


BMJ Open Does an emergency access button increase the patients' satisfaction and feeling of safety with the out-of-hours health services? A randomised controlled trial in Denmark

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ABSTRACT

Objective To investigate if the option to bypass the telephone queue can increase satisfaction and feeling of safety in callers.

Design Randomised controlled parallel superiority trial. Data from questionnaire survey.

Setting Two out-of-hours (OOH) services in Denmark.

Participants 217 510 citizens who called the OOH services between 4 September 2017 and 30 November 2017.

Randomisation Two-faze study period: First half with randomisation of participants based on their date of birth; even date randomised to intervention, uneven date randomised to control group. Second half with all participants included in intervention group.

Intervention Providing randomised callers (intervention group n=146 355) with the option to bypass the telephone waiting line through an emergency access button (EAB), while the rest got the normal service (control group n=71 155). All EAB users were invited to a questionnaire survey as well as random participants who did not use the EAB (of whom approximately 50% did not have the EAB option).

Main outcome measures Satisfaction and feeling of safety in callers.

Results 2208 of 6704 (32.9%) invited callers answered the questionnaire (intervention group n=1415 (users n=621, non-users n=794); control group n=793). The OR for answering in the two categories with highest satisfaction when provided with the EAB option was 1.34 (95% CI 1.07 to 1.68) for satisfaction with the waiting time, 1.21 (95% CI 0.91 to 1.60) for overall satisfaction and 1.46 (95% CI 1.12 to 1.89) for feeling of safety. Approximately 72% (441/621) of EAB users reported that the EAB option increased their feeling of safety with the OOH services 'to a high degree' compared with 25% (197/794) of callers who had the EAB option without using it.

Conclusions The EAB can provide fast access to OOH telephone advice in case of severe illness. It favours citizens perceived in most need of urgent healthcare and significantly increases both feeling of safety and patient satisfaction.

Strengths and limitations of this study

- This study investigates if an option to bypass the telephone waiting queue results in increased feeling of safety and higher satisfaction in callers to the out-of-hours services.
- A large number of questionnaires ensured high statistical power.
- Invitations were sent through a novel secure digital mailbox, which reduced the risk of recall bias.
- However, low response rates (33%) increased the risk of selection bias.

Trial registration details NCT02572115 (5 October 2015).

INTRODUCTION

The out-of-hours (OOH) services provide telephone advice for citizens with acute health problems that are not life-threatening. These services are run by primary medical care in many countries.^{1 2} All callers are offered advice on the telephone, and some are triaged to an OOH clinic consultation, a home visit by a doctor or hospital admittance.^{3 4} All citizens calling the OOH services must queue for triage. In busy periods, the waiting time may exceed 25 min (personal communication with staff at the two Danish OOH services explored in this study). All callers enter the same call queue, regardless of the urgency of their health problem.⁵ Long waiting time for triage in the out-of-hours services carries a risk for callers with severe health problems as their condition may develop into a critical state while waiting.

Research on the OOH services has shown that approximately 5% of callers perceive their condition as highly severe and that 2% to 3% of all callers are admitted directly to a



hospital.^{6–9} Citizens often contact the OOH services due to worry, and long waiting time may produce a feeling of distress in callers when a health problem is perceived as severe.^{5 10 11} Although the satisfaction with the OOH services is generally high,^{6 12 13} long waiting may compromise the patient satisfaction and challenge the feeling of safety.

We tested an emergency access button (EAB) that allowed randomly selected callers to bypass the telephone waiting line in two OOH services in Denmark if the callers perceived their health problem as sufficiently severe to warrant immediate action. In a previous study, we reported a user rate of approximately 3%.¹⁴ Another study evaluated the medical relevance (assessed by staff in the OOH services) of using the EAB¹⁵). In this study, we investigate if the EAB can increase the satisfaction with the OOH services and provide an increased feeling of safety in callers. We also aim to explore if selected descriptive characteristics of the population vary between users and non-users of the emergency access button and to test if factors such as perceived level of severity and triage outcome had an effect on the main outcome measures.

METHODS

Design and setting

We conducted a randomised controlled trial in accordance with the Consolidated Standards of Reporting Trials (CONSORT) guidelines at two OOH services using telephone triage: one in the Central Denmark Region and one in Copenhagen. Denmark has a gate-keeping system. Patients can only access the emergency department (ED) after triage by a general practitioner (GP) or a nurse. In four out of five regions in Denmark, the OOH services are provided by general practitioner cooperatives (GPC) in large-scale organisations.¹ The fifth region (Copenhagen) offers a medical helpline (MH-1813), which is a publicly run call centre with telephone triage by nurses (approximately 80%) and doctors with various medical specialities or in speciality training. In this paper, the GPs performing telephone triage at the GPC and the nurses/doctors performing telephone triage in the MH-1813 are collectively referred to as *triage professionals*.

