition programme improves the physical, psychosocial, and rheumatic-specific health of adolescents with JIA.

Design:An 'embedded experimental design'. Using a 'one-group pretest-posttest, with a non-equivalent posttest-only comparison group design', we quantitatively evaluated the impact of the transition programme, applying both longitudinal and comparative analyses. Subsequently, experiences of adolescents and their parents who participated in the experimental group were analysed qualitatively, using content analysis.

Setting: Subjects participating the intervention, were recruited at a tertiary centre in Belgium. The comparison group subjects were recruited from one tertiary and three secondary care centres in Belgium.

Participants:The intervention group consisted of 33 adolescents (25 females; 8 males), with a median age of 15.99 years. Main diagnoses were persistent or extended JIA(33.3%), poly-articular JIA(30.3%), enthesitis-related JIA(21.2%) or systemic arthritis(15.1%).

Intervention: The transition programme comprises 8 key components: (a)transition coordinator; (b)providing information and education; (c)availability by telephone; (d)information about and contact with adult care programme; (e)guidance of parents; (f)meeting with peers; (g)transfer plan; and (h)actual transfer to adult care.

Primary and secondary outcomes: The primary outcome was health status, as perceived by the adolescents. Secondary outcomes were health status, as perceived by the parents; medication adherence; illness-related knowledge; quality-of-life; fatigue; promotion of independence; support of autonomy; behavioural control; and psychological control.

Results: At baseline, the median score on psychosocial health was 69.17 (Q1=60.00;Q3=92.92) and 68.75 (Q1=56.25;Q3=89.06) on physical health. Rheumatic-specific health scores ranged from 62.50 to 100.00.

Conclusions: We present the rationale and design of a study intended to evaluate a transition programme for adolescents with JIA as a brief intervention, and provided baseline data.

ARTICLE SUMMARY

Article focus

- The content of our transition programme for young people with JIA designed as a brief intervention is described.
- The rationale and design of a new mixed-methods approach for studying the clinical impact of a brief interventional transition programme for young persons with juvenile idiopathic arthritis is provided.

Key messages

- The developed transition programme contains five steps: (1) introduction of the transition coordinator at an outpatient visit at paediatric rheumatology; (2) a second face-to-face visit that takes place at paediatric rheumatology; (3) adolescent-information day; (4) individual transfer plan; and (5) transfer to adult rheumatology care.
- The transition programme comprise eight essential key components that are implemented in one or more of the five steps: (a) a transition coordinator; (b) providing information and education about JIA and medication management, health behaviour, dealing with fatigue, school, friends and any problems with medication adherence; (c) availability by telephone; (d) information about and contact with the adult rheumatology programme; (e) guidance of parents; (f) meeting with peers; (g) a transfer plan; and (h) the actual transfer to adult rheumatology programme.

Strength and limitations

- A transition programme for adolescents with JIA is developed as a brief intervention, which is less costly and time-consuming.
- The development and evaluation of transition programmes is guided by the initial MRC framework for complex interventions.
- The employment of a sequential mixed-method approach within this complex intervention framework enables to gain better and integrative insight into the clinical impact of the key components of the transition programme.

BACKGROUND

Some decades ago, several paediatric disorders were associated with high, progressive morbidity and increased mortality. For many people suffering from these chronic diseases, medical, surgical, and technological advancements have resulted in improved disease management and increased life expectancy. Unlike in past decades, children with a progressive deteriorating disorder now often live into adulthood managing a chronic disease. Expert lifetime care should be provided in order to maximise lifelong functioning and potential of these people.

Adolescents with chronic conditions undergo different stages during their life wherein at least two important phenomena occur. First, they transition developmentally into adulthood, evolving from a dependent child to an independent adult [1]. Second, their health care transfers from a paediatric context to an adult one. Indeed, a timely and well-prepared transfer to adult- centred care is advocated [2,3]. This transfer is defined specifically as *an event or series of events through which adolescents and young adults with chronic physical and medical conditions move their care from a* paediatric *to an adult health care environment* [4]. According to the recent literature, the paediatric-to-adult care transfer should be preceded by a preparatory phase: "a *process by which adolescents and young adults with chronic childhood illnesses are prepared to take charge of their lives and their health in adulthood"* [4].

In order to prepare adolescents to take on new responsibilities for their health and to anticipate the imminent transfer to adult care, transition programmes have been developed. The efficacy of these transition programmes have been evaluated to some extent in the last decade [5-11]. Using quasi-experimental designs, investigators have found some positive effects on quality of life [8], disease outcomes [5,7], number of admissions and length of stay of readmissions [7], knowledge [8], work experience and career advice [8], and satisfaction with care [10]. The vast majority of the studies have been conducted in the United Kingdom [12], which may limit the generalisability of study findings to other health care systems. Therefore, research on the efficacy of transition programmes in other countries is warranted [12].

Existing transition programmes generally adopt a comprehensive approach, likely contributing to their positive effects. However, they are also costly and time-consuming to implement in day-to-day practice. This is illustrated by the finding that the most frequently perceived barriers to the formal transition of patients are limited time and lack of funding for a transition coordinator [13,14]. Hence, the cost-effectiveness of transition

programmes can be questioned. In times of economic crisis and limited funding, more sustainable alternatives must be explored. Brief interventions have the potential to be cost-effective. The cost-effectiveness of these brief evidence-based interventions, therefore, would increase the possibility of their being implemented in clinical practice.

Transition programmes can be viewed as complex interventions. Complex interventions are built up from a number of components that may act both independently and interdependently [15]. This implies that the active ingredient of the intervention is unknown or difficult to specify. The British Medical Research Council (MRC) has provided a framework for developing and evaluating complex interventions. It entails a recursive process of development, feasibility and piloting, evaluation, and implementation of the complex intervention. Hence, before any formal efficacy assessment can be done, comprehensive preparatory work is conducted [15].

The original model of the MRC comprised an investigative sequence of five phases (Figure 1). First, theory and evidence are assessed in order to provisionally identify the steps and the key components of the intervention; this is termed the preclinical phase. Second, an understanding of the intervention and its possible effects is developed; this is termed phase I: modelling phase. Third, feasibility of key components are assessed, and recruitment procedures and measurement of outcomes are tested; this is termed phase II: exploratory trial phase. Fourth, randomised controlled trials are conducted to evaluate the complex intervention. These trials require adequate power, adequate randomisation, appropriate outcome measures, and other standard features of well-designed trials; this is termed phase III: definitive randomised controlled trial. Finally, separate studies are conducted to establish the long-term and real-life effectiveness of the intervention; this is termed phase IV: long-term implementation [15,16].

*** INSERT FIGURE 1 ABOUT HERE***

In order to develop and test a transition programme involving a complex and brief intervention, we established the DON'T RETARD project (**D**evices for the **O**ptimizatio**N** of **TR**ansf**E**r and **T**ransition of **A**dolescents with **R**heumatic **D**isorders). This was designed for young people with juvenile idiopathic arthritis (JIA) (http://www.kuleuven.be/switch2/rheuma.html) and aimed for providing proof of concept for a transition programme devised as a brief intervention. We followed the original MRC framework for complex interventions. As part of the modelling phase, we conducted some preparatory studies that were previously

published [14,17]. The next step in the DON'T RETARD project is to evaluate the newly developed transition programme.

In the present article, we describe (1) the content of our transition programme for young people with JIA designed as a brief intervention, and (2) the rationale and design of the evaluation of this transition programme using a mixed-methods approach. The following hypotheses were tested: The transition programme improves the physical, psychosocial, and rheumatic-specific health of adolescents with JIA (primary outcome) [8,18]. We also hypothesised that the programme improves medication adherence, illness-related knowledge, quality of life, threshold to fatigue, and parenting style (secondary outcomes). To guarantee transparency and quality of reporting our complex intervention, we used the recently published criteria for reporting the development and evaluation of complex interventions (CReDECI) [19].

Transition programme as a brief intervention

Our transition programme, which is designed to be a brief intervention, contains five steps. We will describe in turn each step in the next section.

Intervention steps

(1) The first step occurs during a scheduled outpatient visit. The paediatric rheumatologist introduces the transition coordinator (TC) to the patient and his or her parents, and explains the transition programme. During this first face-to-face visit with the TC, the TC provides the patient and parents with a rheumatology management diary, written information about JIA and medication management, and a DVD with instructions regarding appropriate exercising. The TC guides the adolescent and parents through three patient information websites and presents a video about JIA and its consequences. Also, the second face-to-face visit is scheduled. The initial contact session lasts about 30-40 minutes. The TC is available by telephone to answer additional questions about the condition, therapy, transition process, health behaviour, and clinic appointments.

(2) The second step of the intervention occurs six months later. This consists of a second face-to-face visit that takes place at the outpatient clinic. During this visit, the TC focuses on health behaviour, dealing with fatigue, school, friends, self-image, knowledge about the disease, and any difficulties with medication adherence. Participants receive a folder about the practical issues related to the adult rheumatology

programme (e.g., contact information for the secretary and rheumatologists, organisational information for the outpatient clinic, etc.). This session lasts 20-30 minutes.

(3) For the third step of the intervention, patients and their parents are invited to attend an adolescent information day. On this day, all patients who attended their second visit with the TC are invited to come together. The adolescent information day has two parallel programmes: one for the adolescents and one for the parents. The programme for adolescents begins with a brief introduction from the TC and the paediatric rheumatologist. Then the adolescents take part in a variety of activities: They meet with peers, take an orientation tour of the adult care facilities, meet with the rheumatologists and nurse specialist of the adult rheumatology team, meet the physiotherapist(s) of the adult rheumatology team, and attend a workshop on psychological issues. These activities are followed by a cooking workshop, in which the adolescents prepare a complete meal for themselves and their parents. This allows them to talk with their peers in an informal setting.

The parallel programme for parents during this third step of the intervention is similar. A parent association representative is available so that the parents could express their concerns about their child's entering adulthood. Activities include taking an orientation tour of the adult care facilities, meeting with the rheumatologists and nurse specialist of the adult rheumatology team, and attending a lecture on psychological issues inherent to the development of an adolescent with chronic disorders. After the formal programme, parents join their children for the dinner prepared by the children. The adolescent information day starts at 14.00 h and ends at 18.30 h, and takes place twice during the transition programme. For each information day, about 15 patient-parents dyads participate.

(4) For the fourth step, the TC develops an individual patient transfer plan for each patient. This occurs before transferring from paediatric rheumatology to adult rheumatology. The transfer plan is based on the coding structure of the International Classification of Functioning, Disability and Health for Children and Youth (ICF-CY). By shifting the focus from cause to impact, the ICF-CY puts all health conditions on an equal footing, allowing them to be compared using a common metric. Furthermore, it takes into account the social aspects of a disability and does not view disability only as a 'medical' or 'biological' dysfunction. By including contextual factors, in which environmental factors are listed, the ICF-CY allows us to record the impact of an environment on a person's functioning. The transfer plan also is based on patient information collected by the paediatric

rheumatologist, the TC, and other health care professionals that are consulted. The development of a transfer plan requires 30 minutes per patient.

(5) The fifth step is the actual transfer. Once the transfer plan is handed over to the adult rheumatologist, the patient is considered transferred to adult rheumatology care. The third face-to-face visit with the TC occurs during the patient's first outpatient visit to adult rheumatology care. This time, the rheumatologist of the adult rheumatology programme joins the session, along with the TC, patient, and parents. The TC focuses on health behaviour and medication information. During this outpatient visit, the patient is formally 'handed over' to the adult rheumatology providers. This session lasts about 20 minutes.

Intervention key components

The transition programme comprise 8 essential key components that are implemented in one or more of the five steps: (a) a transition coordinator; (b) providing information and education about JIA and medication management, health behaviour, dealing with fatigue, school, friends and any problems with medication adherence; (c) availability by telephone; (d) information about and contact with the adult rheumatology programme; (e) guidance of parents; (f) meeting with peers; (g) a transfer plan; and (h) the actual transfer to adult rheumatology programme.

Altogether, the TC spends 60 to 90 minutes per patient, spread over a period of 1.5 years. This is in addition to the 40 man-hours (for the TC, paediatric rheumatologists, rheumatologists of the adult setting, physiotherapists, nurses of adult rheumatology, psychologists) incurred by the adolescent information day activities and the 20 hours needed for its preparation. Overall, for this brief intervention, one full-time equivalent from the different disciplines involved in rheumatologic care could take on a caseload of 250 to 300 patients.

METHODS AND DESIGN

To develop and evaluate the transition programme, we applied a mixed-method approach in which quantitative and qualitative studies are combined. More specifically, we used an 'embedded experimental design' [20]. This design is characterised by qualitative studies conducted before and after a quantitative study. In our project, the embedded experimental design started with a qualitative study using in-depth interviews.

The aim of the interviews was to better understand the transitional needs of young people with JIA. The information obtained in this qualitative study assisted us in developing the transition programme. Hence, this particular qualitative study corresponds to the modelling phase of the MRC framework (Figure 1, green box). The methods and results of this qualitative study are reported in two related articles [21,22]. Therefore, we do not elaborate on this study in the present article.

Subsequently, we conducted a quasi-experimental study employing a 'one-group pretest-posttest, with a non-equivalent posttest-only comparison group design' (Figure 1, purple box; Figure 2). In this quantitative study, we investigated the clinical outcomes of patients with JIA and their parents who participated in the transition programme. In this respect, longitudinal analyses were conducted to investigate changes over time (Figures 1, 2; indicated in red). Furthermore, comparative analyses were performed by comparing the posttest scores of the intervention group with those of patients who received usual care (Figures 1, 2; indicated in blue). This quantitative study (which included longitudinal and comparative analyses) is called study 1. After the quantitative study, a second qualitative study using an explanatory design was conducted (study 2; indicated in orange). In study 2, we elaborated on the experiences of adolescents with JIA and their parents on their participation in the transition programme. Both studies 1 and 2 are considered to correspond to the exploratory trial phase of the MRC framework (see above, Background section).

*** INSERT FIGURE 2 HERE ***

Study 1.a. Quantitative study: longitudinal analysis

Inclusion criteria

Potential subjects were recruited during a scheduled visit at the outpatient clinic, between February 1, 2009, and February 1, 2011. Dutch-speaking adolescents (14-16 years of age) with JIA, treated and in active follow-up at the Department of Paediatric Rheumatology of the University Hospitals of Leuven, were invited to participate in the intervention trial. Patients were excluded if they were mentally retarded or if they did not

have the physical capacities to complete the questionnaires used in the study. The convenience sample included all eligible subjects.

Informed consent

Patients were included after obtaining written informed consent from the parents and informed assent from the patients (all patients were minors at the time of inclusion). Anonymity was guaranteed, and patients and parents were assured that they could stop participating at any time.

Variables and measurements

All subjects were assessed three times: at baseline (T_0), at the second outpatient visit at paediatric rheumatology (T_1), and at the first outpatient rheumatology consultation in the adult care setting (T_2) (Figure 2). We measured the primary outcome, secondary outcomes, and disease parameters. The primary outcome was self-perceived health status of the adolescents, as measured with the Pediatric Quality of Life Inventory (PedsQL). We used both the generic (PedsQL™ 4.0 Generic Core Scales) and the disease-specific module (PedsQL 3.0 Rheumatology Module) [23,24].

We measured the following secondary outcomes salient to the adolescents: adolescents' health status as perceived by their parents, which was measured with the PedsQL™ 4.0 Generic Core Scales and PedsQL 3.0 Rheumatology Module [23,24]; medication adherence, which was measured using a Visual Analogue Scale (VAS) and the Swiss HIV Cohort Study Adherence Questionnaire (SHCS-AQ) [25]; illness-related knowledge, which was measured using the modified Patient Knowledge Questionnaire (PKQ) [26]; global quality of life, which was measured using a Linear Analogue Scale (LAS) [27]; and fatigue, which was measured using the Multidimensional Fatigue Inventory (MFI-20) [28]. For parents, the secondary outcomes that we measured were as follows*:* promotion of independence, which was measured using the Promotion of Independence Scale [29]; support of autonomy, which was measured using the Autonomy Support Scale [30]; behavioural control, which was measured using the Parental Regulation Scale [31]; and psychological control, which was measured using the Psychological Control Scale [31]. These outcomes are all suboptimal in patients

with JIA [29,31-34]. We hypothesised that participation in the transition programme could improve medication adherence, illness-related knowledge, quality of life, fatigue, and parenting style.

With regard to disease parameters, we evaluated the clinical presence/absence of disease activity; clinical remission on medication; clinical remission off medication; and functional status, as assessed by the patient-reported and parent-reported Child Health Assessment Questionnaire (CHAQ-DI) [35,36]. Detailed information about the assessments and instruments used in this study is shown in Table 1.

Table 1 Overview of variables and measurements in the quantitative study

Variable	*Measurement*	Report	Items	Validity	Reliability	Responsiveness	Interpretation
Perceived health status	*Pediatric Quality of Life Inventory (PedsQL™ 4.0) Generic Core Scale*	PAT & PAR	23	construct validity confirmed (Varni et al., 2003),p. 333-335; (Varni et al., 2001), p. 809; (Varni et al., 2002b), p. 719	• internal consistency confirmed • *adolescents' self-report:* total score, α=0.91-0.92; physical health, α=0.83-0.90; psychosocial health, α=0.87-0.89 • *parents' proxy report* total score, α=0.92-0.94; physical health, α=0.88; psychosocial health, α=0.89-0.91 (Varni et al., 2003), p. 335; (Varni et al., 2002b), p. 718	responsiveness confirmed (Varni et al., 2002b), p. 721-722	• scores from 0-100 • higher scores indicate a better perceived health status
	Pediatric Quality of Life Inventory (PedsQL™ 3.0) Rheumatology Module	PAT & PAR	22	construct validity confirmed (Varni et al., 2002b), p. 720-721	• internal consistency confirmed • *adolescents' self-report* pain and hurt, α=0.90; daily activities, α=0.84; treatment, α= 0.77; worry, α=0.81; communication, α=0.79 • *parents' proxy report* : pain and hurt, α=0.90; daily activities, α=0.89; treatment, α= 0.77; worry, α=0.80; communication, α=0.91 (Varni et al., 2002b), p. 718	responsiveness confirmed	• scores from 0-100 • higher scores indicate a better perceived rheumatologic health status
Medication adherence	*SWISS HIV Cohort Study Adherence Questionnaire SHCS-AQ* (Deschamps et al., 2008)	PAT	3	NR	NR	NR	medication adherent or non-adherent
Illness-related knowledge	*The Modified Patient Knowledge Questionnaire (PKQ)*	PAT	16	content validity confirmed (Hilderson et al., 2011)	NR	NR	• scores from 0 to 100 • higher scores indicate more illness-related knowledge
Global quality of life	*Linear Analogue Scale (LAS)*	PAT	1	content validity confirmed; construct validity confirmed (Moons et al., 2006), p.410	stability confirmed (ICC= 0.65; P <0.001) (Moons et al., 2006), p.410	responsiveness confirmed (Moons et al., 2006), p.410	scores from 0 (worst imaginable quality of life) to 100 (best imaginable quality of life)
Fatigue	*Multidimensional Fatigue Inventory*	PAT	20	construct validity	internal consistency	responsiveness	• scores from 4-20

	(MFI-20)			confirmed (Lin et al., 2009), p. 6	confirmed: general fatigue, α= 0.82; physical fatigue, α=0.81; reduced activity, α= 0.82; reduced motivation, α=0.71; mental fatigue, α=0.86 (Lin et al., 2009), p.4-6	confirmed (Lin et al., 2009), p.6	• higher scores indicate a higher degree of fatigue
Parenting dimensions **a. promotion of independence** **b. support of autonomy** **c. behavioural control** **d. psychological control**	*Promotion Independence Scale (PI)* *Autonomy Support Scale (PVF)* *Parental Regulation Scale (PRS-YSR revised to parent self-report)* *Psychological Control Scale (PCS-YSR revised to parent self-report)*		8 7 16 8	NR NR construct validity confirmed (Soenens et al., 2006), p. 309 NR	internal consistency confirmed (α=.76) (Soenens et al., 2007), p.17 internal consistency confirmed (α=0.70-0.72) (Kins et al., 2009), p.1420 NR internal consistency confirmed (α=0.69) (Soenens et al., 2006), p.545-546	NR NR NR NR	• scores from 1 to 5 a. higher scores indicate more promotion of independence b. higher scores indicate more support of autonomy c. higher scores indicate more behavioural control d. higher scores indicate more psychological control
Absence of disease activity (Wallace et al., 2004)		MD	NA	NA	NA	NA	inactive disease or active disease
Two types of **clinical remission**: (a) Clinical remission on medication (b) Clinical remission off medication (Wallace et al., 2004)		MD	NA	NA	NA	NA	no clinical remission, clinical remission on medication, or clinical remission off medication
Functional status	*Childhood Health Assessment Questionnaire (CHAQ-DI)* (Ouwerkerk et al., 2008; Singh et al., 1994)	PAT & PAR	30	construct validity confirmed (Takken et al., 2006), p. 980	NR	NR	scores from 0 (good functional status) to 3 (poor functional status)

Legend: ICC, intra-class correlation; MD, medical doctor; NA, not applicable; NR, not reported; PAT, patient; PAR, parent.

