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## Interrelation between illness representation and self-reported degree-of-worry in patients calling out-of-hours services: a mixed methods study

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4 **Interrelation between illness representation and self-reported degree-of-worry in**  
5 **patients calling out-of-hours services: a mixed methods study**  
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## ABSTRACT

### Objectives:

To examine the interrelation between patients' illness representations, presented in telephone consultation to out-of-hours (OOH) services, and self-reported degree-of-worry (DOW), as a measure of self-evaluated urgency. If a clear interrelation is found, incorporating DOW during telephone triage could aid the triage process, potentially increasing patient safety.

### Design:

A convergent parallel mixed methods design with quantitative data; DOW and qualitative data; recorded telephone consultations. Thematic analysis of the qualitative data was used to explore the content of the quantitative scaled DOW, using the Common Sense Model of Self-Regulation (CSM).

### Setting:

A convenience sampling of calls to the OOH services in Copenhagen, the Capital Region of Denmark, during three days was included in the study.

### Participants:

All calls from adults ( $\geq 15$  years of age) concerning somatic illness during the data collection period were eligible for inclusion. Calls made on behalf of another person, calls concerning perceived life-threatening illness or calls regarding non-healthcare related logistical/practical problems were excluded, resulting in analysis of 180 calls.

### Results:

All five components of the CSM framework, regardless of DOW, were present in the data. All callers referred to identity and timeline and were least likely to refer to consequence. Callers with a strong identity, illness duration of less than 5 hours, clear cause and solution for cure/control were more likely to present a low DOW. Callers with a medium identity, illness duration of more than 24 hours and a high consequence were more likely to present a high DOW.

### Conclusion:

This study suggests an interrelation between a patient's illness representation and self-evaluation of urgency. Incorporating a patient's DOW during telephone triage could aid the triage process in determining urgency and type of health care needed, potentially increasing patient safety. Research on patient outcome after DOW-assisted triage is needed before implementation of the DOW scale is recommended.

**Article summary:****Strengths and limitations of this study**

- This study gives a detailed insight into patients' illness representation in an OOH service, which can enable a better understanding of the challenges described in telephone consultations.
- The use of mixed methods enables a thorough analysis and understanding of the illness representation of patients to an OOH service.
- Patients' presentation of their illness representation and reported self-evaluation of their DOW were obtained at the actual time of seeking help and therefore, not influenced by recall bias.
- All coding of the transcribed calls was performed by the researcher, whereby study results could be subjected to personal bias.
- Use of the NVivo V.11 software and researcher triangulation ensures that the coding of the data is available for independent analysis and less subject to personal bias.

## INTRODUCTION

Telephone triage within out-of-hours (OOH) service is recognized as a mean to reduce pressure and overcrowding of emergency departments and OOH clinics.<sup>1</sup> It aims to assess the urgency of a patient's medical condition in order to determine the correct type of health care needed, thus ensuring patient safety. However, due to the lack of non-verbal cues in telephone consultations, assessing urgency is more challenging than face-to-face consultations.<sup>2</sup> Studies show that the quality of telephone triage improves with communication between patient and health professional being patient-centred rather than disease-centred<sup>3</sup> and that non-normative symptom and poor communication description contribute to under-triage.<sup>4</sup> Triage tools, e.g. computerized decision support systems are used to aid the triage process<sup>5</sup>; however these tools focus on medical information and less on psychosocial or affective information.<sup>6</sup> Incorporating the patient's self-evaluation of urgency, defined as degree-of-worry (DOW), with the use of a verbal ten-point numerical rating scale (1=minimal worry to 10=maximal worry) could therefore be a useful additional tool in the triage process.

The Common-Sense Model of Self-Regulation (CSM), by Leventhal<sup>7</sup> is a widely recognized theoretical framework, which can be used to describe how a patient cognitively and emotionally addresses a health threat, based on experienced symptoms. The patient's perception is based on prior experience, personal beliefs, discussions with others and cultural understandings.<sup>8</sup> The CSM is a parallel processing model, with one arm representing the cognitive processing aspects and the other arm representing the emotional processing aspects. Together they make up a patients' illness representation.<sup>9</sup> The cognitive arm can be categorized into five components: 1) *identity*: symptoms or name/label of the health threat, 2) *timeline*: duration of the health threat 3) *cause*: factors that are responsible for the health threat, 4) *cure or control*: whether the health threat can be cured or controlled and 5) *consequence*: of the health threat.<sup>8</sup> The patient's understanding of her illness representation influences how she presents her health issue to a health care provider and this may in turn influence the care she receives.<sup>10</sup> In previous studies, it has been shown that the five components of the CSM framework account for a large proportion of the presentations patients make when contacting OOH services<sup>11</sup> and serve as an appropriate framework for understanding the worry experiences of primary health care patients.<sup>12</sup>

The aim of this paper is to examine the interrelation between a patient's illness representation, as presented in telephone consultation to an OOH service call handler, and the self-reported DOW as a measure of self-evaluated urgency. If there is an interrelation, incorporating a patient's DOW as an additional tool in the telephone triage process could aid determination of urgency and type of health care needed, potentially increasing patient safety.

## METHOD

### Design

A convergent parallel mixed methods design with simultaneously collected data was used. This design allows for the transformation of one type of result to another (e.g. themes into counts).<sup>13</sup> Quantitative data consisted of DOW and qualitative data of recorded telephone consultations.

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4 Deductive thematic analysis of the qualitative data was conducted and used to explore the content  
5 of the quantitatively scaled DOW, using the framework of the CSM theory.  
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## 7 **Setting**

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9 The OOH services and the Emergency Medical Services, Copenhagen, the Capital Region of  
10 Denmark, are integrated in one organization and can be reached through two telephone numbers;  
11 112 for life-threatening emergencies and 1813 for acute, non-emergent medical calls. The Medical  
12 Helpline 1813 is available from 4pm to 8am on weekdays and around the clock on weekends and  
13 holidays. Citizens may also call 1813 for a referral to an emergency department, if they cannot get  
14 in touch with their GP during regular working hours. All access to acute care is pre-assessed by  
15 telephone triage. Annually, approximately one million calls are handled by call handlers  
16 (nurses/physicians) who triage the caller to self-care, a general practitioner, face-to-face  
17 assessment/consultation at a hospital, home visit or direct hospitalisation.<sup>14 15</sup>  
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## 20 **Data collection**

21  
22 A convenience sample of 180 calls to the OOH services during a three-day time period was  
23 included. All calls from adults ( $\geq 15$  years of age) concerning somatic illness were deemed eligible  
24 for inclusion. Calls made on behalf of another person, calls concerning life-threatening problems  
25 and calls regarding non-health care related logistical/practical problems (e.g. questions about  
26 transportation to clinic) or clarifying questions were excluded. Data were collected for three  
27 consecutive days: Wednesday 20<sup>th</sup> April and Thursday 21<sup>st</sup> April (4pm to 10pm) and Friday 22<sup>nd</sup>  
28 April (8am to 4pm) 2016 (a bank holiday), 2016.  
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## 32 **Data sources**

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34 Data consisted of two parallel strands – the quantitative scaled DOW and illness representation  
35 presented by the callers – both derived from the recorded telephone consultations. Prior to data  
36 collection, two experienced call handlers were asked to assess and recommend revisions in  
37 question sequence and phrasing in actual calls. All call handlers were invited to participate in data  
38 collection and received instructions on procedure, inclusion criteria, study focus and voluntary  
39 caller participation. Data collection was obtained during the general telephone consultation by the  
40 call handler posing the following question: “How worried would you say you are on a scale from 1  
41 to 10, about the condition you are calling about today?” If the caller failed to provide a number  
42 reflecting her DOW, an intensity descriptor<sup>16</sup> was used to give a numeric value (1 to 10). These  
43 calls were assessed by two researchers and if not concurrent, a consensus was reached through  
44 discussion.  
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## 48 **ANALYSIS**

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50 The recorded telephone consultations were transcribed in NVivo V.11 and DOW were attached to  
51 each call as attributes. Symptom duration was categorized into three groups: less than 5 hours, 5  
52 to 24 hours and more than 24 hours. The remaining qualitative data were deductively coded  
53 according to the last four components of the CSM framework. For the purpose of simplicity, the  
54 results were then sub-grouped into: low DOW (DOW 1 to 4), moderate DOW (DOW 5 and 6) and  
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4 high DOW (DOW 7 to 10). Furthermore the results were compared to two previous studies:  
5 Farquharson *et al*<sup>10</sup> and Lau *et al*.<sup>17</sup>  
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### 7 **Qualitative data analysis**

8  
9 The qualitative data were created by coding the transcripts deductively according to the five  
10 components of the CSM framework, while blinded for the DOW value. For each component, data  
11 were clustered into themes and recoded, as described by Braun and Clarke.<sup>18</sup>  
12

### 13 **Mixed methods analysis**

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15 All 180 calls were grouped according to themes in each of the five CSM components and listed  
16 according to DOW (1-10). For each theme, the quantiles (Q1-Q3) and median were calculated and  
17 a box and whisker plot created.  
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## 20 **RESULTS**

### 21 **Participants**

22  
23 A total of 261 callers to the OOH services during the three-day time period were approached for  
24 inclusion. Of these, 81 callers were excluded, based on the exclusion criteria, leaving a total of 180  
25 callers to be included in this study (figure 1).  
26  
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### 29 **Quantitative findings according to the CSM framework**

30  
31 All callers referred to identity, as well as duration (timeline) of their symptoms (table 1). Callers with  
32 a low DOW were more likely to mention a cause for their illness than other callers, whereas,  
33 reference to cure/control was similar in all three DOW sub-groups. Callers in all three DOW sub-  
34 groups were least likely to refer to consequence compared to the other four CSM components;  
35 however, callers with a high DOW were more likely to refer to a consequence of their illness than  
36 callers with moderate or low DOW (figure 2).  
37  
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### 39 **Qualitative findings**

#### 40 **Identity**

41  
42 Callers' referrals to the identity of their perceived health threat were divided into three themes:  
43  
44 *Strong identity*; use of a definitive label or diagnosis, reference to a previous identical experience,  
45 reference to a known condition and/or expression of certainty (n=56), *medium identity*; hypothesis  
46 of label or diagnosis, reference to a previous similar, but not identical experience and/or expression  
47 of near certainty (n=90) and *weak identity*; no mention of label or diagnosis, no reference to a  
48 previous experience, reference to an unknown condition and/or expression of uncertainty (n=34).  
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## Timeline

Fifty-two callers described symptoms which had lasted *less than 5 hours*, 44 callers described symptoms which had lasted *between 5 and 24 hours* and 84 callers described symptoms which had lasted *more than 24 hours*.

## Cause

A possible cause of symptoms or illness was reported by 132 callers (73%). The reported causes were divided into the following three themes: *clear cause*; expression of certainty (n=90); *unclear cause*; a hypothesis suggested or expression of uncertainty (n=42); and *no mention of cause* (n=48).

## Cure/control

Reference pertaining to a cure or control related to their symptoms or illness was made by 138 callers (77%). These were divided in to the following three themes: *clear solution for cure/control*; specific request for treatment (n=42), *unclear solution for cure/control*; suggestion for treatment or had attempted self-treatment with little or no effect (n=96), and *no mention of cure/control* (n=42).

## Consequence

Reference to a consequence of their symptoms or illness was made by 67 callers (37%). These were categorized into the following three themes: *high consequence*; potentially long-term or life-threatening consequences and consequences severely affecting work or social life (n=36), *low consequence*; short-term consequences, consequences affecting immediate daily life or mildly affecting work or social life (n=31) and *no mention of consequence* (n=113).

## Mixed methods findings

Study callers with a *medium identity* were more likely to have the highest DOWs, while callers with a *strong identity* generally had a lower DOW and callers with a *weak identity* generally had more moderate DOWs. Callers whose illness had lasted *less than 5 hours* were more likely to have a low to moderate DOW, whereas callers whose illness had lasted *more than 24 hours* were more likely to have a more moderate to high DOW. Callers with a *clear cause* for their illness and a *clear solution for cure/control* were more likely to have a low DOW and finally, callers who mentioned a *high consequence* to their illness were more likely to have a high DOW. (See figure 3 for box and whisker plot describing the interrelation between DOW and the five components of the CSM.)

