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Ambulatory orthopaedic surgery patients' knowledge expectations and perceptions of received knowledge

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Abstract

Title. Ambulatory orthopaedic surgery patients' knowledge expectations and perceptions of received knowledge

Aim. This paper is a report of a study to compare orthopaedic ambulatory surgery patients' knowledge expectations before admission and their perceptions of received knowledge 2 weeks after discharge.

Background. Advances in technology and population ageing are driving up the number of ambulatory orthopaedic surgical procedures. Shorter hospital stays present a major challenge for patient education.

Methods. A descriptive comparative cross-sectional study (pre- and post-test) design was adopted. The data were collected from 120 consecutive patients in 2004, using the Hospital Patient's Knowledge Expectations Scale and Hospital Patient's Received Knowledge Scale. All patients participated in a preoperative education session given by a nurse.

Results. Patients expected more knowledge than they actually perceived that they received on all dimensions except the bio-physiological. They perceived that they received least knowledge about experiential, ethical, social and financial dimensions of knowledge. Knowledge expectations correlated with age and professional education. Perceptions of received knowledge correlated with earlier ambulatory surgery, and both expected knowledge and perceptions of received knowledge were related to the level of basic education.

Conclusion. Patients' knowledge expectations are greater than the knowledge they perceived that they receive, and they cannot become empowered if they lack important knowledge. Further research is needed to learn about meeting patients' knowledge expectations.

Keywords: expectations, Hospital Patient's Knowledge Expectations Scale, Hospital Patient's Received Knowledge Scale, knowledge, nursing, orthopaedic surgery, patient teaching

Introduction

Day-case surgery is continuing to increase (OECD Health Data 2007) and to be used for more complex procedures (Keskimäki 2003, OECD Health Data 2007). For example, arthroscopic surgery has rapidly expanded and is now used for many procedures that formerly required opening up the knee. At present, more than 1·5 million arthroscopic procedures are performed each year around the world (The Whitaker Foundation 2006). In Finland, this number is about 21,000 each year (National Research and Development Centre for Welfare and Health, Stakes 2006).

New surgical techniques combined with shorter care periods mean that patients need to learn more in less time than before (Dougherty 1996, Bernier *et al.* 2003). Well aware of the growing challenge, the Association of Perioperative Registered Nurses (AORN 2005) has committed itself to promoting patient safety in ambulatory settings, among other things by means of 'preoperative teaching'. Ambulatory orthopaedic surgery patients are usually satisfied with their care (Harju 1991, Cardosa *et al.* 1994, Sigurdardottir 1996, Bain *et al.* 1999). However, the care of patients is not always uncomplicated (Ruuth-Setälä *et al.* 2000, McGrath *et al.* 2004, Watt-Watson *et al.* 2004, Chung *et al.* 2007).

Knowledgeable patients seem to cope better with surgery than less knowledgeable patients (Goldsmith & Safran 1999, Rankinen *et al.* 2007), and knowledge also relieves anxiety (Kratz 1993, Grieve 2002). Patients are encouraged to set their own goals and to take an active part in decision-making and care so that they have a sense of empowerment. In ambulatory care, the empowering process starts with preoperative preparation: information should be provided to assist patients in achieving their goals (Anderson 1991, Pellino *et al.* 1998). In this study, we analysed patient education by comparing knowledge expectations and perceptions of received knowledge of ambulatory orthopaedic surgery patients. Our baseline assumption was that the more the correspondence is between patients' expected and received knowledge, the stronger is the possibility of having a sense of empowerment. The knowledge that makes it possible to become empowered can be divided into six dimensions: bio-physiological, functional, experiential, ethical, social and financial (Leino-Kilpi *et al.* 1998, 1999). We also assumed that patients themselves are able to identify gaps in their own knowledge, and that they know what kind of knowledge would be useful for them. Giving information is thus not enough; nurses need to analyse patients' knowledge expectations and their perceptions of received knowledge to be able to support them in becoming empowered (Leino-Kilpi *et al.* 1998, 1999, Rankinen *et al.* 2007).