Data analysis

Since this study was an exploratory trial formulated according to the MRC framework of complex interventions, our aim was not to test the efficacy of the transition programme; rather it was a 'proof of concept' for the transition programme concept as a brief intervention. Therefore, we did not look for statistical significances but rather for clinical differences. Differences in patient- and parent-related outcomes, which were measured continuously starting at T_0 (before intervention) to T_2 (after intervention), were expressed as effect sizes.

For continuous variables, an effect size for the Wilcoxon test was calculated by using r= Z/□n, where Z is the normal approximation of the Wilcoxon test statistic. To appraise the magnitude of the effect sizes, we used Cohen's r. An effect size of 0.1 to 0.3 is considered to be small, whereas effects sizes of 0.3 to 0.5 and 0.5 or higher are considered to be medium and large, respectively [37].

Adherence was dichotomised as adherent or non-adherent. For this outcome, odds ratios were calculated to report the effect size. The odds ratio is the ratio of the odds of an outcome (e.g., being adherent) of one group ($T_{0,}$ before intervention), to the odds of the outcome of the other group ($T_{2,}$ after intervention). To appraise the magnitude of this odds ratio, we used the following suggested cut-off values for the odds ratios: 1.5 to 2.5 is a small effect; 2.5 to 4.3 is a medium effect; and 4.3 or higher is a large effect [38,39].

Nominal data were expressed in frequencies and percentages. Medians and quartiles (Q1-Q3) were calculated for continuous, non-normally distributed variables.

Baseline data

The sample consisted of 33 adolescents, 25 of which were female and 8 male. Detailed information about JIA subtype, medication prescription and remission status (on or off therapy) and the outcome data is shown in Table 2.

Table 2. Demographic, clinical characteristics and outcome data of 33 adolescents with JIA at baseline

Baseline data	(n = 33)
gender	
female	25 (75.8%)
male	8 (24.2%)
subtype	
persistent/ext. JIA	11 (33.3%)
poly JIA (RF-, RF+)	10 (30.3%)
systemic arthritis	5 (15.1%)
enthesitis-related arthritis	7 (21.2%)
age median, in years (Q_1;Q_3)	15.99 (15.15;17.12)
disease activity	10 (30.3%)
functionality$_{ado}$ (Q_1;Q_3)	0.25 (0.13;0.63)
clinical remission on therapy	17 (51.5%)
clinical remission off therapy	5 (15.2%)
medication prescribed	23 (69.7%)
NSAIDS	14 (60.9%)
DMARDS	10 (43.5%)
biologicals	6 (26.0%)
glucocorticosteroids	4 (17.4%)
Primary outcome data adolescents median (Q_1;Q_3)	
psychosocial health (generic)	69.17 (60.00;92.92)
physical health (generic)	68.75 (56.25;89.06)
treatment (rheumatology)	76.79 (71.43;100.00)
communication (rheumatology)	75.00 (66.67;91.67)
pain and hurt (rheumatology)	62.50 (50.00;93.75)
daily activities (rheumatology)	100.00 (91.25;100.00)
worry (rheumatology)	75.00 (66.67;91.67)
Secondary outcome data adolescents median (Q_1;Q_3)	
quality of life	73.00 (68.5;90.00)
illness related knowledge	31.25 (18.75;43.75)
motivation	7.00 (5.25;9.00)

mental fatigue	9.5 (7.00;12.75)
activity	9.50 (7.00;12.00)
physical fatigue	9.50 (6.25;13.75)
general fatigue	9.50 (7.25;13.00)
Secondary outcome data adolescents (%)	
medication adherence	23 (69.70%)
Secondary outcome data parents median (Q_1;Q_3)	
autonomy support	3.83 (3.33;4.33)
promotion of independence	3.38 (3.13;1.75)
behavioural control	4.00 (3.60:4.30)
psychological control	2.00(1.75;2.50)
psychosocial health (generic)	85.00 (71.67;90.00)
physical health (generic)	73.00 (56.25;96.88)
treatment (rheumatology)	89.29 (71.43;97.32)
communication (rheumatology)	75.00 (64.58;91.67)
pain and hurt (rheumatology)	84.38 (50.00;95.31)
daily activities (rheumatology)	100 (90.00;100.00)
worry (rheumatology)	91.67 (66.67;100.00)

Ethical issues

The Institutional Review Board of the University Hospital Leuven, Belgium, evaluated and approved the study protocol (B32220096363). This study was performed with ethical standards as described in the latest Declaration of Helsinki.

Study 1.b. Quantitative study: comparative analysis

Inclusion criteria

The intervention group's subject inclusion criteria were described above. The comparison group consisted of adolescents aged 17-23 years, who already had been transferred to the adult rheumatology programme. These patients were transferred from paediatric rheumatology to the adult programme without participating in a specific self-management/transition programme (i.e., they received the usual care). The comparison group

subjects were recruited from four different health centres in Belgium. Those who were mentally retarded or did not have the physical capacities to complete the questionnaires used in the study were excluded. Subjects of the comparison group were included in the analyses if they could be matched with an intervention group subject in terms of disease activity, medication prescribed, JIA subtype, and gender.

Definition of usual care

For the purposes of this study, usual care is defined as the care that is currently provided in day-to-day clinical practice. Adolescents are usually followed up at the paediatric rheumatology programme until the age of 16 years. Around that age, the adolescent might have a first outpatient visit with the adult rheumatologist and the paediatric rheumatologist together. When the rheumatologists, the patient, and his or her parents agree that the patient is ready for transfer, an appointment for an adult rheumatology consultation is made. No transition coordinator or formal transition plan is used.

Informed consent from comparison group subjects

We used the same procedure described above that we used for the intervention group.

Variables and measurements

The variables and measurements used in these comparative analyses were the same as those used in the longitudinal analyses (see above). The measures for the comparison group were acquired during one of the outpatient visits at the adult care clinic (T_2) (see Figure 2).

Data analysis

As with the longitudinal analyses, we were interested in clinical differences instead of statistical differences. In the comparative analyses, the scores of the intervention and comparison groups at T_2 were compared. The cut-off values used for the longitudinal analyses also were used for the comparative analyses.

Ethical Issues

The Institutional Review Board of the University Hospital Leuven, Belgium, evaluated and approved the study protocol (B32220096363). This study was performed with ethical standards as described in the latest Declaration of Helsinki.

Study 2. Qualitative study

Design

We used an explanatory design to expand the quantitative results with qualitative data [20]. To gain insight into the processes underpinning the transition programme, we conducted in-depth interviews with the adolescents and parents of the intervention group. The specific aims of this qualitative study were (i) to get an understanding of the reasons why particular effects are observed and why others are not, and (ii) to evaluate the feasibility and the utility of the key components of the complex intervention from the patients' and parents' perspective.

Inclusion criteria

Those participating in the intervention group (adolescents and their parents) were purposively sampled and invited to take part in the interviews. Sampling continued until no new themes emerged from the data (i.e., until saturation of the data was reached).

Informed consent

Subjects were included in the qualitative study after we obtained written informed consent for this particular substudy. If the patient was a minor, informed consent was obtained from the parents and informed assent from the patient. Anonymity was guaranteed, and patients and parents were assured that they could stop the interview at any time.

Data collection

We employed a predefined interview guide, previously adjusted by an expert panel consisting of one rheumatologist (RW), one paediatric rheumatologist (CW), and three researchers (KV, PM, DH) in the field of care transition. We asked adolescents and parents to answer open-ended questions about the TC, the adolescent information day, the time of transfer, and general feelings about the transition programme intervention.

Adolescents and parents were interviewed at home, each in a different room. Different strategies were used to assess the trustworthiness of the research: investigator triangulation, bracketing, and building a relationship of trust with the subject. Investigator triangulation requires that more than one investigator collect and analyse the raw data, so that the findings emerge through a consensus of a team of investigators [40]. Bracketing is the process of identifying and holding in abeyance preconceived beliefs and opinions about the phenomenon under study [40]. Bracketing makes the researcher aware of his or her beliefs and opinions about the phenomenon under study. To build a trusting relationship with each subject, we made certain that the interviewers were not part of the therapeutic team and that the interviews took place in a room where the subject felt comfortable. These methods ensured that researcher-related bias was minimised.

Data analysis

The interviews were analysed by using qualitative content analysis, according to the method of Graneheim and Lundman [41]. Each interview was transcribed verbatim. The interviews were read through several times to obtain a good understanding of the content. The first step in the analysis was the identification of meaning units (i.e., constellations of words or statements that were related to the same central meaning). The meaning units were labelled with codes, which allowed the data to be considered in new and different ways. The second step in the analysis involved sorting the codes into themes. A theme is an expression of the latent content of the text. For each theme, its content was expressed in two categories. To ensure the trustworthiness of the analysis, the authors discussed the classification of codes, categories, and themes until consensus was reached.

Ethical Issues

The Institutional Review Board of the University Hospital Leuven, Belgium, evaluated and approved the study protocol. This study was performed with ethical standards as described in the latest Declaration of Helsinki.

DISCUSSION

Previous studies have shown that the implementation of a comprehensive transition programme can have positive effects on several patient outcomes. We developed a transition programme as a brief intervention. Implementation of these transition programmes in clinical practice may be more feasible, because we estimated that one full-time equivalent of manpower could take on a case load of 250 to 300 patients. In the present article, we describe the rationale and the design of a mixed-methods approach for evaluating the clinical impact of the transition programme for adolescents with JIA.

Our study is innovative in four aspects. First, to the best of our knowledge, this is the first evaluation of a transition programme structured as a brief intervention. Brief interventions are usually conducted in a one-on-one situation and take shorter periods of time [42]. Brief interventions are predominantly used in the prevention and treatment of substance abuse [43], although they have been employed in other settings as well [44,45]. Shorter time-consuming interventions are in demand, since the current trend is to implement transition programmes through optimal time use and cost-efficacy.

Second, we designed this brief intervention as a complex intervention and used the MRC framework to perform our evaluation. It is argued that even simple interventions can be complex undertakings, mixing elements of content, intensity, duration, and setting [42].Therefore, clearly specifying the steps and components of a brief intervention is needed. For this purpose, we used the criteria for the development and evaluation of complex interventions (CReDECI) in health care [19].

Within this complex intervention framework, we employed a sequential mixed-method approach, more specifically an embedded experimental design. This mixed-methods approach enabled us to gain better insight into the clinical impact of the key components of this complex intervention. Using this approach, we integrated the findings of the different studies.

Mixed-methods studies differ from multi-methods studies in that the latter involve a set of mono-method studies that use different designs and that are conducted independently. Although integration is highly advocated, it is seldom done. The reason can be explained in two ways [46] . First, researchers do not always make use of the various ways of integrating findings in their reports. They report the results of qualitative and quantitative components separately, or they report the qualitative and quantitative findings together without considering how they are related to each other. This indicates that researchers may be unaware of some of the unique insights available in mixed-methods studies. In our study, we looked for convergence, divergence, and discrepancy in the findings of both methods. This process is defined as crystallisation [46]. Indeed, crystallisation of results and exploration of definite discrepancies can lead to further insights. Second, the integration of data and findings from different components of a mixed-methods study is not always apparent in the articles emerging from them. This indicates that any unique insights available from mixed-methods studies may not be disseminated in ways that are attributable to mixed-methods studies.

Lastly, this study provides pilot data on the feasibility and impact of a brief transition programme for young persons with JIA. The data of this study can be used to design a randomised controlled trial testing the effectiveness of the programme in a robust way. Indeed, the effect size obtained in the present study can be used for power and sample size calculations for future studies. Admittedly, since the present study was conducted in persons with JIA, the data are not necessarily generalisable to other patient populations.

CONCLUSION

We present the rationale and design of a study intended to evaluate a transition programme for adolescents with JIA as a brief intervention. Here, we used the MRC framework. The embedded experimental design offered us the opportunity to obtain an overall picture of the clinical impact of the transition programme on adolescents with JIA who participated in it. It also allowed us to get an overall picture of how these adolescents experienced this programme. This study protocol was designed to evaluate our brief intervention. This evaluation enabled us to get more insight into the active components of our transition programme. Examination of key clinical and methodological uncertainties in the exploratory trial phase helps researchers to set up definite randomised controlled trials and guide long-term implementation.

TRIAL STATUS

The trial started February 1, 2009, and ended on February 1, 2011.

ABBREVIATIONS

CHAQ-DI	Childhood Health Assessment Questionnaire
CReDECI	Criteria for Reporting the Development and Evaluation of Complex Interventions
ICC	Intra-class correlation
ICF	International Classification of Functioning
JIA	juvenile idiopathic arthritis
LAS	linear analogue scale
MD	medical doctor
MRC	Medical Research Council
MVI-20	Multidimensional Fatigue Index
NA	not applicable
NR	not reported
PAT	patient
PAR	parent
PCS-YSR	Psychological Control Scale – Youth Self Report
PedsQL	Paediatric Quality of Life Inventory
PI	Promotion Independence Scale
PKQ	Patient Knowledge Questionnaire
PRS-YSR	Parental Regulation Scale
PVF	Autonomy Support Scale

SHCS-AQ	Swiss HIV Cohort Study Adherence Questionnaire
TC	transition coordinator
VAS	visual analogue scale

AUTHORS CONTRIBUTIONS

PM, RW, CW, and DH were responsible for the concept and design of the study, and analysis and interpretation of the data. DH and KV collected the data. DH drafted the manuscript. PM, KV, EG, RW, and CW critically revised the manuscript for important intellectual content. All authors read and approved the final manuscript.

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COMPETING INTERESTS

The authors declare that they have no competing interests.

Reference List

1 Meleis AI: *Transitions Theory: Middle range and situation-specific theories in nursing research and practice.* New York: Springer Publishing Company; 2010.

2 American Academy of Pediatrics, American Academy of Family Physicians, American College of Physicians-American Society of Internal Medicine.: A consensus statement on health care transitions for young adults with special health care needs**.** Pediatrics 2002, **110:**1304-1306.

3 American Academy of Pediatrics, American Academy of Family Physicians, American College of Physicians, Transitions Clinical Report Authoring Group, Cooley WC, Sagerman PJ: Supporting the health care transition from adolescence to adulthood in the medical home**.** Pediatrics 2011, **128:**182-200.

4 Knauth A, Verstappen A, Reiss J, Webb GD: Transition and transfer from pediatric to adult care of the young adult with complex congenital heart disease**.** Cardiol Clin 2006, **24:**619-29, vi.

5 Chaturvedi S, Jones CL, Walker RG, Sawyer SM: The transition of kidney transplant recipients: a work in progress**.** Pediatr Nephrol 2009, **24:**1055-1060.

6 Craig SL, Towns S, Bibby H: Moving on from paediatric to adult health care: an initial evaluation of a transition program for young people with cystic fibrosis**.** Int J Adolesc Med Health 2007, **19:**333-343.

7 Holmes-Walker DJ, Llewellyn AC, Farrell K: A transition care programme which improves diabetes control and reduces hospital admission rates in young adults with Type 1 diabetes aged 15-25 years**.** Diabet Med 2007, **24:**764-769.

8 McDonagh JE, Southwood TR, Shaw KL: The impact of a coordinated transitional care programme on adolescents with juvenile idiopathic arthritis**.** Rheumatology (Oxford) 2007, **46:**161-168.

9 Remorino R, Taylor J: Smoothing things over: the transition from pediatric to adult care for kidney transplant recipients**.** Prog Transplant 2006, **16:**303-308.

10 Shaw KL, Southwood TR, McDonagh JE: Development and preliminary validation of the 'Mind the Gap' scale to assess satisfaction with transitional health care among adolescents with juvenile idiopathic arthritis**.** Child Care Health Dev 2007, **33:**380-388.

11 Steinkamp G, Ullrich G, Muller C, Fabel H, von der HH: Transition of adult patients with cystic fibrosis from paediatric to adult care--the patients' perspective before and after start-up of an adult clinic**.** Eur J Med Res 2001, **6:**85-92.

12 Hilderson D, Westhovens R, Wouters C, Moons P: Transitional care for adolescents with rheumatic diseases: urgent need for more research**.** Child Care Health Dev 2008, **34:**401-402.

13 Betz CL: Transition of adolescents with special health care needs: review and analysis of the literature**.** Issues Compr Pediatr Nurs 2004, **27:**179-241.

14 Hilderson D, Moons P, Westhovens R, Wouters C: Attitudes of rheumatology practitioners toward transition and transfer from pediatric to adult healthcare**.** Rheumatol Int 2012, **32:**3887-3896.

15 Craig P, Dieppe P, Macintyre S, Michie S, Nazareth I, Petticrew M: Developing and evaluating complex interventions: the new Medical Research Council guidance**.** BMJ 2008, **337:**a1655.

16 Campbell M, Fitzpatrick R, Haines A, Kinmonth AL, Sandercock P, Spiegelhalter D, Tyrer P: Framework for design and evaluation of complex interventions to improve health**.** BMJ 2000, **321:**694-696.

17 Hilderson D, Corstjens F, Moons P, Wouters C, Westhovens R: Adolescents with juvenile idiopathic arthritis: who cares after the age of 16? Clin Exp Rheumatol 2010, **28:**790-797.

18 Chaudhry SR, Keaton M, Nasr SZ: Evaluation of a cystic fibrosis transition program from pediatric to adult care**.** Pediatr Pulmonol 2012.

19 Mohler R, Bartoszek G, Kopke S, Meyer G: Proposed criteria for reporting the development and evaluation of complex interventions in healthcare (CReDECI): guideline development**.** Int J Nurs Stud 2012, **49:**40-46.

20 Creswell JW, Plano Clark VL: *Designing and conducting mixed methods research.* Thousand Oaks, California: Sage Publications; 2007.

21 Eyckmans L, Hilderson D, Westhovens R, Wouters C, Moons P: What does it mean to grow up with juvenile idiopathic arthritis? A qualitative study on the perspectives of patients**.** Clin Rheumatol 2011, **30:**459-465.

22 Hilderson D, Eyckmans L, Van der Elst K, Westhovens R, Wouters C, Moons P: Transfer from paediatric rheumatology to the adult rheumatology setting: experiences and expectations of young adults with juvenile idiopathic arthritis**.** Clin Rheumatol 2012.

23 Varni JW, Seid M, Smith KT, Burwinkle T, Brown J, Szer IS: The PedsQL in pediatric rheumatology: reliability, validity, and responsiveness of the Pediatric Quality of Life Inventory Generic Core Scales and Rheumatology Module**.** Arthritis Rheum 2002, **46:**714-725.

