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# Nursing intervention by telephone interviews of patients aged over 65 years after total hip replacement improves health status: a randomised clinical trial

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## Nursing intervention by telephone interviews of patients aged over 65 years after total hip replacement improves health status: a randomised clinical trial

*Objective:* We hypothesised that all areas of health status after total hip replacement could be improved in patients aged over 65 years and over by using telephone support and counselling 2 and 10 weeks after surgery compared with a control group receiving conventional care and treatment.

*Design:* A randomised clinical trial focusing on patients' health status by using short-form 36 at 4 weeks preoperatively and 3 and 9 months postoperatively was carried out. Sample: 180 patients aged 65 years and over were randomised 4 weeks preoperatively to either control or intervention groups. Measurements: both groups received conventional surgical treatment, but the intervention

group was interviewed by telephone 2 and 10 weeks after surgery. Patients were given counselling within eight main dimensions with reference to their postoperative situation. *Results:* All patients experienced improvement in health status. The intervention significantly reduced the time patients needed to reach their habitual levels in three of eight areas of their health status: the intervention patients reached their habitual levels at 3 months whereas the control patients reached theirs after 9 months.

*Conclusion:* Intervention by telephone support and counselling in the postoperative phase seems to benefit patients' improvement in health status.

**Keywords:** total hip replacement, elderly patients, health status, postoperative support, preoperative interventions counselling.

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## Introduction

Osteoarthritis (OA) of the hip is a severe condition that causes pain and reduced physical and social functioning in patients and results in economic burdens for society. Compared with the normal population, patients with OA have reduced health-related quality of life and reduced social functioning before surgery (1–5).

The most common, and very effective, treatment of OA is surgery with total hip replacement (THR). As OA affects the middle-aged and elderly, it is predicted that the need for THR in decades to come will increase due to a higher prevalence of OA in society (1–5).

In the EU member states over 190 000 THRs are performed every year. In the Nordic countries some 50 000 THRs are carried out annually (6). In Denmark with a population of 5 million people, approximately 15% of the population are aged 65 years and over, and among this population the annual number of THRs is about 4500 (7).

After THR, up to 90% of the patients experience pain relief (8–17) and up to 80% of patients improve their walking ability, but only 33% of the patients report improvements in general health (GH) and physical functions (PFs) (8–10, 17, 18). For some patients, this may be explained by unrealistic expectations regarding the outcome of surgery (8). For others, the explanation could be that many elderly patients seem to continue living as they did before the operation (10, 16). They seem unable to adapt to a new ways of living (11, 15, 16) even if they do experience pain relief and improved walking ability. Six months after surgery they still experience reduced health status, which reduces their ability to go on holiday travels,

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take part in hobby-activities and to perform other activities of daily living (11–15).

In a cross-sectional study, patients reported their health status lower than an age, matched normal population 7 months after surgery indicating that there is a need for rehabilitation after THR (19).

Individually planned support, counselling and training during the first 6 months postoperatively may be of decisive importance for improving the outcome of THR (11–15). In studies of individualised care and support in the postoperative period, more than 50% of patients maintained a healthy approach for at least 3 months after discharge compared with patients who did not receive this kind of care (20, 21).

After surgery, patients with THR are only seen once 3 months after surgery, and they have no further contact with the hospital. After surgery another study has shown that a clinical nurse specialist provided the patients with advices and counselling to support the postoperative progress, fluid and diet intake, instructions about activity, medical treatment, and the phone contact also provided emotional support (22). Overall, patients in the study assessed their progress and wellbeing positively (22–26). In another study, patients have evaluated that phone counselling was effective for further progress of their rehabilitation (27).

We have not identified previous studies that have focused on the patients' problems in the early postoperative phase after discharge. And no studies have evaluated the effect of systematic telephone support and counselling after discharge. We hypothesised therefore that all areas of health status after THR could be improved in patients aged over 65 years and over by using telephone support and counselling 2 and 10 weeks after surgery compared with a control group receiving conventional care and treatment.

## Methods

### *Sample*

The present study was carried out in two orthopaedic departments in a university hospital in Denmark in the period from January 2005 until May 2007. A total of 180 patients aged 65 years and over living in the area of the hospital and consecutively admitted to elective THR in the hospital's two departments of orthopaedic surgery were allocated to the study. Age of enrolled patients ranged from 65 to 88 years.

