

Comparing modular and personal service delivery in specialised outpatient care: A survey of haematology and oncology patient preferences

Short Title: Patient preferences in outpatient care

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Abstract

Background: Oncology and haematology are shifting from inpatient to outpatient care, requiring new care delivery models. This study compares preferences of oncology patients treated by named nurses in a traditional specialty-focused day hospital and haematology patients treated without named nurses in a modularised day hospital. **Methods:** Questionnaires to explore patient preferences on number of treating nurses and named nurses, and satisfaction in day hospital care were distributed to 300 haematology and 410 oncology patients. Binomial logistic regressions were performed to study how background variables influenced preferences for having i) a named nurse or ii) maximum three treating nurses in the day hospital. **Results:** In 2016, 156 (52%) haematology and 289 (70%) oncology surveys were completed and returned. Both groups were satisfied with day hospital care. Haematology patients preferred named nurses less often than oncology patients (OR=0.09, $p<0.0005$). Haematology patients were less likely to prefer a maximum of three treating nurses (OR=0.12, $p<0.0005$). **Conclusion:** This study suggests that patients can be satisfied with outpatient care with or without named nurses. However, as several factors affect patient satisfaction and experience, more in-depth research is needed to understand how modularisation and patient preferences may be linked.

Key words: survey results, modularisation, patient perspective, healthcare, outpatient care, healthcare delivery

Introduction

Oncology and haematology care is evolving from inpatient to outpatient care. This change is supported by different operational management models, such as modularisation. Modularisation can be defined as ‘building a complex product or process from smaller subsystems that can be designed independently yet function together as a whole’.¹ It is considered to have the potential to improve healthcare delivery by enabling service customisation through mixing and matching standardised service modules.²⁻⁵ In modularity, larger systems, such as haematology services, are divided into smaller subsystems or modules^{5,6} with clearly defined interfaces and functions⁷ and comprising several components.⁸

Healthcare modularisation can be considered from different perspectives. From an operational perspective, different units, such as outpatient clinics and day hospitals, are independent modules, and different operations within these units are their components. From another perspective, clinical pathways with different steps can be seen as one example of modularisation.⁹ The needs and requirements of different patients and healthcare organisations vary. Thus, modularisation can be applied differently in diverse situations and contexts, causing modularisation to take varying appearances.¹⁰

Healthcare modularisation studies are scarce. Current literature focuses on the modularisation of elderly or mental care^{2,3,8,11} and less in hospital care^{10,12}. Limited knowledge on the outcomes of applying modularisation in hospital care exists and current literature focuses on the organisational perspective of modularisation.^{10,12} More research is needed to understand how patients experience modularisation. Prior studies indicate that modularisation in hospital outpatient care may

streamline patient flow and communication.^{10,12} Standardised interfaces may be the key to enhanced patient flow.¹³ In addition, the model may have potential in decreasing information asymmetry between healthcare professionals and patients.¹³ However, as the application of modularity varies, the outcomes of modularisation are context-specific as well.¹²

Communication and access to information¹⁴⁻¹⁶ and continuity of care¹⁶⁻¹⁷ are important areas of outpatient and cancer care. Oncology patients have reported the importance of being under the care of the same nurse at different visits.¹⁸ Minimising the number of staff members involved in cancer care has been shown to support the formation of patient–provider relationships.¹⁷ Thus, the function of coordinators, such as nurse navigators, has been considered one way to increase care continuity and patient coordination.^{16,18-21} Nurse navigation programmes focus on improving access to care, enhancing care coordination and patient education and linking community resources.²⁰ Nurse navigators perform many tasks, including coordinating care, documenting patient treatment information, supporting patients through cancer treatment and communicating with patients between visits to care providers.^{18,22}

The purpose of this study is to explore patient preferences related to modularised and non-modularised day hospital care. From a patient perspective, in this case hospital the difference between the two operational models is that in modularised care named nurses do not exist while in non-modularised care named nurses do exist. In the modularised day hospital, modularisation has enabled more efficient staffing as the named nurse concept is not used and all nurses treat all patients. However, in non-modularised oncology care named nurses exist. This may have effect on patient perspective and thus, the specific aim is to study patient preferences concerning named nurses and the number of treating nurses in day hospital care. Additionally, this study explores

whether or not patient satisfaction with the care received differs between modularised and non-modularised care.

