



Patient satisfaction with telephone care assessment among patients with non-urgent prehospital emergency care issues: A cross-sectional study

P. Roivainen ^{a,*}, M.J. Hoikka ^b, T.I. Ala-Kokko ^{c,1}, M. Kääriäinen ^{d,1}

^a Research Unit of Nursing Science and Health Management, University of Oulu, Oulu, Finland

^b Emergency Medical Services, Kainuu Central Hospital, Sotkamontie 13, 87300 Kajaani, Finland

^c Research Group of Surgery, Anaesthesia and Intensive Care Medicine, University of Oulu, Medical Research Center, Division of Intensive Care, Oulu University Hospital, PO Box 21, 90029 Oulu, Finland

^d Faculty of Medicine, Research Unit of Nursing Science and Health Management, University of Oulu, Medical Research Center, Oulu University Hospital, Finland

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ABSTRACT

Background: Telephone care assessment (TCA) by a nurse have shown to reduce the number of emergency department (ED) visits and emergency medical services missions (EMS). The present study aimed to describe satisfaction among patients with non-urgent prehospital medical issues that were transferred to TCA instead of receiving EMS. These results could provide a basis for developing the telephone services and emergency care pathways.

Methods: This cross-sectional study included 765 patients with non-urgent issues that were transferred to a telephone care assessment, after a risk and urgency assessment by an emergency medical communications operator. One week later, patient satisfaction was evaluated in a structured telephone interview with randomized patients.

Results: 127 telephone interviews were completed. Most patients (70.9–85.0%) were highly satisfied with the telephone care assessment. In particular, patients who were unsure of the urgency of their own health condition and the need for EMS, were highly satisfied (95.3%). Patients that received EMS after the telephone care assessment were more satisfied than those that received telephone guidance or those directed to other health care services (91.4% vs. 65.5% vs. 67.9%, $p = 0.002$).

Conclusion: Patients with non-urgent prehospital emergency issues were mainly satisfied with telephone care assessment. In considering ways to reduce the increasing load on emergency medical services, a telephone care assessment could be a good option, without reducing patient satisfaction.

1. Background

The growing number of calls to emergency services for non-urgent issues is a global challenge in welfare states [1–4]. The need for new ways to respond to this demand has increased, due to overuse of emergency medical communication centers (EMCCs), emergency departments (EDs), and prehospital emergency medical services (EMSs) [1,4–6]. In other health care services, telephone care assessment (TCA) by a nurse was shown to reduce ED visits, increase patient safety, increase patient satisfaction, and reduce the strain on the EMS [1,5,7–9]. A previous Finnish study showed that TCA could reduce non-urgent EMS missions by one third [4].

Patient satisfaction is an important patient centered indicator in assessing the quality of care and system performance, especially where reform in care pathways is planned. However, studies on patient satisfaction for TCA in prehospital EMS issues are scarce, and results are inconsistent. In a systematic review, patient satisfaction was fairly good and similar between patients that underwent TCA and those who received other health care services [7]. Also, adherence to treatment were higher in patients that underwent TCA [9]. In other studies however, patients that underwent TCA instead of other forms of services were less satisfied and complained slightly more than those who received EMS [5,8]. A systematic review of TCA in non-urgent EMS issues showed that patient satisfaction was generally high, but possibly

* Corresponding author.

E-mail addresses: petri.roivainen@student.oulu.fi (P. Roivainen), marko.hoikka@oulu.fi (M.J. Hoikka), tero.ala-kokko@oulu.fi (T.I. Ala-Kokko), maria.kaariainen@oulu.fi (M. Kääriäinen).

¹ Contributed equally.

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lower than the satisfaction of patients that received EMS [10]. However, previous studies addressing the transfer of non-urgent prehospital EMS patients to the TCA have focused on the systems structure, safety and system performance, rather than precisely on patient satisfaction [10].