In this study, we used the term knowledge to include information also. Knowledge consists of both information and personal understanding of it. Understanding involves a person's own knowledge base and the processing of knowledge (Chambers dictionary of synonyms and antonyms 1989, MOT Collins English Dictionary 1.0).

Background

Ambulatory orthopaedic surgery patients' knowledge expectations

Earlier studies provide only a limited view on orthopaedic patients' knowledge expectations, and the emphasis has been on the bio-physiological and functional dimensions. Samples in these studies have been quite small and the data collected by questionnaires (Linden & Bergbom Engberg 1995, $n = 105$; Majasaari *et al.* 2005, $n = 60$), interviews (Thatcher 1996, $n = 6$) or diaries (Dewar *et al.* 2004, $n = 238$).

It has been suggested that all ambulatory surgical patients need a great deal of similar preoperative (such as how to prepare for the operation) and postoperative information (Dewar *et al.* 2004). Linden and Bergbom Enberg (1995) used a questionnaire to ask ambulatory surgery patients ($n = 105$) what kind of oral and written information they had wanted and received. Patients who had undergone arthroscopic knee surgery wanted to talk with the surgeon about the bio-physiological dimension of knowledge, such as the causes of their discomfort and the condition of the knee, and about the functional dimension of knowledge, such as when they could return to normal activity and work, what activities were allowed and their optimal condition during the first postoperative week. Thatcher (1996) also found that patients primarily expected knowledge about activities or rest before and after the operation.

Family members of ambulatory orthopaedic patients have also been investigated. In the questionnaire study by Majasaari *et al.* (2005), more than half of the patients ($n = 60$) believed that their family members perceived that they had received adequate information during the ambulatory surgery process. One in five families perceived that they had received no information at all, and some wanted more explanation and greater privacy. More than two-thirds of the patients (68%, $n = 60$) evaluated the information provided as complete, good or adequate, but 23% described it as less than

adequate (on a five-point scale: complete, good, adequate, inadequate and no information).

Ambulatory orthopaedic surgery patients' perceptions of received knowledge

Earlier studies have evaluated the amount and adequacy of functional, social, bio-physiological and experiential dimensions of knowledge received by ambulatory orthopaedic surgery patients. These studies have predominantly used questionnaires (Linden & Bergbom Engberg 1995, $n = 105$; Sigurdardottir 1996, $n = 72$) or interviews (Thatcher 1996, $n = 6$; Fitzpatrick *et al.* 1998, $n = 30$; Bernier *et al.* 2003, $n = 116$) for the collection of data. In one study, the data were collected using diaries (Dewar *et al.* 2004, $n = 238$).

Patients are generally satisfied with the education process (Fitzpatrick *et al.* 1998), and the availability of written educational materials increases patient satisfaction (Sigurdardottir 1996, Thatcher 1996, Dewar *et al.* 2004). However, the evaluation of perceptions of received information does sometimes cause difficulties. Patients may not recall the information they have been given, because they have been too anxious to absorb it (Dewar *et al.* 2004).

Patients have also been reported to receive knowledge about the functional dimension of knowledge, such as clinical skills (Sigurdardottir 1996), about the social dimension, such as patients' role and psychosocial support (Bernier *et al.* 2003), and about the bio-physiological dimension of knowledge, such as the surgical procedure and technology of care (Bernier *et al.* 2003) and complications (Fitzpatrick *et al.* 1998).

Patients' information needs are not always met (Sigurdardottir 1996, Bernier *et al.* 2003). Earlier studies have reported a lack of received knowledge on the functional dimension, such as skills training (Bernier *et al.* 2003), and what to do or who to contact if they develop symptoms they do not know about (Linden & Bergbom Enberg 1995). Linden and Bergbom Enberg also reported that patients claim to have received no information about recommended activities or how to take care of their personal hygiene. One-quarter of these patients ($n = 105$) did not receive any written information about analgesics, while 32% perceived that they received no information about how to take care of the wound. Lack of knowledge on the bio-physiological dimension has also been reported, such as information about the operation (Sigurdardottir 1996) and complications (Fitzpatrick *et al.* 1998). Patients have also reported receiving less knowledge on the experiential dimension of knowledge, such as sensations or discomfort (Bernier *et al.* 2003).