Intervention

All callers were routinely asked to type in the unique civil registration number (CRN), which includes the date of birth and a code for the sex of the patient whom the call concerned. Information on the intervention and opportunity to decline participation was provided through a message on the answering machine. Participants were then randomised into two arms: EAB option (intervention) or regular service (control) (figure 1). Randomisation was based on the CRN; patients with an even birth date got the EAB option (eg, birth date on 2nd, 4th or 6th of

a month), whereas patients with an uneven birth date got the regular service. After randomisation, the caller was informed of the estimated waiting time. If randomised to the intervention arm (EAB option), the caller was subsequently given the option to bypass the queue by pressing ‘9’ if the caller perceived the condition to be sufficiently severe to warrant immediate action. The Danish message corresponded to the following: “If your condition is so severe that you find it necessary to get through straight away, you may press 9 and get first in line. Otherwise please wait.” Bypassing the queue meant being placed at the front of the digital queue as the next caller to talk to a triage professional. As the callers were informed of the EAB option and could actively choose to use it, blinding to whether or not they were in the intervention group was not possible. Triage professionals were blinded, as they only found out about the patient using the button after the actual call was ended when answering the questionnaire directly after the contact. At this point, the triage professionals had already treated the patient without this knowledge and thus it did not affect the triage and hence not patient’s satisfaction nor level of safety.

Outcome measures

We defined the following outcome measures prior to our study (table 1).

Development of questionnaires

The final post-intervention questionnaire comprised 25 questions (online supplementary appendix 1), of which 10 were developed by the authors and 15 had been validated in previous studies conducted by our research group. Questions addressed variables on sociodemographic information (eg, age, sex, education, ethnicity and job status), waiting time, self-perceived health, perceived urgency, caller satisfaction with the OOH services,^{6 12 13 16–18} feeling of safety in callers,¹⁹ as we believe there is a close relation between feeling safe and being satisfied with the provided service. Also, we added the two-item generalised anxiety disorder (GAD-2), a short form of the GAD-7 questionnaire, which was developed in the USA to detect GAD in primary care patients.^{20 21}

The questionnaire was developed using existing questionnaires and literature.^{6 21 22} Numerous feedback rounds were conducted with experienced researchers and GPs to produce a draft questionnaire. This draft questionnaire was pilot tested for 2 weeks in the GPC in the Central Denmark Region.²³ After the pilot test, we conducted two focus group interviews with 13 participants. The interviews focussed on the callers’ assessment of the OOH services provided by the GPC and their views on the questionnaire, including the wording of the questions in order to check the validity of the questionnaire. The interviews, which were performed by the main author assisted by a senior researcher, resulted in the rephrasing of two questions. Data from the pilot test was checked for ceiling effect and excessive amount of missing data or ‘don’t know’ responses, which resulted in deletion of one question.