In some countries EMCC system, in addition to risk and urgency assessment, includes TCA made by nurses [2–4]. In Finland, EMS dispatch is based on criteria based risk assessment without health care assessment [2–4] and there is a target is to introduce the national 116 117 non-emergency medical on-call service in addition to EMCC. This opens the possibility to transfer non-urgent calls from EMCC to TCA for more detailed assessment. The present study aimed to describe satisfaction among patients with non-urgent prehospital medical issues that were transferred to TCA instead of receiving EMS. These results could provide a basis for developing the telephone services and emergency care pathways.

2. Methods

2.1. Study design

This study had a descriptive, cross-sectional study design.

2.2. Setting

This study was conducted as a part of a pilot study, which investigated whether nurse-directed TCA could reduce the number of non-urgent ambulance missions performed in northern Finland [4]. The study was conducted in the Kainuu Hospital District, which covered 74,000 inhabitants, mostly living in rural areas. Annually, one-fifth (5000) of EMS calls were due to non-urgent issues in the area studied.

During the study period (1 March–28 April 2018), all calls ($n = 765$) to the EMCC classified as non-urgent priorities were transferred to the TCA, instead of dispatching an EMS unit. Nurses located in the central hospital conducted the 24-h telephone service. There were ten TCA-nurses, all with extensive work experience, knowledge of the area services, and education in triaging and assessing the need for care over the phone. The nurses use regional triage guidelines to assess care needs over the phone. They have access to the patient's medical history in electronic patient record system and can consult a doctor at the emergency department if necessary. Nurses used a callback system, where they called the patient, assessed their care needs on the telephone, based on regional triage guidelines, and provided health counseling and service guidance to citizens in acute non-emergency situations.

2.3. Instrument

To study patient satisfaction with the TCA, the telephone interview instrument was developed. The instrument used in the telephone interview was developed for this study based on telephone triage studies [11–15] in the literature and national guidelines for EMS and quality of health care [16–18]. The content validity of the instrument was tested by seven experts in EMCC (quality manager and healthcare experts), paramedic (Master of Nursing), EMS senior doctor, nursing (TCA department manager and doctoral students). Based on expert evaluations, the questions were clarified, and five questions were removed. After these modifications, the instrument was pilot-tested on a test sample of patients with non-urgent EMS issues ($n = 10$) to ensure the questions were clear and comprehensible. After this pilot-testing, no new modifications were made.

The instrument consisted of nine background questions and four sub-dimensions of patient satisfaction. The background questions included: age, gender, distance to open ED services, whether the patient lived alone, whether the patient received home care or home medical care, whether the interviewee was the patient that called EMCC, and whether the patient had desired a care-needs assessment directly from the EMS, instead of a TCA. Reason of EMCC contact and dispatch time were

collected from the TCA nurse's records. The four sub-dimensions of patient satisfaction were: care pathway functionality (6 items), telephone care assessment flexibility (5 items), EMCC actions (3 items), and the care-needs assessment (3 items; [Supplementary Table 1](#)). Sub-dimensions of patient satisfaction were self-assessed on a scale of 0–10 (0 = not satisfied at all; 10 = completely satisfied).

2.4. Data collection

Data were collected via a telephone interview conducted one week after the TCA by the main researcher (PR) with a structured instrument. The same telephone number was used to contact interviews as during the TCA. The researcher conducted the entire interview and recorded answers on a form during the interview, as interviews were not audio recorded. The interviewer currently works as an EMS teacher, has a master's degree in nursing and a doctoral student (PR). The interviewer has previously worked for 14 years as a paramedic and for three years as a nurse in the emergency and intensive care unit.

To produce reliable correlation estimates between variables, the sample size had to be five times the number of sub-dimensions questionnaire items [19], which corresponded to at least 125 patients. To achieve this sample size, all patient contacts ($n = 765$) were randomly selected weekly for the interview. For eight weeks, data from the patients of the previous week were transferred to the SPSS program and the patients were randomly selected to the interview call using the SPSS program. Interviewees were selected, until 15 complete responses were achieved in each week of the study period (1 March – 28 April 2018). We excluded patients that were under 18 years of age or mentally incapacitated. The flow chart of the 429 randomly selected patients is presented in [Fig. 1](#).