### *Design*

We used a randomised controlled trial (RCT) for this study. The patients in the control group received the conventional treatment. Patients in the intervention group received the conventional treatment and phone support

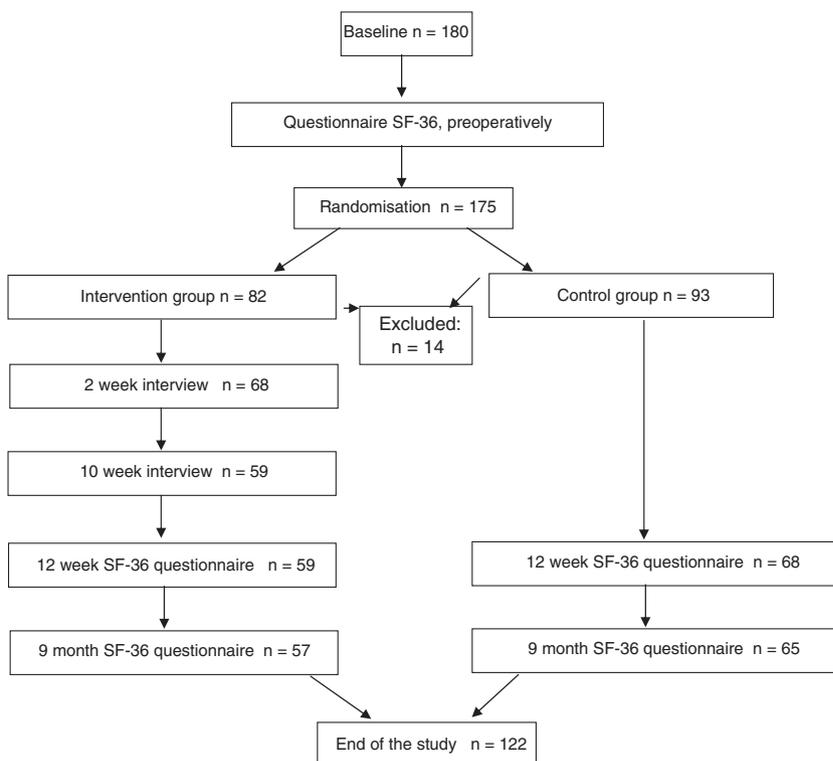
and counselling. The patients in the intervention group were contacted by phone by a specialist care nurse 2 and 10 weeks after discharge. The effect of the intervention was measured on patients' health status. Data on patients' health status were collected by a mailed questionnaire. The questionnaire was mailed 4 weeks before planned surgery, 3 and 9 months after discharge. If patients did not respond, they received one reminder.

The power calculation in this study was based on findings in a cross-sectional study (19). We used the physical dimensions in health status as the primary outcome variable. The mean physical score was 49.4, SD was 26.1; alpha in this study was set to 5% and  $\beta$  to 20%. We considered that the intervention could lead to an improvement of 50% in the physical health score and were willing to overlook a difference in score of 12. When the sample size was calculated, 68 patients were needed in both the intervention group and the control group. With an expected dropout of 22% at least 160 patients had to participate in the study.

All patients were recruited from the hospitals waiting list. Randomisation to an intervention group or control group was done by the envelope method, 200 envelopes were prepared of which 100 contained a note which referred the patient to the intervention group and 100 contained a note which referred the patient to the control group. When patients returned their first questionnaire before admission an envelope was opened placing patients in one of the groups. Neither the hospital staff nor the patients were informed of the result of the randomisation before discharge. Of the 200 hundred envelopes that were prepared, 180 were used, and 175 responded. Sixty-eight patients were allocated to the intervention group and 93 to the control group, of these 161 patients participated (Fig. 1).

### *Theoretical frame of reference*

The nursing intervention in this study was based on the model put forth by Salling Larsen (20). The model is based on Murray and Maslow's theories of motivation combined with Piaget's theory of development in which the main goal is to promote and maintain patients' active involvement in their own care. The model includes the following elements: (1) Assessing the patient's normal activities in relation to health issues and activities of daily living. This assessment was based on Maslow's motivation hierarchy and Murray's theory on subjective and objective press for human activities (beta-press and alpha-press). (2) Continued dialogues between the patient and the nurse to ensure information sharing, teaching and improvement of the individual care, (3) Planning of the nursing care with reference to the patient's usual activities of daily living and (4) Use of the principles embedded in primary nursing care.



**Figure 1** Flow-chart of the study population.

This model was tested in studies which included patients with various orthopaedic diseases and the findings confirmed that patients cared for with this model experienced more personal activity and growth during a hospital stay compared with patients given customary care (21).