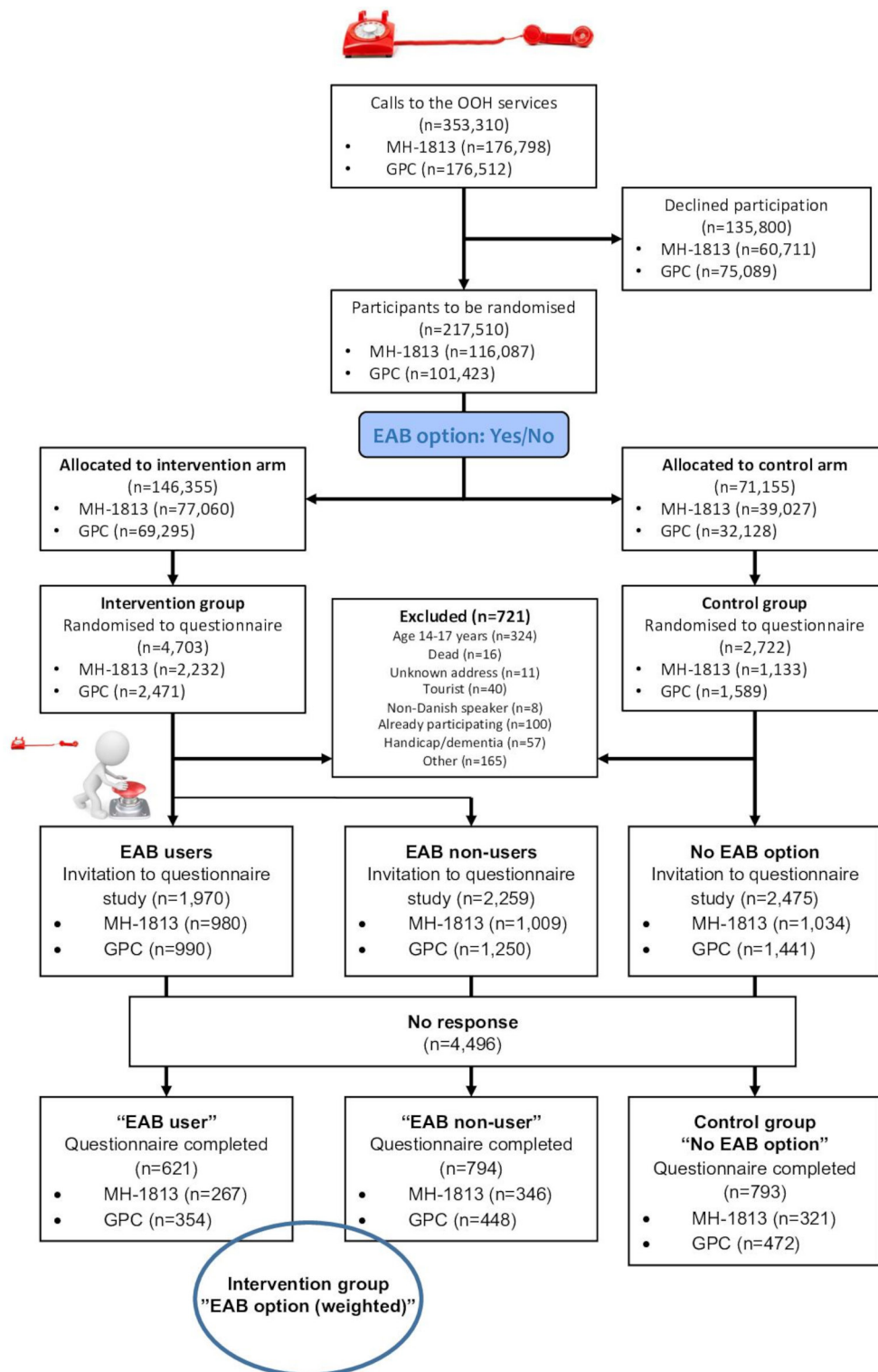


Figure 1 Flowchart of participants (Consolidated Standards of Reporting Trials). EAB, emergency access button; GPC, general practitioner cooperative; MH-1813, medicalhelpline 1813; OOH; out-of-hours.

Exclusion and inclusion criteria

Table 2 shows the exclusion criteria for the study before and after dispatch of invitations. In total, 721 callers were excluded before dispatch of questionnaires. All completed questionnaires were included in the analyses. See figure 1 for CONSORT flowchart.

Data collection

Questionnaire data was collected from 4 September 2017 until 30 November 2017 in both settings. No major public holidays or health campaigns took place in the study period. When a caller accepted participation in the study, the CRN enabled us to retrieve the address of the patient

Table 1 Outcome measures

Primary outcome measures	Secondary outcome measures
Caller feeling of safety (intervention group vs control group)	Frequency of caller characteristics (EAB-users vs non-users)
Caller satisfaction all in all with the contact (control group vs non-intervention group)	
Caller satisfaction with waiting time (control group vs non-intervention group)	

EAB, emergency access button.

(or the legal guardian for children aged <14 years). Three subgroups received an invitation for the questionnaire survey: all callers from the intervention group who used the EAB (EAB users), a matching number of randomly selected callers in the intervention group who did not use the EAB (EAB non-users) and a matching number of randomly selected callers in the control group (no EAB option). The patients from the last two subgroups (EAB non-users and no EAB option) were included during the first 8 weeks of the study, whereas EAB users were included throughout the entire period. These different inclusion periods occurred because fewer callers than expected got the EAB option as approximately 15% refrained from typing in their CRN (and needed for the randomisation) and the participation rate was only approximately 65%. Therefore, we decided to include 10 callers from the two subgroups without EAB use for every EAB user during the first 8 weeks. For the remaining 5 weeks, all participating callers were given the EAB option, including callers who refrained from typing in their CRN. Information on these callers was obtainable as the triage professional would ask

the patient for the CRN and register it in the system. An included caller received only one questionnaire regarding the first contact (and not for any potential subsequent contacts).

Survey invitations were sent out by digital mailbox and surface mail. All citizens aged ≥ 15 years in Denmark have a secure digital mailbox (free of charge), which is used for communication with the public authorities. Danish residents must check it regularly, and email or SMS (shortmessaging service) notifications are optional. A study from 2018 concluded that the digital mailbox is a low-cost, quick and secure way to invite Danish citizens to participate in a questionnaire study, which reduces the risk of recall bias, while the level of selection bias is similar to that of paper invitations.²⁴ In our study, 88.5% had access to a digital mailbox and were invited through this method. The remaining part was invited by regular surface mail.

The digital invitation included a description of the study and a clickable hyperlink directing the citizen to a web-based questionnaire. Two digital reminders were sent 1 week and 2 weeks after the first invitation. The paper invitation included a description of the study, a hyperlink along with a 12-digit unique code, a paper questionnaire and a prepaid return envelope. One reminder was sent 3 weeks after the first invitation.