2.5. Data analysis

Data analyses were performed with IBM SPSS Statistics for Windows, version 25.0. Descriptive statistics were generated using frequencies and percentages with categorical variables and means. Exploratory factor analysis was used since there were no expectations based on theory regarding the number of factors or nature of variables [20].

An exploratory factor analysis, with principal axis factoring and Promax rotation was used to identify four summated variables (sub-dimensions of the instrument) ([Supplementary Table 1](#)). The sample size was adequate for performing a factor analysis based on the result (0.858) of the Kaiser-Meyer-Olkin test. In addition, Bartlett's Test for Sphericity (1244,197; $df = 136$, $p < .001$) indicated that the data were suitable for factor analysis. The factor model was based on eigenvalues > 1 and communalities ≥ 0.30 . The sum variables were formed and classified as either satisfied (scores: 6.1–10) or dissatisfied (scores: 0.0–6.0). Classified background variables and sum variables were compared between groups with the Chi-squared test. The significance level for statistical test was set at $p < .05$.

The internal consistency of the instrument was evaluated with Cronbach Alpha coefficient. The results varied from 0.865 to 0.968, which was above the 0.7 cut-off value for indicating good consistency for a newly developed instrument [21] ([Supplementary Table 1](#)).

2.6. Ethical considerations

This study is a part of a pervasive pilot study that was approved by the Kainuu Central Hospital (142/13900/18) and Regional Ethics Committee (91/2017). Research permission covered interviews and data of non-responders. Oral informed consent was accepted according to the ethics committee decision. At the beginning of each call, each patient was informed about the study by the interviewer, and patients were asked to participate into the study. The patients were given a reasonable amount of time to consider whether to consent. Informed consent was recorded manually on the interview form, those who did

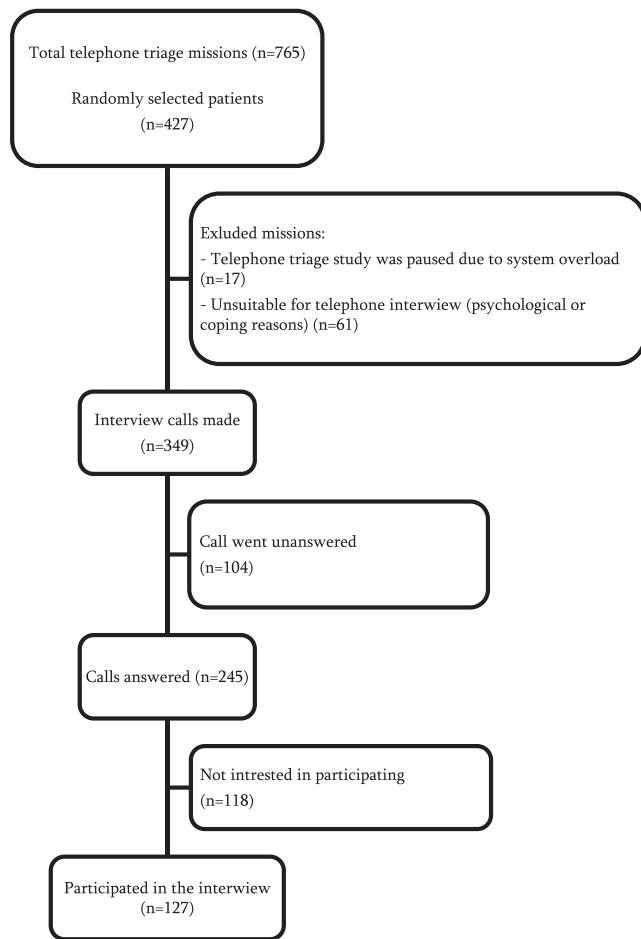


Fig. 1. Flowchart of the study.

not wish to participate were recorded as “not participating” and recorded in the statistics. The patients were informed that the interview was voluntary, and participation would not affect their future social or health services or care in any way. The interviews were conducted anonymously, and patients had possibility to withdraw participation at any time [22].