Methods

Description of the case

The need to enhance knowledge of patient perceptions of modularisation and the possibility of studying an interesting case of modularisation in a university hospital context, specifically in Helsinki University Hospital (HUH), generated this study. Many of HUH's outpatient day hospital services including haematology have been modularised.^{10,12} In 2010, a modularised day hospital with standardised interfaces, clear functions and components was founded to provide outpatient treatments and procedures. It covers 20 conservative and surgical specialties, including haematology. The new facility was designed to improve the efficiency of care by creating an independent day hospital where all nurses can administer treatments, mostly infusions, to many patient groups under different specialties, thus enabling larger patient volumes and diminishing the dependence on individual nurses. Being independent means the day hospital does not belong to any specialty in HUH, but it works as a standardised multispecialty unit, from which different specialties can order services. The day hospital is led by nurses. The physicians who plan and order the treatments and procedures work in the specialty outpatient clinics, not the day hospital.

Currently, the day hospital handles 16,000 visits annually, half of which serve haematology patients. All treatments and procedures have been systematically standardised and documented. Standardisation has also created clear routes and guides for efficient communication between the staff of the day hospital and the outpatient clinics. The day hospital nurses are not responsible for care coordination, patient guidance or scheduling patients' treatments. Patients receiving care in

the day hospital do not have named nurses. Patients cannot contact nurses directly between visits, and they may be treated by a different nurse at every visit. The haematology outpatient clinic handles patient appointments that do not include treatments or procedures, and patients can contact nurses there if needed. Professionals in the outpatient clinic are responsible for care coordination, scheduling patients' treatments and patient guidance, and patients do not have named nurses in the outpatient clinic.

In contrast, HUH oncology patients are treated in the oncology day hospital of the Comprehensive Cancer Center. The day hospital handles over 20,000 treatment visits annually. Both nurses and physicians work in the same unit, that is, the outpatient clinic with appointments and the day hospital are part of the same unit. In the day hospital, named nurses manage the patients' entire treatment process according to physicians' orders, including scheduling and patient guidance. The general principle is to try always to schedule the same nurse to the patient. Only if the named nurse is unavailable will the patient be treated by another nurse, and patients can contact their named nurses between visits when needed. The named-nurse role in HUH's Comprehensive Cancer Centre's oncology day hospital is similar to the role of nurse navigators, but it focuses on the treatment phase.

Haematology and oncology hospital care share common characteristics such as treatments with intravenous medications in day hospitals. Both specialties are evolving towards more day hospital focused outpatient care. Nurses in both specialties have similar tasks in day hospital care. From a patient perspective, the difference between non-modularised oncology and modularised haematology care delivery is that oncology patients have a named nurse while haematology patients do not.

Data

This study is based on questionnaires distributed to oncology and haematology patients in HUH. To support the questionnaire design, semi-structured interviews with five patients of different ages with acute lymphatic leukaemia, melanoma, breast cancer or colon cancer were conducted to explore how patients perceived service delivery. The interviews were transcribed and sent to the interviewees for a validity check.²³ The interviews were used to formulate the questionnaires. Several individuals with no medical training read the questionnaires to check their readability and clarity, and HUH's Coordinating Ethics Committee approved the study.

The questionnaires were distributed and collected by nurses, who were instructed to distribute them to all patients. The nurses distributed 410 questionnaires to oncology patients in the day hospital (outpatient care unit) and the outpatient clinic between April and May of 2016. Similarly, the nurses distributed 300 questionnaires to haematology patients in the (modularised) day hospital and the haematology outpatient clinic between April and September of 2016. The patients answered the questionnaires during their day hospital treatments or clinic visits, or they could return the questionnaires by mail.