24 Varni JW, Seid M, Knight TS, Uzark K, Szer IS: The PedsQL 4.0 Generic Core Scales: sensitivity, responsiveness, and impact on clinical decision-making**.** J Behav Med 2002, **25:**175-193.

25 Deschamps AE, De GS, Vandamme AM, Bobbaers H, Peetermans WE, Van WE: Diagnostic value of different adherence measures using electronic monitoring and virologic failure as reference standards**.** AIDS Patient Care STDS 2008, **22:**735-743.

26 Hilderson D, Moons P, Wouters C, Westhovens R: **Adolescents with juvenile idiopathic arthritis: what do they know about their condition? [abstract].** *Annals of the Rheumatic diseases* 2011, **70:**756

27 Moons P, Van Deyk K, De Bleser L, Marquet K, Raes E, De Geest S, Budts W: Quality of life and health status in adults with congenital heart disease: a direct comparison with healthy counterparts**.** Eur J Cardiovasc Prev Rehabil 2006, **13:**407-413.

28 Lin JM, Brimmer DJ, Maloney EM, Nyarko E, Belue R, Reeves WC: Further validation of the Multidimensional Fatigue Inventory in a US adult population sample**.** Popul Health Metr 2009, **7:**18.

29 Soenens B, Vansteenkiste M, Lens W, Luyckx K, Goossens L, Beyers W, Ryan RM: Conceptualizing parental autonomy support: adolescent perceptions of promotion of independence versus promotion of volitional functioning**.** Dev Psychol 2007, **43:**633-646.

30 Kins E, Beyers W, Soenens B, Vansteenkiste M: Patterns of home leaving and subjective well-being in emerging adulthood: the role of motivational processes and parental autonomy support**.** Dev Psychol 2009, **45:**1416-1429.

31 Soenens B, Vansteenkiste M, Luyckx K, Goossens L: Parenting and adolescent problem behavior: an integrated model with adolescent self-disclosure and perceived parental knowledge as intervening variables**.** Dev Psychol 2006, **42:**305-318.

32 Eddy L, Cruz M: The relationship between fatigue and quality of life in children with chronic health problems: a systematic review**.** J Spec Pediatr Nurs 2007, **12:**105-114.

33 Russo E, Trevisi E, Zulian F, Battaglia MA, Viel D, Facchin D, Chiusso A, Martinuzzi A: Psychological profile in children and adolescents with severe course Juvenile Idiopathic Arthritis**.** ScientificWorldJournal 2012, **2012:**841375.

34 Ullrich G, Mattussek S, Dressler F, Thon A: How do adolescents with juvenile chronic arthritis consider their disease related knowledge, their unmet service needs, and the attractiveness of various services? Eur J Med Res 2002, **7:**8-18.

35 Ouwerkerk JW, van Pelt PA, Takken T, Helders PJ, Net J: Evaluating score distributions in the revised Dutch version of the Childhood Health Assessment Questionnaire**.** Pediatr Rheumatol Online J 2008, **6:**14.

36 Singh G, Athreya BH, Fries JF, Goldsmith DP: Measurement of health status in children with juvenile rheumatoid arthritis**.** Arthritis Rheum 1994, **37:**1761-1769.

37 Cohen J: A power primer**.** Psychol Bull 1992, **112:**155-159.

38 Berben L, Sereika SM, Engberg S: Effect size estimation: methods and examples**.** Int J Nurs Stud 2012, **49:**1039-1047.

39 Cohen J: *Statistical power analysis for the behavioral sciences.* Lawrence Erlbaum Associates; 1988.

40 Polit DF, Beck CT: **Nursing Research: principles and methods.** In *Nursing Research: Principle and Methods*. 7 edition. Philadelphia: Lippincott Williams & Wilkins; 2004.

41 Graneheim UH, Lundman B: Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness**.** Nurse Educ Today 2004, **24:**105-112.

42 Babor TF: Avoiding the horrid and beastly sin of drunkenness: does dissuasion make a difference? J Consult Clin Psychol 1994, **62:**1127-1140.

43 Humeniuk R, Ali R, Babor T, Souza-Formigoni ML, de Lacerda RB, Ling W, McRee B, Newcombe D, Pal H, Poznyak V et al.: A randomized controlled trial of a brief intervention for illicit drugs

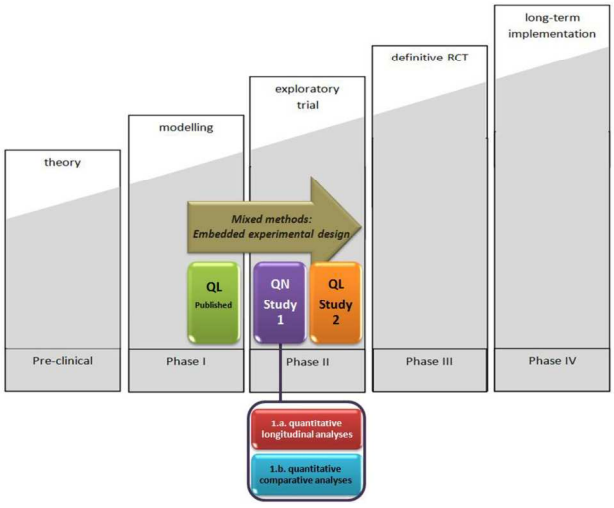
linked to the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) in clients recruited from primary health-care settings in four countries. Addiction 2012, **107**:957-966.

44 Fachini A, Aliane PP, Martinez EZ, Furtado EF: Efficacy of brief alcohol screening intervention for college students (BASICS): a meta-analysis of randomized controlled trials. Subst Abuse Treat Prev Policy 2012, **7**:40.

45 Laure P, Mangin G: Advising parents on physical activity for children between 0 and 5 years. J Sports Med Phys Fitness 2011, **51**:467-472.

46 O'Cathain A, Murphy E, Nicholl J: Integration and publications as indicators of 'yield' from mixed methods studies. Journal of Mixed Methods Research 2007, **1**:147-163.

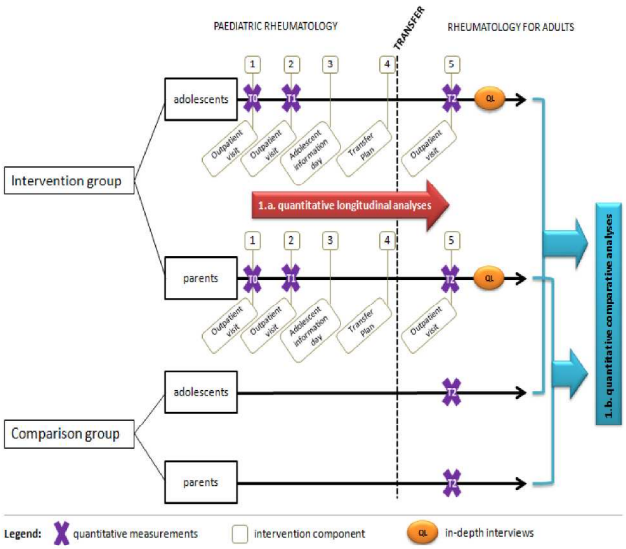
Figure 1. Development of a complex intervention based on the MRC framework and its evaluation using an embedded experimental design.



Legend: RCT, randomised controlled trial; QL, qualitative study; QN, quantitative study

210x297mm (300 x 300 DPI)

Figure 2. Flow chart illustrating the quantitative and qualitative studies used to assess the transition programme for adolescents with JIA. In Study 1, quantitative analyses were conducted based on a one-group pretest-posttest design with a non-equivalent posttest-only comparison group composed of adolescent-parent dyads. This was followed by Study 2, a qualitative study consisting of in-depth interviews.



QL, qualitative study, T0, at baseline; T1, at the second outpatient visit at paediatric rheumatology; T2, at the first outpatient rheumatology consultation in the adult care setting.

210x297mm (300 x 300 DPI)

BMJ open

Rationale, design and baseline data of a mixed-methods study examining the clinical impact of a brief transition programme for young people with juvenile idiopathic arthritis: The DON'T RETARD project

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Rationale, design and baseline data of a mixed-methods study examining the clinical impact of a brief transition programme for young people with juvenile idiopathic arthritis: The DON'T RETARD project

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Keywords: brief intervention, complex intervention, mixed methods, adolescents, juvenile idiopathic arthritis, transition, transfer, study protocol, effect sizes, clinical relevance

Word count: 5250

ABSTRACT

Objectives: To describe (1) the content of a transition programme for young people with juvenile idiopathic arthritis (JIA) designed as a brief intervention, (2) the rationale and design of a mixed-methods study evaluating the clinical impact of this transition programme, and (3) to provide baseline data of the intervention group.

Design:An 'embedded experimental' design is used for the evaluation of the transition programme. A 'one-group pretest-posttest, with a non-equivalent posttest-only comparison group design', is used to quantitatively evaluate the impact of the transition programme, applying both longitudinal and comparative analyses. Subsequently, experiences of adolescents and their parents who participated in the experimental group will be analysed qualitatively, using content analysis.

Setting: Subjects participating in the intervention, are recruited at a tertiary centre in Belgium. The comparison group subjects are recruited from one tertiary and three secondary care centres in Belgium.

Participants:The intervention group consist of 33 young people (25 females; 8 males), with a median age of 16 years. Main diagnoses are persistent or extended oligo-articular JIA (33%), poly-articular JIA (30%), enthesitis-related JIA (21%) or systemic arthritis (15%).

Intervention: The transition programme comprises 8 key components: (a)transition coordinator; (b)providing information and education; (c)availability by telephone; (d)information about and contact with adult care programme; (e)guidance of parents; (f)meeting with peers; (g)transfer plan; and (h)actual transfer to adult care.

Primary and secondary outcomes: The primary outcome is health status, as perceived by the adolescents. Secondary outcomes are health status, as perceived by the parents; medication adherence; illness-related knowledge; quality-of-life; fatigue; promotion of independence; support of autonomy; behavioural control; and psychological control.

Results: At baseline, the median score on psychosocial health was 69.2 (Q1=60.0;Q3=92.9) and 68.8 (Q1=56.3;Q3=89.1) on physical health. Rheumatic-specific health scores ranged from 62.5 to 100.0.

Conclusions: We present the rationale and design of a study intended to evaluate a transition programme for adolescents with JIA as a brief intervention.

ARTICLE SUMMARY

Article focus

- The content of a transition programme for young people with juvenile idiopathic arthritis (JIA), designed as a brief intervention, is described.
- The rationale and design is provided of an innovative mixed-methods approach for studying the clinical impact of a brief transition programme for young people with JIA.

Key messages

- The transition programme contains five subsequent steps: (1) an introduction of the transition coordinator at an outpatient visit at paediatric rheumatology; (2) a second face-to-face visit with the transition coordinator, taking place at paediatric rheumatology; (3) an adolescent-information day for the young people and their parents; (4) the development of an individualized transfer plan; and (5) the actual transfer of care to adult rheumatology .
- The transition programme comprises eight key components that are implemented in one or more of the five steps: (a) a transition coordinator; (b) providing information and education about JIA and medication management, health behaviour, dealing with fatigue, school, friends and any problems with medication adherence; (c) availability by telephone; (d) information about and contact with the adult rheumatology programme; (e) guidance of parents; (f) meeting with peers; (g) a transfer plan; and (h) the actual transfer to adult rheumatology programme.

Strengths and limitations

- A transition programme for adolescents with JIA is developed as a brief intervention, which may be less costly and time-consuming than the existing, more comprehensive transitional care interventions.
- The development and evaluation of this transition programme is guided by the initial Medical Research Council framework for complex interventions.
- The use of a sequential mixed-methods approach within the framework for complex intervention enables a full and integrative insight into the clinical impact of the key components of the transition programme.

BACKGROUND

Some decades ago, several paediatric disorders were associated with high, progressive morbidity and increased mortality. For many people suffering from these chronic diseases, medical, surgical, and technological advancements have resulted in improved disease management and increased life expectancy. Unlike in past decades, children with a progressive deteriorating disorder now often live into adulthood managing a chronic disease. Expert lifetime care should be provided for these patients in order to maximise their potential and lifelong functioning.

Young people with chronic conditions undergo different stages during their life. Two of the many important phenomena that occur include a developmental transition into adulthood, a phase during which young people evolve from being a dependent child to becoming an independent adult [1]. Second, their setting of care is transferring from a paediatric context to an adult-focused environment. Indeed, a timely and well-prepared transfer to adult-centred care is advocated [2,3]. This transfer is defined as an event or series of events through which adolescents and young adults with chronic physical and medical conditions move their care from a paediatric to an adult health care environment [4]. According to the recent literature, the paediatric-to-adult transfer of care should be preceded by a preparatory transitional phase. Transition is therefore defined as a process by which adolescents and young adults with chronic childhood illnesses are prepared to take charge of their lives and their health in adulthood [4].

In order to prepare young people to take on new responsibilities for their health and to anticipate the imminent transfer to adult care, transition programmes have been developed. The efficacy of these transition programmes has been evaluated to some extent in the last decade [5-11]. Using quasi-experimental designs, investigators have found some positive effects on quality of life [8], disease outcomes [5,7], number of admissions and the length of stay of readmissions [7], knowledge [8], work experience and career advice [8], and satisfaction with care [10]. The vast majority of the studies have been conducted in the United Kingdom [12], which may limit the generalizability of study findings to other health care systems due to e.g. differences in financing and reimbursement of health care expenditures. Therefore, research on the efficacy of transition programmes in other countries is warranted [12].

Existing transition programmes generally adopt a comprehensive approach, likely contributing to their positive effects. However, such extensive programmes are also perceived as being costly and time-consuming

to implement in day-to-day practice, although economic cost-effectiveness studies are currently lacking. This is illustrated by the finding that the most frequently reported barriers to the formal transition of patients are limited time and lack of funding for a transition coordinator [13,14]. Hence, the cost-effectiveness of transition programmes can be questioned. In times of economic crisis and limited funding, more sustainable alternatives must be explored. Brief evidence-based interventions have the potential to be cost-effective and therefore, are more likely to become implemented in clinical practice.

Transition programmes can be viewed as complex interventions. Complex interventions are built up from a number of components that may act both independently and interdependently [15]. This implies that the active ingredient of the intervention is unknown or difficult to specify. The British Medical Research Council (MRC) has provided a framework for developing and evaluating complex interventions. It entails a recursive process of development, feasibility and pilot testing, evaluation, and implementation of the complex intervention. Hence, before any formal efficacy assessment can be done, comprehensive preparatory work is conducted [15].

The original model of the MRC comprised an investigative sequence of five phases (Figure 1). First, theory and evidence are assessed in order to provisionally identify the steps and the key components of the intervention; this is termed the preclinical phase. Second, an understanding of the intervention and its possible effects is developed; this is termed phase I: modelling phase. Third, the feasibility of key components is assessed, and recruitment procedures and measurement of outcomes are tested; this is termed phase II: exploratory trial phase. Fourth, randomised controlled trials are conducted to evaluate the impact of the complex intervention. These trials require adequate power, adequate randomisation, appropriate outcome measures, and other standard features of well-designed trials; this is termed phase III: definitive randomised controlled trial. Finally, separate studies are conducted to establish the long-term and real-life effectiveness of the intervention; this is termed phase IV: long-term implementation [15,16].

*** INSERT FIGURE 1 ABOUT HERE***

In order to develop and test a transition programme involving a complex and brief intervention, we established the DON'T RETARD project (**D**evices for the **O**ptimizatio**N** of **TR**ansf**E**r and **T**ransition of **A**dolescents with **R**heumatic **D**isorders). This project was designed for young people with JIA (http://www.kuleuven.be/switch2/rheuma.html) and aimed to provide a proof of concept for a transition

programme devised as a brief intervention. We followed the original MRC framework for complex interventions. As part of the modelling phase, we conducted some preparatory studies that were previously published elsewhere [14,17]. The next step in the DON'T RETARD project is to evaluate the newly developed transition programme.

In the present article, we aim (1) to extensively describe the content of a transition programme for young people with JIA that was designed as a brief intervention, (2) to describe the rationale and design of a mixed methods study evaluating the clinical impact of this transition programme, and (3) to report the baseline characteristics of the intervention group on the respective primary and secondary outcomes. We hypothesize that the transition programme would improve the physical, psychosocial, and rheumatic-specific health of adolescents with JIA (primary outcome) [8,18]. Second, we hypothesize that the programme would improve medication adherence, illness-related knowledge, quality of life, threshold to fatigue, and parenting styles in patients who participate in the programme (secondary outcomes). To guarantee transparency and quality of describing this complex intervention, we used the recently published criteria for reporting the development and evaluation of complex interventions (CReDECI) [19]. The results on the clinical impact of the transition programme will be reported in a forthcoming publication.

Transition programme as a brief intervention

Our transition programme, which is designed to be a brief intervention, contains five steps. We will describe each step in the next section.

Intervention steps

(1) The first step occurs during a scheduled outpatient visit. The paediatric rheumatologist introduces the transition coordinator (TC) to the patient (aged 14-16 years) and his or her parents, and explains the transition programme. During this first face-to-face visit with the TC, the TC provides the patient and parents with a rheumatology management diary (i.e., a booklet including self-reporting symptoms scales, an overview of scheduled appointments, space for writing down questions, etc.), written information about JIA and medication management, and a DVD with instructions regarding appropriate exercising. The TC guides the young person and parent(s) through three patient information websites and presents a video about JIA and its consequences. Young people have the possibility to see both the rheumatologist and TC without the presence

of their parent(s). This independent visit is strongly encouraged. Furthermore, a second face-to-face visit with the TC is scheduled. The initial contact session lasts about 30-40 minutes. The TC is however continuously available by telephone to answer additional questions about the condition, therapy, transition process, health behaviour, and clinic appointments.

(2) The second step of the intervention occurs six months later, and consists of a second face-to-face visit with the TC, taking place at the paediatric outpatient clinic. During this visit, the TC discussed health behaviour, dealing with fatigue, school, friends, self-image, knowledge about the disease, and any difficulties with medication adherence. Participants receive a folder about the practical issues related to the adult rheumatology programme (e.g., contact information for the secretary and rheumatologists, organisational information for the outpatient clinic). This session lasts approximately 30 minutes.

(3) For the third step of the intervention, patients and their parents are invited to attend an adolescent information day. On this day, all patients who attended their second visit with the TC are invited to come together. The adolescent information day has two parallel programmes: one for the adolescents and one for the parents. The programme for adolescents begins with a brief introduction from the TC and the paediatric rheumatologist. Then the adolescents take part in a variety of activities: they meet with peers, take an orientation tour at the adult care facilities, meet with the rheumatologists, physiotherapist(s) and nurse specialist of the adult rheumatology team, and attend a workshop on psychological issues. These activities are followed by a cooking workshop, in which the adolescents prepare a complete meal for themselves and their parents. This allows them to talk with their peers in an informal setting.

The parallel programme for parents during this third step of the intervention is similar. A parent association representative is available so that the parents can express their concerns about their child's transition to adulthood. Activities include taking an orientation tour at the adult care facilities, meeting with the rheumatologists and nurse specialist of the adult rheumatology team, and attending a lecture on psychological issues inherent to the development of an adolescent with chronic disorders. After the formal programme, parents join their children for the dinner prepared by the children. The adolescent information day starts at 2PM and ends at 6.30PM, and takes place twice during the transition programme. For each information day, about 15 patient-parents dyads participate.

(4) For the fourth step, an individualized transfer plan is developed by the TC based on conversations with the young person and the parents. This plan is developed before transferring the patient from paediatric to adult rheumatology. This plan is based on the coding structure of the International Classification of Functioning, Disability and Health for Children and Youth (ICF-CY). By shifting the focus from cause to impact, the ICF-CY puts all health conditions on an equal footing, allowing them to be compared using a common metric. Furthermore, it takes into account the social aspects of a disability and does not view disability only as a 'medical' or 'biological' dysfunction. By including contextual factors, in which environmental factors are listed, the ICF-CY allows us to record the impact of an environment on a person's functioning. The transfer plan also is based on patient information collected by the paediatric rheumatologist, the TC, and other health care professionals that are consulted. The development of a transfer plan requires 30 minutes per patient.