Power calculation and sample size

The main outcome measures were satisfaction and feeling of safety in callers (measured on a dichotomised 5-point Likert scale with the two most positive answers grouped against the three least positive answers). Based on the author group's experience with questionnaire studies we assumed a proportion of satisfaction and safety of 0.8 in the control arm and 0.9 in the EAB-use arm. We should include at least 266 individuals in each arm if we wanted to be able to detect a difference between the two arms with a power of 80% and a Bonferroni adjusted alpha

Table 2 Exclusion criteria before dispatch of invitations

Excluded groups	Reason for exclusion
All citizens aged 14 to 17 years	Privacy considerations: citizens aged 14 to 17 years sometimes contact health authorities without their parents' knowledge
Callers who had already received an invitation due to a previous contact	Callers could participate only once in the study
Tourists	Triage professional registered that caller was a tourist (registered by a 'tourist CRN')
Non-Danish speakers	Triage professional registered that the conversation was held in English
Citizens reported dead	Reported dead by relative or care assistant
Citizens unfit for participation (eg, dementia or handicap)	Triage professional registered that the caller was too ill (eg, call made by care assistant)
Citizens with no registered address	No known address
Other	Not registered in CRN database (eg, homeless, recent hospice care or address outside Denmark)

CRN, civil registration number.

value of 0.01667 (=5%/3) to adjust for multiple testing due to the three studied outcomes.

Statistical methods

The Pearson χ^2 test was used to check for differences between subgroups in the distributions presented in table 3. We checked for differences in participant characteristics between subgroups within each setting. We divided the study population into five age groups based on a similar subdivision in a previous study by Moth *et al.*⁶ The subdivision of employment status and education level was inspired by the categorisations used by Statistics Denmark and UNESCO.^{25 26} Ethnicity was defined as Danish, western immigrant or non-western immigrant in accordance with the definitions by Statistics Denmark.²⁵ A citizen was defined as a non-western immigrant if this person, or one or both parents, had been born outside Western Europe, an European Union country, Australia, New Zealand or the USA.

We aimed to investigate if the EAB had an influence on the levels of satisfaction and feeling of safety in callers. Therefore, we needed a subgroup that represented callers who got the EAB option without using it as well as a fraction of callers who chose to use the EAB. As we included all EAB users and only a random selection of callers who got the EAB option without using it, we could not simply combine all data for callers provided with the EAB option. In the intervention group, 3% used the EAB.¹⁴ Thus, 97% in the intervention group were EAB non-users. As we selected an equal number of EAB users and EAB non-users, we needed to apply a weight of 33 (100 divided by 3) to account for the lower number in the 'EAB non-users' subgroup. We called this weighted group 'EAB option'. We used the Pearson χ^2 test with a Rao-Scott second order correction²⁷ to analyse if there were differences between the control group (no EAB option) and the weighted intervention group (EAB option) in the distribution of responses regarding satisfaction and feeling of safety.

We dichotomised the responses regarding satisfaction and feeling of safety (with getting through on the telephone), which were scored on a 5-point Likert scale, and the responses regarding feeling of safety (with the EAB), which were scored on a 4-point Likert scale, into two categories: positive and negative responses. The positive categories (*satisfied* and *feeling safe*) each contained the two most positive answers (very satisfied and satisfied; very safe and safe, to a high degree and to some degree). We tested the positive categories in each scale against the negative category in three multiple logistic regression models. The first model was crude (model 1). The second model was adjusted for age group, gender, ethnicity and living status (model 2). The third model was adjusted for the same factors as model 2 along with level of perceived severity, parent status, self-rated health, GAD-2 score and triage outcome (model 3). No adjustment for multiplicity was made.

Patient and public involvement statement

This research was done without involving patients in defining the research question, outcome measures or study design. Patients were invited to two focus group meetings to help adjust the questionnaire and the welcome message on the OOH telephone. Patients were not invited to comment on the design and to interpret the results. Patients were not invited to contribute to the writing or editing of the manuscript for readability or accuracy.

RESULTS

In total, 217510 out of 353310 (61.6%) callers chose to participate in the study after contacting the OOH services. Of the 146355 (67.3%) callers randomised to the intervention, 4229 citizens received a questionnaire and 1415 (33.5%) answered. Of the 71155 allocated to non-intervention arm, 2475 citizens received a questionnaire and 793 (32.0%) answered. The total response rate was 32.9% (2208/6704) (figure 1).

Background characteristics of respondents

In the MH-1813, EAB users were generally significantly different from both subgroups of EAB non-users. In the GPC, no differences were seen between the three subgroups in the distribution of gender ($p=0.67$), ethnicity ($p=0.41$) and living status ($p=0.1$). The subgroups 'no EAB option' and 'EAB non-users' were compared between the two settings and for both settings combined. Only four variables demonstrated significantly different distributions: ethnicity in MH-1813, GAD-2 score in the GPC and living status and job status in the two settings combined. A GAD-2 score of >2 was significantly more often seen in the 'EAB users' subgroup (20.9%) than in the control group 'no EAB option' (12.2%) and the subgroup 'EAB non-users' (10.7%) ($p<0.001$). EAB users were significantly more frequently referred to a home visit, a hospital admittance or ambulance care than the other two subgroups (table 3).