The questionnaire used in this research was part of a larger study exploring patient preferences related to outpatient care. Two versions of the questionnaire were designed, one for haematology patients with 29 questions and the other for oncology patients with 28 questions. The two versions were tailored according to the differences between the two units, such as opening hours of the units and the provision of a stem cell transplantation, the latter of which was only asked of the haematology patients. Otherwise, the questionnaires were identical. In this study, three preference questions were used as dependent variables and presented identically in each survey, as follows:

- I am satisfied with the care I have received in the day hospital (5-point Likert scale).
- It is important that I would have a named nurse in the day hospital (5-point Likert scale).

- I wish that the following maximum number of nurses would treat me in the day hospital (multiple choice).

The Likert scale had five options: strongly agree, agree, neither agree nor disagree, disagree and strongly disagree. The third question provided the following multiple-choice answers: 1 nurse, 2 nurses, 3 nurses, 4 to 5 nurses, 6 to 10 nurses, more than 10 nurses and no preference concerning the number of treating nurses. In the analyses, the responses were regrouped by accounting for the research questions and the clinicians' insights regarding the use of personnel resources in the delivery of care.

Seven questions were used as background information (Figure 1), of which six were included as independent variables in the logistics regression and similarly asked in both questionnaires. Additionally, the specialty was identified based on differences between the questionnaires (Table 1), and it was used as an independent variable. The patients' conditions were used as background information and excluded from the regression analyses.

Please insert - Figure 1: Questions used in this study. The answer choices are shown in brackets or bullet points.

This study only included questionnaires with completed answers to the above-mentioned three questions (n = 445). The regression analyses only included questionnaires that also had completed answers to all included dependent variables (n = 380).

Analysis

The statistical analysis was carried out using SPSS version 23, with a significance level of 0.05. Descriptive data on the respondents' background information, preferences and satisfaction with day hospital care were documented (Tables 1 and 2). Binomial logistic regressions were performed to study the effects of specialty, gender, age, other diseases, first time (year) in the day hospital, number of times treated in the day hospital in the previous year and number of treating nurses in the day hospital on the likelihood of the participants' preferences for having i) a named nurse in the day hospital and ii) a maximum of one to three treating nurses in the day hospital (Table 3). All independent variables were categorical; thus, no linearity testing was conducted. The answers to the statement 'It is important that I have a named nurse in the day hospital' were categorised into two groups in the binomial logistics regression: 'strongly agree' or 'agree' versus other answers. Meanwhile, the answers to the question 'I wish the following maximum number of nurses would treat me in the day hospital' were categorised into two groups in the binomial logistics regression: a preference for a maximum of one to three nurses versus other answers. The achieved power of the study (over 0.99) was calculated post-hoc for the binary logistics regressions using the given alpha value (0.05), sample size ($n = 380$) and effect size (odds ratio [OR] = 0.12).

Results

During the survey period, 3,264 oncology patients and 1,166 haematology patients visited the units (Figure 2). Of these, 13% of oncology patients and 26% of haematology patients received the questionnaires. Most of the oncology questionnaires ($n = 319/410$, 78%) and over half of the haematology questionnaires ($n = 168/300$, 56%) were filled out and returned to the researchers. In total, 445 questionnaires (289/410 [70%] oncology questionnaires and 156/300 [52%] haematology questionnaires) met the completion criteria and were categorised as such. Ultimately, 380/445 (85%) of the completed questionnaires were included in the study's two regression

analyses, because 65 (15%) questionnaires had missing values. Table 1 shows the participants' self-reported characteristics.

Please insert - Figure 2: Questionnaire distribution and completion. Oncology surveys were collected between April and May 2016 and haematology surveys between April and September 2016.

Table 1: Participants' self-reported characteristics (haematology n = 156, oncology n = 289).