### Intervention

All patients received the standard postoperative procedure in the hospital, which means discharge after 5–7 days and a clinical control in the outpatient department after 3 months. But the intervention group also received telephone support and counselling 2 and 10 weeks after surgery.

The intervention was performed by the same nurse using a structured interview guide to identify the patients' perceptions of their current situations and need for further support and counselling of importance to their health status.

Together the patients and the nurse assessed the patients' situation and areas of improvements. The assessment focused on eight main dimensions referring to the patients' situation after THR. (1) Wellbeing. (2) Expectations as to PF after surgery. (3) Expectations as to PF compared with those before surgery. (4) Symptoms (pain, leg-oedema, vertigo, sleep disturbance, nausea and other concerns) and (5) Problems with eating and appetite. (6) Fluid intake. (7) Ability to follow prescribed activity and exercise. (8) Need of support from family. For each of the problems identified,

individual solutions were suggested and practical counselling was given by the same clinical nurse specialist, who was one of the authors (BH) (22).

### Measures

Main outcomes were health status measured by the questionnaire short-form 36 (SF-36). It is a self-administered generic questionnaire measuring physical and emotional functioning and the perception of GH (28–32). The instrument measures two dimensions of health on eight subscales, reflecting the impact of both dysfunctions and GH perceptions. Dysfunctions were measured with the following subscales: PF (10 items), role physical (RF – four items), bodily pain (BP – two items), social function (SF – two items), role emotional (three items). Health perception was measured with three subscales: GH (five items), vitality (VT – four items) and mental health (MH – five items). The responses related to each subscale were transformed into a score on a scale from zero (lowest score) to 100 (highest score), with a higher score indicating a better health status or absence of limitations. SF-36 is available in a Danish validated version (28, 29).

The reliability of the responses in this study was between 0.818 and 0.915 (Chronbach's alpha). The questionnaire was supplied with specific demographic questions on gender, age, living alone and whether patients were dependent on help from others.

### Ethics

The patients were included after giving their written consent. If a patient did not return a questionnaire a reminder was sent. If a patient did not return the questionnaire after the reminder, there were no further contacts. The study was approved by The Local Research Committee and reported to The Data Protection Authorities. The Clinical Trials Registry: NCT00226070.

### Statistical analysis

Data were processed by using the statistical program Statistical Package for Social Sciences (SPSS) version 13.0 (Boston, MA, USA). Ratio-scaled data from both groups (intervention and control) were compared by using parametric methods if data were normally distributed, but if not, nonparametric methods were used. Nominal scaled data were compared by using the chi-square test or using 95% CI around the association measure.

Categorical variables were compared using Pearson's chi-square test if appropriate. For continuous data, changes within the groups were analysed by using a paired *t*-test. Groups were compared using an unpaired *t*-test (for normally distributed data).  $p < 0.05$  were considered statistically significant.

### Results

At baseline there were no differences between the patients in the intervention or the control groups. The characteristics of the participating patients are given in (Table 1.) The mean length of stay in hospital for all the patients was 6.4 (2.4) days. Before admission 19 patients were excluded because their operation had been cancelled, postponed or changed to another procedure, leaving 161 patients to be enrolled in the study. During the study 39 patients dropped out, 11 (16.4%) patients in the intervention group and 28 (30.1%) in the control group ( $p = 0.031$ ) thus it was possible to follow 122 (75.7%) of the patients during the entire study time. Comparing the dropouts with the patients who remained in the study we found that among the dropout patients the mean

age was 76.5 years ( $p = 0.270$ ), 34.8% were men ( $p = 1.0$ ), 30 (75.8%) patients were living alone ( $p = 0.030$ ), and 16 (40.6%) were depended on family support ( $p = 0.164$ ). At baseline we compared the scores of the patients who dropped out with those of the patients who remained in the study. The dropouts had the following scores on the eight subscales of SF-36: PF 19.5 (22.8) ( $p = 0.000$ ), RF 10.2 (28.5) ( $p = 0.377$ ), BP 24.6 (15.9) ( $p = 0.002$ ), SF 43.0 (29.5) ( $p = 0.020$ ), role emotion 27.7 (32.5) ( $p = 0.092$ ), GH 43.0 (19.5) ( $p = 0.000$ ), VT 32.2 (23.1) ( $p = 0.013$ ) and MH 60.5 (25.0) ( $p = 0.382$ ).

The phone support and counselling was given 15.9 (3.3) and 68.5 (10.7) days after discharge from hospital. The phone contact with the patients lasted between 10 and 30 minutes with a mean of 19.4 (6.4) minutes for the first interview and 22.1 (4.9) minutes for the second ( $p = 0.001$ ).