(5) The fifth step is the actual transfer. Once the transfer plan is handed over to the adult rheumatologist, the patient is considered transferred to adult rheumatology care. The third face-to-face visit with the TC occurs during the patient's first outpatient visit to adult rheumatology care. This time, the rheumatologist of the adult rheumatology programme joins the session, along with the TC, patient, and parents. The TC focuses on health behaviour and medication information. During this outpatient visit, the patient is formally 'handed over' to the adult rheumatology providers. This session lasts about 20 minutes.

Intervention key components

The transition programme comprises 8key components that are implemented in one or more of the five steps: (a) a transition coordinator; (b) providing information and education about JIA and medication management, health behaviour, dealing with fatigue, school, friends and any problems with medication adherence; (c) availability by telephone; (d) information about and contact with the adult rheumatology programme; (e) guidance of parents; (f) meeting with peers; (g) a transfer plan; and (h) the actual transfer to adult rheumatology programme.

Altogether, the TC spends 60 to 90 minutes per patient, spread over a period of 1.5 years. This is in addition to the 40 man-hours (for the TC, paediatric rheumatologists, rheumatologists of the adult setting, physiotherapists, nurses of adult rheumatology, psychologists) incurred by the adolescent information day activities and the 20 hours needed for its preparation. Overall, it was estimated that the time and work

investment of one full-time equivalent is needed to implement this brief intervention for a caseload of 250 to 300 transitioning patients.

METHODS AND DESIGN

To develop and evaluate the transition programme, we apply a mixed-methods approach in which quantitative and qualitative studies are combined. More specifically, we use an 'embedded experimental design' [20]. This design is characterised by a set of qualitative studies that are conducted before and after a quantitative study. In our project, the embedded experimental design start with a qualitative study using in-depth interviews. The aim of these interviews is to better understand the transitional needs of young people with JIA. The information obtained in this qualitative study assisted us in developing the transition programme. Hence, this particular qualitative study corresponds to the modelling phase of the MRC framework (Figure 1, green box). The methods and results of this first qualitative study are reported in two related articles [21,22]. Therefore, we do not elaborate on this study in the present article. However, we did not solely rely on our qualitative findings to determine the content of the transition programme. Indeed, we built upon previously published studies on transitional care. [8,10,21,22,23]

Subsequently, we conduct a quasi-experimental study employing a 'one-group pretest-posttest, with a non-equivalent posttest-only comparison group' design (Figure 1, purple box; Figure 2). In this quantitative study, we investigate the clinical outcomes of patients with JIA and their parents who participate in the transition programme. In this respect, longitudinal analyses will be conducted to investigate changes over time (Figures 1, 2; indicated in red). Furthermore, comparative analyses will be performed by comparing the post-test scores of the intervention group with those of patients who received usual care (Figures 1, 2; indicated in blue). This quantitative study is called study 1 in figure 2. After this initial quantitative study, a second qualitative study using an explanatory design is conducted (study 2; indicated in orange), in which we elaborate on the experiences of adolescents with JIA and their parents regarding their participation in the transition programme. Both studies 1 and 2 are considered to correspond to the exploratory trial phase of the MRC framework (see above, Background section).

*** INSERT FIGURE 2 HERE ***

Study 1.a. Quantitative study: longitudinal analysis

Inclusion criteria

Potential subjects are recruited during a scheduled visit at the outpatient clinic, between February 1, 2009, and February 1, 2011. Dutch-speaking young people (14-16 years of age) with JIA, treated and in active follow-up at the Department of Paediatric Rheumatology of the University Hospitals Leuven, are invited to participate in the intervention trial. Patients are excluded if they have developmental or cognitive disabilities or if they do not have the physical capacities to complete the questionnaires used in the study. The convenience sample include all eligible subjects.

Informed consent

Patients are included after obtaining written informed consent from the parents and informed assent from the patients (all patients were minors at the time of inclusion). Anonymity is guaranteed, and patients and parents are assured that they could stop participating at any time.

Variables and measurements

All subjects are assessed three times: at baseline (T_0), at the second outpatient visit at paediatric rheumatology (T_1), and at the first outpatient rheumatology consultation in the adult care setting (T_2) (Figure 2). At each point in time we measure the primary and secondary outcomes, as well as disease parameters. The primary outcome of interest is the self-perceived health status of the patient, as measured with the Pediatric Quality of Life Inventory (PedsQL™). We use both the generic (PedsQL™ 4.0 Generic Core Scales) and the disease-specific module (PedsQL™ 3.0 Rheumatology Module) [24,25,26].

We measure the following set of secondary outcomes salient to the young people: the patients' health status as perceived by their parents, which is measured with the PedsQL™ 4.0 Generic Core Scales and PedsQL™ 3.0 Rheumatology Module [24,25,26]. Furthermore a set of patients self-reported secondary outcomes are assessed: medication adherence is measured using a Visual Analogue Scale (VAS) and the Swiss

HIV Cohort Study Adherence Questionnaire (SHCS-AQ) [27].; illness-related knowledge is measured using the modified Patient Knowledge Questionnaire (PKQ) [28]; and the level of global quality of life is measured using a Linear Analogue Scale (LAS) [29]. Fatigue is measured using the Multidimensional Fatigue Inventory (MFI-20) [30]. Finally in the group of parents, four dimensions of parenting are assessed using parent-reported instruments. Promotion of independence by parents is measured using the Promotion of Independence Scale [31] and support of autonomy is measured using the Autonomy Support Scale [32]. Furthermore, the level of behavioural control (i.e., parental monitoring of child's behaviour) is assessed using the Parental Regulation Scale [33]; while the aspect of psychological control (i.e., intrusive and manipulative form of controlling) is measured using the Psychological Control Scale [33]. These outcomes are all found to be suboptimal in patients with JIA [31,33-35,23]. We hypothesize that participation in the transition programme could improve medication adherence, illness-related knowledge, quality of life, fatigue, and parenting style.

With regard to disease parameters, we evaluate the clinical status of disease activity and clinical remission on/off medication according to the preliminary criteria of Wallace et al [36]. Furthermore, the functional status is assessed by the patient- and parent-reported Child Health Assessment Questionnaire (CHAQ-DI) [37-39]. Detailed information about the instruments used to assess the clinical impact of the transition programme are shown in Table 1.

Table 1 Overview of variables and measurements in the quantitative study

Variable	*Measurement*	Report	Items	Validity	Reliability	Responsiveness	Interpretation
Perceived health status	*Pediatric Quality of Life Inventory (PedsQL™ 4.0) Generic Core Scale*	PAT & PAR	23	construct validity confirmed [24],p. 333-335; [25], p. 809;[26], p. 719	• internal consistency confirmed • *adolescents' self-report:* total score, α=0.91-0.92; physical health, α=0.83-0.90; psychosocial health, α=0.87-0.89 • *parents' proxy report* total score, α=0.92-0.94; physical health, α=0.88; psychosocial health, α=0.89-0.91 [24], p. 335; [26], p. 718	responsiveness confirmed [26], p. 721-722	• scores from 0-100 • higher scores indicate a better perceived health status
	Pediatric Quality of Life Inventory (PedsQL™ 3.0) Rheumatology Module	PAT & PAR	22	construct validity confirmed [26], p. 720-721	• internal consistency confirmed • *adolescents' self-report* pain and hurt, α=0.90; daily activities, α=0.84; treatment, α= 0.77; worry, α=0.81; communication, α=0.79 • *parents' proxy report* : pain and hurt, α=0.90; daily activities, α=0.89; treatment, α= 0.77; worry, α=0.80; communication, α=0.91 [26], p. 718	responsiveness confirmed	• scores from 0-100 • higher scores indicate a better perceived rheumatologic health status
Medication adherence	*Visual Analogue Scale (VAS)*	PAT	1	NR	NR	NR	• scores from 0 to 100 • higher scores indicate better medication adherence
	SWISS HIV Cohort Study Adherence Questionnaire SHCS-AQ [27]	PAT	2	NR	NR	NR	medication adherent or non-adherent
Illness-related knowledge	*The Modified Patient Knowledge Questionnaire (PKQ)*	PAT	16	content validity confirmed [28]	NR	NR	• scores from 0 to 100 • higher scores indicate more illness-related knowledge
Global quality of life	*Linear Analogue Scale (LAS)*	PAT	1	content validity confirmed; construct validity confirmed [29], p.410	stability confirmed (ICC= 0.65; P <0.001) [29], p.410	responsiveness confirmed [29], p.410	scores from 0 (worst imaginable quality of life) to 100 (best imaginable quality of life)
Fatigue	*Multidimensional Fatigue Inventory*	PAT	20	construct validity	internal consistency	responsiveness	• scores from 4-20

	(MFI-20)			confirmed [30], p. 6	confirmed: general fatigue, α= 0.82; physical fatigue, α=0.81; reduced activity, α= 0.82; reduced motivation, α=0.71; mental fatigue, α=0.86 [30], p.4-6	confirmed [30], p.6	• higher scores indicate a higher degree of fatigue
Parenting dimensions		PAR					• scores from 1 to 5
a. promotion of independence	*Promotion Independence Scale (PI)*		8	NR	internal consistency confirmed (α=.76) [31], p.17	NR	a. higher scores indicate more promotion of independence
b. support of autonomy	*Autonomy Support Scale (PVF)*		7	NR	internal consistency confirmed (α=0.70-0.72) [32], p.1420	NR	b. higher scores indicate more support of autonomy
c. behavioural control	*Parental Regulation Scale (PRS-YSR revised to parent self-report)*		16	construct validity confirmed [33] p. 309	NR	NR	c. higher scores indicate more behavioural control
d. psychological control	*Psychological Control Scale (PCS-YSR revised to parent self-report)*		8	NR	internal consistency confirmed (α=0.69) [33], p.545-546	NR	d. higher scores indicate more psychological control
Absence of disease activity	[36]	MD	NA	NA	NA	NA	inactive disease or active disease
Two types of **clinical remission**: (a) Clinical remission on medication (b) Clinical remission off medication	[36]	MD	NA	NA	NA	NA	no clinical remission, clinical remission on medication, or clinical remission off medication
Functional status	*Childhood Health Assessment Questionnaire (CHAQ-DI)* [37,38]	PAT & PAR	30	construct validity confirmed [39] p. 980	NR	NR	scores from 0 (good functional status) to 3 (poor functional status)

Legend: ICC, intra-class correlation; MD, medical doctor; NA, not applicable; NR, not reported; PAT, patient; PAR, parent.

Data analysis

Since this study is an exploratory trial formulated according to the MRC framework of complex interventions, our aim is not to test the efficacy of the transition programme; rather it is a 'proof of concept' for the transition programme as a brief intervention. Therefore, we will not look for statistical significances but rather for clinical differences. Differences in patient- and parent-related outcomes, which are measured continuously starting at T_0 (before intervention) to T_2 (after intervention), will be expressed as effect sizes.

For continuous variables, an effect size for the Wilcoxon test will be calculated by using r= Z/□n, where Z is the normal approximation of the Wilcoxon test statistic. To appraise the magnitude of the effect sizes, we will use Cohen's r. An effect size of 0.1 to 0.3 is considered to be small, whereas effects sizes of 0.3 to 0.5 and ≥0.5 are considered to be medium and large, respectively [40].

Adherence will be dichotomised as adherent or non-adherent. For this outcome, odds ratios will be calculated to report the effect size. The odds ratio is the ratio of the odds of an outcome (e.g., being adherent) of one group (T_0, before intervention), to the odds of the outcome of the other group (T_2, after intervention). To appraise the magnitude of this odds ratio, we will use the following suggested cut-off values: 1.5 to 2.5 is a small effect; 2.5 to 4.3 is a medium effect; and 4.3 or higher is a large effect [41,42].

Nominal data will be expressed in frequencies and percentages. Medians and quartiles (Q1-Q3) will be calculated for continuous, non-normally distributed variables.

Baseline data

The intervention group consist of 33 young people, 25 of which are female and 8 male. Detailed information about JIA subtype, prescribed medication and remission status (on or off therapy) and the outcome data is shown in Table 2. At baseline, patients reported a median score on psychosocial health of 69.2 (Q1=60.0;Q3=92.9) and 68.8 (Q1=56.3;Q3=89.1) on physical health (PedsQoL). For rheumatic-specific health (PedsQoL), median scores ranged between 62.5 and 100, with worst scores for pain and hurt, and best scores for daily activities (PedsQoL). Furthermore, patients reported a median score for functional status (CHAQ-DI) of 0.3 (Q1=0.1;Q3=0.6) and 73.0 (68.5;90.0) on quality of life (LAS). Regarding fatigue, the scores on the motivation subscale was worst (7.0).

*** INSERT TABLE 2 HERE ***

Table 2. Demographic, clinical characteristics and baseline outcome data of young people with JIA included in the intervention group (n = 33)

Baseline data	
Sex ***n(%)***	
female	25 (75.8)
male	8 (24.2)
Subtype of JIA based on preliminary criteria of Wallace (2004) ***n(%)***	
persistent/extended oligo-articular JIA	11 (33.3)
Poly-articular JIA (RF-, RF+)	10 (30.3)
systemic arthritis	5 (15.1)
enthesitis-related arthritis	7 (21.2)
Age ***median, in years*** **(Q_1;Q_3)**	16 (15.2;17.1)
Presence of JIA disease activity ***n(%)***	10 (30.3)
Functional status (CHAQ-DI patient-report) ***median*** **(Q_1;Q_3)**	0.3 (0.1;0.6)
Presence of clinical remission on therapy ***n(%)***	17 (51.5)
Presence of clinical remission off therapy ***n(%)***	5 (15.2)
Prescribed medication ***n (%)***	23 (69.7)
NSAIDS	14 (60.9)
DMARDS	10 (43.5)
biologicals	6 (26.0)
glucocorticoids	4 (17.4)
Primary outcomes in young people ***median*** **(Q_1;Q_3)**	
Perceived health status (PedsQL ™ 4.0 Generic Core Scale)	
psychosocial health	69.2 (60.0;92.9)
physical health	68.8 (56.3;89.1)
Perceived health status (PedsQL ™ 3.0 Rheumatology Module)	
treatment	76.8 (71.4;100)
communication	75.0 (66.7;91.7)
pain and hurt	62.5 (50;93.8)
daily activities	100.0 (91.3;100.0)
worry	75.0 (66.7;91.7)

Secondary outcomes in young people *median (Q_1;Q_3)*	
Global quality of life (LAS)	73.0 (68.5;90.0)
Illness-related knowledge (PKQ)	31.3 (18.8;43.8)
Fatigue (MFI-20) *median (Q1;Q3)*	
motivation	7.0 (5.3;9.0)
mental fatigue	9.5 (7.0;12.8)
activity	9.5 (7.0;12.0)
physical fatigue	9.5 (6.3;13.8)
general fatigue	9.5 (7.3;13.0)
Presence of medication adherence (SHCS-AQ)	23 (69.7%)
Secondary outcomes in parents *median (Q_1;Q_3)*	
Dimensions of parenting style *median (Q1;Q3)*	
autonomy support (PVF)	3.8 (3.3;4.3)
promotion of independence (PI)	3.4 (3.1;1.8)
behavioural control (PRS-YSR revised to parent self-report)	4.0 (3.6:4.3)
psychological control (PCS-YSR revised to parent self-report)	2.0 (1.8;2.5)
Perceived health status (PedsQL ™ 4.0 Generic Core Scale, parent report)	
psychosocial health	85.0 (71.7;90.0)
physical health	73.0 (56.3;96.9)
Perceived health status (PedsQL ™ 3.0 Rheumatology Module, parent report)	
treatment	89.3 (71.4;97.3)
communication	75.0 (64.6;91.7)
pain and hurt	84.4 (50.0;95.3)
daily activities	100.0 (90.0;100.0)
worry	91.7 (66.7;100.0)

Ethical issues

The Institutional Review Board of the University Hospitals Leuven, Belgium, evaluated and approved the study protocol (B32220096363). This study is performed with ethical standards as described in the latest Declaration of Helsinki.

Study 1.b. Quantitative study: comparative analysis

Inclusion criteria

The intervention group's subject inclusion criteria are described above. The comparison group consist of 45 young people aged 17-23 years and their parents. These patients already have been transferred to the adult rheumatology programme without participating in a specific self-management/transition programme (i.e., they received the usual care). The comparison group subjects were recruited from four different health centres in Belgium. Patients who have developmental or cognitive disabilities or do not have the physical capacities to complete the questionnaires are excluded. Subjects of the comparison group (n=23) are included in the analyses if they can be matched with an intervention group subject in terms of disease activity, medication prescribed, JIA subtype, and gender.

Definition of usual care

For the purposes of this study, usual care is defined as the care that is currently provided in day-to-day clinical practice. Young people with JIA are usually followed up at the paediatric rheumatology programme until the age of 16 years. Around that age, the adolescent might have a first outpatient visit with the adult rheumatologist and the paediatric rheumatologist together. When the rheumatologists, the patient, and his or her parents agree that the patient is ready for transfer, an appointment for an adult rheumatology consultation is made. No transition coordinator or formal transition plan is provided to patients who receive usual care.

Informed consent from comparison group subjects

We use the same procedure described above that we use for the intervention group; the young people above 18 years of age provide their own written informed consent.

Variables and measurements

The variables and measurements used in these comparative analyses are the same as those used in the longitudinal analyses (see above). The measures for the comparison group are acquired during one of the scheduled outpatient visits at the adult care clinic (T_2) (see Figure 2).

Data analysis

As with the longitudinal analyses, we are interested in clinical differences instead of statistical differences. In the comparative analyses, the scores of the intervention and comparison groups at T_2 will be compared. The cut-off values used for the longitudinal analyses also will be used for the comparative analyses.

Ethical Issues

The Institutional Review Board of the University Hospitals Leuven, Belgium, evaluated and approved the study protocol (B32220096363). This study is performed with ethical standards as described in the latest Declaration of Helsinki.

Study 2. Qualitative study

Design

We use an explanatory design to expand the quantitative results with qualitative data [20]. To gain insight into the processes underpinning the transition programme, we conduct in-depth interviews with the young people and parents of the intervention group. The specific aims of this qualitative study are (i) to get an understanding of the reasons why particular effects are observed, and (ii) to evaluate the feasibility and the utility of the key components of the complex intervention from the patients' and parents' perspective.

Inclusion criteria

Those participating in the intervention group of this qualitative study (young people and their parents) are purposively sampled and invited to take part in the interviews. Sampling continues until no new themes emerge from the data (i.e., until data saturation is reached).

Informed consent

Subjects are included in the qualitative study after we obtained written informed consent for this particular study. If the patient is a minor, informed consent is obtained from the parents and informed assent from the patient. Anonymity is guaranteed, and patients and parents are assured that they can stop the interview at any time.

Data collection

We employ a predefined interview guide, previously adjusted by an expert panel consisting of one rheumatologist (RW), one paediatric rheumatologist (CW), and three researchers (KV, PM, DH) in the field of care transition. We ask young people and parents to answer open-ended questions about the TC, the adolescent information day, the time of transfer, and general experiences about the transition programme intervention.

Young people and parents are interviewed at home, each in a different room. Different strategies are used to assess the trustworthiness of the research: investigator triangulation, bracketing, and building a relationship of trust with the subject. Investigator triangulation requires that more than one investigator collect and analyse the raw data, so that the findings emerge through a consensus of a team of investigators [43]. Bracketing is the process of identifying and holding in abeyance preconceived beliefs and opinions about the phenomenon under study [43]. Bracketing makes the researcher aware of his or her beliefs and opinions about the phenomenon under study. To build a trusting relationship with each subject, we make certain that the interviewers are not part of the therapeutic team and that the interviews take place in a room where the subject feels comfortable. These methods ensure that researcher-related bias is minimised.