3. Results

Among 427 randomly selected interview calls, 104 were unanswered. Among the remaining calls, 118 patients were not interested or were unable to participate in the interview; according to the interviewer’s assessment, 61 patients were unsuitable for the interview, due to psychological or coping reasons (acute psychosis, dementia, alcohol/drug usage or strong negativity towards research during the interview), and 17 patients were not reached in time, because the telephone service was paused, due to a system overload. The final analysis included 127 patients (Fig. 1).

3.1. Patient characteristics

Data on the randomized interviewees and non-responders are shown in Table 1. The mean age of respondents was 61.9 years, and most (60.6%) were female. Nearly half of the patients (52%) lived alone; 26% received home or social care services; and 5.5% were cared for by a relative. About half of the patients (52.7%) had made the call to the

Table 1 Characteristics of patients (n = 127) and non-responders (n = 638), based on EMCC data and interview data.

Characteristic	Interviewed patients n (%)	Non-responders n (%)	P-value
Total	127	638	0.144
Gender			0.064
Male	50 (39.4)	298 (46.7)	
Female	77 (60.6)	318 (49.8)	
Missing		22 (3.5)	
Mean Age, years	61.9	72.0	0.496
Time of call			0.042
Office hours	47 (37.0)	177 (27.7)	
On-call hours	80 (63.0)	461 (72.3)	
Mean callback delay, minutes	5.7	6.8	0.150
Service provided after telephone care assessment			0.260
Guidance via telephone	29 (22.8)	105 (16.5)	
Referred to other health care services	28 (22.0)	96 (15.0)	
Referred to EMS	70 (55.1)	374 (58.6)	
Missing		63 (9.9)	
EMCC dispatch code			0.032
General weakness; unspecific symptoms	58 (45.7)	244 (38.2)	
Back, limb, or body pain	29 (22.8)	112 (17.6)	
Fall	15 (11.0)	75 (11.8)	
Others	25 (19.7)	207 (32.4)	
Caller			
Patient	67 (52.8)		
family member/friend	46 (36.2)		
health care provider	14 (11.0)		
Living environment			
Living alone	66 (52.0)		
Does not live alone	59 (46.5)		
Missing	2 (1.5)		
Support service			
No home care service required	79 (62.2)		
Home care services (including informal/family care)	40 (31.5)		
Nursing home	7 (5.5)		
Missing	1 (0.8)		
Distance to open ED services			
Less than 10 km	81 (63.8)		
More than 10 km	46 (36.2)		

Abbreviations: EMCC: Emergency medical communication center; EMS: emergency medical services; ED: emergency department

EMCC. The most common reasons for calling the EMCC were impaired general condition (45.7%), unspecified back, limb, or body pain (22.8%), and falls (11%). Close to two-thirds of the patients lived less than 10 km from the nearest ED. The average callback delay for the telephone care assessment was 5.7 min (95% CI: 4.8–6.6). Non-responders called more often during out-of-office hours than responders. Responders reported general weakness more often than non-responders. Some demographic data was missing in non-responders; gender in 22 (3.4%), age in 61 (9.6%), callback delay in 46 (7.2%), service provided after TCA in 63 (9.9%) and responders; living environment in 2 (1.5%) and support service during in 1 (0.8%).

3.2. Patient satisfaction

Based on the exploratory factor analysis, four sub-dimensions of the patient satisfaction were identified: care pathway functionality, telephone care assessment flexibility, actions of the EMCC, and the care-needs assessment on the telephone (Supplementary Table 1). Overall, patient satisfaction was mainly high; it varied between 70.9% and 85%, among the different sub-dimensions (Table 2). The most significant factors that contributed to patient satisfaction were female gender, no desire for an EMS visit, receiving an EMS visit, calling the EMCC during

Table 2
Sub-dimensions of patient satisfaction (n = 127) and factors affecting patient satisfaction.