Online supplementary appendix 2 provides an overview of a crude and a multiple logistic regression model of socio-demographic characteristics and questionnaire data related to EAB use for the callers in the intervention arm. When adjusting for all variables in the table, we found that non-western immigrant status (OR 1.79), low education (<10 years OR 2.53), status as retired (OR 1.94) or unemployed (OR 2.07), and self-perceived severe, potentially life-threatening disease (OR 30.00) or severe, but not life-threatening disease (OR 5.02) were significantly related to higher likelihood of EAB use (online supplementary appendix 2).

Satisfaction

When comparing the distribution of responses to the two questions exploring satisfaction (specifically the distribution of responses between the study arms), we found that individuals in the intervention group 'EAB option'

**Table 3** Background information on questionnaire respondents stratified on setting and study group (%), N=2208

Setting		GPC			MH-1813			Combined		
Subject	Subgroups n	No EAB option 472	EAB non-user 448	EAB user 354	No EAB option 321	EAB non-user 346	EAB user 267	No EAB option 793	EAB non-user 794	EAB user 621
Sex	Male	37.7	36.6	39.7**	28.3	27.5	37.5	33.9	32.6	38.7
	Female	62.3	63.4	60.3	71.7	72.5	62.5	66.1	67.4	61.3
Age group	18–40	44.4	46.7	26.9	44.8	49	33.2	44.6	47.7	29.6
	41–60	23.5	26.7	30.4	34.5	30	25.2	28	28.2	28.2
	61–75	20.7	18.2	28.4	13.8	16	22.5	17.9	17.3	25.9
	75<	11.3	8.3	14.3	6.9	5	19.1	9.5	6.9	16.4
Ethnicity	Danish	88.6	88.7	88.9¶	81.5*	87.5	83.7	85.7	88.2	86.7
	Western immigrant	6	6.3	4	8.5	7.8	6.1	7	7	4.9
	Non-western immigrant	5.4	5	7.1	10	4.6	10.2	7.3	4.8	8.4
Education	>15 years	36.4	42.8	29.1	56.4	58.7	39.5	44.5	49.7	33.5
	10–15 years	47.7	43.9	50.8	35.2	34.1	45.1	42.6	39.6	48.4
	<10 years	16	13.2	20.1	8.4	7.2	15.4	12.9	10.6	18.1
Job status	Employed	49	50.8	37.5	61.4	56.4	37	54.1‡	53.2	37.3
	Under education	9.3	8.1	4.9	8.2	11	3.8	8.9	9.4	4.4
	Retired	29.9	24.2	45.8	17.6	17.1	43	24.9	21	44.6
	Unemployed	4.2	4.1	4.6	3.8	4.3	8.3	4.1	4.2	6.2
	On leave	4	7.9	2.9	4.7	8.4	3.8	4.3	8.1	3.3
	Other	3.4	5	4.3	4.4	2.9	4.2	3.8	4.1	4.2
Living status	Cohabiting	77.5	81.8	75.9††	75	81	68.6	76.5	81.5	72.8
	Living alone	22.5	18.2	24.1	25	19	31.4	23.5§	18.5	27.2
Health status	Excellent	10.1	11.5	9.7	16.9	13.6	12.2	12.8	12.4	10.7
	Very good	31.3	36.2	25	35.7	43.2	24.4	33.1	39.2	24.8
	Good	36	31.2	35.5	30.7	32.8	30.9	33.8	31.9	33.6
	Fair	18.2	17.3	21.6	13.8	9	21	16.4	13.7	21.3
	Poor	4.5	3.8	8.2	2.8	1.4	11.5	3.8	2.8	9.6
GAD-2 score	≤2	84.5†	90	80.8	92.5	88.4	76.8	87.8	89.3	79.1
	>2	15.5	10	19.2	7.5	11.6	23.2	12.2	10.7	20.9
Level of perceived severity	Severe, potentially life-threatening	8.1	5.2	37.4	7.5	6.1	29.7	7.8	5.6	34.1
	Severe, not life-threatening	47.7	47.2	47.9	44.5	44.5	56.7	46.4	46	51.6
	Not severe but needed to talk to a medical professional	41.1	45.8	11	44.2	44.5	12.2	42.4	45.3	11.5
	No illness but had questions	2.6	1.1	<5 (.)	2.8	3.5	<5 (.)	2.7	2.1	<5 (.)
	Don't know	<5 (.)	<5 (.)	3.1	<5 (.)	1.4	<5 (.)	0.8	1	2.3
Triage outcome	Telephone advice only	50.2	53.3	29.7	36.2	35.9	19.7	44.7	45.9	25.6
	Consultation at OOH clinic	30.3	30.8	22.9	47.2	51.2	39.7	37	39.5	29.7
	Home visit	13.8	10.3	23.4	0	0	0	8.3	5.9	14
	Hospital admittance	2.8	3.3	8.5	11	7.2	19.7	6	5	13
	Ambulance	3	2.2	15.5	5.5	5.7	20.9	4	3.7	17.7

Continued

Table 3 Continued

Setting	Subgroups n	GPC			MH-1813			Combined		
		No EAB option	EAB non-user	EAB user	No EAB option	EAB non-user	EAB user	No EAB option	EAB non-user	EAB user
Subject		472	448	354	321	346	267	793	794	621

Results with less than five cases are not reported due to data protection regulations by the Danish Data Protection Agency. These cases are instead labelled '<5'. In the 'combined' section, this is also the case as a percentage would give away results labelled n<5.