## DISCUSSION

### Summary of main findings

Using the five components of the CSM framework, as described by Leventhal,<sup>8</sup> our analysis demonstrated that callers presenting their illness to OOH services to a large extent referred to all

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4 five components, regardless of their self-evaluated DOW. All callers referred to identity and  
5 timeline and callers were least likely to refer to consequence.  
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7 A low DOW was more present within the group of callers who had a strong illness identity, illness  
8 duration of less than five hours, a clear cause and a clear solution. Callers who presented a  
9 medium or weak illness identity, illness duration of more than 24 hours and, an unclear cause and  
10 unclear solution and a perception of high consequence were more likely to present a higher DOW.  
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### 12 **Strengths and limitations of this study**

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15 The main strength of the methodology used in this study was the number of patients included and  
16 that the patient's illness representation and reported self-evaluation of her DOW were obtained in  
17 real time, as the caller was seeking help. Therefore, the findings were not influenced by recall bias.  
18 A limitation of this study was that all coding of the transcribed calls according to the five  
19 components of the CSM and their themes was performed by the primary researcher (SLB),  
20 whereby results may be subjected to personal bias. However, use of the NVivo V.11 software and  
21 researcher triangulation ensure that the coding of the data is available for independent analysis  
22 and less subject to personal bias.  
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### 25 **Comparison with existing literature**

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28 The results of the quantitative data can be compared to work done by Farquharson *et al*<sup>10</sup> and Lau  
29 *et al*<sup>19</sup> (table 1). Participants in both studies and in all three DOW sub-groups in the present study  
30 mentioned factors pertaining to all five components of the CSM framework. Farquharson *et al*,  
31 however, solely based their data on information that callers volunteered, without call handler  
32 prompting, but suggested that it may be necessary for call handlers to prompt remaining  
33 components to obtain a comprehensive understanding of patients' representations of illness.<sup>20</sup> In  
34 this study, all information from the caller was coded, including information prompted by the call  
35 handler, thus the prevalence in each of the five CSM components was greater compared to those  
36 found by Farquharson *et al*. The method used in this study provides a more complete portrayal of  
37 the caller's illness representation and is more representative of a real-life call to OOH services.  
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### 40 **Relevance of this study: possible implications for health care providers and policy makers**

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42 This study suggests that there is an interrelation between a patient's illness representation, as  
43 presented telephonically to an OOH services call handler, and the self-evaluation of urgency,  
44 defined as DOW. Incorporating a patient's self-reported DOW as an additional tool in the telephone  
45 triage process could therefore increase patient participation and aid in the determination of urgency  
46 and the type of health care needed, thus increasing patient safety. Research on optimal patient  
47 outcome after DOW-assisted triage is needed before implementation of the DOW scale is  
48 recommended.  
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**Tables**

	Present study			Previous studies	
	Low DOW N=76	Moderate DOW N=39	High DOW N=65	Farquharson et al. <sup>(10)</sup> (2011) N=59	Lau et al. <sup>(16)</sup> (1989) N=887
<b>Identity</b>	100	100	100	100	96
<b>Timeline</b>	100	100	100	44	49
<b>Cause</b>	82	72	65	15	28
<b>Cure/control</b>	78	79	74	37	32
<b>Consequence</b>	33	28	48	14	33

**Table 1. Prevalence (%) of components of illness representation**

Identity n=180 (100%)	Themes	Examples of citations
	<b>Strong identity</b> n=56 (31%)	<p>"I have a bladder infection...I have to pee all the time...I also had a UTI last summer..."</p> <p>"I rubbed my eye and now it is red and there is pus... it is an eye infection...I know it goes away, as I have had it before..."</p>
	<b>Medium identity</b> n=90 (50%)	<p>"I have had genital herpes many times before, but it looks different...maybe it is just a yeast infection..."</p> <p>"...sudden pain after I sneezed...I think I might have punctured a lung or bruised a rib..."</p>
	<b>Weak identity</b> n=34 (19%)	<p>"I suddenly got a severe pain in the left, lower side of my abdomen...I have never tried anything like it before...I cannot figure out why I am in so much pain..."</p> <p>"I have had two attacks of chest pain and cold sweats...I do not usually feel like this...does not feel like pain that I have tried before...I just want to know why..."</p>
<b>Timeline</b> n=180 (100%)	<b>&lt;5 hours</b> n=52 (29%)	
	<b>5-24 hours</b> n=44 (24%)	
	<b>&gt;24 hours</b>	

	n=84 (47%)	
<b>Cause</b> n=132 (73%)	<b>Themes</b>	<b>Examples of citations</b>
	<b>Clear cause</b> n=90 (50%)	“I fell about eight steps down a staircase and hit my shoulder...”  “When I feel like this, it is usually tonsillitis...”
	<b>Unclear cause</b> n=42 (23%)	“I think it could be a mixture of stress and bacteria...”  “It is not an allergy...my immune system might be a bit affected because I have been travelling a lot...”
	<b>No cause</b> n=48 (27%)	
<b>Cure/control</b> n=138 (77%)	<b>Themes</b>	<b>Examples of citations</b>
	<b>Clear solution for cure/control</b> n=42 (23%)	“I want to go to the hospital and get stitches...”  “I have tried it before; when I got penicillin...I am going to try to convince you to give it me again...”
	<b>Unclear solution for cure/control</b> n=96 (53%)	“I have gotten painkillers from the dentist, but they are not helping; can I take Panodil as well?”  “I tried getting in contact with my GP, but no one is picking up the phone...”  “Do I have to do anything about it tonight or can it wait until I call my GP tomorrow?”
	<b>No solution for cure/control</b> n=42 (23%)	
<b>Consequence</b> n=67 (37%)	<b>Themes</b>	<b>Examples of citations</b>
	<b>High consequence</b> n=36 (20%)	“I am afraid it could be a blood clot, my mother had that and she lost her entire leg...”  “I am pregnant, can it affect the baby?”  “I read on Google, that it could be cancer...”

	<b>Low consequence</b> n=31 (17%)	"I cannot sleep or eat anything, because of the pain..."  "Maybe I cannot go out riding tomorrow..."
	<b>No consequence</b> n=113 (63%)	

**Table 2. Thematic analysis of the components of the CSM framework**

### **Footnotes**

**Contributorship statement:** SLT and HGJ planned the study. HGJ planned and performed the data collection. SLT extracted and analysed the data and drafted the manuscript. IE and FKL supervised and contributed substantially to the critical revision. All authors read and approved the final manuscript

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**Data sharing statement:** Additional data that are not available online can be obtained by contacting the corresponding author.

**Ethical statement:** The study was approved by the Data Protection Agency (PVH-2015-004, I-Suite nr: 04330). All participants gave informed consent. The Ethical Committee was consulted but no permission was needed (H-15016323).

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## 11 12 13 **References**

- 14  
15 <sup>1</sup> Würgler MW, Navne LE. Når sygeplejersker visiterer i lægevagten. Copenhagen: Dansk  
16 Sundhedsinstitut; 2010.
- 17  
18 <sup>2</sup> Leprohon J, Patel VL. Decision-making Strategies for Telephone Triage in Emergency Medical  
19 Services. *Medical Decision Making*. 1995;15:240–53. doi:10.1177/0272989x9501500307
- 20  
21 <sup>3</sup> Derkx HP. For your ears only. Quality of telephone triage at out-of-hours centres in the  
22 Netherlands. Maastricht: Department of General Practice, University of Maastricht; 2008.
- 23  
24 <sup>4</sup> Gamst-Jensen H, Lippert FK, Egerod I. Under-triage in telephone consultation is related to non-  
25 normative symptom description and interpersonal communication: a mixed methods  
26 study. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine*. 2017;25:52.  
27 doi:10.1186/s13049-017-0390-0
- 28  
29 <sup>5</sup> Gravsersen DS. Out-of.hours telephone triage by nurses and doctors in Danish acute care  
30 settings – A study of quality focusing on communication, safety and efficiency. Aarhus: Research  
31 Unit for General Practice, University of Aarhus; 2016.
- 32  
33 <sup>6</sup> Holmström I. Decision aid software programs in telenursing: not used as intended? Experiences  
34 of Swedish telenurses. *Nursing & Health Sciences*. 2007;9:23–8. doi:10.1111/j.1442-  
35 2018.2007.00299.x
- 36  
37 <sup>7</sup> Leventhal H, Meyer D, Nerenz D. The common sense representation of illness danger. In:  
38 Rachman S (ed). *Contributions to medical psychology*. 1st edn, Vol 2. Oxford: Pergamon Press,  
39 1980:7–30.
- 40  
41 <sup>8</sup> Leventhal H, Phillips LA, Burns E. The Common-Sense Model of Self-Regulation (CSM): a  
42 dynamic framework for understanding illness self-management. *Journal of Behavioral*  
43 *Medicine*. 2016;39:935–46. doi:10.1007/s10865-016-9782-2
- 44  
45 <sup>9</sup> Hagger MS, Orbell S. A Meta-Analytic Review of the Common-Sense Model of Illness  
46 Representations. *Psychology & Health*. 2003;18:141–84. doi:10.1080/088704403100081321
- 47  
48 <sup>10</sup> Bugge C, Entwistle VA, Watt IS. The significance for decision-making of information that is not  
49 exchanged by patients and health professionals during consultations. *Social Science &*  
50 *Medicine*. 2006;63:2065–78. doi:10.1016/j.socscimed.2006.05.010
- 51  
52 <sup>11</sup> Farquharson B, Johnston M, Bugge C. How people present symptoms to health services: a  
53 theory-based content analysis. *British Journal of General Practice*. 2011;61:267–73.  
54 doi:10.3399/bjgp11x567090
- 55  
56  
57  
58  
59  
60

1  
2  
3  
4  
5 <sup>12</sup> Laakso V, Niemi PM. Primary health-care patients' reasons for complaint-related worry and  
6 relief. *Primary Health Care Research & Development*. 2013;14:151–63.  
7 doi:10.1017/s1463423612000448

8  
9 <sup>13</sup> Creswell JW, Clark VLP. *Designing and conducting mixed methods research*. Los Angeles (CA):  
10 SAGE Publications; 2011.

11  
12 <sup>14</sup> Årsrapportdata. Copenhagen: Emergency Medical Services Copenhagen, University of  
13 Copenhagen; 2015 and 2016. [cited 2017 Apr 15]. Available from: [https://www.regionh.dk/om-](https://www.regionh.dk/om-region-hovedstaden/Den-Praehospitale-Virksohmhed/Documents/%C3%85rsrapportdata20152016.pdf)  
14 [region-hovedstaden/Den-Praehospitale-](https://www.regionh.dk/om-region-hovedstaden/Den-Praehospitale-Virksohmhed/Documents/%C3%85rsrapportdata20152016.pdf)  
15 [Virksomhed/Documents/%C3%85rsrapportdata20152016.pdf](https://www.regionh.dk/om-region-hovedstaden/Den-Praehospitale-Virksohmhed/Documents/%C3%85rsrapportdata20152016.pdf)

16  
17 <sup>15</sup> Forde I, Nader C, Socha-Dietrich K, Oderkirk J, Colombo F. Primary Care Review of Denmark.  
18 OECD; 2016. [cited 2017 Apr 11]. Available from: [https://www.oecd.org/health/health-](https://www.oecd.org/health/health-systems/Primary-Care-Review-of-Denmark-OECD-report-December-2016.pdf)  
19 [systems/Primary-Care-Review-of-Denmark-OECD-report-December-2016.pdf](https://www.oecd.org/health/health-systems/Primary-Care-Review-of-Denmark-OECD-report-December-2016.pdf)

20  
21 <sup>16</sup> Duncan GH, Bushnell CM, Lavigne GJ. Comparison of verbal and visual analogue scales for  
22 measuring the intensity and unpleasantness of experimental pain. *Pain*. 1989;37:295–303.  
23 doi:10.1016/0304-3959(89)90194-2

24  
25 <sup>17</sup> Lau RR, Bernard TM, Hartman KA. Further explorations of common-sense representations of  
26 common illnesses. *Health Psychology* 1989;8:195–219. doi:10.1037//0278-6133.8.2.195

27  
28 <sup>18</sup> Braun V, Clarke V. Using thematic analysis in psychology. *Qualitative Research in*  
29 *Psychology*. 2006;3:77–101. doi:10.1191/1478088706qp063oa

30  
31 <sup>19</sup> Lau RR, Bernard TM, Hartman KA. Further explorations of common-sense representations of  
32 common illnesses. *Health Psychology* 1989;8:195–219. doi:10.1037//0278-6133.8.2.195  
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## Tables

	Present study			Previous studies	
	Low DOW N=76	Moderate DOW N=39	High DOW N=65	Farquharson et al. <sup>(10)</sup> (2011) N=59	Lau et al. <sup>(16)</sup> (1989) N=887
<b>Identity</b>	100	100	100	100	96
<b>Timeline</b>	100	100	100	44	49
<b>Cause</b>	82	72	65	15	28
<b>Cure/control</b>	78	79	74	37	32
<b>Consequence</b>	33	28	48	14	33

**Table 1. Prevalence (%) of components of illness representation**

Identity n=180 (100%)	Themes	Examples of citations
	<b>Strong identity</b> n=56 (31%)	<p>"I have a bladder infection...I have to pee all the time...I also had a UTI last summer..."</p> <p>"I rubbed my eye and now it is red and there is pus... it is an eye infection...I know it goes away, as I have had it before..."</p>
	<b>Medium identity</b> n=90 (50%)	<p>"I have had genital herpes many times before, but it looks different...maybe it is just a yeast infection..."</p> <p>"...sudden pain after I sneezed...I think I might have punctured a lung or bruised a rib..."</p>
	<b>Weak identity</b> n=34 (19%)	<p>"I suddenly got a severe pain in the left, lower side of my abdomen...I have never tried anything like it before...I cannot figure out why I am in so much pain..."</p> <p>"I have had two attacks of chest pain and cold sweats...I do not usually feel like this...does not feel like pain that I have tried before...I just want to know why..."</p>
<b>Timeline</b> n=180 (100%)	<b>&lt;5 hours</b> n=52 (29%)	
	<b>5-24 hours</b> n=44 (24%)	