The study

Aim

The aim of the study was to compare orthopaedic ambulatory surgery patients' knowledge expectations before admission and their perceptions of received knowledge 2 weeks after discharge.

Design

A descriptive comparative design was used (Burns & Grove 2005). Empirical data were collected twice: before the ambulatory surgery in connection with a preoperative education session and 2 weeks after the operation. All patients participated in a preoperative education session. The education session consisted of individual face-to-face education with a nurse. One nurse delivered this education session, which lasted about 30 minutes and took place in a separate room in the day surgery unit. Patients were given a leaflet about the content of the session. This content was divided into six dimensions – bio-physiological, functional, experiential, ethical, social and financial – considered as helping patients to become empowered in their care (Leino-Kilpi *et al.* 1998, 1999, Rankinen *et al.* 2007).

Participants

The study population consisted of all ambulatory surgery patients in one university hospital in Finland during a 6-month period in 2004 (March to August). The inclusion criteria were age over 18 years, Finnish speaking, no cognitive disabilities, capable of completing the questionnaire and giving informed consent. Altogether, 200 patients were eligible but 50 declined to participate, and five questionnaires were discarded because of missing data. The final response rate was thus 73% (145/200). From these patients, only orthopaedic patients ($n = 120$) were selected, which made the group more homogeneous, based on previous results with the instrument (Rankinen *et al.* 2007). A power analysis was performed and this showed that 120 patients were needed for a power level of 0·80, an anticipated moderate relationship ($r = 0{\cdot}30$) and a probability level of 0·05 (Cohen & Cohen 1984).

Data collection

The data were collected with two structured parallel instruments (Leino-Kilpi *et al.* 1998, 1999): the Hospital

Patient's Knowledge Expectations Scale and the Hospital Patient's Received Knowledge Scale, which had been developed earlier (Leino-Kilpi *et al.* 2005, Rankinen *et al.* 2007). Both of these 32-item (plus 13 sub-items – total 45) instruments measure empowering knowledge and include six subscales: bio-physiological (seven items + 13 sub-items; e.g. knowledge about illness, symptoms, treatment and complications), functional (seven items; e.g. mobility, rest, nutrition and body hygiene), experiential (three items; e.g. emotions and hospital experiences), ethical (nine items; e.g. rights, duties, participation in decision-making and confidentiality), social (two items; e.g. families, other patients and patient unions) and financial (four items; e.g. costs and financial benefits) dimensions of knowledge (Leino-Kilpi *et al.* 1998, 1999).

Content validity of the instruments was based on the theoretical literature on knowledge as well as on statements by an expert panel (three nurses, two physicians and three researchers). The instruments were piloted with a sample of 10 ambulatory surgery patients, but no changes were needed.

The reliability (internal consistency) of the instruments was estimated using Cronbach's alpha coefficient, which was 0·930 for the total of 32-item Hospital Patient's Knowledge Expectations Scale and 0·771 (experiential) – 0·953 (economical) for its subscales, and 0·901 for the total Hospital Patient's Received Knowledge Scale and 0·762 (functional) – 0·970 (economical) for its subscales. The required Cronbach's alpha coefficient for a new measure is 0·7 (Burns & Grove 2005).

The Hospital Patient's Knowledge Expectations Scale was completed before the preoperative education session, 2 weeks prior to their ambulatory surgery, and the Hospital Patient's Received Knowledge Scale 2 weeks after surgery. Both were assessed on a four-point scale (1 = strongly disagree to 4 = strongly agree), with higher scores indicating higher levels of knowledge expectations and perceptions of received knowledge. The response option 'not applicable' (0) was excluded from further analysis.

The following patient demographic characteristics were included: gender, age, basic and professional education, employment status, employment in social and health care, long-term illness, earlier ambulatory surgery and level of anxiety.

A nurse on the ward gave the first questionnaires to patients before the education session. Patients returned the first questionnaire in sealed envelopes to the nurse. The second questionnaire was given to patients after surgery and they returned it by mail to the researcher.

Ethical considerations

All relevant permissions and ethics approval to conduct this research were obtained from the organization concerned (ETENE 2004). Patients were informed (in writing) of the purpose of the study and the principles of voluntary and anonymous participation and gave written informed consent.