Significant differences within each setting were found between the distributions in the groups 'no EAB option' and 'EAB non-user' in marked cases (analysed using the χ^2 test): (a) p=0.024, (b) p=0.014, (c) p=0.034 and (d) p=0.015.

'EAB user' group is significantly different from the two other groups in all variables except for gender (e) p=0.67, ethnicity (f) p=0.41 and living status (g) p=0.1 in the GPC.

Interpretations

*Less respondents with Danish ethnicity in 'no EAB option' group compared to 'EAB non-user' group in MH-1813.

†More respondents in 'no EAB option' group with positive GAD-2 score (>2) compared to 'EAB non-user' group in the GPC.

‡Significant difference in distribution of job status between 'no EAB option' group and 'EAB non-user' group when settings are combined.

§More respondents living alone in 'no EAB option' group compared to 'EAB non-user' group when settings are combined.

¶No significant difference in distribution of sex between the three study groups in GPC.

**No significant difference in distribution of ethnicity between the three study groups in GPC.

††No significant difference in distribution of ethnicity between the three study groups in GPC.

EAB, emergency access button; GAD, generalised anxiety disorder; GPC, general practitioner cooperative; MH-1813, medical helpline 1813; OOH, out-of-hours.

reported higher satisfaction levels for both waiting time (p=0.0092) and overall satisfaction (p=0.0073) (table 4).

The satisfaction with *waiting time* was generally high. In the control group 72.2% of respondents reported to be 'satisfied' or 'very satisfied' compared with 78.2% in the intervention group. In the subanalysis of EAB users, 78.6% were 'satisfied' or 'very satisfied'. In fact, 46.7% of EAB users were 'very satisfied', which was significantly more than in the 'no EAB option' and the 'EAB option' groups (approximately 30% reported to be 'very satisfied').

This significant trend was also seen in the overall satisfaction with the contact. In all study groups, 83.9% to 87.1% reported to be 'satisfied' or 'very satisfied'. However, significantly more in the subgroup of EAB users reported to be 'very satisfied' (approximately 55%) compared with the other subgroups (approximately 46%) (table 4).

Additional subanalysis for patients with high perceived levels of severity showed that non-users were significantly less satisfied with waiting time compared with users (data not in table).

Feeling of safety

A significant difference was found in the distribution of responses between the non-intervention arm and the intervention arm in terms of feeling of safety concerning *being able to reach the OOH service* (p=0.0076). Significantly more EAB users (71.9%) than EAB non-users (25.0%) reported that the EAB option 'to a high degree' increased their feeling of safety (p<0.001) (table 4).

Multiple logistic regression

The multiple logistic regression model confirmed that the EAB option in the intervention arm increased the satisfaction levels (unadjusted: *waiting time* OR 1.34 (95% CI 1.07 to 1.68), overall OR 1.21 (95% CI 0.91 to 1.60)) and the feeling of safety with getting through to the OOH service (unadjusted OR 1.46 (95% CI 1.12 to 1.89)). This

was seen in both the crude model and in the adjusted models (table 5).

DISCUSSION

Principal findings

The EAB option significantly increased the callers' satisfaction with the OOH service and their feeling of safety due to increased accessibility to the OOH service. Moreover, 25% of callers with the EAB option and 72% of EAB users reported that the EAB option increased their feeling of safety to a high degree.

Strengths and limitations

A strength of this study was the large number of responses, which ensured good statistical power. We also managed to reduce the risk of recall bias by sending out questionnaire invitations through a secure digital mailbox²⁴ to most of the population (approximately 90%), which implied that the questionnaire was received within 1 to 3 days after the contact.

A limitation was the participation rate of approximately 62% and the response rate of approximately 33%, which increased the risk of selection bias. We did not perform any analyses of non-participants because of lack of consent. If non-participants more often suffered from urgent health problems, this could have led to higher frequency of EAB use and thereby reduced the estimates. The characteristics of the study population in our data were similar to the characteristics reported in a previous study based on register data concerning age, education and employment status,¹⁴ which suggests that the two populations are similar. However, more women, fewer non-western immigrants and fewer with low education answered the questionnaire in this study compared with the previous study.¹⁴ When comparing the group with no EAB option to EAB non-users, we found significant differences in the