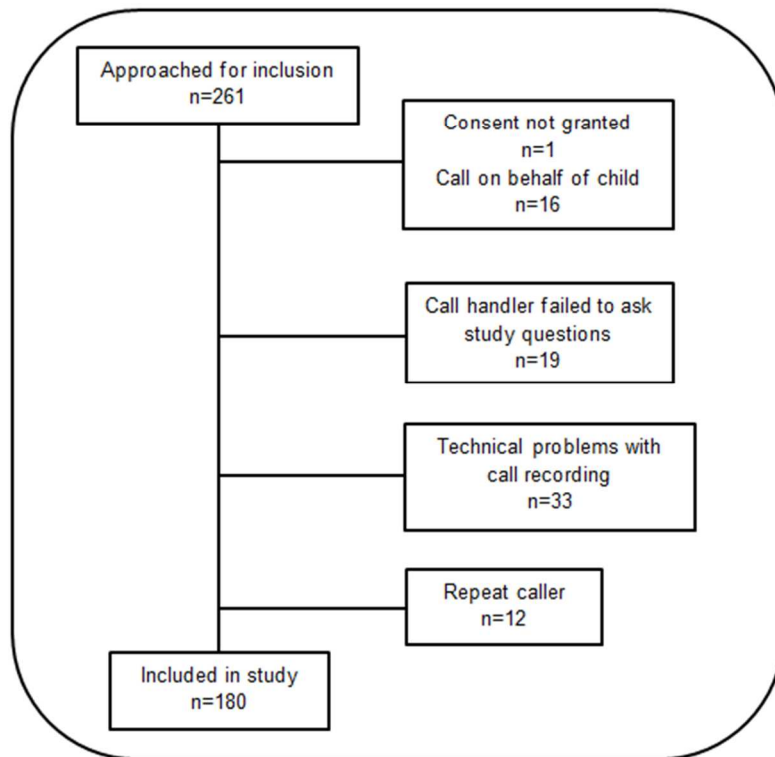


	<b>&gt;24 hours</b> n=84 (47%)	
<b>Cause</b> n=132 (73%)	<b>Themes</b>	<b>Examples of citations</b>
	<b>Clear cause</b> n=90 (50%)	“I fell about eight steps down a staircase and hit my shoulder...”  “When I feel like this, it is usually tonsillitis...”
	<b>Unclear cause</b> n=42 (23%)	“I think it could be a mixture of stress and bacteria...”  “It is not an allergy...my immune system might be a bit affected because I have been travelling a lot...”
	<b>No cause</b> n=48 (27%)	
<b>Cure/control</b> n=138 (77%)	<b>Themes</b>	<b>Examples of citations</b>
	<b>Clear solution for cure/control</b> n=42 (23%)	“I want to go to the hospital and get stitches...”  “I have tried it before; when I got penicillin...I am going to try to convince you to give it me again...”
	<b>Unclear solution for cure/control</b> n=96 (53%)	“I have gotten painkillers from the dentist, but they are not helping; can I take Panodil as well?”  “I tried getting in contact with my GP, but no one is picking up the phone...”  “Do I have to do anything about it tonight or can it wait until I call my GP tomorrow?”
	<b>No solution for cure/control</b> n=42 (23%)	
<b>Consequence</b> n=67 (37%)	<b>Themes</b>	<b>Examples of citations</b>
	<b>High consequence</b> n=36 (20%)	“I am afraid it could be a blood clot, my mother had that and she lost her entire leg...”  “I am pregnant, can it affect the baby?”

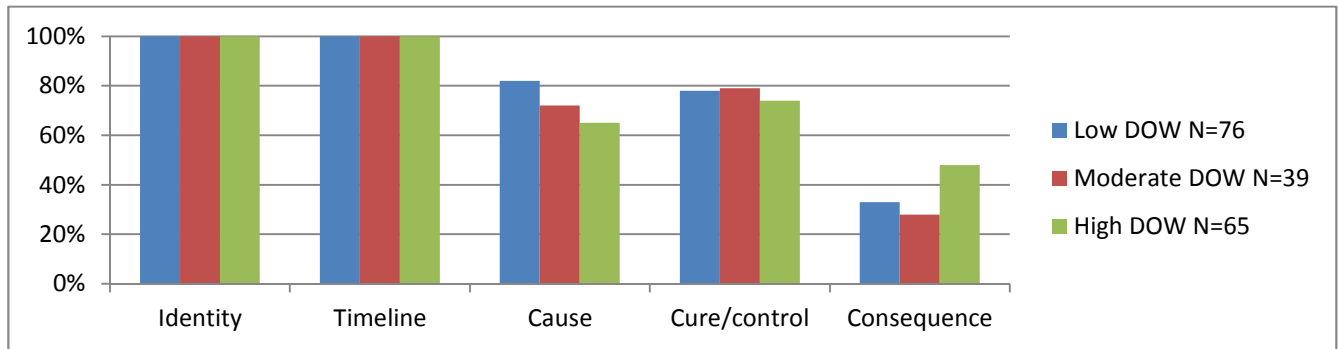
		“I read on Google, that it could be cancer...”
	<b>Low consequence</b> n=31 (17%)	“I cannot sleep or eat anything, because of the pain...”  “Maybe I cannot go out riding tomorrow...”
	<b>No consequence</b> n=113 (63%)	

**Table 2. Thematic analysis of the components of the CSM framework**

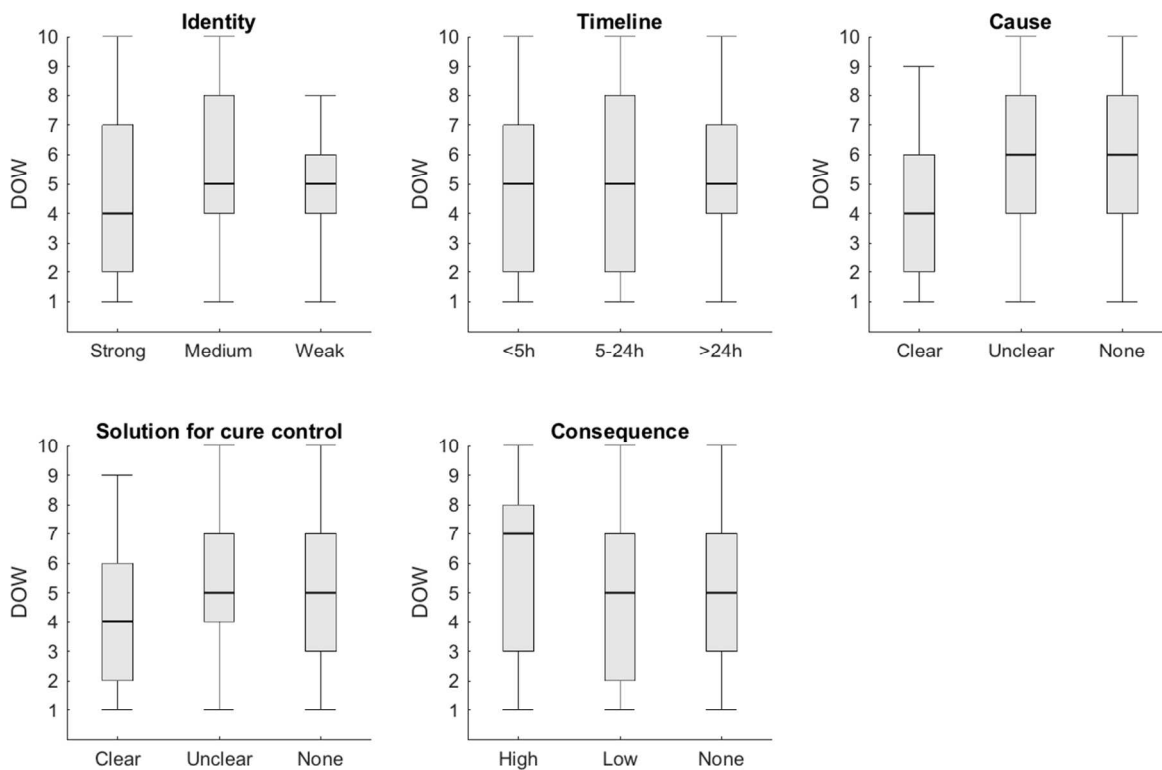
**Figures**



**Figure 1. Flowchart of calls included**



**Figure 2. Prevalence (%) of components of illness representation in present study**



**Figure 3. Interrelation between DOW and the components of the CSM framework**

# BMJ Open

## Relation between illness representation and self-reported degree-of-worry in patients calling out-of-hours services: a mixed methods study in Copenhagen, Denmark

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4 **Relation between illness representation and self-reported degree-of-worry in**  
5 **patients calling out-of-hours services: a mixed methods study in Copenhagen,**  
6 **Denmark**  
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## ABSTRACT

### Objectives:

To examine the relation between patients' illness representations, presented in telephone consultation to out-of-hours (OOH) services, and self-reported degree-of-worry (DOW), as a measure of self-evaluated urgency. If a clear relation is found, incorporating DOW during telephone triage could aid the triage process, potentially increasing patient safety.

### Design:

A convergent parallel mixed methods design with quantitative data; DOW and qualitative data; recorded telephone consultations. Thematic analysis of the qualitative data was used to explore the content of the quantitative scaled DOW, using the Common Sense Model of Self-Regulation (CSM).

### Setting:

A convenience sampling of calls to the OOH services in Copenhagen, Denmark, during three days was included in the study.

### Participants:

Calls from adults ( $\geq 15$  years of age) concerning somatic illness during the data collection period were eligible for inclusion. Calls made on behalf of another person, calls concerning perceived life-threatening illness or calls regarding logistical/practical problems were excluded, resulting in analysis of 180 calls.

### Results:

All five components of the CSM framework, regardless of DOW, were present in the data. All callers referred to identity and timeline and were least likely to refer to consequence (37%). Through qualitative analysis, themes were defined. Callers with a strong identity, illness duration of less than 5 hours, clear cause and solution for cure/control were more likely to present a low DOW. Callers with a medium identity, illness duration of more than 24 hours and a high consequence were more likely to present a high DOW.

### Conclusion:

This study suggests a relation between a patient's illness representation and self-evaluation of urgency. Incorporating a patient's DOW during telephone triage could aid the triage process in determining urgency and type of health care needed, potentially increasing patient safety. Research on patient outcome after DOW-assisted triage is needed before implementation of the DOW scale is recommended.

**Article summary:****Strengths and limitations of this study**

- Use of mixed methods approach in this study gave an in-depth insight and enabled a thorough analysis and understanding of the illness representation of patients to an OOH service.
- Patients' presentation of their illness representation and reported self-evaluation of their DOW were obtained at the actual time of seeking help and therefore, not influenced by recall bias.
- DOW was not uniformly obtained at a specific time within the consultation and responses were both spontaneous and/or prompted by the call-handler, which is representative of real-life calls to OOH services.
- Use of the NVivo V.11 software and researcher triangulation ensures that the coding of the data is available for independent analysis and less subject to personal bias.
- Due to the limited size of the study population, there is a lack of statistical power; however, the results show clear trends and relations, which give direction for future research to strengthen evidence in this new area.

## INTRODUCTION

Telephone triage within out-of-hours (OOH) service is recognised as a mean to reduce pressure and overcrowding of emergency departments (ED) and OOH clinics.<sup>1</sup> It aims to assess the urgency of a patient's medical condition in order to determine the correct type of health care needed, thus ensuring patient safety. However, due to the lack of non-verbal cues in telephone consultations, assessing urgency is more challenging than face-to-face consultations.<sup>2</sup> Studies show that the quality of telephone triage improves with communication between patient and health professional being patient-centred rather than disease-centred<sup>3</sup> and that non-normative symptom description and poor communication contribute to under-triage.<sup>4</sup> Triage tools, e.g. computerised decision support systems are used to aid the triage process<sup>5</sup>; however, these tools focus on medical information and less on psychosocial or affective information.<sup>6</sup>

Patients' perception of urgency has previously been examined, whereby, ED physicians' and the patients' assessment of the severity of symptoms were compared.<sup>7 8</sup> These studies found that patients' perception of urgency can be used as a rough guide to predict the need for hospitalisation.<sup>9</sup> Furthermore, it has been suggested that patients expressing a potential need for hospitalisation should be thoroughly examined for possible severe illness.<sup>10</sup> Previous studies have also shown that patient anxiety or worry about a health threat is a major factor in urgent care decision-making.<sup>11 12</sup> Therefore, the measure of a patient's anxiety or worry about an acute health threat reflects the patient's self-evaluation of urgency. A self-reported verbal ten-point NRS measuring anxiety in patients (1=minimal anxiety to 10=maximal anxiety) has previously been used in several studies in acute care settings.<sup>13</sup> The anxiety observed in these patients was regarded as acute in relation to the immediate health threat and not due to an underlying psychiatric disease.<sup>14</sup> This scale has not been validated. However, as anxiety is a completely subjective symptom, it was felt that a subjective scoring system was acceptable. The feeling of anxiety in this setting is synonymous to worry. In this study, we measured the patient's self-evaluation of urgency, defined as degree-of-worry (DOW), by using a verbal 10-point numerical rating scale (NRS) (1=minimal worry to 10=maximal worry). A previous study shows that callers to OOH services are able to rate their DOW, and that the DOW scale is feasible for large-scale studies.<sup>15</sup> We used the word *worry* and not *anxiety*, as we felt anxiety may be associated with physical symptoms, such as elevated heart rate or shortness of breath, while worry is more of a cognitive nature.<sup>16</sup>

The Common-Sense Model of Self-Regulation (CSM), by Leventhal<sup>17</sup> is a widely recognized theoretical framework, which can be used to describe how a patient cognitively and emotionally addresses a health threat, based on experienced symptoms. The patient's perception is based on prior experience, personal beliefs, discussions with others and cultural understandings.<sup>18</sup> The CSM is a parallel processing model, with one arm representing the cognitive processing aspects and the other arm representing the emotional processing aspects. Together they make up a patients' illness representation.<sup>19</sup> The cognitive arm can be categorized into five components: 1) *identity*: symptoms or name/label of the health threat, 2) *timeline*: duration of the health threat 3) *cause*: factors that are responsible for the health threat, 4) *cure or control*: whether the health threat can be cured or controlled and 5) *consequence*: of the health threat.<sup>18</sup> The patients' understanding of their illness representation influences how they present their health issue to a health care provider and this may in turn influence the care they receive.<sup>20</sup> In previous studies, it has been shown that



