A four-year study of telephone support for oncology patients using a non-supervised call centre

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Summary

A non-supervised call centre was used to allow oncology patients to contact their personal doctors 24 hours a day. Incoming patient calls to the centre were automatically routed to the doctor's mobile phone or office telephone. Over four years, an average of 407 calls were made each year, by an average of 274 oncology patients. The average number of emergency hospital visits was 24 per year (0.09 per patient), compared with 42 per year (0.16 per patient) during the year before the telephone service began. The average number of outreach visits was 783 (2.9 per patient) per year during the study, in comparison with 722 (2.8 per patient) before it began. The average number of non-emergency hospital admissions was 41 (0.15 per patient) per year in comparison with 42 (0.17 per patient) before the study. Calls were short (typically 3–5 min) and the majority (88%) were made on the patient's initiative. Outreach patients in receipt of chemotherapy were the principal users (making 88% of all calls). Excluding the initial investment cost, the income received was approximately the same as the running costs of the call centre in two of the three years for which data were available.

Introduction

Some of the simpler telemedicine applications are telephone-based medical interventions[1–3]. Recorded or realtime patient signs can be transmitted to a doctor for diagnostic, treatment or follow-up purposes[4–6]. Despite the advantages, only a few countries, such as Japan[7], formally recognize such telephone interventions as medical services.

Health call centres are increasing in number. Most of them simply provide information, although some triage centres provide medical support, particularly after hours[8,9]. In most cases the centre's personnel are not able to suggest medical interventions, but this would be possible if the electronic clinical record (ECR) were available online.

Telephone support may take the form of automated calls from health-care providers to chronically ill patients[10] or of provider-initiated telephone calls[11,12]. In certain medical specialties, such as paediatrics[9,13], oncology[14], obstetrics and gynaecology, and psychiatry[15], patients prefer telephone contact with their 'personal doctor'. In public medicine, this occurs through scheduled hospital appointments. In private medicine, contact with a 'personal doctor' by telephone is considered as a favour to the patient and not the patient's right.

We studied a novel call centre that allowed oncology patients to reach their personal doctor 24 hours a day.

Methods

The call centre started in September 1997 after patients had made requests to be able to contact their personal oncologist at any time. The oncologist explained to both patients and relatives that the service was available as a 'patient's right' because patients paid for it (at a call charge of Pta112/min plus VAT, on average; Pta175 is now about €1 and about 1$). Health-related costs and

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clinical management were retrospectively analysed and compared with data from 1996, the year before the introduction of the service.

All patients of the oncology service at the Delfos Clinic in Barcelona from 1997 to 2000 were included in the study. Patients signed a letter of consent to use the service. They suffered from solid tumours and their medical charges were covered by their private insurance policies.

Observations

Doctors recorded telephone call data and interventions on a survey sheet and in the ECR. The variables recorded were:

(1) date, time and duration of the telephone call;
(2) medical/patient variables, including the patient's functional capacity (bad, medium or good) according to the Karnofsky index (KI)[16], type of tumour, type of patient (by location—outreach patient, hospital inpatient or 'hospital-at-home' patient), treatment status (chemotherapy or other therapy) and telephone call initiator (patient's own initiative, or on the suggestion of the doctor or an urgent call);
(3) objective measures of the efficiency[17,18] of the consultation (calls were classed as 'resolving' if they solved the problem, while 'non-resolving' calls required an outreach visit or hospital emergency attendance for the same problem within the next 10 days—this was checked in the patient's clinical record);
(4) objective measures of the type of consultation (calls were classed as 'informative' when they concerned laboratory results, administrative consultations or information for relatives; 'therapeutic' when therapeutic indications were provided; 'psychological' when psychological support was given; and 'doctor appointment' when a doctor's appointment was arranged).

The doctors also recorded their subjective opinions of what would have happened if calls had not been made. This included patients demanding a hospital appointment or emergency care. The opinion of the doctor regarding whether diagnosis would have been delayed and whether the consultation was relevant to the patient's treatment or follow-up was also recorded.