### Outcome

Patients in both the control and intervention groups reported a significant increase in several subscales of SF-36 from baseline to 3 and 9 months after surgery (Table 2). From baseline to 3 months after THR, patients in the intervention group reported increases in the subscales PF, GH and MH that were significantly higher than the increase reported by patients in the control group (Table 3). From baseline to 9 months no significant differences between the groups were noticed.

Twenty-eight control patients dropped out from baseline to 3 and 9 months after discharge. Those who dropped out had a significantly lower score at baseline in the following subscales: PF ( $p = 0.000$ ), BP ( $p = 0.008$ ), GH ( $p = 0.000$ ) and MH ( $p = 0.032$ ). In the intervention group 11 patients dropped out: these patients had a significantly lower scores at baseline within the subscale of BP ( $p = 0.032$ ).

### Discussion

To our knowledge, this is the first RCT using phone counselling and support after THR. Both the intervention and control groups (Tables 2 and 3) reported improvement in SF-36 subscales, after surgery. The intervention group had significantly higher scores within 3 months in three of the eight subscales.

The study is characterised by a high degree of internal validity in terms of accounting for patient selection. A large number of patients were available for both 3- and 9-month follow-ups, and there was a high degree of reliability in the responses. Furthermore, patients were included consecutively from the waiting list and randomised to either a control or an intervention group. The intervention group and the control group were similar regarding demographic variables, age, gender, living alone and dependency on family support and health status before surgery.

**Table 1** Characteristics of participating patients in the intervention and control group at baseline

	Intervention ( <i>n</i> = 68)	Control ( <i>n</i> = 93)	<i>p</i> -value
Gender			
Male (%)	21 (30.9%)	35 (37.6%)	
Female (%)	47 (69.1%)	58 (62.4)	0.236
Mean age (SD)	75	74.8	0.981
Living alone	41 (60.3%)	53 (57.6%)	0.748
Dependent on help	36 (54.5%)	46 (51.1%)	0.746

**Table 2** Changes in health status in the intervention and control patients from baseline to 3 and 9 months after total hip replacement

Subscales	Control					Intervention				
	Baseline	3 months	p-value*	9 months	p-value**	Baseline	3 months	p-value*	9 months	p-value**
Physical function	33.7	49.3	0.000	55.7	0.000	32.0	51.6	0.000	52.8	0.000
Role physical	14.7	30.3	0.011	38.5	0.000	13.3	24.1	0.064	38.9	0.000
Bodily pain	30.6	56.6	0.000	64.3	0.000	31.5	53.7	0.000	57.4	0.000
General health	55.1	61.5	0.526	61.5	0.630	52.8	61.6	0.000	60.6	0.007
Vitality	41.5	64.9	0.000	59.1	0.000	41.2	52.9	0.000	56.3	0.000
Social function	61.3	75.6	0.002	77.7	0.000	60.3	74.3	0.007	76.7	0.006
Role emotional	34.8	45.0	0.605	50.9	0.114	38.0	41.6	0.858	48.3	0.190
Mental health	64.5	72.0	0.073	75.9	0.002	63.5	72.9	0.000	74.4	0.000

\*From baseline to 3 months, \*\*from baseline to 9 months.

Paired t-test.

**Table 3** Development in health status between intervention and control patients from baseline to 3 and 9 months after total hip replacement

Subscales	Changes from baseline to 3 months			Changes from baseline to 9 months		
	Intervention	Control	p-value	Intervention	Control	p-value
PF	17.8	9.6	0.030	17.9	16.9	0.955
95% CI	12.4–23.1	4.4–14.7		11.9–23.9	10.3–23.6	
Role physical	10.0	13.3	0.655	25.0	22.7	0.746
95% CI	0.6–20.7	3.1–23.6		14.9–36.1	12.3–32.9	
BP	20.3	22.5	0.602	23.5	29.2	0.227
95% CI	13.7–27.0	17.3–27.8		17.7–29.3	21.8–36.7	
GH	7.3	1.2	0.023	5.7	1.4	0.255
95% CI	3.4–11.1	–4.8 to 2.5		1.6–9.9	–7.4 to 4.5	
VT	10.2	10.7	0.898	12.9	15.2	0.586
95% CI	4.8–15.6	5.1–16.3		7.3–18.4	8.6–21.8	
SF	12.1	9.9	0.677	12.7	12.7	0.998
95% CI	3.5–20.7	3.2–3.7		3.7–21.7	5.9–19.5	
RE	1.2	3.1	0.832	8.0	9.7	0.844
95% CI	–12.1 to 14.5	–8.8 to 14.9		4.1–20.1	2.4–21.8	
MH	11.1	4.2	0.050	12.1	8.4	0.369
95% CI	5.9–16.3	0.4–8.8		5.8–18.4	3.1–13.7	

