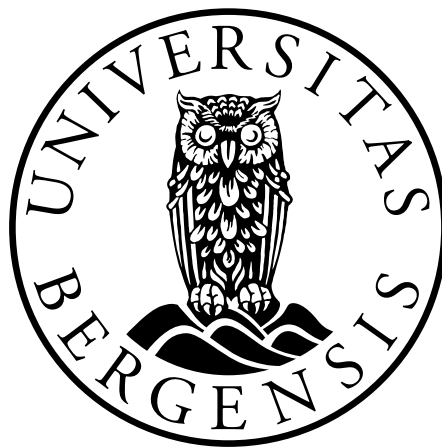


Monitoring activities in out-of-hours emergency primary care in Norway

A special emphasis on nurses telephone triage and counselling

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2. List of papers

This thesis is based on the following papers:

Paper I

Hansen EH, Hunskaar S. Development, implementation, and pilot study of a sentinel network ("The Watchtowers") for monitoring emergency primary health care activity in Norway. *BMC Health Services Research*. 2008;8:62.

Paper II

Hansen EH, Zakariassen E, Hunskaar S. Sentinel monitoring of activity of out-of-hours services in Norway in 2007: an observational study. *BMC Health Services Research*. 2009;9:123

Paper III

Hansen EH, Hunskaar S. Telephone triage by nurses in primary care out-of-hours services in Norway: An evaluation study on written case scenarios. *BMJ Quality & Safety*. 2011;20:390-6

Paper IV

Hansen EH, Hunskaar S. Understanding of and adherence to advice after telephone counselling by nurse: A survey among callers to a primary emergency out-of-hours service in Norway. Under review

The four publications are in the text referred to Roman number, **Papers I-IV**

3. Abbreviations

A&E Accident and Emergency

ED: Emergency Department

EMCC: AMK-sentral or Emergency Medical Communication Centre, run by
Specialist Health Care/hospitals

GP: General Practitioner

LEMC: Local Emergency Medical Call Centre, run by Primary Health
Care/municipalities

OOH: Out-of-hours

In my studies OOH services cover 24 hours, seven days a week.

RGP: Regular General Practitioner

4. Definitions and concepts

This thesis uses several words and concepts with specific meaning. The most important ones are explained below to ensure that the readers have the same understanding and interpretation as the author. They are presented in alphabetical order, and the Norwegian names are in brackets.

Casualty clinic [legevaktlokalet]

A casualty clinic is the OOH emergency clinic where patients attend for a doctor consultation. At some casualty clinics patients are supposed to call for an appointment, while others accept self-referrals.

Emergency medical communication centre (EMCC) [AMK-sentral]

Calls to the national emergency number 113 are routed to the nearest EMCC, which is in charge of pre-hospital emergency resources. EMCC will alarm the ambulance(s), doctor(s) on call and other resources if needed, e.g. the air ambulance.

General practitioner (GP) [allmennlege]

A primary care doctor normally works in a GP office, solo or in a group, and deals with all types of medical problems. He/she also refers patients to specialists and hospitals. Patients do not have direct access to secondary care, but need a referral from their (primary care) GP to get access to a hospital or a specialist. A GP has a gatekeeper role in the Norwegian health care system.

Local emergency medical communication centre (LEMC) [legevaktsentral]

Each municipality has a duty to operate a 24-hour dedicated telephone number for cases that are urgent but not life threatening. When someone calls the local emergency number the calls are received by nurses at a LEMC, which is usually located in the casualty clinic.

Norwegian Index of Medical Emergency Assistant (Index) [Norsk indeks for medisinsk nødhjelp, Indeks]

The Index is a paper version of a decision tool used to triage the patient in order to decide the correct response and provide the patient with help at the appropriate level of care. The Index is used in all EMCCs and is also available, but not mandatory, in all LEMCs and casualty clinics. The Index defines three-levels of response.

- “Red response” is defined as an acute response, with the highest priority.
- “Yellow response” is defined as an urgent response, with a high, but lower priority.
- “Green response” is defined as a non-urgent response, with the lowest priority.

The three-levels of response in Norway differ from triaging in some other countries which apply five-levels of urgency.

Out-of-hours district (OOH) [legevaktistrikt]

An OOH district may consist of one or several municipalities. Inter-municipal co-operation is the most common, and there is no standard for the total area or number of inhabitants in a district. When an out-of-hours district consists of

several municipalities, the casualty clinics and the LEMC are usually located together.

Primary health care services [primærhelsetjenesten]

The primary health care services in its present form (2011) were established by The Norwegian Primary Health Services Act of 1982. The responsibility for the services was given to the 430 local authorities. According to the act, the municipalities have to provide care and treatment for all persons within its boundaries, and this responsibility also includes health promotion and prevention, emergency care and health care for immigrants.

Regional Health Authorities [regionale helseforetak]

Four geographically based Regional Health Authorities owned by the Ministry of Health and Care Services maintain the hospital sector, including all ambulance services and the National air ambulance services. The Regional Health Authorities also organise and run the 20 regional EMCC's including the emergency call number 113. These services, including university hospitals, form the secondary health care system in Norway.

Regular general practitioner (RGP) [fastlege]

RGP's are GP's with a municipal contract. The RGPs have a defined list of patients for which they are responsible during daytime. OOH work is a part of the RGPs contract with the municipality.

Specialist health care services [spesialisthelsetjenesten]

Specialist health care services include hospitals for patients with somatic or

psychiatric disorders, out-patient departments, centres for training and rehabilitation, institutions for drug addicts, centres for re-education for chronically ill and disabled patients, pre-hospital services, emergency departments and private specialists, laboratories, x-ray facilities, ambulances and air ambulances.