Data analysis

The interviews will be analysed by using qualitative content analysis, according to the method of Graneheim and Lundman [44]. Each interview is audio-taped and transcribed verbatim. The interviews will be read through several times to obtain a good understanding of the content. The first step in the analysis is the identification of meaning units (i.e., constellations of words or statements that are related to the same central meaning). The meaning units are labelled with codes, which allows the data to be considered in new and different ways. The

second step in the analysis involve sorting the codes into themes. A theme is an expression of the latent content of the text. For each theme, its content is expressed in two categories. To ensure the trustworthiness of the analysis, the authors discuss the classification of codes, categories, and themes until consensus is reached.

Ethical Issues

The Institutional Review Board of the University Hospitals Leuven, Belgium, evaluated and approved the study protocol. This study is performed with ethical standards as described in the latest Declaration of Helsinki.

DISCUSSION

Previous studies have shown that the implementation of a comprehensive transition programme can have positive effects on several patient outcomes. We developed a transition programme for young people with JIA as a brief intervention. Implementation of these transition programmes in clinical practice may be more feasible, because we estimated that one full-time equivalent of manpower of the entire team could take on a case load of 250 to 300 transitioning patients in this transition programme. In the present article, we describe the rationale and the design of a mixed-methods approach for evaluating the clinical impact of the transition programme for young people with JIA, and provide baseline data.

Our study is innovative in four aspects. First, to the best of our knowledge, this is the first evaluation of a transition programme structured as a brief intervention. Brief interventions are usually conducted in a one-on-one situation and take shorter periods of time [45]. Brief interventions are predominantly used in the prevention and treatment of substance abuse [46], although they have been employed in other settings as well [47,48]. Shorter time-consuming interventions are in demand, since the current trend is to implement transition programmes through optimal time use and cost-efficacy. However, as pointed out by McDonagh and colleagues, training of healthcare professionals will require additional resources [49].

Second, we designed this brief intervention as a complex intervention and used the MRC framework to perform our evaluation. It is argued that even simple interventions can be complex undertakings, mixing elements of content, intensity, duration, and setting [45]. Therefore, clearly specifying the steps and

components of a brief intervention is needed. For this purpose, we used the criteria for the development and evaluation of complex interventions (CReDECI) in health care [19].

Third, within this complex intervention framework, we employ a sequential mixed-methods approach, more specifically an embedded experimental design. This mixed-methods approach enable us to gain better insight into the clinical impact of the key components of this complex intervention. Using this approach, we integrate the findings of our different studies.

Mixed-methods studies differ from multi-methods studies in that the latter involve a set of mono-method studies that use different designs and that are conducted independently. Although integration is highly advocated, it is seldom done. The reason can be explained in two ways [50]. First, researchers do not always make use of the various ways of integrating findings in their reports. They report the results of qualitative and quantitative components separately, or they report the qualitative and quantitative findings together without considering how they are related to each other. This indicates that researchers may be unaware of some of the unique insights available in mixed-methods studies. In our study, we looked for convergence, divergence, and discrepancy in the findings of both methods. This process is defined as crystallisation [50]. Indeed, crystallisation of results and exploration of definite discrepancies can lead to further insights. Second, the integration of data and findings from different components of a mixed-methods study is not always apparent in the articles emerging from them. This indicates that any unique insights available from mixed-methods studies may not be disseminated in ways that are attributable to mixed-methods studies.

Lastly, the results of the quantitative longitudinal and comparative studies, and the qualitative studies will be separately published, and will provide pilot data on the feasibility and impact of a brief transition programme on patient- and parent-reported outcomes in young people with JIA. The data of this forthcoming study can be used to design a randomised controlled trial testing the effectiveness of the programme in a robust way. Indeed, the effect size obtained in the present study can be used for power and sample size calculations for future studies. Admittedly, since the present study is conducted in persons with JIA, the data are not necessarily generalizable to other patient populations.

Although we use an innovative embedded experimental design in the DON'T RETARD project, some limitations should be addressed. The assessment of the patient's transition readiness is no key component of our transition programme. Recently, an increasing number of studies investigated the use of assessment tools

such as the Transition Readiness Assessment Questionnaire (TRAQ) [51], an instrument aiming to evaluate a set of skills and developmental tasks that should be fulfilled in order to transfer patients to adult care.

Furthermore, our brief transition programme might look more as a transfer than a transition programme. The concept of a transition programme may imply more transitional care, starting in early adolescence, whereas this brief intervention starts in the pre-transfer period. Our brief intervention predominantly focuses on counselling and education, rather than skills training. Still, expecting all education needs to be met in the relatively short programme described is ambitious. Moreover, regular assessments of education needs should already be initiated in paediatric care.

In addition, we have to bear in mind that the list of outcomes we use to assess the clinical impact of our programme is non-exhaustive. Additional outcomes such as self-efficacy or the level of autonomy of patients might be of interest [52].

Finally, since patients who were included in the comparison group are already transferred to adult rheumatology, they are older as compared to the intervention group. In addition, transfer of patients occurred in general somewhat later in the era before our transition programme. This also contributes to the higher age of the comparison subjects. Hence, a matching procedure on age is not possible.

CONCLUSION

This methods paper presented the rationale and design of a study intended to evaluate a transition programme for young people with JIA as a brief intervention. Here, we used the Medical Research Council framework. The embedded experimental design offers the opportunity to obtain an overall picture of the clinical impact of the transition programme on young people with JIA. Furthermore, it also allows to get an overall picture of how these young people experience this programme. This study protocol is designed to evaluate our brief intervention. This evaluation enable us to get more insight into the active components of our transition programme. Examination of key clinical and methodological uncertainties in the exploratory trial phase could help researchers to set up definite randomised controlled trials and guide long-term implementation.

TRIAL STATUS

The trial started February 1, 2009, and ended on February 1, 2011.

ABBREVIATIONS

CHAQ-DI	Childhood Health Assessment Questionnaire
CReDECI	Criteria for Reporting the Development and Evaluation of Complex Interventions
ICC	Intra-class correlation
ICF	International Classification of Functioning
JIA	juvenile idiopathic arthritis
LAS	linear analogue scale
MD	medical doctor
MRC	Medical Research Council
MFI-20	Multidimensional Fatigue Index
NA	not applicable
NR	not reported
PAT	patient
PAR	parent
PCS-YSR	Psychological Control Scale – Youth Self Report
PedsQL	Paediatric Quality of Life Inventory
PI	Promotion Independence Scale
PKQ	Patient Knowledge Questionnaire
PRS-YSR	Parental Regulation Scale
PVF	Autonomy Support Scale
SHCS-AQ	Swiss HIV Cohort Study Adherence Questionnaire

TC	transition coordinator
VAS	visual analogue scale

AUTHORS CONTRIBUTIONS

PM, RW, CW, and DH were responsible for the concept and design of the study, and analysis and interpretation of the data. DH and KV collected the data. DH drafted the manuscript. PM, KV, EG, RW, and CW critically revised the manuscript for important intellectual content. All authors read and approved the final manuscript.

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COMPETING INTERESTS

The authors declare that they have no competing interests.

DATA SHARING

No additional unpublished data

Reference List

1 Meleis AI: *Transitions Theory: Middle range and situation-specific theories in nursing research and practice.* New York: Springer Publishing Company; 2010.

2 American Academy of Pediatrics, American Academy of Family Physicians, American College of Physicians-American Society of Internal Medicine.: A consensus statement on health care transitions for young adults with special health care needs**.** Pediatrics 2002, **110:**1304-1306.

3 American Academy of Pediatrics, American Academy of Family Physicians, American College of Physicians, Transitions Clinical Report Authoring Group, Cooley WC, Sagerman PJ: Supporting the health care transition from adolescence to adulthood in the medical home**.** Pediatrics 2011, **128:**182-200.

4 Knauth A, Verstappen A, Reiss J, Webb GD: Transition and transfer from pediatric to adult care of the young adult with complex congenital heart disease**.** Cardiol Clin 2006, **24:**619-29, vi.

5 Chaturvedi S, Jones CL, Walker RG, Sawyer SM: The transition of kidney transplant recipients: a work in progress**.** Pediatr Nephrol 2009, **24:**1055-1060.

6 Craig SL, Towns S, Bibby H: Moving on from paediatric to adult health care: an initial evaluation of a transition program for young people with cystic fibrosis**.** Int J Adolesc Med Health 2007, **19:**333-343.

7 Holmes-Walker DJ, Llewellyn AC, Farrell K: A transition care programme which improves diabetes control and reduces hospital admission rates in young adults with Type 1 diabetes aged 15-25 years**.** Diabet Med 2007, **24:**764-769.

8 McDonagh JE, Southwood TR, Shaw KL: The impact of a coordinated transitional care programme on adolescents with juvenile idiopathic arthritis**.** Rheumatology (Oxford) 2007, **46:**161-168.

9 Remorino R, Taylor J: Smoothing things over: the transition from pediatric to adult care for kidney transplant recipients**.** Prog Transplant 2006, **16:**303-308.

10 Shaw KL, Southwood TR, McDonagh JE: Development and preliminary validation of the 'Mind the Gap' scale to assess satisfaction with transitional health care among adolescents with juvenile idiopathic arthritis**.** Child Care Health Dev 2007, **33:**380-388.

11 Steinkamp G, Ullrich G, Muller C, Fabel H, von der HH: Transition of adult patients with cystic fibrosis from paediatric to adult care--the patients' perspective before and after start-up of an adult clinic**.** Eur J Med Res 2001, **6:**85-92.

12 Hilderson D, Westhovens R, Wouters C, Moons P: Transitional care for adolescents with rheumatic diseases: urgent need for more research**.** Child Care Health Dev 2008, **34:**401-402.

13 Betz CL: Transition of adolescents with special health care needs: review and analysis of the literature**.** Issues Compr Pediatr Nurs 2004, **27:**179-241.

14 Hilderson D, Moons P, Westhovens R, Wouters C: Attitudes of rheumatology practitioners toward transition and transfer from pediatric to adult healthcare**.** Rheumatol Int 2012, **32:**3887-3896.

15 Craig P, Dieppe P, Macintyre S, Michie S, Nazareth I, Petticrew M: Developing and evaluating complex interventions: the new Medical Research Council guidance**.** BMJ 2008, **337:**a1655.

16 Campbell M, Fitzpatrick R, Haines A, Kinmonth AL, Sandercock P, Spiegelhalter D, Tyrer P: Framework for design and evaluation of complex interventions to improve health**.** BMJ 2000, **321:**694-696.

17 Hilderson D, Corstjens F, Moons P, Wouters C, Westhovens R: Adolescents with juvenile idiopathic arthritis: who cares after the age of 16? Clin Exp Rheumatol 2010, **28:**790-797.

18 Chaudhry SR, Keaton M, Nasr SZ: Evaluation of a cystic fibrosis transition program from pediatric to adult care**.** Pediatr Pulmonol 2013, **48:** 658-65.

19 Mohler R, Bartoszek G, Kopke S, Meyer G: Proposed criteria for reporting the development and evaluation of complex interventions in healthcare (CReDECI): guideline development**.** Int J Nurs Stud 2012, **49:**40-46.

20 Creswell JW, Plano Clark VL: *Designing and conducting mixed methods research.* Thousand Oaks, California: Sage Publications; 2007.

21 Eyckmans L, Hilderson D, Westhovens R, Wouters C, Moons P: What does it mean to grow up with juvenile idiopathic arthritis? A qualitative study on the perspectives of patients**.** Clin Rheumatol 2011, **30:**459-465.

22 Hilderson D, Eyckmans L, Van der Elst K, Westhovens R, Wouters C, Moons P: Transfer from paediatric rheumatology to the adult rheumatology setting: experiences and expectations of young adults with juvenile idiopathic arthritis**.** Clin Rheumatol 2013, **32:** 575-83.

23 Ullrich G, Mattussek S, Dressler F, Thon A: How do adolescents with juvenile chronic arthritis consider their disease related knowledge, their unmet service needs, and the attractiveness of various services? Eur J Med Res 2002, 7:8-18.

24 Varni JW, Burwinkle TM, Seid M, Skarr D: The PedsQL 4.0 as a pediatric population health measure: feasibility, reliability, and validity. Ambul Pediatr 2003, 3:329-41.

25 Varni JW, Seid M, Kurtin PS: PedsQL 4.0: reliability and validity of the Pediatric Quality of Life Inventory version 4.0 generic core scales in healthy and patient populations. Med Care 2001, **39**:800-12.

26 Varni JW, Seid M, Smith KT, Burwinkle T, Brown J, Szer IS: The PedsQL in pediatric rheumatology: reliability, validity, and responsiveness of the Pediatric Quality of Life Inventory Generic Core Scales and Rheumatology Module**.** Arthritis Rheum 2002, **46:**714-725.

27 Deschamps AE, De GS, Vandamme AM, Bobbaers H, Peetermans WE, Van WE: Diagnostic value of different adherence measures using electronic monitoring and virologic failure as reference standards**.** AIDS Patient Care STDS 2008, **22:**735-743.

28 Hilderson D, Moons P, Wouters C, Westhovens R: Adolescents with juvenile idiopathic arthritis: what do they know about their condition? [abstract]. *Ann Rheum Dis* 2011, **70:**756

29 Moons P, Van Deyk K, De Bleser L, Marquet K, Raes E, De Geest S, Budts W: Quality of life and health status in adults with congenital heart disease: a direct comparison with healthy counterparts**.** Eur J Cardiovasc Prev Rehabil 2006, **13:**407-413.

30 Lin JM, Brimmer DJ, Maloney EM, Nyarko E, Belue R, Reeves WC: Further validation of the Multidimensional Fatigue Inventory in a US adult population sample**.** Popul Health Metr 2009, **7:**18.

31 Soenens B, Vansteenkiste M, Lens W, Luyckx K, Goossens L, Beyers W, Ryan RM: Conceptualizing parental autonomy support: adolescent perceptions of promotion of independence versus promotion of volitional functioning**.** Dev Psychol 2007, **43:**633-646.

32 Kins E, Beyers W, Soenens B, Vansteenkiste M: Patterns of home leaving and subjective well-being in emerging adulthood: the role of motivational processes and parental autonomy support**.** Dev Psychol 2009, **45:**1416-1429.

33 Soenens B, Vansteenkiste M, Luyckx K, Goossens L: Parenting and adolescent problem behavior: an integrated model with adolescent self-disclosure and perceived parental knowledge as intervening variables**.** Dev Psychol 2006, **42:**305-318.

34 Eddy L, Cruz M: The relationship between fatigue and quality of life in children with chronic health problems: a systematic review**.** J Spec Pediatr Nurs 2007, **12:**105-114.

35 Russo E, Trevisi E, Zulian F, Battaglia MA, Viel D, Facchin D, Chiusso A, Martinuzzi A: Psychological profile in children and adolescents with severe course Juvenile Idiopathic Arthritis**.** ScientificWorldJournal 2012, **2012:**841375.

36 Wallace CA, Ruperto N, Giannini E; Childhood Arthritis and Rheumatology Research Alliance; Pediatric Rheumatology International Trials Organization; Pediatric Rheumatology Collaborative Study Group: Preliminary criteria for clinical remission for select categories of juvenile idiopathic arthritis. J Rheumatol 2004, **31**:2290-4.

37 Ouwerkerk JW, van Pelt PA, Takken T, Helders PJ, Net J: Evaluating score distributions in the revised Dutch version of the Childhood Health Assessment Questionnaire**.** Pediatr Rheumatol Online J 2008, **6:**14.

38 Singh G, Athreya BH, Fries JF, Goldsmith DP: Measurement of health status in children with juvenile rheumatoid arthritis**.** Arthritis Rheum 1994, **37:**1761-1769.

39 Takken T, van den Eijkhof F, Hoijtink H, Helders PJ, van der Net J: Examining the psychometric characteristics of the Dutch childhood health assessment questionnaire: room for improvement? Rheumatol Int 2006, 26:979-83.

40 Cohen J: A power primer**.** Psychol Bull 1992, **112:**155-159.

41 Berben L, Sereika SM, Engberg S: Effect size estimation: methods and examples**.** Int J Nurs Stud 2012, **49:**1039-1047.

42 Cohen J: *Statistical power analysis for the behavioral sciences.* Lawrence Erlbaum Associates; 1988.

43 Polit DF, Beck CT: **Nursing Research: principles and methods.** In *Nursing Research: Principle and Methods*. 7 edition. Philadelphia: Lippincott Williams & Wilkins; 2004.

44 Graneheim UH, Lundman B: Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness**.** Nurse Educ Today 2004, **24:**105-112.

45 Babor TF: Avoiding the horrid and beastly sin of drunkenness: does dissuasion make a difference? J Consult Clin Psychol 1994, **62:**1127-1140.

46 Humeniuk R, Ali R, Babor T, Souza-Formigoni ML, de Lacerda RB, Ling W, McRee B, Newcombe D, Pal H, Poznyak V et al.: A randomized controlled trial of a brief intervention for illicit drugs linked to the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) in clients recruited from primary health-care settings in four countries**.** Addiction 2012, **107:**957-966.

47 Fachini A, Aliane PP, Martinez EZ, Furtado EF: Efficacy of brief alcohol screening intervention for college students (BASICS): a meta-analysis of randomized controlled trials**.** Subst Abuse Treat Prev Policy 2012, **7:**40.

48 Laure P, Mangin G: Advising parents on physical activity for children between 0 and 5 years**.** J Sports Med Phys Fitness 2011, **51:**467-472.

49 McDonagh JE, Southwood TR, Shaw KL; Bristish Paediatric Rheumatology Group: Unmet education and training needs of rheumatology health professionals in adolescent health and transitional care. Rheumatology (Oxford) 2004, **43**(6):737-43.

50 O'Cathain A, Murphy E, Nicholl J: Integration and publications as indicators of 'yield' from mixed methods studies**.** J Mix Methods Res 2007, **1:**147-163.

51 Sawicki GS, Lukens-Bull K, Yin X, Demars N, Huang IC, Livingood W, Reiss J, Wood D: Measuring the transition readiness of youth with special healthcare needs: validation of the TRAQ--TransitionReadiness Assessment Questionnaire. J Pediatr Psychol 2011 Mar, **36**:160-71.

52 van Staa A, van der Stege HA, Jedeloo S, Moll HA, Hilberink SR: Readiness to transfer to adult care of adolescents with chronic conditions: exploration of associated factors. J Adolesc Health 2011, **48**:295-302.

Rationale, design and baseline data of a mixed-methods study examining the clinical impact of a brief transition programme for young people with juvenile idiopathic arthritis: The DON'T RETARD project

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Keywords: brief intervention, complex intervention, mixed methods, adolescents, juvenile idiopathic arthritis, transition, transfer, study protocol, effect sizes, clinical relevance

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ABSTRACT

Objectives: To describe (1) the content of a transition programme for young peoplesters with juvenile idiopathic arthritis (JIA) designed as a brief intervention, (2) the rationale and design of a mixed-methods study the evaluating the clinical impact on of this transition programme using mixed methods,, and (3) to provide baseline data of the intervention group. Since we hypothesized that the transition programme improves the physical, psychosocial, and rheumatic-specific health of adolescents with JIA, baseline characteristics of young people who will participate in the transition programme are furthermore presented. We hypothesised that the transition programme improves the physical, psychosocial, and rheumatic-specific health of adolescents with JIA

Design:An 'embedded experimental' study design is will be used for the development and evaluation of the transition programme. 'study. Using a A 'one-group pretest-posttest, with a non-equivalent posttest-only comparison group design', is will be used we to quantitatively evaluated the impact of the transition programme, applying both longitudinal and comparative analyses. Subsequently, experiences of adolescents and their parents who participated in the experimental group will be were analysed qualitatively, using content analysis.

Setting: Subjects participating in the intervention, awere recruited at a tertiary centre in Belgium. The comparison group subjects awere recruited from one tertiary and three secondary care centres in Belgium.