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4 the five components of the CSM framework account for a large proportion of the presentations  
5 patients make when contacting OOH services<sup>21</sup> and serve as an appropriate framework for  
6 understanding the worry experiences of primary health care patients.<sup>22</sup>  
7

8 The aim of this paper is to examine the relation between a patient's illness representation, as  
9 presented in telephone consultation to an OOH service call handler, and the self-reported DOW as  
10 a measure of self-evaluated urgency. If there is a relation, incorporating a patient's DOW as an  
11 additional tool in the telephone triage process could aid determination of urgency and type of  
12 health care needed, potentially increasing patient safety.  
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## 15 **METHOD**

### 16 **Design**

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18 A convergent parallel mixed methods design with simultaneously collected data was used. This  
19 design allows for the transformation of one type of result to another (e.g. themes into counts).<sup>23</sup>  
20 Quantitative data consisted of DOW and qualitative data of recorded telephone consultations.  
21 Deductive thematic analysis of the qualitative data was conducted and used to explore the content  
22 of the quantitatively scaled DOW, using the framework of the CSM theory.  
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### 26 **Setting**

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28 The OOH services and the Emergency Medical Services, Copenhagen, the Capital Region of  
29 Denmark, are integrated in one organisation and can be reached through two telephone numbers;  
30 112 for life-threatening emergencies and 1813 for acute, non-emergent medical calls. The Medical  
31 Helpline 1813 is available from 4pm to 8am on weekdays and around the clock on weekends and  
32 holidays. Individuals may also call 1813 for a referral to an emergency department, if they cannot  
33 get in touch with their general practice (GP) during regular working hours. All access to acute care  
34 is pre-assessed by telephone triage. Annually, approximately one million calls are handled by call  
35 handlers (nurses/physicians) who triage the caller to self-care, a general practitioner, face-to-face  
36 assessment/consultation at a hospital, home visit or direct hospitalisation.<sup>24 25</sup>  
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### 40 **Data collection**

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42 A total of 261 callers to the OOH services, The Medical Helpline 1813, during a three-day time  
43 period were approached for inclusion in this study. As a new rating scale was being implemented  
44 by the call handlers, it was considered, that this was a reasonable length of time. All calls from  
45 adults ( $\geq 15$  years of age) concerning somatic illness were deemed eligible for inclusion. Calls  
46 made on behalf of another person, including children (n=16) were excluded, in order to have a  
47 study population exclusively describing personal symptoms. Furthermore, calls in which consent  
48 was not granted (n=1), calls in which the call handler failed to ask study questions (n=19), calls in  
49 which there were technical problems with the call recording (n=33) and repeat callers (n=12) were  
50 also excluded. This resulted in a convenience sample of a total of 180 calls. Data were collected  
51 for three consecutive days: Wednesday 20<sup>th</sup> April and Thursday 21<sup>st</sup> April (4pm to 10pm) and  
52 Friday 22<sup>nd</sup> April (8am to 4pm) 2016 (a bank holiday), 2016. The study was approved by the Data  
53 Protection Agency, Denmark.  
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## Data sources

Data consisted of two parallel strands – the quantitative scaled DOW and illness representation presented by the callers – both derived from the recorded telephone consultations. Two experienced call handlers were first asked to assess and recommend question phrasing for data collection. All call handlers participated in data collection and received instructions on procedure, inclusion criteria, study focus and voluntary caller participation. Based on the recommendations, call handlers were instructed to ask the following questions in each call: “What is your reason for calling in today?”, “How long have you been experiencing these symptoms?” and “On a scale from 1-10, how worried are you?”. Additional questions were asked at the call handlers’ discretion as they deemed relevant and the caller was invited to participate in the study, giving verbal informed consent. Data were collected throughout the course of the consultation. Calls in which the caller failed to provide a number reflecting their DOW (n=10), were assessed by two researchers and using the intensity verbal descriptors (see table 1, Duncan *et al*<sup>26</sup>) assigned a numeric value (1 to 10). If not concurrent, a consensus was reached through discussion. The intensity verbal descriptors used, describe the intensity of pain and not worry. However, as both pain and worry are subjective, it was felt, that in these few cases, the intensity descriptors for pain were an adequate tool.

## Patient and public involvement

The development of the research aim, design, recruitment, conduct and outcome measures in this study were not based on patients’ involvement. The results of this study will not automatically be disseminated to study participants. However, participants can request information regarding this study.

## ANALYSIS

The recorded telephone consultations were transcribed in NVivo V.11 and DOW were attached to each call as attributes. According to the information given by the callers, symptom duration (timeline) was categorised into three groups: less than 5 hours, 5 to 24 hours and more than 24 hours. The remaining qualitative data were deductively coded according to the last four components of the CSM framework, by the main author. For the purpose of simplicity, the results were then sub-grouped into: low DOW (DOW 1 to 4), moderate DOW (DOW 5 and 6) and high DOW (DOW 7 to 10). Furthermore, the results were compared to two previous studies: Farquharson *et al*<sup>21</sup> and Lau *et al*.<sup>27</sup>

## Qualitative data analysis

The qualitative data were created by coding the transcripts deductively according to the four components of the CSM framework (identity, cause, cure/control and consequence), while disregarding the DOW value. For each of the four components, data were clustered and patterns identified. Three themes within each component were derived from these patterns and each theme was recoded, as described by Braun and Clarke.<sup>28</sup> The patterns and thereby derived theme definitions, were discussed and agreed upon with a second researcher, using 50% of the study

data. The remaining data were rechecked and recoded if necessary, by the main researcher, according to the agreed theme definitions.

### Mixed methods analysis

All 180 calls were grouped according to themes in each of the five CSM components and listed according to DOW (1-10). For each theme, the quantiles (Q1-Q3) and median were calculated and a box and whisker plot created.

## RESULTS

### Participants

A total of 261 callers to the OOH services during the three-day time period were approached for inclusion. Of these, 81 callers were excluded, based on the exclusion criteria, leaving a total of 180 callers to be included in this study. Due to this limited size of the study population, there is a lack of statistical power. The nature of the calls was as follows: acute illness (n = 120), injury (n = 37), exacerbation of chronic disease (n = 15), other (n = 7), and undetermined (n = 1), which is representative for calls to the OOH services.<sup>29</sup> (See table 1.)

DOW	Low DOW (1-4)	Moderate DOW (5-6)	High DOW (7-10)
<b>Total study callers</b>	76	39	65
<b>Women</b>	43 (57%) <sup>i</sup>	24 (62%)	47 (72%)
<b>Men</b>	33 (43%)	15 (38%)	18 (28%)
<b>Age 15-20 years</b>	4 (5%)	5 (13%)	10 (15%)
<b>Age 21-40 years</b>	46 (61%)	19 (49%)	26 (40%)
<b>Age 41-65 years</b>	19 (25%)	13 (33%)	21 (32%)
<b>Age &gt;65 years</b>	7 (9%)	2 (5%)	8 (12%)

**Table 1. Participant demographics**

<sup>i</sup> Percentages of total callers in each DOW group.

### Quantitative findings according to the CSM framework

All callers referred to identity, as well as duration (timeline) of their symptoms. Callers with a low DOW were more likely to mention a cause for their illness (82%) than other callers, whereas, reference to cure/control was similar (78%, 79% and 74%) in all three DOW sub-groups. Callers in all three DOW sub-groups were least likely to refer to consequence compared to the other four CSM components; however, callers with a high DOW were more likely to refer to a consequence (48%) of their illness than callers with moderate (28%) or low DOW (33%). (See figure 1.)

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4 **(Placement of figure 1.)**  
5

6 **Qualitative findings**  
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8 Identity  
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10 Callers' referrals to the identity of their perceived health threat were divided into three themes:  
11 *Strong identity*; use of a definitive label or diagnosis, reference to a previous identical experience,  
12 reference to a known condition and/or expression of certainty (n=56), *medium identity*; hypothesis  
13 of label or diagnosis, reference to a previous similar, but not identical experience and/or  
14 expression of near certainty (n=90) and *weak identity*; no mention of label or diagnosis, no  
15 reference to a previous experience, reference to an unknown condition and/or expression of  
16 uncertainty (n=34).  
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20 Timeline

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22 Fifty-two callers described symptoms which had lasted *less than 5 hours*, 44 callers described  
23 symptoms which had lasted *between 5 and 24 hours* and 84 callers described symptoms which  
24 had lasted *more than 24 hours*.  
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26 Cause

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28 A possible cause of symptoms or illness was reported by 132 callers (73%). The reported causes  
29 were divided into the following three themes: *clear cause*; expression of certainty (n=90); *unclear*  
30 *cause*; a hypothesis suggested or expression of uncertainty (n=42); and *no mention of cause*  
31 (n=48).  
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34 Cure/control

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36 Reference pertaining to a cure or control related to their symptoms or illness was made by 138  
37 callers (77%). These were divided in to the following three themes: *clear solution for cure/control*;  
38 specific request for treatment (n=42), *unclear solution for cure/control*; suggestion for treatment or  
39 had attempted self-treatment with little or no effect (n=96), and *no mention of cure/control* (n=42).  
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42 Consequence

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44 Reference to a consequence of their symptoms or illness was made by 67 callers (37%). These  
45 were categorized into the following three themes: *high consequence*; potentially long-term or life-  
46 threatening consequences and consequences severely affecting work or social life (n=36), *low*  
47 *consequence*; short-term consequences, consequences affecting immediate daily life or mildly  
48 affecting work or social life (n=31) and *no mention of consequence* (n=113).  
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51 (See table 2 for examples of citations of each theme. Citations were chosen to represent the  
52 breadth of definition of each theme.)  
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<b>Identity</b> n=180 (100%)	<b>Themes</b>	<b>Examples of citations</b>
	<b>Strong identity</b> n=56 (31%)	<p>"I have a bladder infection...I have to pee all the time...I also had a UTI last summer..."</p> <p>"I rubbed my eye and now it is red and there is pus... it is an eye infection...I know it goes away, as I have had it before..."</p> <p>"My right big toe is swollen, the area next to the nail is red and infected, I can press pus out..."</p>
	<b>Medium identity</b> n=90 (50%)  <b>Weak identity</b> n=34 (19%)	<p>"I have had genital herpes many times before, but it looks different...maybe it is just a yeast infection..."</p> <p>"...sudden pain after I sneezed...I think I might have punctured a lung or bruised a rib..."</p> <p>"I have a fever and my throat hurts...I think I'm sick....it's usually a throat infection..."</p> <p>"I suddenly got a severe pain in the left, lower side of my abdomen...I have never tried anything like it before...I cannot figure out why I am in so much pain..."</p> <p>"I have had two attacks of chest pain and cold sweats...I do not usually feel like this...does not feel like pain that I have tried before...I just want to know why..."</p> <p>"I feel really bad; have had a fever for 3-4 days and I'm coughing a lot. Yesterday, I had the shakes and I threw up"</p>
<b>Timeline</b> n=180 (100%)	<b>&lt;5 hours</b> n=52 (29%)  <b>5-24 hours</b> n=44 (24%)  <b>&gt;24 hours</b> n=84 (47%)	<p>"...I just fell and cut my forehead and it is bleeding..."</p> <p>"...I started feeling sick this morning, but I still decided to go to work.."</p> <p>"...it's been going on for a few days now..."</p>
<b>Cause</b> n=132 (73%)	<b>Themes</b>	<b>Examples of citations</b>
	<b>Clear cause</b> n=90 (50%)	"I fell about eight steps down a staircase and hit my shoulder..."

		<p>“When I feel like this, it is usually tonsillitis...”</p> <p>“After skating...pain in my leg... muscle strain seems very logical...”</p>
	<p><b>Unclear cause</b> n=42 (23%)</p>	<p>“I think it could be a mixture of stress and bacteria...”</p> <p>“It is not an allergy...my immune system might be a bit affected because I have been travelling a lot...”</p> <p>“It looks like hives, but I do not have any allergies...”</p>
	<p><b>No cause</b> n=48 (27%)</p>	
<p><b>Cure/control</b> n=138 (77%)</p>	<p><b>Themes</b></p>	<p><b>Examples of citations</b></p>
	<p><b>Clear solution for cure/control</b> n=42 (23%)</p>	<p>“I want to go to the hospital and get stitches...”</p> <p>“I have tried it before; when I got penicillin...I am going to try to convince you to give it me again...”</p> <p>“I have spoken to my husband, who is a doctor, and he believes I need to be seen by an eye specialist...”</p>
	<p><b>Unclear solution for cure/control</b> n=96 (53%)</p>	<p>“I have gotten painkillers from the dentist, but they are not helping; can I take Panodil as well?”</p> <p>“I tried getting in contact with my GP, but no one is picking up the phone...”</p> <p>“Do I have to do anything about it tonight or can it wait until I call my GP tomorrow?”</p>
	<p><b>No solution for cure/control</b> n=42 (23%)</p>	
<p><b>Consequence</b> n=67 (37%)</p>	<p><b>Themes</b></p>	<p><b>Examples of citations</b></p>
	<p><b>High consequence</b> n=36 (20%)</p>	<p>“I am afraid it could be a blood clot, my mother had that and she lost her entire leg...”</p>

		“I am pregnant, can it affect the baby?”
		“I read on Google, that it could be cancer...”
	<b>Low consequence</b> n=31 (17%)	“I cannot sleep or eat anything, because of the pain...”  “Maybe I cannot go out riding tomorrow...”  “I have to travel for work tomorrow...”
	<b>No consequence</b> n=113 (63%)	

**Table 2. Thematic analysis of the components of the CSM framework**

### Mixed methods findings

Study callers with a *medium identity* were more likely to have the highest DOWs, while callers with a *strong identity* generally had a lower DOW and callers with a *weak identity* generally had more moderate DOWs. Callers whose illness had lasted *less than 5 hours* were more likely to have a low to moderate DOW, whereas callers whose illness had lasted *more than 24 hours* were more likely to have a more moderate to high DOW. Callers with a *clear cause* for their illness and a *clear solution for cure/control* were more likely to have a low DOW and finally, callers who mentioned a *high consequence* to their illness were more likely to have a high DOW. (See figure 2.)