Table 4 Responses regarding satisfaction and feeling of safety stratified on study group (N=2208)

n	No EAB option 793	EAB option* (weighted)	EAB non-users 794	EAB users 621	P value	Missings/N (%)
Waiting time on telephone	N (%)	(%)	N (%)	N (%)		
Very satisfied	235 (29.7)	(30.3)	236 (29.9)	286 (46.7)		
Satisfied	337 (42.6)	(47.9)	381 (48.3)	195 (31.9)		
Neither satisfied nor dissatisfied	119 (15.0)	(13.5)	107 (13.6)	54 (8.8)		
Dissatisfied	66 (8.3)	(6.2)	49 (6.2)	38 (6.2)		
Very dissatisfied	27 (3.4)	(2.0)	15 (1.9)	30 (4.9)		
Don't know/not relevant	7 (0.9)	(0.2)	<5 (.)	9 (1.5)	0.0092	16/2208 (0.72)
All in all with the contact						
Very satisfied	364 (46.0)	(46.2)	363 (45.9)	337 (54.8)		
Satisfied	300 (37.9)	(40.9)	325 (41.1)	183 (29.8)		
Neither satisfied nor dissatisfied	59 (7.5)	(5.7)	45 (5.7)	41 (6.7)		
Dissatisfied	30 (3.8)	(3.1)	24 (3.0)	21 (3.4)		
Very dissatisfied	29 (3.7)	(4.1)	32 (4.1)	28 (4.6)		
Don't know/not relevant	9 (1.1)	(0.1)	<5 (.)	5 (0.8)	0.0073	12/2208 (0.54)
Do you feel safe about being able to reach the OOH-PC service?						
Very safe	208 (26.3)	(28.5)	225 (28.4)	199 (32.3)		
Safe	420 (53.1)	(56.0)	444 (56.1)	311 (50.5)		
Neither safe nor unsafe	106 (13.4)	(11.2)	89 (11.3)	54 (8.8)		
Unsafe	41 (5.2)	(3.1)	24 (3.0)	30 (4.9)		
Very unsafe	12 (1.5)	(0.4)	<5 (.)	11 (1.8)		
Don't know/not relevant	<5 (.)	(0.8)	6 (0.8)	11 (1.8)	0.0076	10/2208 (0.45)
Did the EAB option increase your feeling of safety?						
To a high degree	–	–	197 (25.0)	441 (71.9)		
To some degree	–	–	231 (29.3)	111 (18.1)		
In a lesser degree	–	–	85 (10.8)	10 (1.6)		
Not at all	–	–	116 (14.7)	20 (3.3)		
Don't know/not relevant	–	–	159 (20.2)	31 (5.1)	<0.001	14/1415 (0.99)

Results with less than five cases are not reported due to data protection regulations by the Danish Data Protection Agency. These cases are instead labelled 'n<5'.

'EAB use' group is significantly different from the other groups.

**'EAB option' group is a weighted group that also contains EAB users to mimic an intervention group with 3% EAB users. P values compare the distribution of answers between 'No EAB option' and 'EAB option' using the Pearson χ^2 test with a Rao-Scott correction.

EAB, emergency access button; OOH, out-of-hours; PC, practitioner cooperative.

distribution of four variables: ethnicity in the MH-1813, GAD-2 score in the GPC and living status and job status for both settings combined. We expect the risk of selection bias to be limited as these socio-demographic variables are known to not consistently influence the callers' satisfaction.^{6 18}

Several studies have explored patient satisfaction with the OOH services.^{28–30} Most questionnaires use several scales to measure patient satisfaction with different aspects of provided services, and many are designed to be used as a repeated measure over time. We chose to include only two single-item questions as they depended on the choice of using the EAB. Our method of using single items to

measure satisfaction may not give a complete picture of the patient satisfaction with the EAB.

Another limitation of the study was the potential bias from the asymmetrical data collection period. The data on the two groups that did not use the EAB was collected during the first 8 weeks, while the data on the group that used the EAB was collected throughout the entire study period of 13 weeks. However, as no public holidays or major health campaigns that could have influenced OOH service user rates occurred during the data collection period, we expect minimal selection bias from this variation.

Moreover, we acknowledge that there is a loss of power when going from a Likert scale to a binary outcome.

Table 5 Logistic regression with ORs for answering in the highest two categories to questions regarding satisfaction and feeling of safety, N=2208

	Satisfaction with waiting time		Satisfaction overall		Feeling of safety, getting through		Feeling of safety, with EAB option	
	No EAB option	EAB option*	No EAB option	EAB option*	No EAB option	EAB option*	No EAB option	EAB option*
	option (weighted)	EAB users	option (weighted)	EAB users	option (weighted)	EAB users	option (weighted)	EAB users
Model 1 (crude)								
OR	Ref.	1.34	Ref.	1.46	Ref.	1.46	Ref.	6.86
95% CI		(1.07 to 1.68)		(1.13 to 1.88)		(1.12 to 1.89)		(1.03 to 1.80)
P value		0.012		0.003		0.004		<0.001
Model 2 (adjusted†)								
OR	Ref.	1.36	Ref.	1.37	Ref.	1.37	Ref.	7.08
95% CI		(1.08 to 1.72)		(1.05 to 1.80)		(1.05 to 1.80)		(0.99 to 1.78)
P value		0.01		0.02		0.021		<0.001
Model 3 (adjusted‡)								
OR	Ref.	1.37	Ref.	1.78	Ref.	1.37	Ref.	7.40
95% CI		(1.07 to 1.74)		(1.23 to 2.57)		(1.04 to 1.81)		(1.11 to 2.53)
P value		0.011		0.002		0.025		<0.001