Call centre

The call centre was unsupervised. Incoming patient calls were automatically routed to the doctor's mobile phone or office telephone. The system was managed by the oncology service. If emergency hospital visits were required, the call centre doctor telephoned the hospital to inform staff about the patient and to suggest appropriate treatment. The running cost of the call centre comprised the telephone company's charges only, since non-supervised call centres do not have any operating costs (e.g. staff salary, room rental, heating and lighting).

Data analysis

The numbers of outreach visits and hospital visits were compared with those in the year before the service was introduced (1996).

Results

Medical assistance

The average number of oncology service patients managed per year was 274, compared with 254 patients in 1996 (Table 1). The numbers and types of pathologies were similar (see Table 4). During the four years of the study, the average number of emergency hospital visits was 24 per year (0.09 per patient), compared with 42 per year (0.16 per patient) during 1996. The average number of outreach visits was 783 (2.9 per patient) during the study, whereas during 1996 there were 722 (2.8 per patient). The average number of non-emergency hospital admissions was 41 (0.15 per patient), compared with 42 (0.17 per patient) in 1996.

Types of patients

During the study period there were 1.5 calls per patient, on average (Table 2). The mean call rate was 0.64 for hospital inpatients, 2.3 for hospital-at-home patients and 1.6 for outreach patients (Table 3). The majority of calls (88%) came from outreach patients.

Type of tumour

The mean number of calls per patient was similar for all tumour types (1.3 for breast, 1.7 for digestive, 0.5 for skin, 1.3 for lymphoma, 1.5 for 'other'), with the exception of lung tumours (3.0) (Table 4).

Patient functionality

The mean numbers of calls per patient were 0.9 among those with poor functionality (KI < 50%), 2.3 among those with medium functional capacity and 1.3 among patients with high functionality (KI > 80%) (Table 5).

Table 1 Numbers of patients and episodes of care per year before (1996) and during the study (in parentheses are mean per patient values)

Year	Number of patients in oncology service	Number of emergency hospital visits	Number of outreach visits	Number of non-emergency hospital admissions
1996 (baseline)	254	42 (0.17)	722 (2.8)	42 (0.16)
1997	250	37 (0.15)	745 (3.0)	43 (0.17)
1998	310	23 (0.07)	914 (2.9)	35 (0.11)
1999	280	13 (0.05)	703 (2.5)	40 (0.14)
2000	257	23 (0.09)	770 (3.0)	46 (0.17)

Table 2 Numbers of calls from patients (values in parentheses are numbers of patients)

Year	Calls from patients receiving outreach care but not chemotherapy	Calls from patients undergoing active treatment	Total numbers of calls	Total cumulative duration of calls (min)
1997	54 (169)	120 (81)	174 (250)	750
1998	174 (235)	318 (75)	492 (310)	1866
1999	151 (200)	329 (80)	480 (280)	1586
2000	209 (188)	271 (69)	480 (257)	2005
Total	*588 (792)*	*1038 (305)*	*1626 (1097)*	*6207*

Table 3 Numbers of calls according to patient location (values in parentheses are numbers of patients)

Year	Outreach patients	Hospital inpatients	Hospital-at-home patients
1997	134 (207)	14 (38)	26 (5)[a]
1998	452 (275)	18 (31)	22 (4)
1999	433 (200)	30 (76)	17 (4)
2000	405 (188)	61 (64)	14 (5)
Total	*1424 (870)*	*123 (193)*	*79 (34)*

[a]Home hospitalization started in October 1997.

Time and duration of calls

Most calls were made between 09:00 and 17:00 (960 calls, 59%). The rest were made between 17:00 and 0:00 (631 calls, 39%) or overnight (0:00–09:00) (35 calls, 2%). All calls at night were considered urgent and medically relevant. Patients apologized for disturbing the doctor in most cases.