(Placement of figure 2.)

## DISCUSSION

### Summary of main findings

Using the five components of the CSM framework, as described by Leventhal<sup>18</sup>, our analysis demonstrated that callers presenting their illness to OOH services to a large extent referred to all five components, regardless of their self-evaluated DOW. All callers referred to identity and timeline and callers were least likely to refer to consequence.

A low DOW was more present within the group of callers who had a strong illness identity, illness duration of less than five hours, a clear cause and a clear solution. Callers who presented a medium or weak illness identity, illness duration of more than 24 hours and, an unclear cause and unclear solution and a perception of high consequence were more likely to present a higher DOW.

### Strengths and limitations of this study

The main strength of this study was the use of mixed methods approach, which gave an in-depth insight and enabled a thorough analysis and understanding of the illness representation of patients to an OOH service. In addition, patients' illness representation and reported self-evaluation of DOW were obtained in real time, as the callers were seeking help. Findings were, therefore, not

influenced by recall bias. DOW was not uniformly obtained at a specific time within the consultation. Therefore, the consultation itself could influence the patient's DOW and the patient's DOW could influence the consultation. This, however, is representative of real-life calls to OOH services and how DOW can be used as a potential triage tool. Use of the NVivo V.11 software and researcher triangulation ensure that the coding of the data is available for independent analysis and less subject to personal bias. Due to the short duration of data collection, the size of the study population was limited, resulting in a lack of statistical power. However, irrespective of this limitation, the analyses of the results, using the mixed methods approach, show a distinct trend and relation between DOW as a measure of patient-evaluated urgency and their illness representation.

### Comparison with existing literature

The results of the quantitative data can be compared to work done by Farquharson *et al*<sup>21</sup> and Lau *et al*.<sup>27</sup> (See table 3.) Participants in both studies and in all three DOW sub-groups in the present study mentioned factors pertaining to all five components of the CSM framework. Farquharson *et al*, however, solely based their data on information that callers volunteered, without call handler prompting, but suggested that it may be necessary for call handlers to prompt remaining components to obtain a comprehensive understanding of patients' representations of illness. In this study, all information from the caller was coded, including information prompted by the call handler, thus the prevalence in each of the five CSM components was greater compared to those found by Farquharson *et al*. The method used in this study provides a more complete portrayal of the caller's illness representation and is more representative of real-life calls to OOH services.

	Present study			Previous studies	
	Low DOW N=76	Moderate DOW N=39	High DOW N=65	Farquharson <i>et al</i> <sup>(21)</sup> (2011) N=59	Lau <i>et al</i> <sup>(27)</sup> (1989) N=887
<b>Identity</b>	100	100	100	100	96
<b>Timeline</b>	100	100	100	44	49
<b>Cause</b>	82	72	65	15	28
<b>Cure/control</b>	78	79	74	37	32
<b>Consequence</b>	33	28	48	14	33

**Table 3. Prevalence (%) of components of illness representation**

### Relevance of this study: possible implications for health care providers and policy makers

This study suggests a relation between a patient's illness representation, as presented telephonically to an OOH services call handler, and the self-evaluation of urgency, defined as DOW. This is a new area of research and this study gives direction for future research to further strengthen the evidence. Research on coherence between patient DOW, call handlers', ED and GP physicians' assessment of urgency, both prospectively and retrospectively will strengthen the basis for potential use of DOW as a triage tool. Incorporating DOW as an additional tool in the telephone triage process could potentially aid in the determination of urgency and the type of health care needed, thus increasing patient safety.



## **Figure legends**

**Figure 1.** Prevalence (%) of components of illness representation in present study

**Figure 2.** Relation between DOW and the components of the CSM framework

## **Footnotes**

**Contributorship statement:** SLT and HGJ planned the study and discussed and agreed upon theme definitions in the qualitative analysis. HGJ planned and performed the data collection. SLT extracted and analysed the data and drafted the manuscript. IE and FKL supervised and contributed substantially to the critical revision. All authors read and approved the final manuscript.

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**Conflicts of interests statement:** "All authors have completed the ICMJE uniform disclosure form at [www.icmje.org/coi\\_disclosure.pdf](http://www.icmje.org/coi_disclosure.pdf) and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work."

**Data sharing statement:** Additional data that are not available online can be obtained by contacting the corresponding author.

**Ethical statement:** The study was approved by the Data Protection Agency (PVH-2015-004, I-Suite nr.: 04330). All participants gave informed consent. The Ethical Committee was consulted but no permission was needed (H-15016323).

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Word count: 3545 words

Abstract word count: 300 words

Number of tables and figures: 3 tables and 2 figures

Keywords: illness representation, degree-of-worry, out-of-hours services, triage

## References

- 1 Würgler MW, Navne LE. Når sygeplejersker visiterer i lægevagten. Copenhagen: Dansk Sundhedsinstitut; 2010.
- 2 Leprohon J, Patel VL. Decision-making Strategies for Telephone Triage in Emergency Medical Services. *Medical Decision Making*. 1995;15:240–53. doi:10.1177/0272989x9501500307
- 3 Derkx HP. For your ears only. Quality of telephone triage at out-of-hours centres in the Netherlands. Maastricht: Department of General Practice, University of Maastricht; 2008.
- 4 Gamst-Jensen H, Lippert FK, Egerod I. Under-triage in telephone consultation is related to non-normative symptom description and interpersonal communication: a mixed methods study. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine*. 2017;25:52. doi:10.1186/s13049-017-0390-0
- 5 Gravsersen DS. Out-of-hours telephone triage by nurses and doctors in Danish acute care settings – A study of quality focusing on communication, safety and efficiency. Aarhus: Research Unit for General Practice, University of Aarhus; 2016.
- 6 Holmström I. Decision aid software programs in telenursing: not used as intended? Experiences of Swedish telenurses. *Nursing & Health Sciences*. 2007;9:23–8. doi:10.1111/j.1442-2018.2007.00299.x
- 7 Gifford MJ, Franaszek JB, Gibson G. Emergency physicians and patients assessments: Urgency of need for medical care. *Annals of Emergency Medicine*. 1980;9:502–7. doi:10.1016/s0196-0644(80)80187-9
- 8 Hunt RC, Dehart KL, Allison E, *et al*. Patient and physician perception of need for emergency medical care: A prospective and retrospective analysis. *The American Journal of Emergency Medicine*. 1996;14:635–9. doi:10.1016/s0735-6757(96)90077-7
- 9 Caterino JM, Holliman C, Kunselman AR. Underestimation of case severity by emergency department patients: Implications for managed care. *The American Journal of Emergency Medicine*. 2000;18:254–6. doi:10.1016/s0735-6757(00)90115-3
- 10 Miyamichi R, Mayumi T, Asaoka M, *et al*. Evaluating patient self-assessment of health as a predictor of hospital admission in emergency practice: a diagnostic validity study. *Emergency Medicine Journal*. 2011;29:570–5. doi:10.1136/emj.2010.105247
- 11 Booker MJ, Simmonds RL, Purdy S. Patients who call emergency ambulances for primary care problems: a qualitative study of the decision-making process. *Emergency Medicine Journal*. 2013;31:448–52. doi:10.1136/emermed-2012-202124
- 12 Agarwal S, Banerjee J, Baker R, *et al*. Potentially avoidable emergency department attendance: interview study of patients reasons for attendance. *Emergency Medicine Journal* 2011;29. doi:10.1136/emermed-2011-200585
- 13 Fosnocht D, Swanson E. Pain and anxiety in the emergency department. *Annals of Emergency Medicine*. 2004;44. doi:10.1016/j.annemergmed.2004.07.284

- 1  
2  
3  
4
- 
- 5 <sup>14</sup> Craven P, Cinar O, Madsen T. Patient anxiety may influence the efficacy of ED pain  
6 management. *The American Journal of Emergency Medicine*. 2013;31:313–8.  
7 doi:10.1016/j.ajem.2012.08.009
- 8  
9 <sup>15</sup> Gamst-Jensen H, Huibers L, Pedersen K, et al. Self-rated worry in acute care telephone triage: a  
10 mixed-methods study. *British Journal of General Practice* Published Online First: December 2018.  
11 doi:10.3399/bjgp18x695021
- 12  
13 <sup>16</sup> Zebb BJ, Beck JG. Worry Versus Anxiety. *Behavior Modification*. 1998;22:45–61.  
14 doi:10.1177/01454455980221003
- 15  
16 <sup>17</sup> Leventhal H, Meyer D, Nerenz D. The common sense representation of illness danger. In:  
17 Rachman S (ed). *Contributions to medical psychology*. 1st edn, Vol 2. Oxford: Pergamon Press,  
18 1980:7–30.
- 19  
20 <sup>18</sup> Leventhal H, Phillips LA, Burns E. The Common-Sense Model of Self-Regulation (CSM): a  
21 dynamic framework for understanding illness self-management. *Journal of Behavioral*  
22 *Medicine*. 2016;39:935–46. doi:10.1007/s10865-016-9782-2
- 23  
24 <sup>19</sup> Hagger MS, Orbell S. A Meta-Analytic Review of the Common-Sense Model of Illness  
25 Representations. *Psychology & Health*. 2003;18:141–84. doi:10.1080/088704403100081321
- 26  
27 <sup>20</sup> Bugge C, Entwistle VA, Watt IS. The significance for decision-making of information that is not  
28 exchanged by patients and health professionals during consultations. *Social Science &*  
29 *Medicine*. 2006;63:2065–78. doi:10.1016/j.socscimed.2006.05.010
- 30  
31 <sup>21</sup> Farquharson B, Johnston M, Bugge C. How people present symptoms to health services: a  
32 theory-based content analysis. *British Journal of General Practice*. 2011;61:267–73.  
33 doi:10.3399/bjgp11x567090
- 34  
35 <sup>22</sup> Laakso V, Niemi PM. Primary health-care patients' reasons for complaint-related worry and  
36 relief. *Primary Health Care Research & Development*. 2013;14:151–63.  
37 doi:10.1017/s1463423612000448
- 38  
39 <sup>23</sup> Creswell JW, Clark VLP. *Designing and conducting mixed methods research*. Los Angeles (CA):  
40 SAGE Publications; 2011.
- 41  
42 <sup>24</sup> Årsrapportdata. Copenhagen: Emergency Medical Services Copenhagen, University of  
43 Copenhagen; 2015 and 2016. [cited 2017 Apr 15]. Available from: <https://www.regionh.dk/om-region-hovedstaden/Den-Praehospitale-Virksomhed/Documents/%C3%85rsrapportdata20152016.pdf>
- 44  
45  
46  
47  
48 <sup>25</sup> Forde I, Nader C, Socha-Dietrich K, Oderkirk J, Colombo F. Primary Care Review of Denmark.  
49 OECD; 2016. [cited 2017 Apr 11]. Available from: <https://www.oecd.org/health/health-systems/Primary-Care-Review-of-Denmark-OECD-report-December-2016.pdf>
- 50  
51  
52 <sup>26</sup> Duncan GH, Bushnell CM, Lavigne GJ. Comparison of verbal and visual analogue scales for  
53 measuring the intensity and unpleasantness of experimental pain. *Pain*. 1989;37:295–303.  
54 doi:10.1016/0304-3959(89)90194-2
- 55  
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59  
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6 <sup>27</sup> Lau RR, Bernard TM, Hartman KA. Further explorations of common-sense representations of  
7 common illnesses. *Health Psychology* 1989;8:195–219. doi:10.1037//0278-6133.8.2.195

8  
9 <sup>28</sup> Braun V, Clarke V. Using thematic analysis in psychology. *Qualitative Research in*  
10 *Psychology*. 2006;3:77–101. doi:10.1191/1478088706qp063oa

11  
12 <sup>29</sup> Dam, PS. Derfor ringer danskerne 1813. *Berlingske* [newspaper on the internet]. 2017 Mar 19  
13 [cited 2018 Feb 10]. Available from: <https://www.b.dk/nationalt/derfor-ringer-danskerne-1813>  
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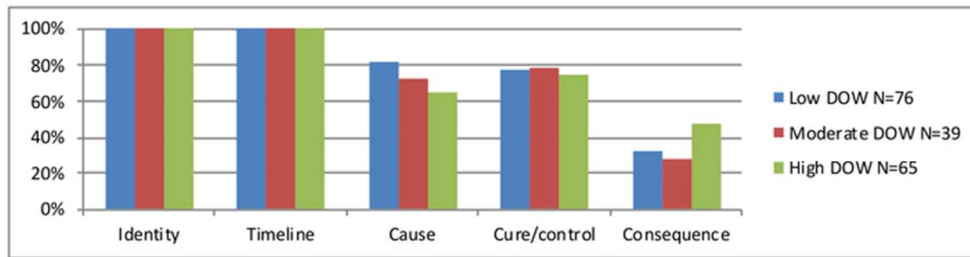


Figure 1. Prevalence (%) of components of illness representation in present study

61x21mm (300 x 300 DPI)

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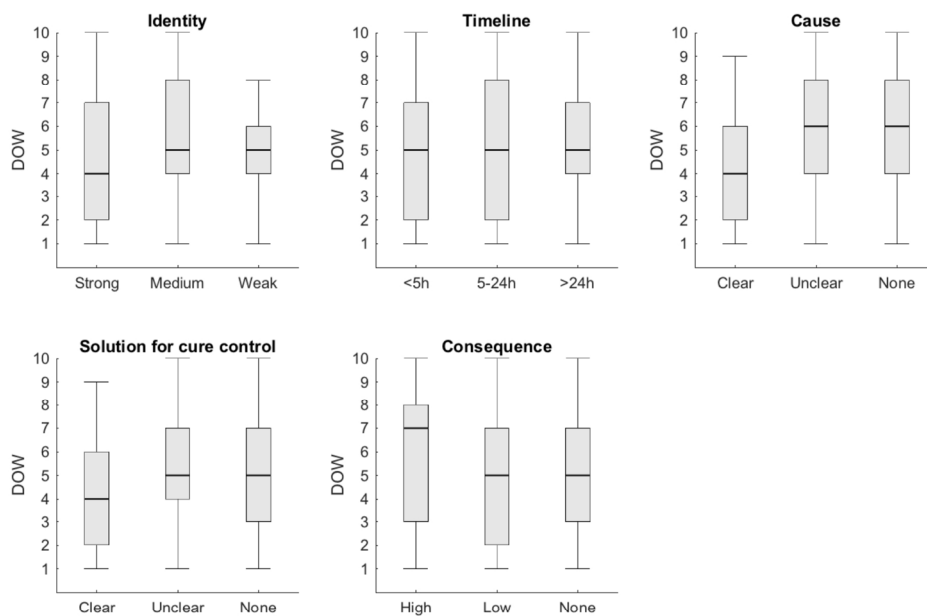


Figure 2. Relation between DOW and the components of the CSM framework

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## STROBE (Strengthening The Reporting of OBServational Studies in Epidemiology) Checklist

A checklist of items that should be included in reports of observational studies. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at [www.strobe-statement.org](http://www.strobe-statement.org).