Self-care advice by nurses [råd ved sykepleier]

Self-care advice by a nurse is an extension of the triage. Medical advice can be self-care advice and information given to the patients based on medical knowledge and /or national guidelines. Medical advice given by nurses requires good medical knowledge and good communication skills.

Triage [hastegradsvurdering, sortering]

Traditionally, triage is the process in wars or catastrophe situations of sorting injured people into groups based on their need for immediate medical treatment. Today, triage is an individual process undertaken mainly as face-to-face triage or telephone triage. In this thesis the word triage is used for the classification of responses in accordance with the Index, and only telephone triage is included.

Watchtowers [Vakttårn]

The Watchtowers is a sample of OOH clinics and districts participating in the Watchtowers project. The nurses working in the Watchtowers register all contacts, both by telephone and by direct attendance all day, all week, all year. Every month all data are sent to the National Centre for Emergency Primary Health Care.

5. Abstract

5.1 English summary

The main aim of this thesis has been to develop and establish an organisation, the Watchtowers, in order to continuously collect valid data from the OOH services in Norway, and to describe the activities. Further, we have investigated how nurses decide the grade on urgency of patients, if callers to LEMCs understand the advices given by nurses, and the outcome of the patients after advice.

The municipalities in Norway are by law responsible for all the inhabitants regarding primary health care and emergency medical services [1]. The law requires that the services should be safe, but the purpose and content of the services is not statutory. It is therefore, up to each municipality to decide the quality, manning requirement, competence and the content of the services.

The aims of the studies have been to:

- Establish a method for collecting data about OOH services in Norway
- Gather knowledge about activities and the scope of these in the OOH emergency service
- Study how nurses decide the urgency grade for patients contacting the casualty clinic
- Elucidate the degree to which the patient/caller understands and follows the medical advice given by the nurses at the LEMCs, and the patient outcome.

Study 1 is presented in **Paper I** and **Paper II**. **Paper I** describes the method for collecting data from a representative sample of casualty clinics in Norway. When the Watchtowers were established, 18 municipalities and 7 casualty clinics signed a contract to deliver data on a defined variable set 24 hours a day, seven days a week, all year. All the casualty clinics in Norway were invited to participate in the study. The final selection took place from 44 municipalities and was based on demographic, economic, population, and geographic characteristics.

All contact with the casualty clinics, either by telephone or by direct attendance was registered. A pilot study was carried out to check that the registration program, routines for sending data, and procedures for data cleaning and saving, functioned. The results showed that we had a representative sample of casualty clinics corresponding to 4.6% of the inhabitants of Norway. The data for the municipalities participating in the Watchtowers was obtained from Statistics Norway, and the municipalities in the Watchtowers were quite representative for Norway as a whole when compared to the main dimensions used by Statistics Norway.

Paper II describes activity data from the Watchtowers for the year 2007. It analyses the different patterns of activity for the casualty clinics, and presents national estimates. In 2007, a total of 86,235 contacts were registered, corresponding to an average contact rate of 399 per 1,000 inhabitants. Contacts at the clinics varied from 300 to 633 contacts per 1,000 inhabitants. Women represented 54% of the contacts, and had the highest contact rate in all age groups, with the exception of the youngest group. Two thirds contacted the clinics by telephone. The priority grades were distributed as 76.6% non-urgent responses, 21.1% urgent responses, and 2.3% acute responses. Doctor's consultation was the most frequent action taken (63%). When patients attended the casualty clinics without calling beforehand, 91.2% were referred for a doctor consultation, whereas if they called beforehand, 56.5% were referred for a doctor consultation.

There were large inter-clinic differences in home visits by a doctor. The rate varied from 0.5 to 78 per 1,000 inhabitants. Casualty clinics in rural districts had the highest rate of home visits by a doctor. The overall contact rate in the Watchtowers was slightly higher than the contact rate based on reimbursement claims from Helfo. This is because when nurses deal with patients and give advice and counselling as a sole response, a reimbursement claim is not elicited. Accordingly, the total number of contacts and the contact rate is higher in the Watchtowers than the figures from Helfo would indicate.

Study 2 [**Paper III**] shows how nurses in the Watchtowers decide upon priority grade and urgency. Twenty written, medical scenarios were prepared according to the Index, and all nurses had to assess and decide the correct classification for priority grade. The cases were validated by an expert group and presented in a booklet in which the nurses also had to fill in the number of years worked in the casualty clinic, profession and employment fraction. In all, 88 nurses assessed the cases and filled out the booklet and 85 were analysed. Total mean correct classification was 77%. There were significant differences in correct classifications between the Watchtowers, but no significant differences according to profession, experience or employment fraction. A sub-group of 20 nurses were randomly selected from the 85 nurses who participated the first time and, 4 months later, 19 nurses received the same booklet and re-assessed the same written cases. The nurse's decision on priority grade was compared for the first and second assessment, resulting in an agreement of 0.68 (Cohen's kappa). The percentage of correct classification within the three priority grades was quite similar, and high. Work experience and employment fraction did not influence the decisions. Intra-rater agreement was good and about the same as we found in comparable international studies.

Based on this sample of Norwegian casualty clinics we concluded that the quality of decisions on priority grades was quite high, and that the competence of the nurses was sufficient to ensure patient safety. We propose an organisation within the OHH

services where nurses involved in telephone triage also meet the patient face-to-face, because this could enable opportunity for both evaluation and learning in Norwegian casualty clinics.

Study 3 [**Paper IV**] presents the extent to which callers/patients contacting a LEMC understood and followed the advice given by the nurses, and the patients outcome after contact with the nurse.