Characteristic		Haematology n (%)	Oncology n (%)
Gender			
	Female	77 (49)	181 (63)
	Male	74 (47)	84 (29)
	NA	5 (3)	24 (8)
Age group			
	18–44	16 (10)	26 (9)
	45–64	60 (39)	138 (48)
	65–74	59 (38)	84 (29)
	75 and over	18 (12)	19 (7)
	NA	3 (2)	22 (8)
Other chronic disease			
	Yes	74 (47)	120 (42)
	No	81 (51)	135 (47)
	NA	1 (0.6)	34 (12)
First time (year) in the day hospital			
	2013 and earlier	50 (32)	74 (26)
	2014–2015	56 (36)	103 (36)
	2016	37 (24)	107 (37)
	NA	13 (8)	5 (2)
Number of visits to the day hospital in the previous year			
	1–5	54 (35)	102 (35)
	6–10	26 (17)	82 (28)
	11–15	24 (15)	43 (15)
	Over 15	49 (31)	57 (20)
	NA	3 (2)	5 (2)
Number of treating nurses in the day hospital in the previous year			
	1–2	25 (16)	132 (46)
	3–5	55 (35)	141 (49)
	6–10	54 (35)	11 (4)
	Over 10	20 (13)	2 (1)
	NA	2 (1)	3 (1)
Condition group			
	Breast cancer		103 (36)

	Gastro-intestinal cancer		112 (39)
	Urologic cancer		18 (6)
	Lymphoma		25 (9)
	Acute leukaemia	34 (22)	
	Chronic lymphatic leukaemia or lymphoma	16 (10)	
	Myeloma	57 (37)	
	Other	45 (29)	22 (8)
	NA	4 (3)	9 (3)

Note: NA = not available/missing value.

Both haematology and oncology patients were satisfied with the care they received in the day hospital (Table 2). Most of the oncology patients strongly agreed that they preferred having a named nurse, whereas only approximately one-fifth of the haematology patients answered similarly. Most of the oncology patients preferred having a maximum of one to three nurses in the day hospital. However, nearly half of the haematology patients had no preference with respect to the number of nurses (Table 2).

Table 2: Comparison between haematological and oncological patient groups' satisfaction, preference regarding a named nurse and preferred maximum number of treating nurses in the day hospital.

Question		Haematology n (%)	Oncology n (%)
Satisfaction with day hospital care*	5-point Likert scale		
	Strongly agree	116 (74)	231 (80)
	Agree	33 (21)	55 (19)
	Neither agree nor disagree	5 (3)	1 (0.3)
	Disagree	2 (1)	1 (0.3)
	Strongly disagree	0 (0)	1 (0.3)
Preference regarding a named nurse**	5-point Likert scale		
	Strongly agree	35 (22)	202 (70)
	Agree	28 (18)	64 (22)
	Neither agree nor disagree	66 (42)	20 (7)
	Disagree	20 (13)	1 (0.3)
	Strongly disagree	7 (5)	2 (1)
Preferred maximum number of treating nurses in the day hospital***	Multiple choice		
	Maximum of 1–3	50 (32)	245 (85)
	Maximum of 4–5	27 (17)	9 (3)
	Maximum of 6–10	4 (3)	0 (0)
	More than 10	1 (1)	1 (0)
	No preference	74 (47)	34 (12)

*I am satisfied with the care I have received in the day hospital. **It is important that I would have a named nurse in the day hospital. Answers categorised into two groups in the binomial logistics regression: strongly agree or agree versus other answers. ***I wish that the following maximum number of nurses would treat me in the day hospital. Answers categorised into two groups in the binomial logistics regression: preference for a maximum of one to three nurses versus other answers.

Preference for a named nurse. The logistic regression model was statistically significant [$\chi^2(14)=141,390$ ($p < 0.0005$)]. Of the seven predictor variables, two were statistically significant (Table 3). Haematology patients preferred named nurses less often than oncology patients ($p < 0.0005$), and patients with more than two treating nurses in the day hospital did not prefer named nurses as often as patients with one to two nurses ($p < 0.05$).

Preference for one to three nurses. The logistic regression model was statistically significant [$\chi^2(14) = 160,375$ ($p < 0.0005$)]. Of the seven predictor variables, three were statistically significant (Table 3). Haematology patients preferred having a maximum of one to three nurses less often than oncology patients ($p < 0.0005$). As well, patients with 15 or fewer visits to the day hospital preferred a maximum of one to three nurses more often than patients with more than 15 visits to the day hospital ($p < 0.05$). Patients with more than two treating nurses did not prefer one to three treating nurses as often as patients with one to two nurses ($p < 0.01$).