Data analysis

The data were analysed statistically using SAS System for Windows, release 9.1 (SAS Institute Inc., Cary, NC, USA). Summary variables of the Hospital Patient's Knowledge Expectations Scale and the Hospital Patient's Received Knowledge Scale were constructed on six dimensions of knowledge – bio-physiological, functional, experiential, ethical, social and financial – by calculating the means for the corresponding items. In addition, the total index of knowledge was calculated by using the means of the six summary variables. The summary variable was accepted if the patient had answered at least 50% of the items. Differences in means between knowledge expectations and perceptions of received knowledge were tested by using the *t*-test for dependent samples. A one-way analysis of variance with contrasts was used to test the effect of the demographic variables on knowledge expectation and perceptions of received knowledge.

In addition, variables hereafter called HIT variables were calculated from the differences between knowledge expectations and perceptions of received knowledge in six summary variables and classified into three classes using the mean ± SD as limits: (1) received more knowledge than expected (difference > mean + SD); (2) as expected (mean−SD ≤ difference ≤ mean + SD); and (3) less than expected (difference < mean−SD). These HIT variables were explained using a multinomial logistic regression analysis, where the risk describes the probability of not receiving the expected knowledge, using the first of each category of the explaining variable (demographic variables such as age and gender) as reference category (with risk = 1). For example, the risk of missing the expected knowledge was 5·433 times higher in the oldest age category compared with young people (P = 0·041) (see Table 4.).

The effect of sociodemographic variables (gender, age, basic education, professional education, employment status, previous ambulatory surgery, long-term disease and anxiety) and education from the pre- to postoperative phases on knowledge expectations and perceptions of received knowledge was tested using a multinomial logistic regression

analysis. In all tests, the level of statistical significance was set at $P < 0{\cdot}05$ (Burns & Grove 2005).

Results

Sample characteristics

A total of 120 ambulatory orthopaedic surgery patients were enrolled in the study (Table 1). Most of the operations were arthroscopies (43%) of the knee ($n = 24$), shoulder ($n = 23$), ankle ($n = 2$) or elbow ($n = 2$). Other operations included hardware removal and various hand operations. Over half (54%) of the participants were women (Table 1). The average age of participants was 45·85 years (range 19–83, SD 13·95). Nine years of schooling was the single largest category of basic education (46%); in professional education the largest category was a first degree. Half of the patients (53%, $n = 63$) had had earlier ambulatory surgery.

Table 1 Sample characteristics ($n = 120$)

Variables	Frequency	Per cent
Gender	120	
Female	65	54
Male	55	46
Age in years	120	
19–34	29	24
35–50	43	36
51–65	40	33
66–83	8	7
Basic education	117	
6 years' schooling	28	24
9 years' schooling	54	46
12 years' schooling	35	30
Professional education	112	
None	17	15
Secondary level	48	43
Upper secondary/college	30	27
Polytechnic/university	17	15
Employment status	120	
Employed	77	64
Retired	20	17
Homework	4	3
Student	6	5
Unemployed	11	9
Sick leave	2	2

Knowledge expectations and perceptions of received knowledge

Patients had high knowledge expectations (Table 2). The mean for all dimensions was 3·350 (Scale 1–4). Questions about knowledge expectations and perceptions of received knowledge were answered by 113 of the 120 patients. The highest knowledge expectations were recorded in the bio-physiological (mean 3·597) and the lowest in the experiential (mean 3·022) dimension. The second lowest knowledge expectations were seen in the social dimension (mean 3·154). In the bio-physiological dimension, the highest expectations were found for knowledge of possible complications (mean 3·823) and how to prevent complications (mean 3·789), and in the functional dimension in aspects such as what kind of physical exercise is allowed (mean 3·791). In the experiential dimension, expectations were the lowest concerning feelings of anxiety or fear (mean 3·031) and who they could tell about their feelings (mean 2·96).