In a quite large casualty clinic in Norway, telephone record files containing medical advice by nurses were selected from the first and last telephone contacts at every shift over a period of 2 months. The information from the telephone records was interpreted and noted in a questionnaire, and the information from the telephone conversations was compared with an interview with the same callers approximately one week later. 100 callers/patients were interviewed; 99 stated that they understood the advice given by the nurse, 92 callers followed the advice, 79 stated that their questions were answered, and 74 had confidence in the nurses and their assessment. After the call, 22 patients contacted their GP; 11 re-contacted the casualty clinic, and 5 callers wanted to talk to a doctor. When comparing the information from the telephone record file with the interviews with the callers/patients, we found an overall discrepancy of 18%. Non-native Norwegians followed the advice given by the nurses to a lesser degree than native Norwegians.

Of the 22 callers/patients who contacted their GP the next day, one was referred to hospital, and was discharged the following day without any treatment. In addition, five patients received medical treatment (antibiotics). Of the 11 patients who re-contacted the casualty clinic, two were referred to hospital: one to x-ray, and one patient was admitted and observed until the next day.

Main results:

- The Watchtowers is a representative sample of casualty clinics in Norway, and data collected reflect national figures.
- Norway has a high contact rate to the OOH-services compared to other countries. Valid data is important for local services and politicians.
- The assessment of priority grades in casualty clinics in Norway is safe.
- Callers/patients to LEMCs understand and follow nurse's advice to a great extent, but there is a communication challenge with regard to non-native Norwegians. The patients' outcome after telephone counselling by nurses is good.

5.2 Norwegian summary- norsk sammendrag

Hovedmålet med denne avhandlingen har vært å etablere et utvalg av representative legevakter i Norge og å utvikle en metode for å samle inn valide data for å beskrive aktivitetene som foregår der. Videre har vi undersøkt hvordan sykepleiere fastsetter pasientenes hastegrad og hvordan innringere til legevaktsentralen forstår sykepleiers medisinske rådgivning, og hva kontakten har ført til.

Kommunene har ansvaret for å sørge for et forsvarlig tilbud til alle som bor eller midlertidig oppholder seg i kommunen og som trenger øyeblikkelig hjelp [1]. Det poengteres at tjenesten skal være forsvarlig, men tjenestens innhold er ikke lovfestet eller nedfelt i noen forskrift. Det er derfor opptil kommunen selv å definere både kvalitet, bemanning, kompetanse og tjenestens innhold.

Målet med studiene har vært å:

- Etablere en metode for innhenting av data fra legevakter i Norge
- Skaffe kunnskap om omfang og aktiviteter som foregår på legevakt
- Studere fastsetting av hastegrad for pasienter som kontakter legevakten
- Belyse i hvilken grad pasienter/innringere forstår medisinske råd som blir gitt av sykepleier ved legevaktsentraler, og hva kontakten fører til

Første delstudie [**Paper I** og **Paper II**] har beskrevet en metode for innsamling av data fra et representativt utvalg av legevakter i Norge. Ved etablering av Vakttårnene underskrev 18 kommuner og sju legevakter en kontrakt om å levere data på et bestemt sett av variabler hele døgnet, hele uken, alle årets dager. Alle landets legevakter ble invitert til å delta i studien, 44 kommuner var igjen etter tre runder med informasjon. De 44 kommunene ble vurdert med hensyn til kommunedemografi, økonomi, befolkningssammensetning og sentralitet.

Alle henvendelser til legevakten enten per telefon eller ved direkte oppmøte ble registrert. En pilotstudie ble gjennomført for å se om registreringsprogrammet, rutiner for sending, datasjekk og lagring fungerte. Resultatet viste at vi hadde et representativt utvalg av legevakter som utgjorde 4,6 % av Norges befolkning (216 030 innbyggere i 2007). Med hensyn på kommunedata fra SSB var kommunene som deltok i Vakttårnene representative for kommune-Norge.

Paper II beskriver aktiviteter fra Vakttårnene for hele 2007, analyserer ulike aktivitetsmønstre for legevaktene og presenterer nasjonale estimater. Det ble registrert 86 235 kontakter for 2007, noe som ga en kontaktrate på 399 per tusen innbyggere som varierte mellom legevaktene fra 300-633. Kvinner hadde 54% av kontaktene og

hadde den høyeste kontaktraten i alle aldersgrupper med unntak av den yngste aldersgruppa. To tredeler kontaktet legevakten per telefon, mens hastegrad fordelte seg til 76,6% grønne, 21,1% gule og 2,3% røde responser. Legekonsultasjoner hadde den høyeste andel av tiltak (63%). Der pasientene møtte opp på legevakten uten å ha ringt først resulterte 91,2% i konsultasjon med lege, men når pasientene ringte først endte 56,5% opp med en legekonsultasjon. Det var store forskjeller mellom sykebesøk av lege i de ulike legevaktene som varierte fra 0,5 til 78 per 1,000 innbygger. Legevakter i distrikter hadde den høyeste andelen av sykebesøk.

Tallene som ble samlet inn fra Vakttårnene var nesten identiske med noen av tallene som ble registrert i regningskort og NAV. Kontaktratene for Vakttårnene var litt høyere enn det som er presentert fra regningskort og NAV. Dette skyldes at Vakttårnene også registrerte alle sykepleierkontakter som ikke endte i en legekontakt. Vanligvis blir det ikke skrevet regningskort når sykepleiere gir selvstendige råd på telefonen, derfor får man ikke fanget opp alle henvendelsene via NAV/HELFO.