Participants:The intervention group consisted of 33 young people (25 females; 8 males), with a median age of 15.9916 years. Main diagnoses awere persistent or extended oligo-articular JIA (33.3%), poly-articular JIA (30.3%), enthesitis-related JIA (21.2%) or systemic arthritis (15.1%).

Intervention: The transition programme comprises 8 key components: (a)transition coordinator; (b)providing information and education; (c)availability by telephone; (d)information about and contact with adult care programme; (e)guidance of parents; (f)meeting with peers; (g)transfer plan; and (h)actual transfer to adult care.

Primary and secondary outcomes: The primary outcome is s which will be assessed are was health status, as perceived by the adolescents. Secondary outcomes arewere will be health status, as perceived by the parents;

medication adherence; illness-related knowledge; quality-of-life; fatigue; promotion of independence; support of autonomy; behavioural control; and psychological control.

Results: At baseline, the median score on psychosocial health was 69.217 (Q1=60.00;Q3=92.92) and 68.875 (Q1=56.325;Q3=89.106) on physical health. Rheumatic-specific health scores ranged from 62.50 to 100.00.

Conclusions: We present the rationale and design of a study intended to evaluate a transition programme for adolescents with JIA as a brief intervention, and provided baseline data. .

ARTICLE SUMMARY

Article focus

- The content of ~~our~~ a transition programme for young people with juvenile idiopathic arthritis (JIA)~~,~~ designed as a brief intervention~~,~~ is described.
- The rationale and design is provided of an ~~new~~ innovative mixed-methods approach for studying the clinical impact of a brief ~~interventional~~ transition programme for young ~~persons~~ people with ~~juvenile idiopathic arthritis~~JIA ~~is provided~~.

Key messages

- The ~~developed~~ transition programme ~~developed~~ contains five subsequent steps: (1) an introduction of the transition coordinator at an outpatient visit at paediatric rheumatology; (2) a second face-to-face visit with the transition coordinator, ~~that takes~~taking place at paediatric rheumatology; (3) an adolescent-information day for the young people and their parents; (4) the development of an individualized transfer plan; and (5) the actual transfer of care to adult rheumatology ~~care~~.
- The transition programme comprises eight ~~essential~~ key components that are implemented in one or more of the five steps: (a) a transition coordinator; (b) providing information and education about JIA and medication management, health behaviour, dealing with fatigue, school, friends and any problems with medication adherence; (c) availability by telephone; (d) information about and contact with the adult rheumatology programme; (e) guidance of parents; (f) meeting with peers; (g) a transfer plan; and (h) the actual transfer to adult rheumatology programme.

Strengths and limitations

- A transition programme for adolescents with JIA is developed as a brief intervention, which may be ~~is~~ less costly and time-consuming than the existing, more comprehensive transitional care interventions.
- The development and evaluation of this transition programme~~s~~ is guided by the initial Medical Research Council framework for complex interventions.
- The ~~employment~~ use of a sequential mixed-methods approach within the~~is~~ framework for complex intervention ~~framework~~ enables ~~to gain~~a ~~better~~ full and integrative insight into the clinical impact of the key components of the transition programme.

BACKGROUND

Some decades ago, several paediatric disorders were associated with high, progressive morbidity and increased mortality. For many people suffering from these chronic diseases, medical, surgical, and technological advancements have resulted in improved disease management and increased life expectancy. Unlike in past decades, children with a progressive deteriorating disorder now often live into adulthood managing a chronic disease. Expert lifetime care should be provided for these patients in order to maximise their potential and lifelong functioning ~~and potential of these people~~.

~~Adolescents~~ Young people with chronic conditions undergo different stages during their life~~, wherein~~ Two of the many important phenomena that~~which~~ occur include ~~at least two important phenomena occur. First, their~~a developmental transition ~~developmentally~~ into adulthood, a phase during which young people evolve~~ing~~ from being a dependent child to becoming an independent adult [1]. Second, their setting of ~~health~~ care is transferr~~ings~~ from a paediatric context to an adult-focused environment ~~one~~. Indeed, a timely and well-prepared transfer to adult-centred care is advocated [2,3]. This transfer is defined ~~specifically~~ as an event or series of events through which adolescents and young adults with chronic physical and medical conditions move their care from a paediatric to an adult health care environment [4]. According to the recent literature, the paediatric-to-adult ~~care~~ transfer of care should be preceded by a preparatory transitional phase. Transition is therefore defined as~~:~~ a process by which adolescents and young adults with chronic childhood illnesses are prepared to take charge of their lives and their health in adulthood [4].

In order to prepare young people~~adolescents~~ to take on new responsibilities for their health and to anticipate the imminent transfer to adult care, transition programmes have been developed. The efficacy of these transition programmes has~~ve~~ been evaluated to some extent in the last decade [5-11]. Using quasi-experimental designs, investigators have found some positive effects on quality of life [8], disease outcomes [5,7], number of admissions and the length of stay of readmissions [7], knowledge [8], work experience and career advice [8], and satisfaction with care [10]. The vast majority of the studies have been conducted in the United Kingdom [12], which may limit the generali~~z~~sability of study findings to other health care systems due to e.g. differences in financing and reimbursement of health care expenditures~~)~~. Therefore, research on the efficacy of transition programmes in other countries is warranted [12].

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Existing transition programmes generally adopt a comprehensive approach, likely contributing to their positive effects. However, ~~they~~ such extensive programmes are also perceived as being costly and time-consuming to implement in day-to-day practice, although economic cost-effectiveness studies are currently lacking. This is illustrated by the finding that the most frequently ~~perceived~~ reported barriers to the formal transition of patients are limited time and lack of funding for a transition coordinator [13,14]. Hence, the cost-effectiveness of transition programmes can be questioned. In times of economic crisis and limited funding, more sustainable alternatives must be explored. Brief evidence-based interventions have the potential to be cost-effective. ~~The cost-effectiveness of these brief evidence-based interventions~~and ~~,~~ therefore, are more likely to become implemented~~would~~ in ~~increase the possibility of their being implemented in~~ clinical practice.

Transition programmes can be viewed as complex interventions. Complex interventions are built up from a number of components that may act both independently and interdependently [15]. This implies that the active ingredient of the intervention is unknown or difficult to specify. The British Medical Research Council (MRC) has provided a framework for developing and evaluating complex interventions. It entails a recursive process of development, feasibility and pilot testing, evaluation, and implementation of the complex intervention. Hence, before any formal efficacy assessment can be done, comprehensive preparatory work is conducted [15].

The original model of the MRC comprised an investigative sequence of five phases (Figure 1). First, theory and evidence are assessed in order to provisionally identify the steps and the key components of the intervention; this is termed the preclinical phase. Second, an understanding of the intervention and its possible effects is developed; this is termed phase I: modelling phase. Third, the feasibility of key components ~~are~~ is assessed, and recruitment procedures and measurement of outcomes are tested; this is termed phase II: exploratory trial phase. Fourth, randomised controlled trials are conducted to evaluate the impact of the complex intervention. These trials require adequate power, adequate randomisation, appropriate outcome measures, and other standard features of well-designed trials; this is termed phase III: definitive randomised controlled trial. Finally, separate studies are conducted to establish the long-term and real-life effectiveness of the intervention; this is termed phase IV: long-term implementation [15,16].

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In order to develop and test a transition programme involving a complex and brief intervention, we established the DON'T RETARD project (**D**evices for the **O**ptimizatio**N** of **TR**ansf**E**r and **T**ransition of **A**dolescents with **R**heumatic **D**isorders). This projectgramme was designed for young people with ~~juvenile idiopathic arthritis (~~JIA~~)~~ (http://www.kuleuven.be/switch2/rheuma.html) and aimed ~~for~~ to provide a~~ing~~ proof of concept for a transition programme devised as a brief intervention. We followed the original MRC framework for complex interventions. As part of the modelling phase, we conducted some preparatory studies that were previously published elsewhere [14,17]. The next step in the DON'T RETARD project is to evaluate the newly developed transition programme.

In the present ~~article~~methods paper, we aim ~~describe~~ (1) to extensively describe the content of ~~our~~ a transition programme for young people with JIA that~~which~~ was designed as a brief intervention, ~~and~~ (2) to describe the rationale and design of a mixed methods study ~~the~~ evaluati~~o~~ng the clinical impact of this transition programme~~using a mixed methods approach, aiming to test. tThe following~~ , and (3) to report the baseline characteristics of the intervention group on the respective primary and secondary outcomes. We hypothesize~~s~~d ~~were tested~~ that~~:~~ ~~T~~the transition programme would improve~~s~~ the physical, psychosocial, and rheumatic-specific health of adolescents with JIA (primary outcome) [8,18]. Seconda~~ry~~, ~~W~~we ~~also~~ hypothesize~~s~~d that the programme would improve~~s~~ medication adherence, illness-related knowledge, quality of life, threshold to fatigue, and parenting style~~s~~ in patients who participate~~d~~ in the programme (secondary outcomes). To guarantee transparency and quality of ~~reporting~~ describing ~~our~~ this complex intervention, we used the recently published criteria for reporting the development and evaluation of complex interventions (CReDECI) [19]. The results on the clinical impact of the transition programme will be reported in a forthcoming publication.

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Transition programme as a brief intervention

Our transition programme, which is designed to be a brief intervention, contains five steps. We will describe ~~in turn~~ each step in the next section.

Intervention steps

(1) The first step occurs during a scheduled outpatient visit. The paediatric rheumatologist introduces the transition coordinator (TC) to the patient (aged 14-16 years) and his or her parents, and explains the

transition programme. During this first face-to-face visit with the TC, the TC provides the patient and parents with a rheumatology management diary (i.e., a booklet including self-reporting symptoms scales, an overview of scheduled appointments, space for writing down questions, etc.), written information about JIA and medication management, and a DVD with instructions regarding appropriate exercising. The TC guides the ~~adolescent~~ young person and parent(s) through three patient information websites and presents a video about JIA and its consequences. Young people have the possibility to see both the rheumatologist and TC without the presence of their parent(s). T~~,~~ ~~t~~his independent visit is strongly encouraged. ~~Also~~Furthermore, ~~the~~ a second face-to-face visit with the TC is scheduled. The initial contact session lasts about 30-40 minutes. The TC is however continuously available by telephone to answer additional questions about the condition, therapy, transition process, health behaviour, and clinic appointments.

(2) The second step of the intervention occurs six months later, and~~. This~~ consists of a second face-to-face visit with the TC, ~~that~~ takinges place at the paediatric outpatient clinic. During this visit, the TC ~~focuses~~ discussed~~on~~ health behaviour, dealing with fatigue, school, friends, self-image, knowledge about the disease, and any difficulties with medication adherence. Participants receive a folder about the practical issues related to the adult rheumatology programme (e.g., contact information for the secretary and rheumatologists, organisational information for the outpatient clinic~~, etc.~~). This session ~~lasts~~ lasts approximately ~~20~~ 30 minutes.

(3) For the third step of the intervention, patients and their parents are invited to attend an adolescent information day. On this day, all patients who attended their second visit with the TC are invited to come together. The adolescent information day has two parallel programmes: one for the adolescents and one for the parents. The programme for adolescents begins with a brief introduction from the TC and the paediatric rheumatologist. Then the adolescents take part in a variety of activities: t~~T~~hey meet with peers, take an orientation tour ~~of~~ at the adult care facilities, meet with the rheumatologists, ~~-~~ physiotherapist(s) and nurse specialist of the adult rheumatology team, ~~meet the physiotherapist(s) of the adult rheumatology team,~~ and attend a workshop on psychological issues. These activities are followed by a cooking workshop, in which the adolescents prepare a complete meal for themselves and their parents. This allows them to talk with their peers in an informal setting.

The parallel programme for parents during this third step of the intervention is similar. A parent association representative is available so that the parents can~~ould~~ express their concerns about their child's

~~entering~~ transition to adulthood. Activities include taking an orientation tour ~~of~~ at the adult care facilities, meeting with the rheumatologists and nurse specialist of the adult rheumatology team, and attending a lecture on psychological issues inherent to the development of an adolescent with chronic disorders. After the formal programme, parents join their children for the dinner prepared by the children. The adolescent information day starts at ~~14.00 h~~2PM and ends at ~~18.30 h~~6.30PM, and takes place twice during the transition programme. For each information day, about 15 patient-parents dyads participate.

(4) For the fourth step, an individualized transfer plan is developed by the TC ~~develops an individual patient transfer plan for each patient~~ based on conversations with the young person and the parents. This plan is developed ~~occurs~~ before transferring the patient from paediatric ~~rheumatology~~ to adult rheumatology. ~~The transfer~~This plan is based on the coding structure of the International Classification of Functioning, Disability and Health for Children and Youth (ICF-CY). By shifting the focus from cause to impact, the ICF-CY puts all health conditions on an equal footing, allowing them to be compared using a common metric. Furthermore, it takes into account the social aspects of a disability and does not view disability only as a 'medical' or 'biological' dysfunction. By including contextual factors, in which environmental factors are listed, the ICF-CY allows us to record the impact of an environment on a person's functioning. The transfer plan also is based on patient information collected by the paediatric rheumatologist, the TC, and other health care professionals that are consulted. The development of a transfer plan requires 30 minutes per patient.

(5) The fifth step is the actual transfer. Once the transfer plan is handed over to the adult rheumatologist, the patient is considered transferred to adult rheumatology care. The third face-to-face visit with the TC occurs during the patient's first outpatient visit to adult rheumatology care. This time, the rheumatologist of the adult rheumatology programme joins the session, along with the TC, patient, and parents. The TC focuses on health behaviour and medication information. During this outpatient visit, the patient is formally 'handed over' to the adult rheumatology providers. This session lasts about 20 minutes.

Intervention key components

The transition programme comprises ~~-~~ 8 ~~essential~~ key components that are implemented in one or more of the five steps: (a) a transition coordinator; (b) providing information and education about JIA and medication management, health behaviour, dealing with fatigue, school, friends and any problems with medication adherence; (c) availability by telephone; (d) information about and contact with the adult

rheumatology programme; (e) guidance of parents; (f) meeting with peers; (g) a transfer plan; and (h) the actual transfer to adult rheumatology programme.

Altogether, the TC spends 60 to 90 minutes per patient, spread over a period of 1.5 years. This is in addition to the 40 man-hours (for the TC, paediatric rheumatologists, rheumatologists of the adult setting, physiotherapists, nurses of adult rheumatology, psychologists) incurred by the adolescent information day activities and the 20 hours needed for its preparation. Overall, it was estimated~~for this brief intervention,~~ that the time and work investment of one full-time equivalent is needed to implement this brief intervention ~~from the different disciplines involved in rheumatologic care could take on~~for a caseload of 250 to 300 transitioning patients.

METHODS AND DESIGN

To develop and evaluate the transition programme, we applyied a mixed-methods approach in which quantitative and qualitative studies are combined. More specifically, we used an 'embedded experimental design' [20]. This design is characterised by a set of qualitative studies thatwhich awere conducted before and after a quantitative study. In our project, the embedded experimental design started with a qualitative study using in-depth interviews. The aim of these interviews iwas to better understand the transitional needs of young people with JIA. The information obtained in this qualitative study assisted us in developing the transition programme. Hence, this particular qualitative study corresponds to the modelling phase of the MRC framework (Figure 1, green box). The methods and results of this first qualitative study are reported in two related articles [21,22]. Therefore, we do not elaborate on this study in the present article. However, we did not solelyonly rely on our qualitative findings to determine the content of the transition programme. IndeedAdditionally, we built upon previously published studies on transitional carethis topic ~~to design our intervention~~. [8,10,21,22,23]

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Subsequently, we conducted a quasi-experimental study employing a 'one-group pretest-posttest, with a non-equivalent posttest-only comparison group' design' (Figure 1, purple box; Figure 2). In this quantitative study, we investigated the clinical outcomes of patients with JIA and their parents who participated in the transition programme. In this respect, longitudinal analyses will bewere conducted to

investigate changes over time (Figures 1, 2; indicated in red). Furthermore, comparative analyses will be ~~were~~ performed by comparing the ~~posttest~~post-test scores of the intervention group with those of patients who received usual care (Figures 1, 2; indicated in blue). This quantitative study ~~(which included longitudinal and comparative analyses)~~ is called study 1 in figure 2. After thise initial quantitative study, a second qualitative study using an explanatory design ~~wa~~s conducted (study 2; indicated in orange), in which ~~. In study 2,~~ we elaborate~~d~~ on the experiences of adolescents with JIA and their parents ~~on~~ regarding their participation in the transition programme. Both studies 1 and 2 are considered to correspond to the exploratory trial phase of the MRC framework (see above, Background section).

*** INSERT FIGURE 2 HERE ***

Study 1.a. Quantitative study: longitudinal analysis

Inclusion criteria

Potential subjects ~~we~~re recruited during a scheduled visit at the outpatient clinic, between February 1, 2009, and February 1, 2011. Dutch-speaking ~~adolescents~~ young people (14-16 years of age) with JIA, treated and in active follow-up at the Department of Paediatric Rheumatology of the University Hospitals ~~of~~ Leuven, ~~we~~re invited to participate in the intervention trial. Patients ~~we~~re excluded if they ~~were~~ have~~d~~ ~~a~~ developmental or cognitive disabilitie~~s~~ ~~mentally retarded~~ or if they d~~id~~ not have the physical capacities to complete the questionnaires used in the study. The convenience sample include~~d~~ all eligible subjects.

Informed consent

Patients ~~we~~re included after obtaining written informed consent from the parents and informed assent from the patients (all patients were minors at the time of inclusion). Anonymity ~~wa~~s guaranteed, and patients and parents ~~we~~re assured that they could stop participating at any time.

Variables and measurements

All subjects awere assessed three times: at baseline (T_0), at the second outpatient visit at paediatric rheumatology (T_1), and at the first outpatient rheumatology consultation in the adult care setting (T_2) (Figure 2). We At each point in time we measured the primary outcome,and secondary outcomes, as well as and disease parameters. The primary outcome of interest iwas the self-perceived health status of the adolescentspatient, as measured with the Pediatric Quality of Life Inventory (PedsQL™). We used both the generic (PedsQL™ 4.0 Generic Core Scales) and the disease-specific module (PedsQL™ 3.0 Rheumatology Module) [24,25,263,24].

We measured the following set of secondary outcomes salient to the adolescentsyoung people: the adolescents' patients' health status as perceived by their parents, which iwas measured with the PedsQL™ 4.0 Generic Core Scales and PedsQL™ 3.0 Rheumatology Module [24,25,263,24]. ;Furthermore a set of patients self-reported secondary outcomes awere assessed:. mMedication adherence is, which was measured using a Visual Analogue Scale (VAS) and the Swiss HIV Cohort Study Adherence Questionnaire (SHCS-AQ) [275].; iIllness-related knowledge, iwhich was measured using the modified Patient Knowledge Questionnaire (PKQ) [286]; and; the level of global quality of life, iwhich was measured using a Linear Analogue Scale (LAS) [297]. ; and fFatigue, which iwas measured using the Multidimensional Fatigue Inventory (MFI-20) [3028]. Finally in the group of For parents, four dimensions of parenting awere assessed using parent-reported instruments. the secondary outcomes that we measured were as follows: pPromotion of independence by parents , which iwas measured using the Promotion of Independence Scale [3129]; and support of autonomy, which iwas measured using the Autonomy Support Scale [329]. Furthermore,; the level of behavioural control (i.e., parental monitoring of child's behaviour), which iwas measured assessed using the Parental Regulation Scale [331]; and while the aspect of psychological control (i.e., intrusive and manipulative form of controlling), which iwas measured using the Psychological Control Scale [331]. These outcomes are awere all found to be suboptimal in patients with JIA [3129,33-35,231-34]. We hypothesizsed that participation in the transition programme could improve medication adherence, illness-related knowledge, quality of life, fatigue, and parenting style.