Table 3: Logistic regressions predicting the likelihood of 1) strong or very strong preferences for a named nurse and 2) preferring a maximum of one to three nurses in a day hospital. For both analyses, the following variables were used: specialty, gender, age group, other chronic diseases, first year in the day hospital, yearly visits to the day hospital and number of treating nurses in the day hospital.

Regression analysis 1: Likelihood of strong or very strong preferences for a named nurse		
Sample size n = 380, Nagelkerke $R^2 = 45.1\%$, model correctly classified 82.1% of cases. Sensitivity: 87.4%, specificity: 68.0%, positive predictive value: 88.0%, negative predictive value: 66.7%.		
Variables	OR (95% CI)	P value

Specialty (Haematology)	0.09 (0.04–0.17)	< 0.0005
Gender (Male)	0.91 (0.49–1.70)	0.776
Age group		0.785
18–44	1.12 (0.30–4.16)	0.868
45–65	1.17 (0.43–3.19)	0.763
66–74	0.83 (0.30–2.29)	0.716
Other chronic diseases (No)	0.56 (0.30–1.04)	0.065
First year in day hospital		0.257
2013 or earlier	0.76 (0.36–1.59)	0.461
2014–2015	1.39 (0.64–3.05)	0.407
Yearly visits to day hospital		0.100
1–5	0.83 (0.33–2.07)	0.690
6–10	2.46 (0.998–6.06)	0.051
11–15	1.48 (0.59–3.70)	0.408
Number of treating nurses in day hospital		0.033
3–5 nurses	0.44 (0.20–0.986)	0.046
6–10	0.22 (0.07–0.63)	0.005
more than 10	0.53 (0.14–2.02)	0.348
Regression analysis 2: Likelihood of preferring a maximum of one to three nurses		
Sample size n = 380, Nagelkerke $R^2 = 47.2\%$, model correctly classified 79.5% of cases. Sensitivity: 87.2%, specificity: 65.7%, positive predictive value: 81.9%, negative predictive value: 74.4%.		
Variables	OR (95% CI)	P value
Specialty (Haematology)	0.12 (0.07–0.23)	< 0.0005
Gender (Male)	0.68 (0.38–1.22)	0.198
Age group		0.915
18–44	0.70 (0.19–2.54)	0.587
45–65	0.70 (0.26–1.91)	0.487
66–74	0.71 (0.26–1.97)	0.512
Other chronic diseases (No)	0.80 (0.45–1.41)	0.435
First year in day hospital		0.091
2013 or earlier	1.04 (0.51–2.13)	0.91
2014–2015	2.08 (0.97–4.46)	0.060
Yearly visits to day hospital		0.020
1–5	2.03 (0.86–4.78)	0.106
6–10	3.24 (1.42–7.39)	0.005
11–15	3.04 (1.23–7.55)	0.016
Number of treating nurses in day hospital		< 0.0005
3–5	0.38 (0.19–0.76)	0.006
6–10	0.11 (0.04–0.30)	< 0.0005
more than 10	0.30 (0.08–1.15)	0.080

Note: Above compared to specialty: oncology, gender: female, age group: 75 or older, other chronic diseases: yes, first year in day hospital: 2016, yearly visits to day hospital: more than 15, number of treating nurses: 1–2

OR = odds ratio, CI = confidence interval, *P* value = statistical significance (0.05 significance level)

Discussion

This study is the first to explore patient perspectives regarding modularised hospital services. It shows that patient preferences are equivocal and that patients may be satisfied with overall day hospital care regardless of whether they have a named nurse. It also finds that oncology patients prefer named nurses and a maximum of three treating nurses in day hospitals more often than haematology patients treated in a modularised day hospital. In addition, patients treated by more nurses prefer named nurses or a maximum of three treating nurses less often than patients treated by one to two nurses in day hospitals.

Both haematology and oncology patients are satisfied with their day hospital care. However, patient satisfaction and experience are affected by several factors;^{24,25} thus, having a named nurse is only one of many influencing factors. Nonetheless, it is noteworthy that both patient groups, despite experiencing different approaches to day hospital care organisation, are similarly satisfied with their care. However, prior research shows that although patients often report satisfaction with care,^{26,27} the results may not correlate with how patients evaluate their actual experience of services.²⁷ Thus, more studies are needed to understand how new operational models, such as modularisation, are related to patient experiences in different patient groups with varying diseases.