Section and Item	Item No.	Recommendation	Reported on Page No.
Title and Abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	
<b>Introduction</b>			
Background/Rationale	2	Explain the scientific background and rationale for the investigation being reported	
Objectives	3	State specific objectives, including any prespecified hypotheses	
<b>Methods</b>			
Study Design	4	Present key elements of study design early in the paper	
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up  <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls  <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants	
		(b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed  <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case	
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	

Section and Item	Item No.	Recommendation	Reported on Page No.
Data Sources/ Measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	
Bias	9	Describe any efforts to address potential sources of bias	
Study Size	10	Explain how the study size was arrived at	
Quantitative Variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	
Statistical Methods	12	(a) Describe all statistical methods, including those used to control for confounding	
		(b) Describe any methods used to examine subgroups and interactions	
		(c) Explain how missing data were addressed	
		(d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed <i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed <i>Cross-sectional study</i> —If applicable, describe analytical methods taking account of sampling strategy	
		(e) Describe any sensitivity analyses	
<b>Results</b>			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	
		(b) Give reasons for non-participation at each stage	
		(c) Consider use of a flow diagram	
Descriptive Data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	
		(b) Indicate number of participants with missing data for each variable of interest	
		(c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	
Outcome Data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time	
		<i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure	
		<i>Cross-sectional study</i> —Report numbers of outcome events or summary measures	



Section and Item	Item No.	Recommendation	Reported on Page No.
Main Results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	
		(b) Report category boundaries when continuous variables were categorized	
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other Analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	
<b>Discussion</b>			
Key Results	18	Summarise key results with reference to study objectives	
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	
Generalisability	21	Discuss the generalisability (external validity) of the study results	
<b>Other Information</b>			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	

\*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

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# BMJ Open

## Relation between illness representation and self-reported degree-of-worry in patients calling out-of-hours services: a mixed methods study in Copenhagen, Denmark

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2017-020401.R2
Article Type:	Research
Date Submitted by the Author:	10-Jun-2018
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<b>Primary Subject Heading</b>:	Emergency medicine
Secondary Subject Heading:	Qualitative research, Patient-centred medicine
Keywords:	illness representation, degree-of-worry, out-of-hours services, triage

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4 **Relation between illness representation and self-reported degree-of-worry in**  
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8 Sita LeBlanc Thilsted, Ingrid Egerod, Freddy Knudsen Lippert, Hejdi Gamst-Jensen  
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## ABSTRACT

### Objectives:

To examine the relation between patients' illness representations, presented in telephone consultation to out-of-hours (OOH) services, and self-reported degree-of-worry (DOW), as a measure of self-evaluated urgency. If a clear relation is found, incorporating DOW during telephone triage could aid the triage process, potentially increasing patient safety.

### Design:

A convergent parallel mixed methods design with quantitative data; DOW and qualitative data; recorded telephone consultations. Thematic analysis of the qualitative data was used to explore the content of the quantitative scaled DOW, using the Common Sense Model of Self-Regulation (CSM).

### Setting:

A convenience sampling of calls to the OOH services in Copenhagen, Denmark, during three days was included in the study.

### Participants:

Calls from adults ( $\geq 15$  years of age) concerning somatic illness during the data collection period were eligible for inclusion. Calls made on behalf of another person, calls concerning perceived life-threatening illness or calls regarding logistical/practical problems were excluded, resulting in analysis of 180 calls.

### Results:

All five components of the CSM framework, regardless of DOW, were present in the data. All callers referred to identity and timeline and were least likely to refer to consequence (37%). Through qualitative analysis, themes were defined. Callers with a strong identity, illness duration of less than 24 hours, clear cause and solution for cure/control seemed to present a lower DOW. Callers with a medium identity, illness duration of more than 24 hours and a high consequence seemed to present a higher DOW.

### Conclusion:

This study suggests a relation between a patient's illness representation and self-evaluation of urgency. Incorporating a patient's DOW during telephone triage could aid the triage process in determining urgency and type of health care needed, potentially increasing patient safety. Research on patient outcome after DOW-assisted triage is needed before implementation of the DOW scale is recommended.

**Article summary:****Strengths and limitations of this study**

- Use of mixed methods approach in this study gave an in-depth insight and enabled a thorough analysis and understanding of the illness representation of patients to an OOH service.
- Patients' presentation of their illness representation and reported DOW were obtained at the actual time of seeking help and therefore, not influenced by recall bias.
- DOW was not uniformly obtained at a specific time within the consultation and responses were both spontaneous and/or prompted by the call-handler, which is representative of real-life calls to OOH services.
- Use of the NVivo V.11 software and researcher triangulation ensures that the coding of the data is available for independent analysis and less subject to personal bias.
- Due to the limited size of the study population, there is a lack of statistical power; however, the results show clear trends and relations, which give direction for future research to strengthen evidence in this new area.

## INTRODUCTION

Telephone triage within out-of-hours (OOH) service is recognised as a mean to reduce pressure and overcrowding of emergency departments (ED) and OOH clinics.<sup>1</sup> It aims to assess the urgency of a patient's medical condition in order to determine the correct type of health care needed, thus ensuring patient safety. However, due to the lack of non-verbal cues in telephone consultations, assessing urgency is more challenging than face-to-face consultations.<sup>2</sup> Studies show that the quality of telephone triage improves with communication between patient and health professional being patient-centred rather than disease-centred<sup>3</sup> and that non-normative symptom description and poor communication contribute to under-triage.<sup>4</sup> Triage tools, e.g. computerised decision support systems are used to aid the triage process<sup>5</sup>; however, these tools focus on medical information and less on psychosocial or affective information.<sup>6</sup>

Patients' perception of urgency has previously been examined, comparing ED physicians' and the patients' assessment of the severity of symptoms.<sup>7,8</sup> These studies found that patients' perception of urgency can be used as a rough guide to predict the need for hospitalisation.<sup>9</sup> Furthermore, it has been suggested that patients expressing a potential need for hospitalisation should be thoroughly examined for possible severe illness.<sup>10</sup> Previous studies have also shown that patients' anxiety or worry about a health threat is a major factor in urgent care decision-making<sup>11,12</sup> and that worry is the most important motive for patients contacting OOH services.<sup>13</sup> Therefore, the measure of a patient's worry about an acute health threat reflects the patient's self-evaluation of urgency. A self-reported verbal ten-point numerical rating scale (NRS) measuring anxiety in patients (1=minimal anxiety to 10=maximal anxiety) has previously been used in several studies in acute care settings.<sup>14</sup> The anxiety observed in these patients was regarded as acute in relation to the immediate health threat and not due to an underlying psychiatric disease, thus, the feeling of anxiety in this setting was synonymous to worry.<sup>15</sup> This scale has not been validated. However, as anxiety is a subjective symptom, a subjective scoring system was deemed acceptable. A previous study showed that callers to OOH services were able to rate their degree-of-worry (DOW), using a verbal 10-point NRS (1=minimal worry to 10=maximal worry) as a measure of their self-evaluation of urgency. It was also shown that the DOW scale is feasible for use in large-scale studies.<sup>16</sup>

The Common-Sense Model of Self-Regulation (CSM), by Leventhal<sup>17</sup> is a widely recognized theoretical framework, which can be used to describe how a patient cognitively and emotionally addresses a health threat, based on experienced symptoms. The patient's perception is based on prior experience, personal beliefs, discussions with others and cultural understandings.<sup>18</sup> The CSM is a parallel processing model, with one arm representing the cognitive processing aspects and the other arm representing the emotional processing aspects. Together they make up a patient's illness representation.<sup>19</sup> The cognitive arm can be categorized into five components: 1) *identity*: symptoms or name/label of the health threat, 2) *timeline*: duration of the health threat 3) *cause*: factors that are responsible for the health threat, 4) *cure or control*: whether the health threat can be cured or controlled and 5) *consequence*: of the health threat.<sup>17</sup> The patients' understanding of their illness representation influences how they present their health issue to a health care provider and this may in turn influence the care they receive.<sup>20</sup> In previous studies, it has been shown that the five components of the CSM framework account for a large proportion of the presentations patients make when contacting OOH services<sup>21</sup> and serve as an appropriate framework for understanding the worry experiences of primary health care patients.<sup>22</sup>

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5 The aim of this paper is to examine the relation between a patient's illness representation, as  
6 presented in telephone consultation to an OOH service call handler, and the self-reported DOW as  
7 a measure of self-evaluated urgency. If there is a relation, incorporating a patient's DOW as an  
8 additional tool in the telephone triage process could aid determination of urgency and type of  
9 health care needed, potentially increasing patient safety.  
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## 11 **METHOD**

### 12 **Design**

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16 A convergent parallel mixed methods design with simultaneously collected data was used. This  
17 design allows for the transformation of one type of result to another (e.g. themes into counts).<sup>23</sup>  
18 Quantitative data consisted of DOW and qualitative data of recorded telephone consultations.  
19 Deductive thematic analysis of the qualitative data was conducted and used to explore the content  
20 of the quantitatively scaled DOW, using the framework of the CSM theory.  
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### 23 **Setting**

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26 The OOH services and the Emergency Medical Services, Copenhagen, the Capital Region of  
27 Denmark, are integrated in one organisation and can be reached through two telephone numbers;  
28 112 for life-threatening emergencies and 1813 for acute, non-emergent medical calls. The Medical  
29 Helpline 1813 is available from 4pm to 8am on weekdays and around the clock on weekends and  
30 holidays. Individuals may also call 1813 for a referral to an emergency department, if they cannot  
31 get in touch with their general practice (GP) during regular working hours. All access to acute care  
32 is pre-assessed by telephone triage. Annually, approximately one million calls are handled by call  
33 handlers (nurses/physicians) who triage the caller to self-care, a general practitioner, face-to-face  
34 assessment/consultation at a hospital, home visit or direct hospitalisation.<sup>24 25</sup>  
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### 37 **Data collection**

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39 A total of 261 callers to the OOH services, The Medical Helpline 1813, during a three-day time  
40 period were approached for inclusion in this study. As a new rating scale was being implemented  
41 by the call handlers, it was considered, that this was a reasonable length of time. All calls from  
42 adults ( $\geq 15$  years of age) concerning somatic illness were deemed eligible for inclusion. Calls  
43 made on behalf of another person, including children (n=16) were excluded, in order to have a  
44 study population exclusively describing personal symptoms. Furthermore, calls in which consent  
45 was not granted (n=1), calls in which the call handler failed to ask study questions (n=19), calls in  
46 which there were technical problems with the call recording (n=33) and repeat callers (n=12) were  
47 also excluded. This resulted in a convenience sample of a total of 180 calls. Data were collected  
48 for three consecutive days: Wednesday 20<sup>th</sup> April and Thursday 21<sup>st</sup> April (4pm to 10pm) and  
49 Friday 22<sup>nd</sup> April (8am to 4pm) 2016 (a bank holiday), 2016. The study was approved by the Data  
50 Protection Agency, Denmark.  
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## Data sources

Data consisted of two parallel strands – the quantitative scaled DOW and illness representation presented by the callers – both derived from the recorded telephone consultations. Two experienced call handlers were first asked to assess and recommend question phrasing for data collection. All call handlers participated in data collection and received instructions on procedure, inclusion criteria, study focus and voluntary caller participation. Based on the recommendations, call handlers were instructed to ask the following questions in each call: “What is your reason for calling in today?”, “How long have you been experiencing these symptoms?” and “On a scale from 1-10, how worried are you?”. Additional questions were asked at the call handlers’ discretion as they deemed relevant and the caller was invited to participate in the study, giving verbal informed consent. Data were collected throughout the course of the consultation. Calls in which the caller failed to provide a number reflecting their DOW (n=10), were assessed by two researchers and using the intensity verbal descriptors (see table 1, Duncan *et al*<sup>26</sup>) assigned a numeric value (1 to 10). If not concurrent, a consensus was reached through discussion. The intensity verbal descriptors used, describe the intensity of pain and not worry. However, as both pain and worry are subjective, it was felt, that in these few cases, the intensity descriptors for pain were an adequate tool.