Patients perceived that they received less knowledge than they had expected (Table 2). The mean for all dimensions of received knowledge was 2·877. The most knowledge was received on the bio-physiological dimension (mean 3·614) and the least on financial (mean 1·954). In the bio-physiological dimension, patients perceived that they received most knowledge on eating and drinking (mean

Table 2 Differences between ambulatory orthopaedic surgery patients' knowledge expectations and received knowledge (scale 1–4) on the dimensions of knowledge

		Expected		Received			
Dimensions of knowledge (32 items plus 13 sub-items)	n	Mean	SD	Mean	SD	Difference	P
Bio-physiological knowledge (7 items plus 13 sub-items)	108	3·597	0·476	3·614	0·403	+0·017	0·76 ns
Functional knowledge (7 items)	96	3·488	0·528	3·270	0·597	−0·218	0·007
Experiential knowledge (3 items)	83	3·022	0·871	2·562	0·967	−0·460	0·002
Ethical knowledge (9 items)	100	3·360	0·633	2·597	0·860	−0·763	< 0·001
Social knowledge (2 items)	78	3·154	0·819	2·417	1·005	−0·737	< 0·001
Financial knowledge (4 items)	85	3·307	0·858	1·954	0·988	−1·353	< 0·001
Total	113	3·350	0·601	2·877	0·715	−0·473	< 0·001

t-test for dependent samples.

3·897), selecting an escort from hospital (mean 3·897) and such aspects as when they could take a shower or how to wash before the operation (mean 3·856). In the financial dimension, they perceived that they received the least knowledge on insurance details (mean 1·924) and social benefits (mean 2·069).

Patients perceived that they received the second greatest amount of knowledge on the functional dimension (mean 3·270), including such aspects as when could they take a shower (mean 3·835) or what kind of physical exercise they were allowed to do (mean 3·45). They perceived that they received the second lowest amount of knowledge on the social dimension (mean 2·417), such as whether there was someone whom family members could contact for information (mean 2·29).

The difference between expectations and perceptions of received knowledge was clear (Table 2). The smallest negative mean difference (d) was found on the functional ($d = -0{\cdot}218$, $P = 0{\cdot}007$) dimension, the greatest on the financial ($d = -1{\cdot}353$, $P \leq 0{\cdot}001$) dimension. Patients expected more knowledge than they perceived that they received on all other dimensions except the bio-physiological ($d = +0{\cdot}017$, $P = 0{\cdot}760$).

The greatest negative mean differences at the item level were recorded for ethical knowledge, such as knowledge about patient ombudsman (who can give advice on issues about patients' rights) (−1·363), or about whether patients are allowed access to their own medical records (−1·323); and for financial knowledge, such as medication costs (−1·296) or social benefits (−1·164). Patients perceived that they received more knowledge than they expected on the bio-physiological dimension, such as about selecting an escort from hospital (+0·675), how to wash (+0·465) or recommendations for eating and drinking (+0·417).

Table 3 Relationship between knowledge expectations and received knowledge (scale 1–4) and patients' demographic variables

	Knowledge expectations			Received knowledge		
Demographic variables	Mean	SD	*P*	Mean	SD	*P*
Age in years			**< 0·001**			0·249
19–34	2·976	0·743		2·684	0·554	
35–50	3·389	0·496	**0·003**	2·983	0·762	0·100
51–65	3·465	0·516	**< 0·001**	2·841	0·679	0·384
66–83	3·891	0·168	**< 0·001**	3·164	1·029	0·098
Gender			0·554			0·898
Female	3·318	0·695		2·869	0·740	
Male	3·384	0·478		2·886	0·691	
Level of basic education (years)			**< 0·001**			**< 0·001**
6	3·723	2·907		3·308	0·611	
9	3·426	0·487	**0·016**	2·840	0·692	**0·004**
12	2·900	0·692	**< 0·001**	2·588	0·661	**< 0·001**
Level of professional education			**< 0·001**			**0·011**
No education	3·715	0·336		3·153	0·938	
Secondary level	3·411	0·496	0·064	2·980	0·627	0·388
Upper secondary/college	3·253	0·685	**0·010**	2·585	0·692	**0·010**
Polytechnic/university	2·867	0·748	**< 0·001**	2·551	0·528	**0·015**
Employment status						
Employed	3·432	0·593	0·084	2·797	0·679	0·102
Retired	3·577	0·465	0·119	3·182	0·804	**0·033**
Other (unemployed, homework, student)	3·168	0·697	0·221	2·862	0·705	0·718
Employed in social or health care			0·139			0·285
No	3·389	0·526		2·929	0·717	
Yes	3·198	0·791		2·762	0·684	
Chronic illness			0·344			0·571
No	3·301	0·655		2·841	0·740	
Yes	3·407	0·508		2·919	0·688	
Earlier ambulatory surgery			0·188			**0·026**
No	3·420	0·509		2·723	0·705	
Yes	3·274	0·673		3·024	0·702	