Total N	Functionality of care pathway			Telephone triage flexibility			Actions of the EMCC			Care-needs assessed by phone		
	Satisfied n = 102	Dissatisfied n = 25	P	Satisfied n = 90	Dissatisfied n = 36	P	Satisfied n = 103	Dissatisfied n = 22	P	Satisfied n = 108 (85.0)	Dissatisfied n = 18 (14.2)	P
%	(80.3)	(19.7)		(70.9)	(28.3)		(81.1)	(17.3)		(85.0)	(14.2)	
Gender												
Male, n = 50	34 (68.0)	16 (32.0)	0.005	32 (64.0)	18 (36.0)	0.134	38 (77.6)	11 (22.4)	0.253	38 (77.6)	11 (22.4)	0.037
Female, n = 77	68 (88.3)	9 (11.7)		58 (76.3)	18 (23.7)		65 (85.5)	11 (14.5)		70 (90.9)	7 (9.1)	
Age												
<65 years, n = 68	57 (83.8)	11 (16.2)	0.286	46 (67.6)	22 (32.4)	0.309	56 (83.6)	11 (16.4)	0.709	55 (82.1)	12 (17.9)	0.215
>65 years, n = 59	45 (76.3)	14 (23.7)		44 (75.9)	14 (24.1)		47 (81.0)	11 (19.0)		53 (89.8)	6 (10.2)	
Distance to ED												
<10 km, n = 81	67 (82.7)	14 (17.3)	0.367	56 (69.1)	25 (30.9)	0.445	66 (81.5)	14 (17.5)	0.969	71 (87.7)	10 (12.3)	0.404
>10 km, n = 46	35 (76.0)	11 (23.9)		34 (73.9)	11 (23.9)		37 (80.0)	8 (17.8)		37 (80.0)	8 (17.8)	
Home care*												
^services (*)												
No, n = 79	64 (81.0)	15 (19)	0.755	61 (78.2)	17 (21.8)	0.026	64 (81.0)	13 (16.9)	0.749	67 (84.8)	12 (15.2)	0.742
Yes, n = 47	37 (78.7)	10 (21.3)		28 (59.6)	19 (40.4)		40 (85.0)	9 (19.1)		40 (85.0)	6 (13.0)	
Service received (°)												
Phone guidance, n = 29	19 (65.5)	10 (34.5)	0.002	23 (79.3)	6 (20.7)	0.540	23 (79.3)	5 (17.9)	0.463	24 (82.8)	4 (14.3)	0.405
Referred, n = 28	19 (67.9)	9 (32.1)		20 (71.4)	8 (28.6)		21 (75.0)	7 (25.0)		22 (78.6)	6 (21.4)	
Referred to EMS, n = 70	64 (91.4)	6 (8.6)		47 (67.1)	22 (31.9)		59 (84.3)	10 (14.5)		62 (88.6)	8 (11.4)	
Time of the call												
Office hours, n = 47	35 (74.5)	12 (25.5)	0.249	27 (57.4)	20 (42.6)	0.009	34 (72.3)	13 (27.7)	0.029	37 (78.7)	10 (21.3)	0.114
On-call hours, n = 80	67 (83.8)	13 (16.3)		63 (78.6)	16 (20.3)		69 (86.3)	9 (11.5)		71 (88.6)	8 (10.1)	
EMS desired (**)(*)												
Yes, n = 68	48 (69.6)	21 (30.4)	0.002	36 (52.2)	33 (47.8)	0.000	49 (71.0)	19 (27.9)	0.003	53 (76.8)	15 (22.1)	0.026
No, n = 43	41 (95.3)	2 (4.7)		41 (95.3)	2 (4.7)		41 (95.3)	2 (4.7)		41 (95.3)	2 (4.7)	
DK, n = 14	12 (85.7)	2 (14.3)		12 (85.7)	1 (7.7)		12 (85.7)	1 (7.7)		13 (92.9)	1 (7.1)	
Reason of EMCC contact												
Gen. weakness, n = 59	52 (88.1)	7 (11.9)	0.026	44 (74.6)	14 (24.1)	0.204	52 (88.1)	6 (10.3)	0.127	54 (91.5)	4 (6.9)	0.022
Pain, n = 29	19 (65.5)	10 (34.5)		16 (55.2)	13 (44.8)		20 (69.0)	8 (28.6)		20 (69.0)	9 (31.9)	
Fall, n = 15	14 (93.3)	1 (6.7)		12 (80.0)	3 (20.0)		11 (73.3)	4 (26.7)		14 (93.3)	1 (6.7)	
Other, n = 24	17 (70.8)	7 (29.2)		18 (20.0)	6 (25.0)		20 (19.4)	4 (16.7)		20 (18.5)	4 (16.8)	