PF, physical function; RE, role emotional; BP, bodily pain; GH, general health; VT, vitality; SF, social function; MH, mental health, 95% CI = Confidence limit at 95%

Dropout is a well-known phenomenon in any study. In some studies, it is difficult to identify the dropout rate (24, 25), and in other similar studies the dropout rates have been given to be between 13% and 52% (12, 17, 33). In this study the dropout rate was 24.2%.

Patients who dropped out during the study had the same age, gender and need for help from others as did the patients who completed the study, but more dropout patients lived alone. The health status of the drop-outs was recorded lower in five of eight subscales indicating, that the health of the drop-outs was worse than that in the group who stayed in the study. Health scores at baseline were similar for the patients in the intervention and control groups. But patients who dropped out of the control group had significantly lower scores in four subscales compared

with the intervention group means, which indicated that there were more patients with a low health score in the intervention group than in the final control group.

The telephone interviews 2 and 10 weeks after surgery may be the reason why patients in the intervention group did not drop out of the study because the contact with the nurse specialist influenced the patients' willingness to complete the questionnaires at 3 and 9 months.

We hypothesised that all areas of health status after THR could be improved in patients aged 65 years and over by using telephone support and counselling 2 and 10 weeks after surgery, compared with a control group receiving conventional care and treatment. But patients in the intervention group reported only improvements in three of eight subscales within the first 3 months after surgery.

Studies have shown that phone counselling was effective within the first 3 months after discharge for patients with chronic disorders (27). This is in line with the findings in this study and in studies that have used the same theoretical frame of reference for the nursing interventions (20, 21). Other authors report no further improvement in health status after THR after 6 months (4, 8, 10, 33). The measurements at 9 months must therefore be seen as the final level for patients' development in health status after the THR.

#### *Weaknesses and strengths of the study*

It was possible to carry out a RCT, which is considered the strongest design when testing the effect of an intervention, furthermore the design made it possible to blind the intervention to the hospital staff, but the nature of the intervention made it impossible to blind it for the patients. It must be assumed therefore that all patients received the same conventional treatment when in contact with the hospital staff during their hospital stay. Patients first became aware of their participation in the intervention group when they received the first phone call after 2 weeks and were not prepared for the counselling and support. The second phone contact had a significantly longer duration because many patients had prepared questions for the nurse. In clinical settings, patients and their nurse could make an appointment for the first phone call before discharge, and patients could therefore prepare questions and areas of worries, which may have enhance the effect of the intervention.

We used SF-36 to measure health status in this study. A previous validity study has confirmed the internal consistency and homogeneity of the Danish version of the SF-36 (28), which is an established instrument for assessment of longitudinal changes in health status (29), and it is also applicable in context of THR (33). In a Danish study of data quality, the SF-36 could discriminate between levels of health in all subgroups, but there were skewness, kurtosis and ceiling effects in many subgroups except for elderly people and people suffering from chronic diseases (30). Although the SF-36 includes eight distinct health status concepts and one item measuring self-reported health transition, important health concepts are not represented. Among those omitted are health distress, family functioning, sexual functioning, cognitive functioning and sleep disorders (31, 32). Adding these concepts would roughly multiply the response burden fourfold (31, 32), and measuring a comprehensive set of health concepts and the full range of levels for each concept does not necessarily bring about greater detail.

Dropout patients in the control group had a significantly lower SF-36 score at baseline within the five subscales of SF-36: thus the patients with the highest scores were included in the data analysis. This means that differences

in health status found between the control and the interventions patients in reality may have been higher, and the differences reported in this study are subject to a type 2 error. The same clinical nurse specialist had all the contacts with intervention patients, which reduced the inter-observer variability.

In conclusion, this seems to be the first RCT to show an improvement in patients' health status after THR achieved by offering phone counselling and support after discharge from hospital. It seems that this kind of intervention speeds up the recovery of patients after THR because intervention patients more rapidly reached their final postoperative level of health more quickly than did the control group.

#### **Author contributions**

Britta Hørdam was responsible for the research and her supervisors have been available with general supervising.

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