ORs indicate the probability for a given subgroup to respond in the two highest categories of a 5-point Likert scale (4-point scale feeling of safety with EAB option). 'Don't know/not relevant' responses were recoded as missing.

Two-item short form (a score above 2 is described as a positive result).

*EAB option' group is a weighted group that also contains EAB users to mimic an intervention group with 3% EAB users.

†Adjusted for sex, age group, ethnicity and living status.

‡Adjusted for model 2 + level of perceived severity, parent status, self-rated health, GAD-2 and triage outcome. EAB, emergency access button; GAD-2, generalized anxiety disorder scale.

However, as the subgroups contained all respondents from both settings, we achieved more than the necessary amount of responses needed as described in the power calculations

Findings in relation to other studies

No other studies have investigated patient experiences with an EAB and the potential impact on patient satisfaction. The satisfaction with the OOH services is already high.^{6 12 17 18} Moth *et al*⁶ reported a satisfaction level of approximately 80%, which is comparable with the level found in our study as 84% to 87% of respondents were (very) satisfied. Such high baseline satisfaction levels can make it difficult to detect any significant additional effects of an intervention, although respondents in our weighted 'EAB option' intervention group showed significantly higher satisfaction levels than respondents in the control group. Furthermore, the subgroup of callers who were offered the EAB without using it were not less satisfied than the rest. This is a relevant finding as some patients might have felt dissatisfied with others cutting the line. Several factors have previously been associated with level of satisfaction, such as age, self-perceived health, waiting time and triage outcome.^{13 18 31 32} After adjustment for these factors, the ORs were similar to the ORs of the crude model in our study.

The EAB provides callers with an option to bypass the queue in case of perceived acute severe illness. This may increase what Lovink *et al* described as 'feeling of safety' by providing callers with some control of the situation.¹⁹ To our knowledge, the literature is scarce on patients' feeling of safety in connection with the OOH telephone services; the quality of these services is predominantly measured by level of patient satisfaction.^{28–30} However, EAB users were older, more often retired/unemployed, and more often anxious people of poorer health than the other groups. Citizens with these socio-demographic traits have previously been found to exhibit more frequent help-seeking^{33 34} and higher degrees of worry;³⁵ these citizens could thus be more vulnerable and have a stronger need for increased feeling of safety, which the EAB provides.¹⁵ Moreover, reporting an increased feeling of safety when using the EAB option could also be subject to social desirability bias,³⁶ and could be related to the higher proportion of EAB users triaged to an increased service level (ie, EAB users were significantly more frequently referred to a home visit, a hospital admittance or ambulance care than the other two subgroups). However, the differences found seem robust; 72% of EAB users reported to have an increased feeling of safety because of the EAB option compared with 25% of non-users.

Implications for future research and clinical practice

The EAB is intended to provide fast access to a healthcare professional in the OOH service for patients in urgent need of medical assistance. Approximately 3% of callers used the EAB,¹⁴ and only approximately 23% of this use is assessed as 'not relevant' by triage professionals.¹⁵ The EAB provides an increased satisfaction and feeling of safety. The main challenge is to get severely ill callers to use the EAB and yet prevent misuse of the option. A future qualitative study design

could investigate if the EAB option changes the behaviour of OOH service users with regards to reasons for contacting the service and use of the EAB.

Future studies could explore what happens to EAB users after the OOH call, specifically in terms of further contacts to the healthcare system and later diagnoses. It also seems relevant to study the patients who chose not to use the EAB although such use would have been considered medically relevant. These individuals should be identified and potential negative effects on patient outcome should be explored. This group may benefit from tailored interventions to support the most appropriate health behaviour in the future.

As a result of this project, the OOH services in the Central Denmark Region and the Capital Region of Denmark have decided to implement the EAB.

CONCLUSION

This study shows that the option to bypass the telephone waiting queue increases the satisfaction with the OOH services in callers. This is seen despite high satisfaction levels before the intervention. Furthermore, the EAB option provides most callers with a higher feeling of safety due to increased accessibility to the OOH service. More than 50% of callers who had the EAB option reported that the option gave an increased feeling of safety. Both the level of satisfaction and the feeling of safety in EAB users, which constitute a more worried and vulnerable patient population, were significantly higher than the level in all other callers.

We believe that the EAB is an improvement to the Danish OOH services and that it could easily be incorporated into the OOH services in other countries with similar OOH service organisation.

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