(°) Service received = Service received by patient following telephone triage; Referred = Referred to other services.

(**) EMS desire = Did the patient desire the EMS to perform the care-needs assessment, instead of a nurse’s assessment during the telephone triage, DK = did not know.

(*) 1 missing.

Abbreviations: EMCC: Emergency Medical Communications Center; EMS: Emergency Medical Services; DK: Didn’t know; Gen: General.

out-of-office hours, and falls. In all sub-dimensions, patients that did not desire an EMS visit were highly satisfied (95.3%) with the TCA. The factors that reduced patient satisfaction were pain, a desire for an EMS visit, and calling the EMCC during office hours.

3.2.1. Care pathway functionality

Most (80.3%) patients were satisfied with the functionality of the care pathway. Women were more satisfied (88.3%) than men (68.0%; p = .005). Patients that received EMS after the TAC were more satisfied (91.4%) than those that received telephone guidance (65.5%) or were directed to other health care services (67.9%) (p = .002). Patients that required assistance with a fall (93.3%) or had an impaired general

condition (88.1%) were highly satisfied with the functionality of the care pathway. Patients with pain-related symptoms reported lower satisfaction (65.5%) than patients without pain.

3.2.2. Telephone care assessment flexibility

Two thirds of patients (70.9%) were satisfied with the flexibility of the TCA. Patients that only required telephone guidance were more satisfied (n = 23, 79.3%) than patients that received EMS (n = 47, 67.1%) and those directed to other services (n = 20, 71.4%). Patients that called during on-call hours were more satisfied with the flexibility of the TCA (n = 63, 78.6%) than patients that called during office hours. Patients that received home care services (p = .041) and those that

called during office hours ($p = .009$) were the most dissatisfied with the flexibility of the TCA.

3.2.3. Actions of the EMCC

Most patients reported satisfaction ($n = 103$, 81.1%) with EMCC actions and that the call dispatchers spent sufficient time to understand patient needs. The patients most dissatisfied with the EMCC actions were those that called during office hours ($p = .029$).

3.2.4. Care-needs assessment on the telephone

Satisfaction was high ($n = 108$, 85.0%) for care-needs assessments conducted on the telephone. Over 90% of patients that required assistance for falls and those with an impaired general condition were satisfied with the care-needs assessment on the telephone. Those most dissatisfied with the care-needs assessment on the telephone were patients that had desired to receive EMS ($p = .026$) and those that had called due to pain (reason of EMCC contact; $p = .022$).

4. Discussion

To our knowledge, no previous study that focused on system changes in pre-hospital EMS services has assessed patient satisfaction and the factors associated with it. Our results showed that patients with non-urgent EMS issues were highly satisfied with health care services that integrated a TCA by nurse and guidance into the EMCC risk assessment. In particular, patients that did not want EMS or were unsure whether EMS was necessary were mostly satisfied in all sub-dimensions. Often, patients call the EMCC because they cannot assess the urgency of their condition. Not surprisingly, these patients are very satisfied to receive an immediate care-needs assessment by telephone and professional guidance on the condition, rather than receiving EMS. Studies in Sweden and Australia have also shown that patients had difficulty recognizing the urgency of their own situations; therefore, TCA might be a good option for increasing patient satisfaction [7,10,23].