## Patient and public involvement

The development of the research aim, design, recruitment, conduct and outcome measures in this study were not based on patients’ involvement. The results of this study will not automatically be disseminated to study participants. However, participants can request information regarding this study.

## ANALYSIS

The recorded telephone consultations were transcribed in NVivo V.11 and DOW were attached to each call as attributes. According to the information given by the callers, symptom duration (timeline) was categorised into three groups: less than 5 hours, 5 to 24 hours and more than 24 hours. The remaining qualitative data were deductively coded according to the last four components of the CSM framework, by the main author. For the purpose of simplicity, the results were then sub-grouped into: low DOW (DOW 1 to 4), moderate DOW (DOW 5 and 6) and high DOW (DOW 7 to 10). Furthermore, the results were compared to two previous studies: Farquharson *et al*<sup>21</sup> and Lau *et al*.<sup>27</sup>

## Qualitative data analysis

The qualitative data were created by coding the transcripts deductively according to the four components of the CSM framework (identity, cause, cure/control and consequence), while disregarding the DOW value. For each of the four components, data were clustered and patterns identified. Three themes within each component were derived from these patterns and each theme was recoded, as described by Braun and Clarke.<sup>28</sup> The patterns and thereby derived theme definitions, were discussed and agreed upon with a second researcher, using 50% of the study



data. The remaining data were rechecked and recoded if necessary, by the main researcher, according to the agreed theme definitions.

### Mixed methods analysis

All 180 calls were grouped according to themes in each of the five CSM components and listed according to DOW (1-10). For each theme, the quantiles (Q1-Q3) and median were calculated and a box and whisker plot created.

## RESULTS

### Participants

A total of 261 callers to the OOH services during the three-day time period were approached for inclusion. Of these, 81 callers were excluded, based on the exclusion criteria, leaving a total of 180 callers to be included in this study. Due to this limited size of the study population, there is a lack of statistical power. The nature of the calls was as follows: acute illness (n = 120), injury (n = 37), exacerbation of chronic disease (n = 15), other (n = 7), and undetermined (n = 1), which is representative for calls to the OOH services.<sup>29</sup> (See table 1.)

DOW	Low DOW (1-4)	Moderate DOW (5-6)	High DOW (7-10)
<b>Total study callers</b>	76	39	65
<b>Women</b>	43 (57%) <sup>i</sup>	24 (62%)	47 (72%)
<b>Men</b>	33 (43%)	15 (38%)	18 (28%)
<b>Age 15-20 years</b>	4 (5%)	5 (13%)	10 (15%)
<b>Age 21-40 years</b>	46 (61%)	19 (49%)	26 (40%)
<b>Age 41-65 years</b>	19 (25%)	13 (33%)	21 (32%)
<b>Age &gt;65 years</b>	7 (9%)	2 (5%)	8 (12%)

**Table 1. Participant demographics**

<sup>i</sup> Percentages of total callers in each DOW group.

### Quantitative findings according to the CSM framework

All callers referred to identity, as well as duration (timeline) of their symptoms. Callers with a low DOW were more likely to mention a cause for their illness (82%) than other callers, whereas, reference to cure/control was similar (78%, 79% and 74%) in all three DOW sub-groups. Callers in all three DOW sub-groups were least likely to refer to consequence compared to the other four CSM components; however, callers with a high DOW were more likely to refer to a consequence (48%) of their illness than callers with moderate (28%) or low DOW (33%). (See figure 1.)

## (Placement of figure 1.)

### Qualitative findings

#### Identity

Callers' referrals to the identity of their perceived health threat were divided into three themes: *Strong identity*; use of a definitive label or diagnosis, reference to a previous identical experience, reference to a known condition and/or expression of certainty (n=56), *medium identity*; hypothesis of label or diagnosis, reference to a previous similar, but not identical experience and/or expression of near certainty (n=90) and *weak identity*; no mention of label or diagnosis, no reference to a previous experience, reference to an unknown condition and/or expression of uncertainty (n=34).

#### Timeline

Fifty-two callers described symptoms which had lasted *less than 5 hours*, 44 callers described symptoms which had lasted *between 5 and 24 hours* and 84 callers described symptoms which had lasted *more than 24 hours*.

#### Cause

A possible cause of symptoms or illness was reported by 132 callers (73%). The reported causes were divided into the following three themes: *clear cause*; expression of certainty (n=90); *unclear cause*; a hypothesis suggested or expression of uncertainty (n=42); and *no mention of cause* (n=48).

#### Cure/control

Reference pertaining to a cure or control related to their symptoms or illness was made by 138 callers (77%). These were divided into the following three themes: *clear solution for cure/control*; specific request for treatment (n=42), *unclear solution for cure/control*; suggestion for treatment or had attempted self-treatment with little or no effect (n=96), and *no mention of cure/control* (n=42).

#### Consequence

Reference to a consequence of their symptoms or illness was made by 67 callers (37%). These were categorized into the following three themes: *high consequence*; potentially long-term or life-threatening consequences and consequences severely affecting work or social life (n=36), *low consequence*; short-term consequences, consequences affecting immediate daily life or mildly affecting work or social life (n=31) and *no mention of consequence* (n=113).

(See table 2 for examples of citations of each theme. Citations were chosen to represent the breadth of definition of each theme.)

<b>Identity</b> n=180 (100%)	<b>Themes</b>	<b>Examples of citations</b>
	<b>Strong identity</b> n=56 (31%)	<p>"I have a bladder infection...I have to pee all the time...I also had a UTI last summer..."</p> <p>"I rubbed my eye and now it is red and there is pus... it is an eye infection...I know it goes away, as I have had it before..."</p> <p>"My right big toe is swollen, the area next to the nail is red and infected, I can press pus out..."</p>
	<b>Medium identity</b> n=90 (50%)  <b>Weak identity</b> n=34 (19%)	<p>"I have had genital herpes many times before, but it looks different...maybe it is just a yeast infection..."</p> <p>"...sudden pain after I sneezed...I think I might have punctured a lung or bruised a rib..."</p> <p>"I have a fever and my throat hurts...I think I'm sick....it's usually a throat infection..."</p> <p>"I suddenly got a severe pain in the left, lower side of my abdomen...I have never tried anything like it before...I cannot figure out why I am in so much pain..."</p> <p>"I have had two attacks of chest pain and cold sweats...I do not usually feel like this...does not feel like pain that I have tried before...I just want to know why..."</p> <p>"I feel really bad; have had a fever for 3-4 days and I'm coughing a lot. Yesterday, I had the shakes and I threw up"</p>
<b>Timeline</b> n=180 (100%)	<b>&lt;5 hours</b> n=52 (29%)  <b>5-24 hours</b> n=44 (24%)  <b>&gt;24 hours</b> n=84 (47%)	<p>"...I just fell and cut my forehead and it is bleeding..."</p> <p>"...I started feeling sick this morning, but I still decided to go to work.."</p> <p>"...it's been going on for a few days now..."</p>
<b>Cause</b> n=132 (73%)	<b>Themes</b>	<b>Examples of citations</b>
	<b>Clear cause</b> n=90 (50%)	"I fell about eight steps down a staircase and hit my shoulder..."

		<p>“When I feel like this, it is usually tonsillitis...”</p> <p>“After skating...pain in my leg... muscle strain seems very logical...”</p>
	<p><b>Unclear cause</b> n=42 (23%)</p>	<p>“I think it could be a mixture of stress and bacteria...”</p> <p>“It is not an allergy...my immune system might be a bit affected because I have been travelling a lot...”</p> <p>“It looks like hives, but I do not have any allergies...”</p>
	<p><b>No cause</b> n=48 (27%)</p>	
<p><b>Cure/control</b> n=138 (77%)</p>	<p><b>Themes</b></p>	<p><b>Examples of citations</b></p>
	<p><b>Clear solution for cure/control</b> n=42 (23%)</p>	<p>“I want to go to the hospital and get stitches...”</p> <p>“I have tried it before; when I got penicillin...I am going to try to convince you to give it me again...”</p> <p>“I have spoken to my husband, who is a doctor, and he believes I need to be seen by an eye specialist...”</p>
	<p><b>Unclear solution for cure/control</b> n=96 (53%)</p>	<p>“I have gotten painkillers from the dentist, but they are not helping; can I take Panodil as well?”</p> <p>“I tried getting in contact with my GP, but no one is picking up the phone...”</p> <p>“Do I have to do anything about it tonight or can it wait until I call my GP tomorrow?”</p>
	<p><b>No solution for cure/control</b> n=42 (23%)</p>	
<p><b>Consequence</b> n=67 (37%)</p>	<p><b>Themes</b></p>	<p><b>Examples of citations</b></p>
	<p><b>High consequence</b> n=36 (20%)</p>	<p>“I am afraid it could be a blood clot, my mother had that and she lost her entire leg...”</p>

		“I am pregnant, can it affect the baby?”
		“I read on Google, that it could be cancer...”
	<b>Low consequence</b> n=31 (17%)	“I cannot sleep or eat anything, because of the pain...”  “Maybe I cannot go out riding tomorrow...”  “I have to travel for work tomorrow...”
	<b>No consequence</b> n=113 (63%)	

**Table 2. Thematic analysis of the components of the CSM framework**

### Mixed methods findings

A clear trend was observed. Study callers with a medium identity seemed to have a higher DOW, whereas, callers with a strong identity seemed to have a lower DOW and callers with a weak identity generally seemed to have a moderate DOW. There were more callers with a low DOW who had an illness lasting less than 24 hours than callers who had an illness lasting more than 24 hours. Callers with a clear cause for their illness and a clear solution for cure/control seemed to have a low DOW and finally, callers who mentioned a high consequence to their illness seemed to have a high DOW. (See figure 2.)

(Placement of figure 2.)

## DISCUSSION

### Summary of main findings

Using the five components of the CSM framework, as described by Leventhal<sup>18</sup>, our analysis demonstrated that callers presenting their illness to OOH services to a large extent referred to all five components, regardless of their self-evaluated DOW. All callers referred to identity and timeline and callers were least likely to refer to consequence.

Lower DOW seemed to be more present in the group of callers who had a strong illness identity, illness duration of less than 24 hours, a clear cause and a clear solution. Callers who presented a medium or weak illness identity, illness duration of more than 24 hours, an unclear or no cause, unclear or no solution and a perception of high consequence seemed to present a higher DOW.

### Strengths and limitations of this study

The main strength of this study was the use of mixed methods approach, which gave an in-depth insight and enabled a thorough analysis and understanding of the illness representation of patients to an OOH service. In addition, patients' illness representation and reported self-evaluation of DOW were obtained in real time, as the callers were seeking help. Findings were, therefore, not

influenced by recall bias. DOW was not uniformly obtained at a specific time within the consultation. Therefore, the consultation itself could influence the patient's DOW and the patient's DOW could influence the consultation. This, however, is representative of real-life calls to OOH services and how DOW can be used as a potential triage tool. Use of the NVivo V.11 software and researcher triangulation ensure that the coding of the data is available for independent analysis and less subject to personal bias. Due to the short duration of data collection, the size of the study population was limited, resulting in a lack of statistical power. However, irrespective of this limitation, the analyses of the results, using the mixed methods approach, show a distinct trend and relation between DOW as a measure of patient-evaluated urgency and their illness representation.

### Comparison with existing literature

The results of the quantitative data can be compared to work done by Farquharson *et al*<sup>21</sup> and Lau *et al*.<sup>27</sup> (See table 3.) Participants in both studies and in all three DOW sub-groups in the present study mentioned factors pertaining to all five components of the CSM framework. Farquharson *et al*, however, solely based their data on information that callers volunteered, without call handler prompting, but suggested that it may be necessary for call handlers to prompt remaining components to obtain a comprehensive understanding of patients' representations of illness. In this study, all information from the caller was coded, including information prompted by the call handler, thus the prevalence in each of the five CSM components was greater compared to those found by Farquharson *et al*. The method used in this study provides a more complete portrayal of the caller's illness representation and is more representative of real-life calls to OOH services.

	Present study			Previous studies	
	Low DOW N=76	Moderate DOW N=39	High DOW N=65	Farquharson <i>et al</i> <sup>(21)</sup> (2011) N=59	Lau <i>et al</i> <sup>(27)</sup> (1989) N=887
<b>Identity</b>	100	100	100	100	96
<b>Timeline</b>	100	100	100	44	49
<b>Cause</b>	82	72	65	15	28
<b>Cure/control</b>	78	79	74	37	32
<b>Consequence</b>	33	28	48	14	33

**Table 3. Prevalence (%) of components of illness representation**

### Relevance of this study: possible implications for health care providers and policy makers

This study suggests a relation between patients' illness representation, as presented telephonically to an OOH services call handler, and their self-evaluation of urgency, defined as DOW. The relation observed, is that DOW is not random, but follows a pattern, depending on patients' illness representation. This pattern can aid call handlers in understanding patients' perception of urgency, potentially aiding the triage process.

This is a new area of research and this study gives direction for future research to further strengthen the evidence. Research on coherence between patient DOW and call handlers', ED

and GP physicians' assessment of urgency, both prospectively and retrospectively will strengthen the basis for potential use of DOW as a triage tool. Incorporating DOW as an additional tool in the telephone triage process could potentially aid in the determination of urgency and the type of health care needed, thus increasing patient safety.