Andre delstudie [**Paper III**] undersøker fastsetting av hastegrad blant sykepleiere og medarbeidere i Vakttårnene. Det ble utviklet 20 ulike skriftlige scenarier i henhold til Norsk indeks for medisinsk nødhjelp, og legevaktsykepleierne skulle sette riktig hastegrad på hver case. Casene ble validert av et ekspertpanel og nedfelt i et hefte der hver sykepleier også skulle fylle ut hvor lenge de hadde jobbet i legevakt, profesjon, og stillingsbrøk. 88 sykepleiere fylte ut skjemaene og 85 ble analysert. Totalt var gjennomsnittlig korrekte vurderinger 77 %. Det var signifikante forskjeller i korrekt klassifisering i total antall case mellom Vakttårnene, men det var ingen signifikante forskjeller med hensyn til profesjon, erfaring på legevakt eller stillingsprosent. En sub-gruppe på 20 sykepleiere ble trukket fra de 85 sykepleiere som hadde svart første gang, og 19 revurderte de samme casene etter 4 måneder. Sykepleiernes hastgradsfastsetting ble sammenlignet fra 1. til 2. gang med et samsvar på 0,68 (Cohen's kappa). Andelen korrekte klassifikasjoner innen de tre hastegradene var ganske like og høy. Arbeidserfaring og stillingsbrøk påvirket ikke beslutningene.

Intra-rater agreement var god og omtrent den samme vi fant i tilsvarende studier internasjonalt. Fra dette utvalget av norske legevakter konkluderte med at kvaliteten på beslutninger av hastegrad var høy, og sykepleiers kompetanse var sikker for pasientene. Det foreslås en organisering med sykepleier som både vurderer på telefonen og møter pasienter ansikt til ansikt, noe som er viktig med tanke på evaluering og læring i norske legevakter.

Tredje delstudie [**Paper IV**] beskriver hvordan innringere til en legevaktsentral oppfatter de medisinske rådene som er gitt av sykepleier, om rådene følges, og hva som skjer med pasientene i etterkant av telefonkonsultasjonen. Fra en stor legevakt i Norge ble lydloggsamtaler som endte med medisinsk råd fra sykepleier, den første og siste rådgivningen på hver vakt, valgt ut over en periode på 2 måneder. Samtalene fra lydloggene ble skrevet ned i et utarbeidet skjema og informasjon fra samtalene ble sammenlignet med intervju av de samme innringerne etter ca en uke. 100 innringere ble intervjuet og resultatene viste at 99 sa at de forstod rådene, 93 fulgte rådene, 79 fikk svar på det de lurte på, 74 stolte på sykepleiers vurdering, 22 kontaktet fastlegen i etterkant, 11 kontaktet legevakten i etterkant og 5 ville helst ha snakket med lege. Ved sammenligning av de 6 felles spørsmålene fra lydlogg og intervju var det diskrepans mellom gitte råd og innringers forståelse av rådene. Ikke-norske innringere fulgte i mindre grad rådene gitt av sykepleiere enn de norske innringerne.

Av de 22 som kontaktet fastlegen neste dag, ble én innlagt i sykehus, men skrevet ut neste dag uten behandling. I tillegg ble fem behandlet med antibiotika. Av de som kontaktet legevakten på nytt ble to henvist til sykehuset; én til røntgen og én innlagt til observasjon til neste dag.

Hovedfunn:

- Vakttårnene er et representativt utvalg av legevakter i Norge, og data som samles inn gjenspeiler nasjonale tall.
- Norge har en høy kontaktrate til legevakt sammenlignet med andre land. Valide data er viktige for lokale tjenester og politikere.
- Fastsetting av hastegrad ved legevakter er trygg.
- Innringere til legevakter forstår og følger medisinsk rådgivning i stor grad, men det er kommunikasjonsutfordringer i kontakt med ikke-norske. Pasientenes utkomme etter rådgivning ved sykepleier er god.

6. Introduction

Having worked in the out-of-hours emergency primary care at different levels for nearly 25 years I have experienced and subsequently learned about clinical challenges, management, and policy in the OOH services. It has been interesting to have been a part of, and to have followed, developments in this field. Laws and regulations governing the OOH services are weak and non-specific. It is obvious that the motivation for and the initiative to develop a secure and safe service originates with the leaders at the clinics and not with the health authorities at different levels. Due to the differing available resources, interests, and motivation of the leaders, OOH services in Norway have become a service with considerable professional variation.

Coincidentally, while I was qualifying for research, the National Centre for Emergency Primary Health Care was established and was fortunately recruiting staff members with my qualifications. In my position in the Centre, I have been able to bring about the establishment of the Watchtowers and have also had the opportunity to explore two important roles that nurses working in the OOH services attend to exclusively - roles that I for a long time have been particularly interested in because of my practical experiences.

Up until 1982, the OOH services in Norway had been based on voluntary work by GPs. In 1982, legislation was introduced making the municipalities responsible for the OOH services [1]. Since then, various committees have proposed differing schemes for the distribution of tasks and responsibilities between the OOH and GPs during daytime. Differing organisation of casualty clinics has been tried, some with and some without nurses answering the telephone in the clinics.

In 2003, Stiftelsen GRUK was assigned by the Norwegian Directorate of Health to prepare and write “Veileder for etablering og drift av interkommunale legevaktordninger” [2]. This is an instruction book on how to establish and run inter-municipality OOH services, and I was one of the authors. The publication also

presents several practical suggestions regarding management aspects of the OOH services.

Nurses are an important part in the OOH services, involved in assessing and prioritising all contacts either by telephone or direct attendance. This research has made it possible to acquire a deeper understanding of this work, including the triage and advice given by the nurses.

The findings from my studies constitute this thesis, and are considered to be important findings for policy makers and organisations within OOH emergency primary care in Norway. I hope it may contribute to increased quality of services and better outcomes for the patients.