In this study, the new instrument to study patient satisfaction was developed and its validity and reliability were promising as a valuable instrument for patients' self-evaluation. The instrument can be used to measure four sub-dimensions of the patient satisfaction (functionality of care pathway, telephone triage flexibility, actions of the EMCC and care-needs assessed by phone) that were identified in this study. Our results show that the satisfaction with TCA is mainly high when TCA is integrated into the entire healthcare and EMCC care path into a functional and flexible entity that seeks to find a solution to a patient's problem from the first contact. In Finland, it has not been possible to find such a change in the service chain and related sub-dimensions in the past, partly due to the fact that health care services and EMCC operate under different ministries and integration has not been tried before.

Among patients with non-urgent medical issues, an essential sub-dimension of patient satisfaction is the functionality of the care pathway. We found that patients that received EMS after the TCA were more satisfied with the care pathway function than those that only received TCA or were instructed to use other services. Similarly, in previous studies, patients that received EMS were more satisfied than those that received TCA in after-hours primary care or other services than pre-hospital ambulance [8,10]. However, our results also suggested that the desire to receive EMS services does not correlate always with the satisfaction. Our results showed that patients referred to other services were more satisfied with the flexibility of the TCA than patients that received EMS. Studies in Sweden also showed that, among patients with non-urgent medical issues, the most common first contact was by telephone to assess the urgency of the patient's care and to give medical or social guidance [24–26]. Taken together, telephone contact with a nurse could often provide appropriate assistance and service more quickly than the EMS [1].

In this study, patients without home care service and patients that called during out-of-office hours were satisfied with the flexibility of the

TCA. Previously, Bunn et al. [7] found that older individuals, ethnic minorities, and other disadvantaged groups were less likely to use the telephone service than other groups, and consequently, they put more strain on other services. Satisfaction with TCA's flexibility also increases if the care needs assessment can be made entirely over the telephone [23,11,14]. Satisfaction also increases the time spent on the call, the offer of treatment options, and the ability to avoid unnecessary visits [1,24–25].

This study found that patients were pleased with EMCC actions and that the call dispatchers spent sufficient time to understand patient needs. However, in Finland, the current EMCC providers are not health care professionals; therefore, they might dispatch unnecessary EMS missions or fail to assess non-urgent situations correctly [2,27]. However, because patients have difficulty assessing the urgency of their own health status [10,23], they reported satisfaction with the EMCC transferring them to TCA in non-urgent situations. Providing care over the telephone requires a nurse's professionalism, training, and abilities to listen, understand, and respond to the patient's needs [23]. Our results might also partly be explained by the fact that Finns place high value on public authorities, like the EMCC [28].

More than 80% of patients were very satisfied with the care-needs assessment over the telephone. Women were significantly more satisfied than men. Moreover, satisfaction was different in different patient groups. Nearly everyone that experienced falls or general weakness were highly satisfied with both the care pathway and the care-needs assessment, but patients in pain showed low satisfaction with the care-needs assessment. Satisfaction with the care-needs assessment via telephone was independent of the services received after the call. In addition, previous studies found that patients were pleased that a nurse was helping them find the right treatment option and that they avoided unnecessary EMS services [4,10,23]. Thus, in Finland, the health care service needs more extensive care-needs assessments than currently provided by the EMCC.

Our results showed that the distance to the ED did not significantly affect patient satisfaction. Nevertheless, when distance was an issue, patients were satisfied with contacting the caregiver by phone. Increasing the public awareness of telephone services can increase the patient's sense of safety, continuity, and flexibility in care [14].