With regard to duration, 861 calls (53%) lasted 3–5 min, 554 (34%) less than 3 min and 211 (13%) more than 5 min. The cumulative duration of calls per month averaged 2.5 h (SD=0.8 h) (see also Table 2). On average 40 calls per month (SD=12) were recorded. The monthly distribution of calls per year (summer vacations were in September, Christmas in December and Easter vacations were taken only during April 1999) is shown in Fig 1.

Medical and patient variables

Calls were made on the patient's initiative on 1435 occasions (88%) and in response to a previous suggestion by the doctor on 191 occasions (12%). In 142 cases (9%) the calls were considered to be urgent.

Objective measures

Eight hundred calls (49%) were classed as informative; 485 (30%) could be classed as therapeutic; 56 (3%)

Table 4 Numbers of calls according to tumour type (values in parentheses are numbers of patients)

Year	Breast	Digestive tract	Lung	Skin	Lymphoma	Other
1996	0 (90)	0 (70)	0 (11)	0 (6)	0 (11)	0 (63)
1997	66 (68)	37 (44)	17 (20)	1 (11)	4 (16)	49 (91)
1998	158 (126)	82 (60)	56 (14)	11 (11)	31 (16)	154 (83)
1999	144 (99)	143 (52)	27 (14)	7 (16)	15 (9)	144 (90)
2000	138 (97)	97 (53)	70 (8)	4 (8)	17 (11)	154 (80)
Total	*506 (390)*	*359 (209)*	*170 (56)*	*23 (46)*	*67 (52)*	*501 (344)*

Table 5 Numbers of calls according to patient functionality on the Karnosfky index (KI) (values in parentheses are numbers of patients)

Year	KI < 50%	KI 50–80%	KI 81–100%
1997	8 (25)	34 (52)	132 (173)
1998	13 (36)	106 (57)	373 (217)
1999	25 (13)	157 (48)	298 (219)
2000	38 (16)	204 (49)	238 (192)
Total	*84 (90)*	*501 (206)*	*1041 (801)*

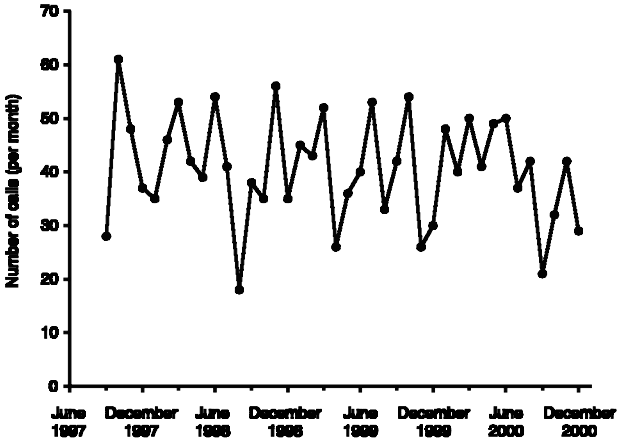

Fig 1 Monthly numbers of telephone calls since the start of the call centre (September 1997).

could be classed psychological; and 165 (10% of total calls) concerned arrangements for an outreach visit. A mix of classes applied to 151 calls and some could not be categorized.

Telephone prescriptions were given for antibiotics in 30% of the therapeutic calls, pain relievers or anti-inflammatory drugs in 26%, anxiolytics in 18% and other treatments in 26%.

Of the 826 calls that were not purely informative, one-third (272; 17% of all calls) required further medical action and so were classed as non-resolving; the remaining two-thirds (554; 34% of all calls) were considered resolving.

Subjective measures

If the calls had not been made, the doctors considered that diagnosis would have been delayed for 7% of the callers, while in 13% the patient's telephone report indicated problems such as haemorrhage, medullary aplasia or infection; 66% of the callers would have had to go to hospital, either to attend an appointment (51%) or on an urgent visit (15%).