7. Background

The OOH emergency primary service is an important part of the public health services, but very little knowledge has been available about this service in Norway. The functions of the OOH services are mentioned in laws and regulations, but they are feeble and non-specific [1, 3]. Thus, each municipality can more or less decide the level of quality of the service offered as long as it is safe. The National Centre for Emergency Primary Health Care has been engaged in this issue and has proposed a “Plan of Action”[4], which proposes that the services should be regulated not only with regard to the organisation of the OOH services but also with regard to the professional competencies of nurses and doctors. So far no regulations have been implemented.

In Norway, there has been a shortage of valid activity statistics from the primary care OOH services and the pre-hospital emergency health care system. Little systematic information has been available because data registration is lacking or is only done periodically, and definitions of variables are not consistent. Data from HELFO (reimbursement claims) have been available, and a report on OOH services activities has been compiled for 2007-2009 [5, 6].

The Norwegian Ministry of Health and Care Services established The National Centre for Emergency Primary Health Care in 2005. The purpose of the National Centre for Emergency Primary Health Care is to generate knowledge on the emergency primary health care through research and information dissemination. The main tasks for the National Centre for Emergency Primary Health Care are to:

- Support national and international research in the field
- Establish national standards
- Establish and manage data registries

- Support national competencies and quality improvement in the field
- Take part in undergraduate and postgraduate teaching and CME activities

An important principle for the health services in Norway has been the LEON principle, which means that patients should be treated at the lowest, effective level of care. This principle challenges the cooperation between the primary health care and the specialist health care services with regard to organisation, division of responsibility, and willingness to co-operate [4].

7.1 Organisation of emergency services

Norway has a two-level public health care system with only a marginal private sector. The four geographically based Regional Health Authorities owned by the Ministry of Health and Care Services maintain the hospital sector, including all ambulance services and the National air ambulance services. The Regional Health Authorities also organise and run the 20 regional EMCCs including operation of the emergency call number 113. These services, including university hospitals, form the secondary health care level [7, 8].

The 430 municipalities (2009) are by law responsible for organising primary health care, including general practice, nursing homes, home care, preventive medicine for children, school health care and also local emergency medical services for all inhabitants 24 hours a day. The emergency medical service is usually managed by the GP surgeries during the day, and by municipality operated out-of-hours rotas with GPs during evenings, nights and weekends, often based in local casualty clinics [8].

In Norway and in several other western countries there are a number of quite different models for the OOH emergency care. [9]. One model is that the GP takes care of his

or her own patients 24 hours a day, seven days a week. This is the case in rural districts in Austria and also on some small islands in Norway.

In the Netherlands GPs work in a non-profit organisation and work in the OOH services for the patient population of all participating GPs. This service is offered in the afternoon, at nights, and 24 hours at weekends. These are large-scale organisations that are supported by nurses. The doctors are in charge of the services, and the services include own drivers for home visits [10].

In Slovenia there are Primary Care Centres which patients with minor injuries or illnesses can attend without an appointment. These Centres operate under the supervision of a general practitioner or family physician. In the UK, there is a deputising organisation in which commercial agencies employ GPs to take over the duties of other GPs. In Ireland the organisation model involves minor injury centres or walk-in centres. In addition, there are a few privately organised models. In Belgium, the OOH service is part of the emergency department, as it is in Canada, Israel and Croatia, while in Italy the GPs are integrated in the hospital [9].

Norway seems to be the country with the most organisational models. The most common models are casualty clinics, with or without LEMCs, and GP offices used both in daytime and out-of-hours. A model in which the OOH services are integrated in an ED is quite rare in Norway, and several of the few attempts that have been realised have reverted to an independent, municipality-based model [11]. More commonly, casualty clinics are located in a hospital as an independent services [7]. Due to geographic differences, but also because of lack of regulation, the OOH services vary, both with regard to organisation and content. This implies that provision of services across Norway is not equal.

7.2 Local Emergency Medical Call Centres

Each municipality has a duty to maintain a dedicated telephone number at a LEMC for cases that are urgent but not life threatening. The LEMCs are often located in the casualty clinic, and 43% of all clinics have their own LEMC which is mainly staffed by registered nurses. However, enrolled nurses and ambulance workers also undertake telephone triage to prioritise patient treatment and/or transportation [11]. In 2009 there were 146 LEMCs in Norway [11]. After assessment of the patient's medical condition, a decision is made on the appropriate action which could include advice only, home visit by a GP, consultation with a GP in a casualty clinic, or a call-out for the on-duty GP or an ambulance. Some LEMCs are outsourced by the municipality and the services are provided by an EMCC or private actors. A LEMC can serve one or several municipalities [7, 8].

In other countries, the organisation of OOH services differs and the same applies for LEMCs. In England, the OOH services are organised by NSH Direct, which is a national nurse-led communication centre. Nurses are commonly used for triage in Iceland, Scotland, Ireland, New Zealand, Australia, Netherlands, Sweden, and Finland, but in Denmark doctors answer the call [9, 12].

It has not been possible to find a good overview of the call-centre models used in Europe or the rest of the world; a study from the Netherlands claims that the triage models in which a nurse answers the telephone is quite common [9]. Similarly no summary information of the location of the LEMCs and the professions serving the call centres appears to have been published. In Norway, all EMCCs use registered nurses, but in LEMCs there is a trend that other health personnel also manage the telephone [11]. The concept "nurse" is used differently in several studies; the word is used for an enrolled nurse, a medical secretary, and a registered nurse who is also called a hospital nurse [9].