Despite the high overall satisfaction, we observed, there were several challenges related to satisfaction with TCA. We found that one fifth of patients were dissatisfied with the TCA after the EMCC risk assessment. These included various calls involving pain (reason of EMCC contact), calls made during office hours, patients with home care services, and patients that received non-EMS services. These results might have reflected the fact that, when patients called the EMCC because they felt they absolutely needed the EMS to assess, treat, or transport, it was difficult to find a replacement service. These results were particularly evident in patients with home care services that called the EMCC during office hours. These individuals felt that an additional TCA delayed their care. Moreover, according to a Swedish study, currently, patients that receive telephone care assessment are increasingly aware of their rights in contributing to treatment decisions. It is very difficult to negotiate with these patients when considering different treatment options [26]. In contrast, the satisfaction we observed in patients that called outside of office hours might have reflected patient knowledge of the Finnish healthcare system structure. Patients realized that relatively few services were available during out-of-office hours.

Patients that called due to pain (reason of EMCC contact) were the most dissatisfied with a telephone assessment of treatment needs. These results probably reflected the fact that pain is very difficult to assess over the telephone; consequently, patients felt that the telephone assessment was unnecessary in their treatment path. An Australian study found that up to one quarter of telephone triage calls involving pain were difficult to assess because they often required different types of transfer help or pain medication [1]. Further studies are needed to improve pain assessments and facilitate treatment decisions over the telephone.

5. Limitations

One limitation of this study was the relatively small sample size, which represented 17% of the original cohort. The sample size was estimated according to existing guidelines [19]. By chance women participated more actively in the interview and the average age of non-respondents was ten years higher. In general women were more satisfied with TCA and lack of male participants may overestimate the results. Another limitation was the proportion of unanswered interview calls and those who refused to be interviewed which may also cause selection bias to the results. Among non-responders, there were higher proportion of pain as a dispatch code and higher proportion of calls during out of office hours than among interviewed patients. This could have led to an overestimation of satisfied patients since pain and call during out of office hours were factors related to dissatisfaction. Furthermore, the study was conducted in one hospital district with a population mainly representative of remote areas. Therefore, our findings might not be generalizable to urban areas. However, geographically speaking, the EMCC catchment population represented well over half of Finland. Patient satisfaction in only one aspect of the quality or success of EMS services. Future studies are needed on effects of TCA on overall use of health care or social services and the safety as well as costs of TCA.

6. Conclusions

This study was a quality survey conducted to assess patient satisfaction with the telephone care assessment service in Finland. We found that patients with non-urgent medical issues were mainly satisfied with telephone care assessment after an EMCC risk assessment. Patients that did not desire EMS were satisfied with guidance to appropriate health care services and avoiding an unnecessary EMS visit. About one fifth of patients were dissatisfied, which was mostly associated with the desire for an EMS visit, pain symptoms, and calls during office hours. When considering ways to reduce the increasing EMS load, a telephone assessment might be a good option without reducing patient satisfaction.

CRedit authorship contribution statement

Roivainen Petri: Conceptualization, Methodology, Software, Formal analysis, Investigation Conducting, Data Curation, Writing -Original draft preparation, Writing- Reviewing and Editing, Visualization Preparation. **Hoikka Marko:** Conceptualization, Resources Provision, Writing -Original draft preparation, Writing- Reviewing and Editing, Visualization Preparation, Project administration Management and coordination. **Ala-Kokko Tero:** Conceptualization, Resources Provision, Writing -Original draft preparation, Writing- Reviewing and Editing, Visualization Preparation, Project administration Management and coordination, Supervision. **Kääriäinen Maria:** Conceptualization, Methodology Resources Provision, Investigation Conducting, Writing -Original draft preparation, Writing- Reviewing and Editing, Visualization Preparation, Project administration Management and coordination, Supervision.

Conflicts of interest

None.

Ethical statement

Oulu University Hospital Regional Ethics Committee (91/2017).

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ienj.2021.101070>.

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