Table 6 Call centre running costs (Pta) and revenues (no data for 1997)

Year	Call diversion costs	Total running costs[a]	Revenues[b]	Balance
1998	97,602	196,345	189,793	−6552
1999	151,013	313,521	235,441	−78,080[c]
2000	148,884	253,317	246,071	−7246

[a]The sum of telephone charges, line rental and call diversion costs.
[b]From the value-added service.
[c]Large negative balance due to the high cost of connection errors.

Economics

The oncology service paid for the telephone line, the contract with the telephone company for the 'value-added' service and the cost of diverted calls (rerouting from a fixed telephone to a mobile phone, or from a fixed to another fixed telephone). The patient paid the extra charge associated with a digital 'value-added' line, a proportion of which was returned to the oncology service by the telephone company (about 75% of the charge paid by the patient). This revenue was used to pay for the costs of the call centre, including the call diversion costs.

Calls diverted from the call centre to doctors' mobile phones cost about 10 times more than ordinary telephone calls.

In two of the three years for which data were available, the income received was approximately the same as the running costs of the call centre (Table 6). The high negative balance during 1999 was due to connection errors. This problem was controlled in the following year by waiting longer before answering the telephone. The initial investment involved in setting up the call centre (Pta1,022,485) was excluded from the cost analysis.

Discussion

In the present study, patients could reach their personal doctor easily; moreover, their clinical records were available online for the doctor. Patients' problems were detected earlier than they would have been without the call facility and fewer high-cost emergency care visits occurred. The service improved the care of oncology patients, reduced their level of anxiety and increased their quality of life. Telephone calls were generally short (3–5 min) and similar in length to the reported duration of other provider-initiated calls (1.5–4 min)[19–21], with the exception of paediatric telephone support[22]. Although the duration of calls may be influenced by their cost, in our experience 5 min is

enough for most telephone interventions. This is relevant to call centre use in public health-care.

The average number of calls per month (40) decreased when doctors were on holiday, despite the fact that colleagues covered the service. This was considered to be an indicator of the patients' dependence on their personal doctor. The frequency of calls was similar for patients with different types of tumour, with the exception of lung tumours (these patients made calls twice as often as other patients). Most calls (88%) were from outreach patients; nevertheless, individual demand was higher from hospital-at-home patients[18] and from those with medium functional capacity. These conditions are associated with higher levels of anxiety and uncertainty.

The average number of emergency hospital visits decreased to about 60% of the baseline frequency. This should produce direct savings for the health service (about 20 avoided visits per year at a cost of Pta10,000 per visit) as well as indirect savings in patient travel. This could represent a way to control health-care expenditure, in addition to the previously reported cost reductions associated with home hospitalization[18].

Although half the calls were informative, most of the issues (such as drug doses and results of analyses) could be handled only by a specialist, which justifies the need to have a doctor on call. Of the total of 1626 calls, 30% concerned drug prescriptions. Prescribing by telephone was safe because the doctor not only knew the patient but also had the electronic record available. The finding that antibiotics were the drugs most often prescribed suggests a quicker control of concomitant infections. Two-thirds of the 826 calls that were not purely informative resolved the patient's problem (i.e. no further interventions were required in the following 10 days for the same episode). Surprisingly, the expected reduction in the number of hospital appointments was not observed.

A further aspect is the cost for the patients themselves (about Pta500 for a 5 min call). The service could operate at a profit if it handled more calls per month or had lower call diversion costs. This is relevant, since supervised call centres have reported substantial losses[22]. In contrast, non-supervised call centres have been very profitable in areas unrelated to medicine. They have used fixed-to-fixed telephone diversions (which are less expensive) from front-end numbers linked to different professionals and going to a pool of attendants working at home.

The cost of the telephone service also has implications for public sector health-care, since it may not be acceptable if it appears that only patients who can afford the service are able to contact their doctor.

In the present study, the rapid detection of symptoms improved the overall standard of medical care. Unlike other call centres, the availability of an electronic medical record during telephone consultations was important. It expedited the treatment process and reduced the time required to gather necessary information such as medical histories, past diagnoses, treatments and prescriptions. Doctors appreciated the continuity and coordination of care provided by the call centre.

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