7.3 Casualty clinics

A casualty clinic is open to all inhabitants for help with an urgent medical condition. For most clinics, it is necessary to call the LEMC in order to get an appointment with a doctor. However, some of the largest clinics have free access and patients just meet directly without calling first. A casualty clinic can serve more than one municipality. It is then organised as an inter-municipality out-of-hours service. In 2009 in Norway, there were 430 municipalities, and 220 OOH districts. This means that 76% of the municipalities participate in an OOH inter-municipality district either completely or partly; 22% of the clinics are located in hospitals; and 44% are located in a doctor's surgery [7]. There is no regulation or national standard governing equipment needed in the clinics. One study showed that ECG, oxygen and emergency bags were commonly available [13].

The health system in Norway is organised so that inhabitants can seek their own GP during daytime on weekdays for all medical conditions, and use the casualty clinic for urgent conditions at evenings, nights and weekends. One study showed that about 75 % of all the contacts to the OOH services are green or non-urgent [14]. This means that about half of the non-urgent contacts could wait and see their own GP the next day or receive self-care advice by a nurse. It is common knowledge that some clinics are very strict regard to what level of urgency they handle, while others accept all self-referrals.

Basically, all emergency conditions are taken care of in a casualty clinic, except trauma and major accidents. The most common conditions classified according to The International Classification for Primary Care (ICPC) chapters are respiratory, general and unspecified, skin and musculoskeletal [15]. The nurse's role in the clinics is almost the same as when they do the triage by the telephone, but in addition they observe patients in the clinic before and after the doctor consultations. In most of the clinics the nurses do blood sampling, ECG, give medication according to the doctor's prescription, and handle skin problems and wounds, either alone or together with the

doctor. Some of the patient attending directly at the clinics may for example be taken care of by a nurse if the condition is not acute.

In this thesis I focus on the telephone triage and counselling (LEMC), and not the roles of nurses in the casualty clinic.

7.4 Contact rates from OOH services

Due to differing organisational models for the OOH services in Norway, valid data from these services have been difficult to achieve. In addition, the definitions of most variables of interest are lacking and the electronic record systems do not generate the required data. Reimbursement claims have been compiled for 2006 and 2008-2010 and published in two reports, but nurse advices does not qualify for a reimbursement claim so these contacts are not included. The reports do not contain data on priority degree, mode of contact, or telephone advice by nurse [5, 6].

The contact rate of 415 (2010) contacts per 1,000 inhabitants per year to the out-of-hours services in Norway is quite high compared to other countries [14].

Studies from the Netherlands, England, Scotland, New Zealand, and Poland have all shown a lower contact rate [10, 16-19]. The Netherlands reported 275 per 1,000 inhabitants; England reported 136; Scotland reported 221 contacts per 1,000 inhabitants; New Zealand 245, and Poland 238. It must be mentioned that these numbers were estimated from a selected group of OOH districts, and are not necessarily representative. Furthermore, some studies have registered activity data from one city for a whole year. Even after excluding daytime contacts on weekdays, Norway still had the highest contact rate with the exception of Denmark [12, 20], which had 535 contacts per 1,000 inhabitants.

7.5 Telephone triage by nurses

When contacting casualty clinics in Norway either by telephone or by direct contact, a registered nurse or an enrolled nurse is the first health personnel to be met. They receive calls from patients, their family, or others, assess the priority grade, and decide on different actions, whether giving self-care advice or referring to the appropriate level of care. Telephone triage is considered by many to be the most complex and vulnerable element in the OOH services, and there have been no studies on this topic in Norway.

Triage has been used for several years in wars, pandemics, hospital EDs, and OOH services. The aim of triage has been to save lives, and to use resources efficiently and fairly [21]. Triage is described as a benefit for individual in hospital, but in a disaster or war the focus is on groups [22].

The nurses are responsible for the triage in each clinic. Most of the clinics employ registered nurses, but nurses and secretaries also work with triage. No law or instructions regulate this service so the quality level of the OOH services offered is decided by the local authorities. 52% of all municipalities in Norway claimed that they offer in-house training for triage nurses, and that the training lasts 3-4 days, on average [11]. All casualty clinics have the Index available for prioritising the patient. There is no national training system developed for this function in Norway, so the scope and content of the in-house training differs from LEMC to LEMC or from clinic to clinic.

In the UK the frequency of non-urgency is reported to be 40 % [16]. A study from the USA indicated that 28.1% of patients attending an ED were judged to need assistance within 2-12 hours. Another study from Switzerland showed that 20% were non-urgent [23-25]. A study from the Netherlands showed that about 28% were non-urgent [26]. These differences probably partly reflect the fact that the number of urgency levels differs from one country to another, and that inhabitants used the OOH services differently. Some countries, like the Netherlands and the UK, use a five-level priority

scale assessment. Studies from Canada and Australia often describe A&E departments as using face-to-face triage; however, there is no comprehensive summary of the different organisations in OOH primary emergency services with regard to telephone triage [27, 28]. In general, EDs use a five-level priority scale, but the assessment is done after the patients have attended the emergency ward.

Some studies from other countries on priority assessment by nurses in OOH services describe the nurse triage as safe [29-32] while others have questioned the safety and quality [33-36]. Both in the Netherlands and the UK, several studies on safety describe underestimation and overestimation during triage, where underestimation may cause a risk that patients do not get the help they need in the appropriate time. Some of the UK studies claim that nurse assessment is safe and secure [37-39] while others question the safety without explaining this matter further [29]. In Norway, there have been no studies on triage, although two studies have been conducted at one casualty clinic on ten aspects of the communication and medical skills of the nurses handling phone calls in OOH services [40, 41]. One of the studies describes a method for evaluating the communication and professional skills of the nurses [41].

7.6 Written case scenarios

Written case scenarios are descriptions of situations used in research and education as a strategy to elicit participants' attitudes, judgements, knowledge, opinions or decisions [42].