With regard to disease parameters, we evaluated the clinical presence/absencestatus of disease activity and; clinical remission on/off medication; clinical remission off medication according to the preliminary criteria of Wallace et al [36];. Furthermore, and the functional status, iwas assessed by the patient-reported and parent-reported Child Health Assessment Questionnaire (CHAQ-DI) [375,36-39]. Detailed information

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about the ~~assessments and~~ instruments used to assess the clinical impact of ~~in this study~~the transition programme ~~is~~ are shown in Table 1.

Table 1 Overview of variables and measurements in the quantitative study

Variable	*Measurement*	Report	Items	Validity	Reliability	Responsiveness	Interpretation
Perceived health status	*Pediatric Quality of Life Inventory (PedsQL™ 4.0) Generic Core Scale*	PAT & PAR	23	construct validity confirmed [24]~~(Varni et al., 2003)~~, p. 333-335; [25] ~~(Varni et al., 2001)~~, p. 809;-[26]~~(Varni et al., 2002b)~~, p. 719	• internal consistency confirmed • *adolescents' self-report:* total score, α=0.91-0.92; physical health, α=0.83-0.90; psychosocial health, α=0.87-0.89 • *parents' proxy report* total score, α=0.92-0.94; physical health, α=0.88; psychosocial health, α=0.89-0.91- [24]~~(Varni et al., 2003)~~, p. 335;- [26]~~(Varni et al., 2002b)~~, p. 718	responsiveness confirmed [26]~~(Varni et al., 2002b)~~, p. 721-722	• scores from 0-100 • higher scores indicate a better perceived health status
	Pediatric Quality of Life Inventory (PedsQL™ 3.0) Rheumatology Module	PAT & PAR	22	construct validity confirmed- [26]~~(Varni et al., 2002b)~~, p. 720-721	• internal consistency confirmed • *adolescents' self-report* pain and hurt, α=0.90; daily activities, α=0.84; treatment, α= 0.77; worry, α=0.81; communication, α=0.79 • *parents' proxy report* : pain and hurt, α=0.90; daily activities, α=0.89; treatment, α= 0.77; worry, α=0.80; communication, α=0.91 [26]~~(Varni et al., 2002b)~~, p. 718	responsiveness confirmed	• scores from 0-100 • higher scores indicate a better perceived rheumatologic health status
Medication adherence	*Visual Analogue Scale (VAS)*	PAT	1	NR	NR	NR	• scores from 0 to 100 • higher scores indicate better medication adherence
	SWISS HIV Cohort Study Adherence Questionnaire SHCS-AQ [27]~~(Deschamps et al., 2008)~~	PAT	~~23~~	NR	NR	NR	medication adherent or non-adherent
Illness-related knowledge	*The Modified Patient Knowledge Questionnaire (PKQ)*	PAT	16	content validity confirmed ~~(Hilderson et al., 2011)~~[28]	NR	NR	• scores from 0 to 100 • higher scores indicate more illness-related knowledge
Global quality of life	*Linear Analogue Scale (LAS)*	PAT	1	content validity confirmed; construct	stability confirmed (ICC= 0.65; P <0.001) [29~~(Moons et~~	responsiveness confirmed	scores from 0 (worst imaginable quality of life) to

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				validity confirmed ~~(Moons et al., 2006)~~[29], p.410	~~al., 2006)~~], p.410	[29]~~(Moons et al., 2006)~~, p.410	100 (best imaginable quality of life)
Fatigue	*Multidimensional Fatigue Inventory (MFI-20)*	PAT	20	construct validity confirmed [30]~~(Lin et al., 2009)~~], p. 6	internal consistency confirmed: general fatigue, α= 0.82; physical fatigue, α=0.81; reduced activity, α= 0.82; reduced motivation, α=0.71; mental fatigue, α=0.86 [30]~~(Lin et al., 2009)~~, p.4-6	responsiveness confirmed [30]~~(Lin et al., 2009)~~, p.6	• scores from 4-20 • higher scores indicate a higher degree of fatigue
Parenting dimensions		PAR					• scores from 1 to 5
a. promotion of independence	*Promotion Independence Scale (PI)*		8	NR	internal consistency confirmed (α=.76)	NR	a. higher scores indicate more promotion of independence
b. support of autonomy	*Autonomy Support Scale (PVF)*		7	NR	[31]~~(Soenens et al., 2007)~~, p.17	NR	b. higher scores indicate more support of autonomy
c. behavioural control	*Parental Regulation Scale (PRS-YSR revised to parent self-report)*		16	construct validity confirmed	internal consistency confirmed (α=0.70-0.72) ~~(Kins et al., 2009)~~[32], p.1420	NR	c. higher scores indicate more behavioural control
d. psychological control	*Psychological Control Scale (PCS-YSR revised to parent self-report)*		8	[33]~~(Soenens et al., 2006)~~, p. 309 NR	NR internal consistency confirmed (α=0.69) [33]~~(Soenens et al., 2006)~~, p.545-546	NR	d. higher scores indicate more psychological control
Absence of disease activity	~~(Wallace et al., 2004)~~[36]	MD	NA	NA	NA	NA	inactive disease or active disease
Two types of **clinical remission**: (a) Clinical remission on medication (b) Clinical remission off medication	[36]~~(Wallace et al., 2004)~~	MD	NA	NA	NA	NA	no clinical remission, clinical remission on medication, or clinical remission off medication
Functional status	*Childhood Health Assessment Questionnaire (CHAQ-DI)* [37,38] ~~(Ouwerkerk et al., 2008; Singh et al., 1994)~~	PAT & PAR	30	construct validity confirmed [39]~~(Takken et al., 2006)~~, p. 980	NR	NR	scores from 0 (good functional status) to 3 (poor functional status)

Legend: ICC, intra-class correlation; MD, medical doctor; NA, not applicable; NR, not reported; PAT, patient; PAR, parent.

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Data analysis

Since this study iwas an exploratory trial formulated according to the MRC framework of complex interventions, our aim iwas not to test the efficacy of the transition programme; rather it iwas a 'proof of concept' for the transition programme ~~concept~~ as a brief intervention. Therefore, we willdid not look for statistical significances but rather for clinical differences. Differences in patient- and parent-related outcomes, which awere measured continuously starting at T_0 (before intervention) to T_2 (after intervention), will be ~~were~~ expressed as effect sizes.

For continuous variables, an effect size for the Wilcoxon test will be ~~was~~ calculated by using r= Z/□n, where Z is the normal approximation of the Wilcoxon test statistic. To appraise the magnitude of the effect sizes, we will used Cohen's r. An effect size of 0.1 to 0.3 is considered to be small, whereas effects sizes of 0.3 to 0.5 and ≥0.5 ~~or higher~~ are considered to be medium and large, respectively [4037].

Adherence will be ~~was~~ dichotomised as adherent or non-adherent. For this outcome, odds ratios will be ~~were~~ calculated to report the effect size. The odds ratio is the ratio of the odds of an outcome (e.g., being adherent) of one group (T_0, before intervention), to the odds of the outcome of the other group (T_2, after intervention). To appraise the magnitude of this odds ratio, we will used the following suggested cut-off values ~~for the odds ratios~~: 1.5 to 2.5 is a small effect; 2.5 to 4.3 is a medium effect; and 4.3 or higher is a large effect [4138,4239].

Nominal data will be ~~were~~ expressed in frequencies and percentages. Medians and quartiles (Q1-Q3) will be ~~were~~ calculated for continuous, non-normally distributed variables.

Baseline data

The ~~sample~~ intervention group consisted of 33 ~~adolescents~~young people, 25 of which awere female and 8 male. Detailed information about JIA subtype, prescribed medication ~~prescription~~ and remission status (on or off therapy) and the outcome data is shown in Table 2. At baseline, patients reported a median score on psychosocial health of 69.2 (Q1=60.0;Q3=92.9) and 68.8 (Q1=56.3;Q3=89.1) on physical health (PedsQoL). For rheumatic-specific health (PedsQoL), median scores ranged between 62.5 and 100, with worst scores for pain and hurt, and best scores for daily activities (PedsQoL). Furthermore, patients reported a median score for

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functional status (CHAQ-DI) of 0.3 (Q1=0.1;Q3=0.6) and 73.0 (68.5;90.0) on quality of life (LAS). Regarding fatigue, the scores on ~~was~~ the motivation subscale was ~~rated~~ worst (7.0).

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*** INSERT TABLE 2 HERE ***

Table 2. Demographic, clinical characteristics and baseline outcome data of ~~33 adolescents~~ young people with JIA ~~at baseline~~included in the intervention group (n = 33)

Baseline data	~~(n = 33)~~
~~Gender~~Sex *n(%)*	
female	25 (75.8%)
male	8 (24.2%)
Subtype of JIA based on preliminary criteria of Wallace (2004) *n(%)*	
persistent/extended oligo-articular~~.~~ JIA	11 (33.3%)
Poly-articular JIA (RF-, RF+)	10 (30.3%)
systemic arthritis	5 (15.1%)
enthesitis-related arthritis	7 (21.2%)
A~~a~~ge *median, in years (Q_1;Q_3)*	~~15.99~~16 (15.2~~15~~;17.12)
Presence of JIA disease activity *n(%)*	10 (30.3%)
Functional status (CHAQ-DI patient-report) *median* ~~functionality~~ (Q_1;Q_3)	0.~~25~~ 3 (0.1~~3~~;0.6~~3~~)
Presence of clinical remission on therapy *n(%)*	17 (51.5%)
Presence of clinical remission off therapy *n(%)*	5 (15.2%)
~~medication P~~prescribed medication *n (%)*	23 (69.7%)
NSAIDS	14 (60.9%)
DMARDS	10 (43.5%)
biologicals	6 (26.0%)
glucocortic~~ster~~oids	4 (17.4%)
Primary outcomes ~~data~~ in young people ~~adolescents~~ *median (Q_1;Q_3)*	
Perceived health status (PedsQL ™ 4.0 Generic Core Scale)	
psychosocial health ~~(generic)~~	69.2~~17~~ (60.0.~~00~~;92.9~~2~~)
physical health ~~(generic)~~	68.8~~75~~ (56.3~~25~~;89.1~~06~~)
Perceived health status (PedsQL ™ 3.0 Rheumatology Module)	
treatment ~~(rheumatology)~~	76.8~~79~~ (71.4~~3~~;100.~~00~~)
communication ~~(rheumatology)~~	75.0.~~00~~ (66.~~6~~7;91.~~6~~7)

pain and hurt (rheumatology)	62.50 (50.00;93.875)
daily activities (rheumatology)	100.0.00 (91.325;100.0.00)
worry (rheumatology)	75.0.00 (66.67;91.67)
Secondary outcomes in young peopole data adolescents *median (Q_1;Q_3)*	
Global quality of life (LAS)	73.0.00 (68.5;90.0.00)
Illness-related knowledge (PKQ)	31.325 (18.875;43.875)
Fatigue (MFI-20) median (Q1:Q3)	
motivation	7.0.00 (5.235;9.0.00)
mental fatigue	9.5 (7.0.00;12.875)
activity	9.50 (7.0.00;12.0.00)
physical fatigue	9.50 (6.325;13.875)
general fatigue	9.50 (7.325;13.0.00)
Secondary outcome data adolescents (%)	
Presence of medication adherence (SHCS-AQ)	23 (69.70%)
Secondary outcomes in data parents *median (Q_1;Q_3)*	
Dimensions of parenting style *median (Q1;Q3)*	
autonomy support (PVF)	3.83 (3.33;4.33)
promotion of independence (PI)	3.438 (3.13;1.875)
behavioural control (PRS-YSR revised to parent self-report)	4.0.00 (3.60:4.30)
psychological control (PCS-YSR revised to parent self-report)	2.0 .00(1.875;2.50)
Perceived health status (PedsQL ™ 4.0 Generic Core Scale, parent report)	
psychosocial health (generic)	85.0.00 (71.67;90.0.00)
physical health (generic)	73.0.00 (56.325;96.988)
Perceived health status (PedsQL ™ 3.0 Rheumatology Module, parent report)	
treatment (rheumatology)	89.329 (71.43;97.32)
communication (rheumatology)	75.0.00 (64.658;91.67)
pain and hurt (rheumatology)	84.438 (50.0.00;95.31)
daily activities (rheumatology)	100.0 (90.0.00;100.0.00)
worry (rheumatology)	91.67 (66.67;100.0.00)

Ethical issues

The Institutional Review Board of the University Hospitals Leuven, Belgium, evaluated and approved the study protocol (B32220096363). This study ~~i~~was performed with ethical standards as described in the latest Declaration of Helsinki.

Study 1.b. Quantitative study: comparative analysis

Inclusion criteria

The intervention group's subject inclusion criteria ~~a~~were described above. The comparison group consist~~ed~~ of 45 ~~adolescents~~ young people aged 17-23 years and their parents. These patients~~, who~~ already ha~~ved~~ been transferred to the adult rheumatology programme~~, and their parents. These patients were transferred from paediatric rheumatology to the adult programme~~ without participating in a specific self-management/transition programme (i.e., they received the usual care). The comparison group subjects were recruited from four different health centres in Belgium. ~~Those~~ Patients who have ~~a~~ developmental or cognitive disabilities~~y were mentally retarded~~ or do not have the physical capacities to complete the questionnaires ~~used in the study~~ ~~a~~were excluded. Subjects of the comparison group (n=23) ~~a~~were included in the analyses if they can~~ould~~ be matched with an intervention group subject in terms of disease activity, medication prescribed, JIA subtype, and gender.

Definition of usual care

For the purposes of this study, usual care is defined as the care that is currently provided in day-to-day clinical practice. ~~Adolescents~~ Young people with JIA are usually followed up at the paediatric rheumatology programme until the age of 16 years. Around that age, the adolescent might have a first outpatient visit with the adult rheumatologist and the paediatric rheumatologist together. When the rheumatologists, the patient, and his or her parents agree that the patient is ready for transfer, an appointment for an adult rheumatology consultation is made. No transition coordinator or formal transition plan is provided ~~used~~to patients ~~in the comparison group~~ who receive~~d~~ usual care.

Informed consent from comparison group subjects

We used the same procedure described above that we used for the intervention group; the young people above 18 years of age provided their own written informed consent.

Variables and measurements

The variables and measurements used in these comparative analyses awere the same as those used in the longitudinal analyses (see above). The measures for the comparison group awere acquired during one of the scheduled outpatient visits at the adult care clinic (T_2) (see Figure 2).

Data analysis

As with the longitudinal analyses, we awere interested in clinical differences instead of statistical differences. In the comparative analyses, the scores of the intervention and comparison groups at T_2 will be were compared. The cut-off values used for the longitudinal analyses also will be were used for the comparative analyses.

Ethical Issues

The Institutional Review Board of the University Hospitals Leuven, Belgium, evaluated and approved the study protocol (B32220096363). This study iwas performed with ethical standards as described in the latest Declaration of Helsinki.

Study 2. Qualitative study

Design

We used an explanatory design to expand the quantitative results with qualitative data [20]. To gain insight into the processes underpinning the transition programme, we conducted in-depth interviews with the adolescents young people and parents of the intervention group. The specific aims of this qualitative study

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awere (i) to get an understanding of the reasons why particular effects awoare observed ~~and why others are not~~, and (ii) to evaluate the feasibility and the utility of the key components of the complex intervention from the patients' and parents' perspective.

Inclusion criteria

Those participating in the intervention group of this qualitative study (~~adolescents~~ young people and their parents) awere purposively sampled and invited to take part in the interviews. Sampling continues~~d~~ until no new themes emerge~~d~~ from the data (i.e., until data saturation ~~of the data~~ iwas reached).

Informed consent

Subjects awere included in the qualitative study after we obtained written informed consent for this particular ~~sub~~study. If the patient iwas a minor, informed consent iwas obtained from the parents and informed assent from the patient. Anonymity iwas guaranteed, and patients and parents awere assured that they canould stop the interview at any time.

Data collection

We employ~~ed~~ a predefined interview guide, previously adjusted by an expert panel consisting of one rheumatologist (RW), one paediatric rheumatologist (CW), and three researchers (KV, PM, DH) in the field of care transition. We ask~~ed~~ ~~adolescents~~ young people and parents to answer open-ended questions about the TC, the adolescent information day, the time of transfer, and general ~~feelings~~ experiences about the transition programme intervention.

~~Adolescents~~ Young people and parents awere interviewed at home, each in a different room. Different strategies awere used to assess the trustworthiness of the research: investigator triangulation, bracketing, and building a relationship of trust with the subject. Investigator triangulation requires that more than one investigator collect and analyse the raw data, so that the findings emerge through a consensus of a team of investigators [430]. Bracketing is the process of identifying and holding in abeyance preconceived beliefs and

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opinions about the phenomenon under study [430]. Bracketing makes the researcher aware of his or her beliefs and opinions about the phenomenon under study. To build a trusting relationship with each subject, we makde certain that the interviewers awere not part of the therapeutic team and that the interviews taooke place in a room where the subject feelst comfortable. These methods ensured that researcher-related bias iwas minimised.

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Data analysis

The interviews will be were analysed by using qualitative content analysis, according to the method of Graneheim and Lundman [441]. Each interview iwas audio-taped and transcribed verbatim. The interviews will bewere read through several times to obtain a good understanding of the content. The first step in the analysis iwas the identification of meaning units (i.e., constellations of words or statements that awere related to the same central meaning). The meaning units awere labelled with codes, which allowsed the data to be considered in new and different ways. The second step in the analysis involved sorting the codes into themes. A theme is an expression of the latent content of the text. For each theme, its content iwas expressed in two categories. To ensure the trustworthiness of the analysis, the authors discussed the classification of codes, categories, and themes until consensus iwas reached.

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Ethical Issues

The Institutional Review Board of the University Hospitals Leuven, Belgium, evaluated and approved the study protocol. This study iwas performed with ethical standards as described in the latest Declaration of Helsinki.

DISCUSSION

Previous studies have shown that the implementation of a comprehensive transition programme can have positive effects on several patient outcomes. We developed a transition programme for young people with JIA as a brief intervention. Implementation of these transition programmes in clinical practice may be more feasible, because we estimated that one full-time equivalent of manpower of the entire team could take on a case load of 250 to 300 transitioning patients within this transition programme. In the present article, we

describe the rationale and the design of a mixed-methods approach for evaluating the clinical impact of the transition programme for ~~adolescents~~ young people with JIA, and provide baseline data.

Our study is innovative in four aspects. First, to the best of our knowledge, this is the first evaluation of a transition programme structured as a brief intervention. Brief interventions are usually conducted in a one-on-one situation and take shorter periods of time [4~~5~~2]. Brief interventions are predominantly used in the prevention and treatment of substance abuse [4~~6~~3], although they have been employed in other settings as well [4~~7~~4,4~~8~~5]. Shorter time-consuming interventions are in demand, since the current trend is to implement transition programmes through optimal time use and cost-efficacy. However, as pointed out by McDonagh and colleagues, training of healthcare professionals will require additional resources [49].

Second, we designed this brief intervention as a complex intervention and used the MRC framework to perform our evaluation. It is argued that even simple interventions can be complex undertakings, mixing elements of content, intensity, duration, and setting [4~~5~~2]. Therefore, clearly specifying the steps and components of a brief intervention is needed. For this purpose, we used the criteria for the development and evaluation of complex interventions (CReDECI) in health care [19].

Third, within this complex intervention framework, we employ~~ed~~ a sequential mixed-methods approach, more specifically an embedded experimental design. This mixed-methods approach enable~~d~~ us to gain better insight into the clinical impact of the key components of this complex intervention. Using this approach, we integrate~~d~~ the findings of ~~the~~ our different studies.