One-way analysis of variance with contrasts.
Bold values = significant values.

Table 4 Risk of receiving less than expected knowledge (HIT)

Demographic variable	Risk of receiving less than expected knowledge (95% confidence interval)	*P*-value
Age in years		0·218
19–34	1·000	
35–50	2·010 (0·702–5·753)	0·193
51–65	1·661 (0·587–4·703)	0·339
66–83	5·433 (1·070–27·58)	**0·041**
Gender		0·187
Female	1·000	
Male	1·690 (0·775–3·684)	
Level of basic education (years)		0·157
6	1·000	
9	1·018 (0·381–2·719)	0·971
12	0·425 (0·143–1·264)	0·124
Level of professional education		0·427
No education	1·000	
Secondary level	0·424 (0·133–1·357)	0·149
Upper secondary/college	0·561 (0·160–1·965)	0·366
Polytechnic/university	0·336 (0·080–1·402)	0·134
Employment status		0·507
Retired	1·000	
Employed	0·952 (0·342–2·654)	0·926
Other (unemployed, homework, student)	0·825 (0·228–2·988)	0·770
Employed in social or health care		0·507
No	1·000	
Yes	0·738 (0·301–1·808)	
Chronic illness		0·707
No	1·000	
Yes	1·164 (0·528–2·562)	
Earlier ambulatory surgery		**0·002**
No	1·000	
Yes	0·255 (0·107–0·606)	
Anxiety		0·341
No	1·000	
Yes	1·624 (0·598–4·410)	

Multinomial logistic regression analysis.
Bold values = significant values.

Relationship between knowledge expectations, perceptions of received knowledge and demographic variables

Knowledge expectations were related to the age and level of basic education and professional education ($P \leq 0{\cdot}01$): older and less educated patients expected more knowledge than did younger and more educated patients. Perceptions of received knowledge were related to the level of basic and professional education and earlier ambulatory surgery: less educated patients and those with no earlier ambulatory surgery perceived that they received more knowledge than more educated patients and those with previous experiences of ambulatory surgery ($P = 0{\cdot}026$) (Table 3).

We also calculated the risk of receiving less knowledge than expected, classified into three classes (HIT): more than expected, as expected and less than expected. The risk of receiving less knowledge than expected was 5·433 times higher for patients aged 66–83 years than for those aged 19–34 years. The risk of receiving less knowledge than expected was 0·255 times lower for patients who had had earlier ambulatory surgery than for those with no earlier surgery (Table 4).

Discussion

There are some limitations in this study. These have to do with the instrument, patients' awareness about their expectations and the sample. First of all, with respect to the instrument (Hospital Patient's Knowledge Expectations Scale and Hospital Patient's Received Knowledge Scale): these were used for the first time with this group of patients. Content validity was based on careful literature review and the opinion of a panel of experts. Reliability (consistency in sum variables), measured by Cronbach's alpha, indicated good consistency. However, it is possible that some of the concepts used might have been difficult for the patients to understand. It is also possible that the patients were not aware of their expectations: they did not know what they could expect. Nevertheless, there were always more than 65% of patients (78/120) who answered the questions about knowledge expectations. In the instrument, patients had alternatives to choose from to describe their knowledge expectations, which made it easier to name the expectations. A further limitation concerned the sample, which was drawn from only one of five hospitals in Finland. The results cannot therefore be generalized to the rest of the hospitals in Finland, even though practices in ambulatory surgery patient care are quite similar throughout Finland. Therefore, further research would be needed to test their wider generalizablility within and beyond Finland.