In Norway this method is not commonly used for skills development in OOH services, and no studies have been found on triage or telephone consultations.

The use of narratives in education and social science research has a very long history in some countries, but application of the technique within healthcare research has only become more common over the past 30 years. Case scenarios have been used in studies addressing chronic and life-threatening illnesses to understand hypothetical decision-making [43]. Written case scenarios have been used in studies of

cardiovascular disease (CVD), diabetes, arthritis, and dementia and other psychiatric conditions [44].

Written case scenarios and vignettes for learning, assessment of medical conditions and for evaluation of intra-rater agreement have been used in several studies in other countries [42, 45-48]. Written case scenarios as a means of measuring student learning outcomes in practical and communication skills have been commonly used for a number of occupations. Some studies claim that evaluating written case scenarios can contribute to learning how to improve professional and communication skills in a decision-making situation. The method can identify health personnel who need to improve their performance in differing ways, and who can learn from good or bad examples [49]. This could be an important contribution towards better communication, thus avoiding errors in telephone consultations which could result in adverse outcomes for the patients [50].

A disadvantage when using written case scenarios in a telephone triage setting is that all the necessary information which is needed to assess the situation is given. Whether the nurses would have asked the patients the proper questions needed to clarify the urgency, remained unclear. Another disadvantage is that the interaction skills with the patient are not challenged. The use of simulated patients in practice gives the opportunities to observe the nurses communication skills and their ability to ask the questions needed [51]. An obvious advantage using written case scenarios is that all participants get the same information, and the setting is equal and stable. Written case scenarios may also offer opportunities for comparative studies.

7.7 Medical advice by nurses

In Norway, every contact with casualty clinics and LEMCs is triaged and assessed by nurses, but the degree to which they offer medical self-care advice as a sole response to situations which are not urgent or acute, or refer the patients to their own GP the next day, varies. There is no national training programme for this special role of

nurses, but the Index is a national decision tool designed to help nurses make decisions on the appropriate level of care. National Centre on Emergency Communication in Health, KoKom [52], has recently compiled a national report on this topic which will be published in 2011. There have been no studies of this part of the services in Norway.

In England NHS Direct is organised as part of the healthcare system, and is a 24 hour telephone advice line staffed by nurses to direct people to the most appropriate level for treatment [53, 54]. They also give self-care advice.

In the Netherlands, Australia, and the UK several studies have been conducted on self-care advice from nurses [28, 55-58]. There is a distinct difference between triage and medical advice. In some clinics the nurses only triage the contact and refer to an appropriate level of care, while other clinics also emphasize medical advices and counselling. A systematic review found no differences between doctors and nurses in patient outcomes, process of care, resources, or costs with regard to telephone advice [39]. In five studies the nurse had responsibility for first contact care for patients wanting urgent consultations during office hours or out-of-hours. Patient health outcomes were similar for nurses and doctors, but patient satisfaction was higher with nurse-led care. Nurses tended to provide longer consultations, give more information to patients, and to recall patients more frequently than doctors did [39]. Denmark uses only GP for triage and medical advice, and telephone advice accounted for 48% in one study [12]. In Norway about 24% of the contacts resulted in telephone advice by a nurse as a sole response [14], while in Sweden a study showed 30% [59].

Among the proficiencies that nurses need in their work in casualty clinics and LEMC's, communication skills is an important factor. Communication consists of several elements which are important when nurses give advice by telephone. The ability to deal with callers as individuals, both when giving appropriate advice and when treating the callers in a kind manner, requires both training and experience

[41, 60-62]. These aspects of communication have barely been touched on in these papers, but are mentioned as a relevant factor in the discussion.

8. Aims of the studies included in this thesis

The overall aim for this thesis has been:

- To establish a method for collecting valid data from the OOH services in Norway, in order to describe activities taking place based on a representative sample of casualty clinics.
- Further, to investigate selected central roles of the nurses working in LEMC's.

Three studies were carried out and the results were published in four papers (**Papers I-IV**).

Study 1:

The aim of the first study was to test the establishment, organisation, variable set and sampling of the Watchtowers, and also to generate results from a pilot study period during the last three months of 2006. In addition we aimed to present data on activity for the year 2007, the first full calendar year for the Watchtowers, analyse differences in user patterns for the seven casualty clinics involved, and estimate national rates for the use of casualty clinics and out-of-hours services. **Papers I and II**

Study 2:

The aim of this study was to investigate the decisions on priority degree made by nurses in OOH services in Norway, using written case scenarios. We wanted to explore whether the nurses assessed the cases according to national guidelines, and explore intra-observer variation for identical written cases in a sub-group of the nurses. **Paper III**

Study 3:

The aim of this study was to explore how callers understand the medical information and advices given by nurses by telephone in one casualty clinic. In addition, we wanted to explore the degree to which the patients followed the advices given and the consequences of the contact with a nurses. **Paper IV**

9. Materials, methods and results of individual studies

This chapter presents a brief description of the material, methods, and main results of the three studies.

The first study was a descriptive study, describing how a representative sample of Norwegian municipalities and out-of-hours districts were contracted to establish a sentinel network, “The Watchtowers”. From this establishment we have been able to complete an observational study which presents activity data for a full year registered in the Watchtowers. The second study evaluated triage by the nurses working in the Watchtowers using written case scenarios. The third study was a telephone survey following-up the counselling given by nurses in one (non-Watchtowers) casualty clinic where the evaluation of the consultation reported by callers/patients was compared to a standardized evaluation of a telephone recording of the actual conversation.

9.1 Materials, methods and results of study 1

Paper I.

Hansen EH, Hunskaar S. *Development, implementation, and pilot study of a sentinel network ("The Watchtowers") for monitoring emergency primary health care activity in Norway* BMC Health Services Research.2008;8:62.