Mixed-methods studies differ from multi-methods studies in that the latter involve a set of mono-method studies that use different designs and that are conducted independently. Although integration is highly advocated, it is seldom done. The reason can be explained in two ways [50~~46~~]. First, researchers do not always make use of the various ways of integrating findings in their reports. They report the results of qualitative and quantitative components separately, or they report the qualitative and quantitative findings together without considering how they are related to each other. This indicates that researchers may be unaware of some of the unique insights available in mixed-methods studies. In our study, we looked for convergence, divergence, and discrepancy in the findings of both methods. This process is defined as crystallisation [50~~46~~]. Indeed, crystallisation of results and exploration of definite discrepancies can lead to further insights. Second, the integration of data and findings from different components of a mixed-methods study is not always apparent in

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the articles emerging from them. This indicates that any unique insights available from mixed-methods studies may not be disseminated in ways that are attributable to mixed-methods studies.

Lastly, the results of the quantitative longitudinal and comparative studies, and the qualitative studies will be separately published, and will provide pilot data on the feasibility and impact of a brief transition programme on patient- and parent-reported outcomes ~~in youngin~~ young people with JIA. ~~this study provides pilot data on the feasibility and impact of a brief transition programme for young persons with JIA.~~ The data of this forthcoming study can be used to design a randomised controlled trial testing the effectiveness of the programme in a robust way. Indeed, the effect size obtained in the present study can be used for power and sample size calculations for future studies. Admittedly, since the present study i~~was~~s conducted in persons with JIA, the data are not necessarily ~~generalisable~~generalizable to other patient populations.

Although we use an innovative embedded experimental design in the DON'T RETARD project, some limitations should be addressed. The assessment of the patient's transition readiness i~~was~~s no key component of our transition programme. Recently, an increasing number of studies investigated the use of assessment tools such as the Transition Readiness Assessment Questionnaire (TRAQ) [51], an instrument aiming to evaluate a set of skills and developmental tasks that should be fulfilled in order to transfer patients to adult care.

Furthermore, our brief transition programme might look more as a transfer than a transition programme. The concept of a transition programme may imply more transitional care, starting in early adolescence, whereas this brief intervention starts in the pre-transfer period. Our brief intervention predominantly focuses on counselling and education, rather than skills training. Still, expecting all education needs to be met in the relatively short programme described is ambitious. Moreover, regular assessments of education needs should already be initiated in paediatric care.

In addition~~Furthermore~~, we have to bear in mind that the list of outcomes we use~~d~~ to assess the clinical impact of our programme is non-exhaustive. Additional outcomes such as self-efficacy or the level of autonomy of patients might be of interest~~. Post-hoc, we must also admit that evaluating the transition readiness of young people with JIA, even as their level of autonomy and self-efficacy lacking in our intervention, however, those are definitely aspects of interest in the context of transition~~ [52].~~.~~

~~which should be included in future research.~~ F~~urthermore~~inally, since patients who were included in the comparison group ~~awe~~re already transferred to adult rheumatology, they ~~awe~~re older as compared to the intervention group. In addition, transfer of patients occurred in general somewhat later in the era before our transition programme. This also contributes to the higher age of the comparison subjects. ~~the comparative study included control subjects of a different and older age group than the intervention subjects.~~ Hence~~Indeed~~, a matching procedure on age i~~was~~s not possible.~~we did not match on age, because of the precondition that control subjects~~

CONCLUSION

~~We~~ This methods paper presented the rationale and design of a study intended to evaluate a transition programme for ~~adolescents~~ young people with JIA as a brief intervention. Here, we used the Medical Research Council framework. The embedded experimental design ~~offered~~ offers ~~us~~ the opportunity to obtain an overall picture of the clinical impact of the transition programme on ~~adolescents~~ young people with JIA ~~who participated in it~~. Furthermore, ~~I~~it also allow~~ed us~~ s to get an overall picture of how these ~~adolescents~~ young people experience~~d~~ this programme. This study protocol i~~was~~ designed to evaluate our brief intervention. This evaluation enable~~d~~ us to get more insight into the active components of our transition programme. Examination of key clinical and methodological uncertainties in the exploratory trial phase ~~helps~~ could help researchers to set up definite randomised controlled trials and guide long-term implementation.

TRIAL STATUS

The trial started February 1, 2009, and ended on February 1, 2011.

ABBREVIATIONS

CHAQ-DI	Childhood Health Assessment Questionnaire
CReDECI	Criteria for Reporting the Development and Evaluation of Complex Interventions
ICC	Intra-class correlation

ICF	International Classification of Functioning
JIA	juvenile idiopathic arthritis
LAS	linear analogue scale
MD	medical doctor
MRC	Medical Research Council
MFVI-20	Multidimensional Fatigue Index
NA	not applicable
NR	not reported
PAT	patient
PAR	parent
PCS-YSR	Psychological Control Scale – Youth Self Report
PedsQL	Paediatric Quality of Life Inventory
PI	Promotion Independence Scale
PKQ	Patient Knowledge Questionnaire
PRS-YSR	Parental Regulation Scale
PVF	Autonomy Support Scale
SHCS-AQ	Swiss HIV Cohort Study Adherence Questionnaire
TC	transition coordinator
VAS	visual analogue scale

AUTHORS CONTRIBUTIONS

PM, RW, CW, and DH were responsible for the concept and design of the study, and analysis and interpretation of the data. DH and KV collected the data. DH drafted the manuscript. PM, KV, EG, RW, and CW critically revised the manuscript for important intellectual content. All authors read and approved the final manuscript.

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COMPETING INTERESTS

The authors declare that they have no competing interests.

Reference List

Field Code Changed

1 Meleis AI: *Transitions Theory: Middle range and situation-specific theories in nursing research and practice.* New York: Springer Publishing Company; 2010.

2 American Academy of Pediatrics, American Academy of Family Physicians, American College of Physicians-American Society of Internal Medicine.: A consensus statement on health care transitions for young adults with special health care needs. Pediatrics 2002, **110:**1304-1306.

3 American Academy of Pediatrics, American Academy of Family Physicians, American College of Physicians, Transitions Clinical Report Authoring Group, Cooley WC, Sagerman PJ: Supporting the health care transition from adolescence to adulthood in the medical home. Pediatrics 2011, **128:**182-200.

4 Knauth A, Verstappen A, Reiss J, Webb GD: Transition and transfer from pediatric to adult care of the young adult with complex congenital heart disease. Cardiol Clin 2006, **24:**619-29, vi.

5 Chaturvedi S, Jones CL, Walker RG, Sawyer SM: The transition of kidney transplant recipients: a work in progress. Pediatr Nephrol 2009, **24:**1055-1060.

6 Craig SL, Towns S, Bibby H: Moving on from paediatric to adult health care: an initial evaluation of a transition program for young people with cystic fibrosis. Int J Adolesc Med Health 2007, **19:**333-343.

7 Holmes-Walker DJ, Llewellyn AC, Farrell K: A transition care programme which improves diabetes control and reduces hospital admission rates in young adults with Type 1 diabetes aged 15-25 years. Diabet Med 2007, **24:**764-769.

8 McDonagh JE, Southwood TR, Shaw KL: The impact of a coordinated transitional care programme on adolescents with juvenile idiopathic arthritis. Rheumatology (Oxford) 2007, **46:**161-168.

9 Remorino R, Taylor J: Smoothing things over: the transition from pediatric to adult care for kidney transplant recipients. Prog Transplant 2006, **16:**303-308.

10 Shaw KL, Southwood TR, McDonagh JE: Development and preliminary validation of the 'Mind the Gap' scale to assess satisfaction with transitional health care among adolescents with juvenile idiopathic arthritis. Child Care Health Dev 2007, **33:**380-388.

11 Steinkamp G, Ullrich G, Muller C, Fabel H, von der HH: Transition of adult patients with cystic fibrosis from paediatric to adult care--the patients' perspective before and after start-up of an adult clinic. Eur J Med Res 2001, **6:**85-92.

12 Hilderson D, Westhovens R, Wouters C, Moons P: Transitional care for adolescents with rheumatic diseases: urgent need for more research. Child Care Health Dev 2008, **34:**401-402.

13 Betz CL: Transition of adolescents with special health care needs: review and analysis of the literature. Issues Compr Pediatr Nurs 2004, **27:**179-241.

14 Hilderson D, Moons P, Westhovens R, Wouters C: Attitudes of rheumatology practitioners toward transition and transfer from pediatric to adult healthcare. Rheumatol Int 2012, **32:**3887-3896.

15 Craig P, Dieppe P, Macintyre S, Michie S, Nazareth I, Petticrew M: Developing and evaluating complex interventions: the new Medical Research Council guidance. BMJ 2008, **337:**a1655.

16 Campbell M, Fitzpatrick R, Haines A, Kinmonth AL, Sandercock P, Spiegelhalter D, Tyrer P: Framework for design and evaluation of complex interventions to improve health. BMJ 2000, **321:**694-696.

17 Hilderson D, Corstjens F, Moons P, Wouters C, Westhovens R: Adolescents with juvenile idiopathic arthritis: who cares after the age of 16? Clin Exp Rheumatol 2010, **28:**790-797.

18 Chaudhry SR, Keaton M, Nasr SZ: Evaluation of a cystic fibrosis transition program from pediatric to adult care. Pediatr Pulmonol 2013, **48:** 658-65.

19 Mohler R, Bartoszek G, Kopke S, Meyer G: Proposed criteria for reporting the development and evaluation of complex interventions in healthcare (CReDECI): guideline development. Int J Nurs Stud 2012, **49:**40-46.

20 Creswell JW, Plano Clark VL: *Designing and conducting mixed methods research.* Thousand Oaks, California: Sage Publications; 2007.

21 Eyckmans L, Hilderson D, Westhovens R, Wouters C, Moons P: What does it mean to grow up with juvenile idiopathic arthritis? A qualitative study on the perspectives of patients. Clin Rheumatol 2011, **30:**459-465.

22 Hilderson D, Eyckmans L, Van der Elst K, Westhovens R, Wouters C, Moons P: Transfer from paediatric rheumatology to the adult rheumatology setting: experiences and expectations of young adults with juvenile idiopathic arthritis. Clin Rheumatol 2013, **32:** 575-83.

23 Ullrich G, Mattussek S, Dressler F, Thon A: How do adolescents with juvenile chronic arthritis consider their disease related knowledge, their unmet service needs, and the attractiveness of various services? Eur J Med Res 2002, 7:8-18.

24 Varni JW, Burwinkle TM, Seid M, Skarr D: The PedsQL 4.0 as a pediatric population health measure: feasibility, reliability, and validity. Ambul Pediatr 2003, 3:329-41.

25 Varni JW, Seid M, Kurtin PS: PedsQL 4.0: reliability and validity of the Pediatric Quality of Life Inventory version 4.0 generic core scales in healthy and patient populations. Med Care 2001, **39**:800-12.

26 ~~3~~ Varni JW, Seid M, Smith KT, Burwinkle T, Brown J, Szer IS: The PedsQL in pediatric rheumatology: reliability, validity, and responsiveness of the Pediatric Quality of Life Inventory Generic Core Scales and Rheumatology Module. Arthritis Rheum 2002, **46:**714-725.

~~24 Varni JW, Seid M, Knight TS, Uzark K, Szer IS: The PedsQL 4.0 Generic Core Scales: sensitivity, responsiveness, and impact on clinical decision-making. J Behav Med 2002, **25:**175-193.~~

27 ~~5~~ Deschamps AE, De GS, Vandamme AM, Bobbaers H, Peetermans WE, Van WE: Diagnostic value of different adherence measures using electronic monitoring and virologic failure as reference standards. AIDS Patient Care STDS 2008, **22:**735-743.

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286 Hilderson D, Moons P, Wouters C, Westhovens R: Adolescents with juvenile idiopathic arthritis: what do they know about their condition? [abstract]. *Annals of the Rheumatic Diseases* 2011, **70:**756

297 Moons P, Van Deyk K, De Bleser L, Marquet K, Raes E, De Geest S, Budts W: Quality of life and health status in adults with congenital heart disease: a direct comparison with healthy counterparts**.** Eur J Cardiovasc Prev Rehabil 2006, **13:**407-413.

3028 Lin JM, Brimmer DJ, Maloney EM, Nyarko E, Belue R, Reeves WC: Further validation of the Multidimensional Fatigue Inventory in a US adult population sample**.** Popul Health Metr 2009, **7:**18.

3129 Soenens B, Vansteenkiste M, Lens W, Luyckx K, Goossens L, Beyers W, Ryan RM: Conceptualizing parental autonomy support: adolescent perceptions of promotion of independence versus promotion of volitional functioning**.** Dev Psychol 2007, **43:**633-646.

320 Kins E, Beyers W, Soenens B, Vansteenkiste M: Patterns of home leaving and subjective well-being in emerging adulthood: the role of motivational processes and parental autonomy support**.** Dev Psychol 2009, **45:**1416-1429.

331 Soenens B, Vansteenkiste M, Luyckx K, Goossens L: Parenting and adolescent problem behavior: an integrated model with adolescent self-disclosure and perceived parental knowledge as intervening variables**.** Dev Psychol 2006, **42:**305-318.

342 Eddy L, Cruz M: The relationship between fatigue and quality of life in children with chronic health problems: a systematic review**.** J Spec Pediatr Nurs 2007, **12:**105-114.

353 Russo E, Trevisi E, Zulian F, Battaglia MA, Viel D, Facchin D, Chiusso A, Martinuzzi A: Psychological profile in children and adolescents with severe course Juvenile Idiopathic Arthritis**.** ScientificWorldJournal 2012, **2012:**841375.

~~34 Ullrich G, Mattussek S, Dressler F, Thon A: How do adolescents with juvenile chronic arthritis consider their disease related knowledge, their unmet service needs, and the attractiveness of various services? Eur J Med Res 2002, **7:**8-18.~~

36 Wallace CA, Ruperto N, Giannini E; Childhood Arthritis and Rheumatology Research Alliance; Pediatric Rheumatology International Trials Organization; Pediatric Rheumatology Collaborative Study Group: Preliminary criteria for clinical remission for select categories of juvenile idiopathic arthritis. J Rheumatol 2004, **31**:2290-4.

376 Ouwerkerk JW, van Pelt PA, Takken T, Helders PJ, Net J: Evaluating score distributions in the revised Dutch version of the Childhood Health Assessment Questionnaire**.** Pediatr Rheumatol Online J 2008, **6:**14.

387 Singh G, Athreya BH, Fries JF, Goldsmith DP: Measurement of health status in children with juvenile rheumatoid arthritis**.** Arthritis Rheum 1994, **37:**1761-1769.

39 Takken T, van den Eijkhof F, Hoijtink H, Helders PJ, van der Net J: Examining the psychometric characteristics of the Dutch childhood health assessment questionnaire: room for improvement? Rheumatol Int 2006, 26:979-83.

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3840 Cohen J: A power primer**.** Psychol Bull 1992, **112:**155-159.

3941 Berben L, Sereika SM, Engberg S: Effect size estimation: methods and examples**.** Int J Nurs Stud 2012, **49:**1039-1047.

420 Cohen J: *Statistical power analysis for the behavioral sciences.* Lawrence Erlbaum Associates; 1988.

431 Polit DF, Beck CT: **Nursing Research: principles and methods.** In *Nursing Research: Principle and Methods*. 7 edition. Philadelphia: Lippincott Williams & Wilkins; 2004.

442 Graneheim UH, Lundman B: Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness**.** Nurse Educ Today 2004, **24:**105-112.

453 Babor TF: Avoiding the horrid and beastly sin of drunkenness: does dissuasion make a difference? J Consult Clin Psychol 1994, **62:**1127-1140.

464 Humeniuk R, Ali R, Babor T, Souza-Formigoni ML, de Lacerda RB, Ling W, McRee B, Newcombe D, Pal H, Poznyak V et al.: A randomized controlled trial of a brief intervention for illicit drugs linked to the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) in clients recruited from primary health-care settings in four countries**.** Addiction 2012, **107:**957-966.

475 Fachini A, Aliane PP, Martinez EZ, Furtado EF: Efficacy of brief alcohol screening intervention for college students (BASICS): a meta-analysis of randomized controlled trials**.** Subst Abuse Treat Prev Policy 2012, **7:**40.

486 Laure P, Mangin G: Advising parents on physical activity for children between 0 and 5 years**.** J Sports Med Phys Fitness 2011, **51:**467-472.

49 McDonagh JE, Southwood TR, Shaw KL; Bristish Paediatric Rheumatology Group: Unmet education and training needs of rheumatology health professionals in adolescent health and transitional care. Rheumatology (Oxford) 2004, **43**(6):737-43.

5048 O'Cathain A, Murphy E, Nicholl J: Integration and publications as indicators of 'yield' from mixed methods studies**.** Journal of Mixed Methods Research 2007, **1:**147-163.

51 Sawicki GS, Lukens-Bull K, Yin X, Demars N, Huang IC, Livingood W, Reiss J, Wood D: Measuring the transition readiness of youth with special healthcare needs: validation of the TRAQ--TransitionReadiness Assessment Questionnaire. J Pediatr Psychol 2011 Mar, **36**:160-71.

52 van Staa A, van der Stege HA, Jedeloo S, Moll HA, Hilberink SR: Readiness to transfer to adult care of adolescents with chronic conditions: exploration of associated factors. J Adolesc Health 2011, **48**:295-302.

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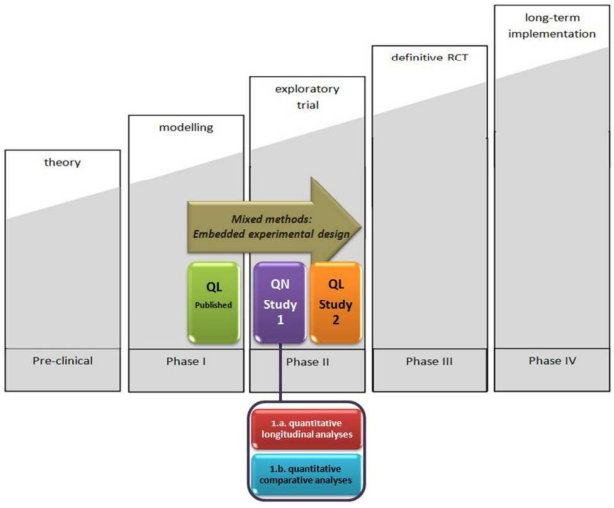
Figure 1. Development of a complex intervention based on the MRC framework and its evaluation using an embedded experimental design.



Legend: RCT, randomised controlled trial; QL, qualitative study; QN, quantitative study

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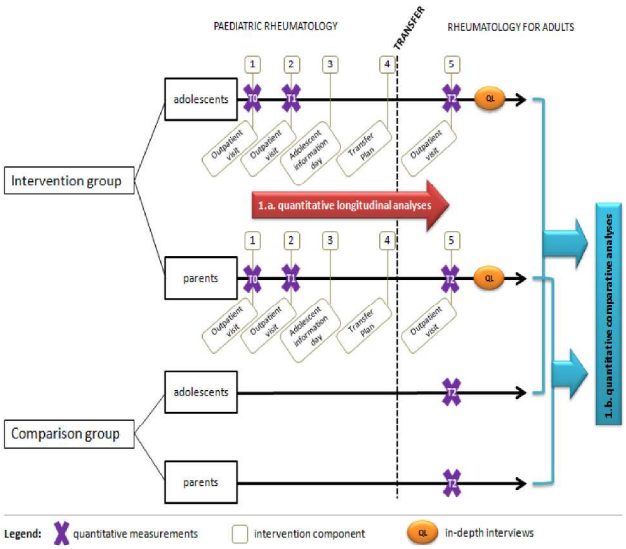
Figure 2. Flow chart illustrating the quantitative and qualitative studies used to assess the transition programme for adolescents with JIA. In Study 1, quantitative analyses were conducted based on a one-group pretest-posttest design with a non-equivalent posttest-only comparison group composed of adolescent-parent dyads. This was followed by Study 2, a qualitative study consisting of in-depth interviews.



QL, qualitative study, T0, at baseline; T1, at the second outpatient visit at paediatric rheumatology; T2, at the first outpatient rheumatology consultation in the adult care setting.

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