The tasks of named nurses are similar to those of nurse navigators.^{18,22} Communication in the nurse–patient relationship involves the transmission of both information and feelings.²⁸ Thus, relationships between oncology patients and named nurses may have influenced the oncology patients' responses. In addition to treatment visits in the day hospital, both haematology and

oncology patients have non-treatment appointments with different nurses and physicians in the outpatient clinic during their care. If patients have continuous relationships with other outpatient staff, they may not prefer to have named nurses in day hospitals. This may have been the case with the haematology patients in this study. Because this study focuses on day hospital care, the findings relate to the treatment phase of outpatient care, and they cannot be compared directly with those of studies focusing on nurse navigation.^{20,22,29}

The haematology patients preferred a maximum of one to three treating nurses less often than the oncology patients, and the patients who visited the day hospital more than 15 times in the previous year favoured a maximum of three nurses less often than patients with fewer annual visits. Patients with more than two treating nurses did not prefer a maximum of three treating nurses as often as patients with maximum two treating nurses. These findings are noteworthy, because oncology patients have reported that being under the care of the same nurse during different visits is important,¹⁸ and continuity is considered essential in outpatient care.¹⁴⁻¹⁷ Further research is necessary to gain a better understanding of the reasons behind the patients' varying answers. Minimising the number of cancer care staff is also perceived as beneficial for building patient-provider relationships.¹⁷ This issue must be addressed in modularisation if the treating nurses change often.

This study is limited to only two patient groups experiencing different approaches to outpatient care organisation. The patient groups are very similar as most of the respondents are treated for a malignant disease and thus the results may not be generalised to patients with non-malignant diseases. In addition, this research is based solely on the patient questionnaires, with no available accurate diagnoses or information on the respondents' cancer stages. The results must therefore be interpreted with such missing information in mind. Future studies are required to understand how

varying aged patients of different specialties with different diseases (malignant or not) or cancer stages prefer and perceive care delivery. In addition, future studies are needed to analyse the outcomes, patient preferences, and potential drivers of preferences of patients in more depth to evaluate the success of modularisation.

This study has further limitations. There may be other underlying factors affecting patient preferences and satisfaction that are not identified in this study. Thus, future studies in different countries and in various healthcare settings are needed to increase the generalisability of the results. The collection of the haematology questionnaires took longer (seven months) than that of the oncology questionnaires (two months) due to challenges in distributing them to the haematology patients. Although the nurses were instructed to distribute the questionnaires to all patients, not all patients received them. Moreover, although the patients were given structured information letters explaining the questionnaire and the study, and although all nurses were similarly informed, different nurses possibly introduced and discussed the study with patients differently. These issues might have influenced the patients' likelihood of answering the questionnaire, creating answer bias. Furthermore, although the questionnaire explained the term 'named nurse', different patients might have understood the concept differently. This study assessed patient preferences in a real-world setting after care delivery decisions (modularisation) had been made. Thus, this research did not evaluate the applicability of modularisation to the oncology treatment setting.

It is possible that satisfied patients were more eager to answer the survey than dissatisfied patients. Because the questionnaires used in this study were part of a larger survey focusing on patient preferences concerning the delivery of outpatient care and communication, patient satisfaction was

measured with only one question. Thus, a focused questionnaire survey should be conducted to gain an in-depth understanding of patient experiences and satisfaction with outpatient care.³⁰

This study explored patient preferences in modularised and non-modularised day hospital care delivery. This study demonstrated that named nurses do not necessarily lead to better patient satisfaction, but may introduce system inefficiencies and rigidity. However, different patients and patient groups may have differences in preferences regarding named nurses. These issues should be taken into account when planning and managing services. The strengths of this research lie in a real-world setting and a high amount of completed surveys with a high response rate. Patient preferences were assessed directly from the patients' responses and not through the staff. This study offers insights for further development of day hospital care. This issue is important, as care shifts from an inpatient to an outpatient focus.

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