### **Figure legends**

**Figure 1.** Prevalence (%) of components of illness representation in present study

**Figure 2.** Relation between DOW and the components of the CSM framework

### **Footnotes**

**Contributorship statement:** SLT and HGJ planned the study and discussed and agreed upon theme definitions in the qualitative analysis. HGJ planned and performed the data collection. SLT extracted and analysed the data and drafted the manuscript. IE and FKL supervised and contributed substantially to the critical revision. All authors read and approved the final manuscript.

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**Data sharing statement:** Additional data that are not available online can be obtained by contacting the corresponding author.

**Ethical statement:** The study was approved by the Data Protection Agency (PVH-2015-004, I-Suite nr.: 04330). All participants gave informed consent. The Ethical Committee was consulted but no permission was needed (H-15016323).

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## References

- <sup>1</sup> Würgler MW, Navne LE. Når sygeplejersker visiterer i lægevagten. Copenhagen: Dansk Sundhedsinstitut; 2010.
- <sup>2</sup> Leprohon J, Patel VL. Decision-making Strategies for Telephone Triage in Emergency Medical Services. *Medical Decision Making*. 1995;15:240–53. doi:10.1177/0272989x9501500307
- <sup>3</sup> Derkx HP. For your ears only. Quality of telephone triage at out-of-hours centres in the Netherlands. Maastricht: Department of General Practice, University of Maastricht; 2008.
- <sup>4</sup> Gamst-Jensen H, Lippert FK, Egerod I. Under-triage in telephone consultation is related to non-normative symptom description and interpersonal communication: a mixed methods study. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine*. 2017;25:52. doi:10.1186/s13049-017-0390-0
- <sup>5</sup> Gravsersen DS. Out-of.hours telephone triage by nurses and doctors in Danish acute care settings – A study of quality focusing on communication, safety and efficiency. Aarhus: Research Unit for General Practice, University of Aarhus; 2016.
- <sup>6</sup> Holmström I. Decision aid software programs in telenursing: not used as intended? Experiences of Swedish telenurses. *Nursing & Health Sciences*. 2007;9:23–8. doi:10.1111/j.1442-2018.2007.00299.x
- <sup>7</sup> Gifford MJ, Franaszek JB, Gibson G. Emergency physicians and patients assessments: Urgency of need for medical care. *Annals of Emergency Medicine*. 1980;9:502–7. doi:10.1016/s0196-0644(80)80187-9
- <sup>8</sup> Hunt RC, Dehart KL, Allison E, *et al*. Patient and physician perception of need for emergency medical care: A prospective and retrospective analysis. *The American Journal of Emergency Medicine*. 1996;14:635–9. doi:10.1016/s0735-6757(96)90077-7
- <sup>9</sup> Caterino JM, Holliman C, Kunselman AR. Underestimation of case severity by emergency department patients: Implications for managed care. *The American Journal of Emergency Medicine*. 2000;18:254–6. doi:10.1016/s0735-6757(00)90115-3
- <sup>10</sup> Miyamichi R, Mayumi T, Asaoka M, *et al*. Evaluating patient self-assessment of health as a predictor of hospital admission in emergency practice: a diagnostic validity study. *Emergency Medicine Journal*. 2011;29:570–5. doi:10.1136/emj.2010.105247
- <sup>11</sup> Booker MJ, Simmonds RL, Purdy S. Patients who call emergency ambulances for primary care problems: a qualitative study of the decision-making process. *Emergency Medicine Journal*. 2013;31:448–52. doi:10.1136/emermed-2012-202124
- <sup>12</sup> Agarwal S, Banerjee J, Baker R, *et al*. Potentially avoidable emergency department attendance: interview study of patients reasons for attendance. *Emergency Medicine Journal* 2011;29. doi:10.1136/emermed-2011-200585



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51  
52  
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- 
- <sup>13</sup> Keizer E, Smits M, Peters Y, et al. Contacts with out-of-hours primary care for nonurgent problems: patients' beliefs or deficiencies in healthcare? *BMC Family Practice* 2015;16. doi:10.1186/s12875-015-0376-9
- <sup>14</sup> Fosnocht D, Swanson E. Pain and anxiety in the emergency department. *Annals of Emergency Medicine*. 2004;44. doi:10.1016/j.annemergmed.2004.07.284
- <sup>15</sup> Craven P, Cinar O, Madsen T. Patient anxiety may influence the efficacy of ED pain management. *The American Journal of Emergency Medicine*. 2013;31:313–8. doi:10.1016/j.ajem.2012.08.009
- <sup>16</sup> Gamst-Jensen H, Huibers L, Pedersen K, et al. Self-rated worry in acute care telephone triage: a mixed-methods study. *British Journal of General Practice* Published Online First: December 2018. doi:10.3399/bjgp18x695021
- <sup>17</sup> Leventhal H, Meyer D, Nerenz D. The common sense representation of illness danger. In: Rachman S (ed). *Contributions to medical psychology*. 1st edn, Vol 2. Oxford: Pergamon Press, 1980:7–30.
- <sup>18</sup> Leventhal H, Phillips LA, Burns E. The Common-Sense Model of Self-Regulation (CSM): a dynamic framework for understanding illness self-management. *Journal of Behavioral Medicine*. 2016;39:935–46. doi:10.1007/s10865-016-9782-2
- <sup>19</sup> Hagger MS, Orbell S. A Meta-Analytic Review of the Common-Sense Model of Illness Representations. *Psychology & Health*. 2003;18:141–84. doi:10.1080/088704403100081321
- <sup>20</sup> Bugge C, Entwistle VA, Watt IS. The significance for decision-making of information that is not exchanged by patients and health professionals during consultations. *Social Science & Medicine*. 2006;63:2065–78. doi:10.1016/j.socscimed.2006.05.010
- <sup>21</sup> Farquharson B, Johnston M, Bugge C. How people present symptoms to health services: a theory-based content analysis. *British Journal of General Practice*. 2011;61:267–73. doi:10.3399/bjgp11x567090
- <sup>22</sup> Laakso V, Niemi PM. Primary health-care patients' reasons for complaint-related worry and relief. *Primary Health Care Research & Development*. 2013;14:151–63. doi:10.1017/s1463423612000448
- <sup>23</sup> Creswell JW, Clark VLP. *Designing and conducting mixed methods research*. Los Angeles (CA): SAGE Publications; 2011.
- <sup>24</sup> Årsrapportdata. Copenhagen: Emergency Medical Services Copenhagen, University of Copenhagen; 2015 and 2016. [cited 2017 Apr 15]. Available from: <https://www.regionh.dk/om-region-hovedstaden/Den-Praehospitale-Virksohed/Documents/%C3%85rsrapportdata20152016.pdf>

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5 <sup>25</sup> Forde I, Nader C, Socha-Dietrich K, Oderkirk J, Colombo F. Primary Care Review of Denmark.  
6 OECD; 2016. [cited 2017 Apr 11]. Available from: [https://www.oecd.org/health/health-  
8 systems/Primary-Care-Review-of-Denmark-OECD-report-December-2016.pdf](https://www.oecd.org/health/health-<br/>7 systems/Primary-Care-Review-of-Denmark-OECD-report-December-2016.pdf)

9 <sup>26</sup> Duncan GH, Bushnell CM, Lavigne GJ. Comparison of verbal and visual analogue scales for  
10 measuring the intensity and unpleasantness of experimental pain. *Pain*. 1989;37:295–303.  
11 doi:10.1016/0304-3959(89)90194-2

12  
13 <sup>27</sup> Lau RR, Bernard TM, Hartman KA. Further explorations of common-sense representations of  
14 common illnesses. *Health Psychology* 1989;8:195–219. doi:10.1037//0278-6133.8.2.195

15  
16 <sup>28</sup> Braun V, Clarke V. Using thematic analysis in psychology. *Qualitative Research in*  
17 *Psychology*. 2006;3:77–101. doi:10.1191/1478088706qp063oa

18  
19 <sup>29</sup> Dam, PS. Derfor ringer danskerne 1813. Berlingske [newspaper on the internet]. 2017 Mar 19  
20 [cited 2018 Feb 10]. Available from: <https://www.b.dk/nationalt/derfor-ringer-danskerne-1813>  
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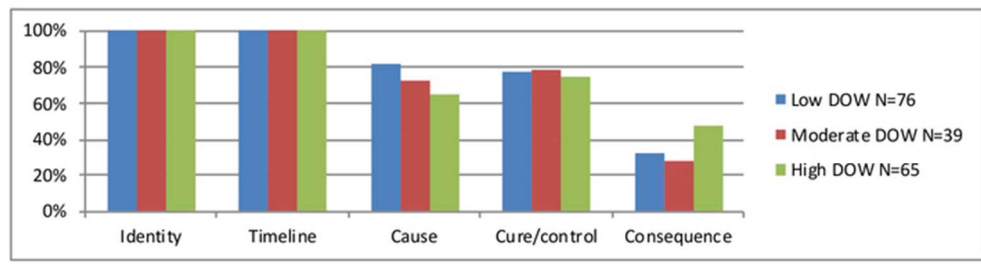


Figure 1. Prevalence (%) of components of illness representation in present study

61x21mm (300 x 300 DPI)

peer review only

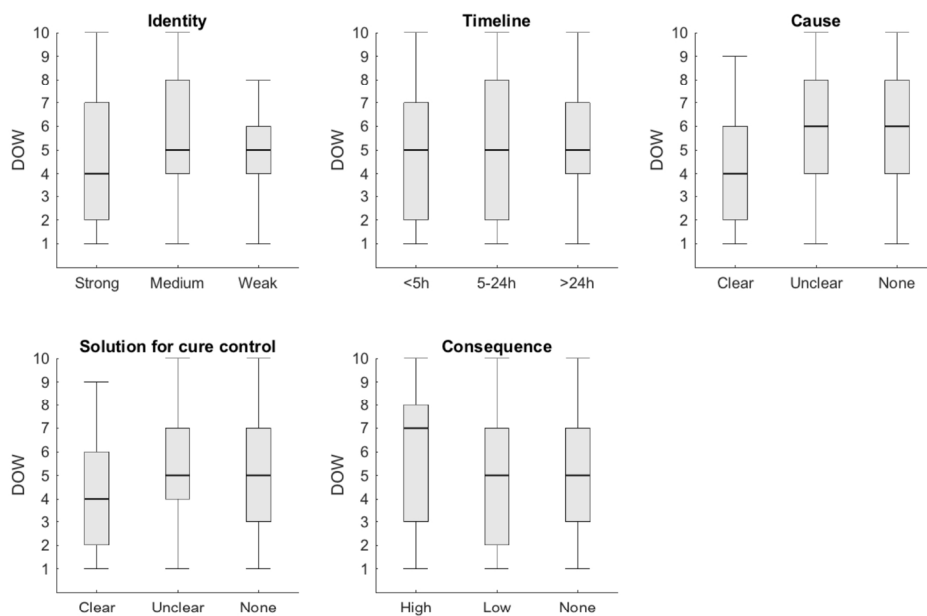


Figure 2. Relation between DOW and the components of the CSM framework

166x122mm (300 x 300 DPI)

## STROBE (Strengthening The Reporting of OBServational Studies in Epidemiology) Checklist

A checklist of items that should be included in reports of observational studies. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at [www.strobe-statement.org](http://www.strobe-statement.org).

Section and Item	Item No.	Recommendation	Reported on Page No.
Title and Abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	
<b>Introduction</b>			
Background/Rationale	2	Explain the scientific background and rationale for the investigation being reported	
Objectives	3	State specific objectives, including any prespecified hypotheses	
<b>Methods</b>			
Study Design	4	Present key elements of study design early in the paper	
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up  <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls  <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants	
		(b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed  <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case	
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	

Section and Item	Item No.	Recommendation	Reported on Page No.
Data Sources/ Measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	
Bias	9	Describe any efforts to address potential sources of bias	
Study Size	10	Explain how the study size was arrived at	
Quantitative Variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	
Statistical Methods	12	(a) Describe all statistical methods, including those used to control for confounding	
		(b) Describe any methods used to examine subgroups and interactions	
		(c) Explain how missing data were addressed	
		(d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed <i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed <i>Cross-sectional study</i> —If applicable, describe analytical methods taking account of sampling strategy	
		(e) Describe any sensitivity analyses	
<b>Results</b>			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	
		(b) Give reasons for non-participation at each stage	
		(c) Consider use of a flow diagram	
Descriptive Data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	
		(b) Indicate number of participants with missing data for each variable of interest	
		(c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	
Outcome Data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time	
		<i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure	
		<i>Cross-sectional study</i> —Report numbers of outcome events or summary measures	

Section and Item	Item No.	Recommendation	Reported on Page No.
Main Results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	
		(b) Report category boundaries when continuous variables were categorized	
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other Analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	
<b>Discussion</b>			
Key Results	18	Summarise key results with reference to study objectives	
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	
Generalisability	21	Discuss the generalisability (external validity) of the study results	
<b>Other Information</b>			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	

\*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

**Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.**

## COREQ (CONsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
<b>Domain 1: Research team and reflexivity</b>			
<i>Personal characteristics</i>			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
<i>Relationship with participants</i>			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
<b>Domain 2: Study design</b>			
<i>Theoretical framework</i>			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
<i>Participant selection</i>			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
<i>Setting</i>			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
<i>Data collection</i>			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat interviews carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the interview or focus group?	
Duration	21	What was the duration of the interviews or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	



Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
<b>Domain 3: analysis and findings</b>			
<i>Data analysis</i>			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
<i>Reporting</i>			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

**Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.**