Patients' knowledge expectations varied. However, the results of this and earlier studies indicate that patients do have knowledge expectations. There were clear differences between different dimensions of knowledge. Patients expected knowledge particularly on the bio-physiological and on the functional dimensions. These results are in line with earlier findings (Linden & Bergbom Enberg 1995, Thatcher 1996, Dewar *et al.* 2004). For example, on the experiential and social dimensions, the standard deviations were quite high (0·871–0·819). Knowledge expectations were the highest on the bio-physiological dimension and the lowest on the social dimension. Before surgery, the social dimension will

What is already known about this topic

- The volume of ambulatory orthopaedic surgery is increasing as technology advances and the population ages.
- Shorter hospital stays are placing ever greater demands on patient education.

What this paper adds

- Patients expected more knowledge than they actually perceived that they received on all dimensions except the bio-physiological.
- The gap between patients' knowledge expectations and perceptions of received knowledge was the greatest on the experiential, ethical, social and financial dimensions.
- Older, less educated patients and those with no previous experience of ambulatory surgery perceived that they received less knowledge than they expected.

obviously be seen as less important, while the role of friends and family is more important postoperatively.

Patients expected more knowledge than they actually perceived that they received on all other dimensions except the bio-physiological. This result is in line with earlier findings (Linden & Bergbom Enberg 1995, Sigurdardottir 1996, Bernier *et al.* 2003). At the item level, the biggest differences in knowledge expectations and perceptions of received knowledge were in ethical knowledge, such as knowledge about the patient ombudsman or patients' rights, and on financial knowledge, such as knowledge about medication costs or social benefits.

Age, level of basic and professional education and earlier ambulatory surgery had a statistically significant relationship with knowledge expectations and perceptions of received knowledge. Older patients had more knowledge expectations than younger patients, but there were no age differences in perceptions of received knowledge. The risk of receiving less knowledge than expected (HIT) was more than five times greater among older patients than among younger patients. However, in the absence of previous research, it is hard to define the appropriate limit for this risk. Less educated patients had more knowledge expectations and perceived that they received more knowledge than more educated patients. This result might indicate that less educated patients are more active in the education process and have more questions than more highly educated patients. More highly educated patients may also be more knowledgeable about their operations and therefore have fewer knowledge expectations than less educated patients. Patients with earlier ambulatory surgery also perceived that they received more knowledge than those with no earlier ambulatory surgery. It is likely that patients with previous experience of ambulatory surgery are also more knowledgeable about the operation. However, it was not possible to compare our results with earlier research data due to the lack of such earlier research.

Conclusion

Imbalance between expectations and perceptions of received knowledge can lead to ineffective preoperative preparation, unpleasant feelings or even surgical complications such as infection. It can also cause extra costs for the patient and the organization. Those problems can be avoided by a careful analysis of patients' expectations and tailoring education accordingly. Knowledge provision must be varied and the six dimensions of knowledge studied here can be used in patient education.

Some patients require special attention in knowledge provision. Particularly, in the case of older patients, attention should be focused on fulfilling knowledge expectations, as these people may have more expectations than younger people due to their illnesses and life situations. They may also have cognitive problems that affect their learning ability, make up the vast majority of all patients receiving education, and their numbers are on the rise worldwide. This makes assessing knowledge expectations and tailoring education according to them particularly important, as their care may be very demanding and costly in the case of complications.

In earlier studies, patients' received knowledge has been studied postoperatively. Our study provided information about how patients' knowledge expectations and perceptions of received knowledge are related at different stages. A limitation of this study was that it was conducted with a small number of patients in one country. In future, more generalizable knowledge is needed to assist in the development, planning and implementation of patient education. Information on other patient groups and testing of the impact of different educational methods on patients are also needed, for example, the Internet.

Author contributions

HLK, AH and SS were responsible for the study conception and design and KH was responsible for the drafting of the manuscript. SR performed the data collection and AK performed the data analysis. KH, HLK, AH, KJ, AK, HV

and SS made critical revisions to the paper. AK provided statistical expertise. HLK and SS supervised the study.

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