Materials and methods

All casualty clinics in Norway were invited to participate in the Watchtowers project, and after three repeat invitations, 44 clinics remained. In order to select a sample as representative as possible for Norwegian municipalities these 44 municipalities were

categorized through several statistical dimensions defined and managed by Statistics Norway (SSB) [63]. Dimension included were population size (absolute number and change) age and gender distribution, degree of centralization, employment, public economy and gross income among men. The Norwegian Social Science Data Service (NSD) assisted in the selection.

All contacts either by telephone or by direct attendance were registered in an electronic application, developed by the Centre. The ten variables recorded were nationality and place of residence, year, number of week, day of week, time of day (day, afternoon and night), gender of patient, age of patient, mode of contact, first response initiated and priority degree. No diagnosis or ICPC-codes were registered.

In order to check and ensure the quality of the data, procedures were developed by the Centre and discussed with all the personnel at the clinics. Every variable was defined with exclusive and exhaustive categories, and instructions were prepared for the nurses to ensure correct registration. Data was checked in four steps. The data was sent to the Centre each month, and in the event of delay the casualty clinic was sent a reminder. In the second step, the researcher checked the data for missing values for the week number, weekday, and time of day. In the third step, the data were sent to another researcher and checked again for all data and then transferred to SPSS. In the fourth step, a statistician conducted the last check for logical consistency and prepared the data for statistical analysis. Strict procedures were followed for sending, receiving and checking data, including checking for completeness, inspection of frequency tables, identifying missing values and duplicate records, and checking for invalid variable values. All data were subsequently merged into a master database. A pilot study checked that the routines and procedures worked.

Results

The Watchtowers included OOH districts of varying sizes. They covered one single or multiple municipalities. The largest Watchtowers district consisted of ten

municipalities from two different counties with initially 85,000 inhabitants, whereas the smallest Watchtowers had one municipality with 4,389 inhabitants. In total, the Watchtowers comprised 216,030 inhabitants (as of 01.01.2007), which represents 4.6% of the Norwegian population and 4.6% of the total area of Norway. The Watchtowers represent different organisational models and sizes for the Norwegian OOH districts. The actual software and procedures worked well.

A total of 23,346 contacts were registered in the last months of 2006 and there were large differences in contact and consultation rates between the Watchtowers. Daytime contact rates varied from 3 to 72 per thousand inhabitants. A large majority of the contacts were non-urgent (green responses). Based on these numbers the estimated mean number of contacts to OOH clinics in Norway was 0.45 per inhabitant per year.

The pilot study shows that the procedures for collecting data and the quality of the data obtained were satisfactory. The municipalities chosen were satisfactorily representative for Norway as a whole.

Paper II

Hansen EH, Zakariassen E, and Hunskaar S, *Sentinel monitoring of activity of out-of-hours services in Norway in 2007: an observational study*. BMC Health Services Research 2009;9:123.

Material and methods

The attending nurses in the Watchtowers registered all contacts during 24-hours, seven days a week, all year, both by telephone and by direct attendance. Each month the participating casualty clinics sent their data to the Centre who checked and validated the data in four steps.

In 2007, some cases were lost due to technical reasons during one week in one of the Watchtowers, and during one and a half weeks in another Watchtower.

Results

The data collected from the Watchtowers showed that the contact rate in 2007 was 399 per 1,000 inhabitants, ranging from 300 to 633 between the clinics. The distribution of all contacts during the day, afternoon and nights was 37%, 50.8% and 12.2%.

Women were responsible for 53.9% of the contacts and had the highest contact rate in all age groups with the exception of the youngest group. Mean age of the patients was 33.5 years; 76.7% were non-urgent contacts, 21.2% were urgent, while 2.3% were acute. In total, 63% resulted in a consultation with a doctor, and 10% were handled by a doctor over the telephone. Two thirds of the contacts were made by telephone, while 25.9% attended the clinic without calling first. The remainder was referred from EMMCs, other health personnel, or the police. When patients called first, 55% of the contacts resulted in consultation with a doctor, whereas more than 90% of the patients had a consultation with a doctor when they attended the clinic in person. Call-out by doctor and ambulance comprised 1.7%, while home visits comprised 1.6% of all action taken. Casualty clinics in rural districts had the largest proportion of home visits. Nurses handled 24.2% of the contacts either by giving self-care advice, referral to a GP the next day, or by dispatching an ambulance on a red response. Patients most commonly handled by nurses were young children, and this decreased with increasing age. For the first time in Norway we presented representative data from a full year of out-of-hours services.

Norway had a high rate of contacts compared with a number of other countries for which data were available. Norway had a high proportion of non-urgent cases. Valid national figures and future research are essential for local services and policymakers.

9.2 Material, methods and results of study 2

Paper III

Hansen EH and Hunskaar S. *Telephone triage by nurses in primary care out-of-hours services in Norway: an evaluation study based on written case scenarios*. *BMJ Quality & Safety* 2011;20:390-6.

Material and methods

During 2008 all nurses working in the Watchtowers were invited to participate in the study. The researcher contacted the head nurse of each clinic and informed them of the study. After this information was given, both verbally and in writing, the head nurse informed all nurses at each clinic and invited them to participate. The researcher visited clinics that requested more information. All casualty clinics participated. Twenty written scenarios were designed based on the Index, which is a decision tool designed to decide the correct level of response, and were validated by an expert team. The cases included, intentionally; 40% green responses, 40% yellow responses, and 20% red responses. Each nurse received a booklet containing the written scenarios. The nurses provided information on the number of years worked in the clinic, employment fraction, and profession, together with a self-selected identification. The nurses were to assess all the scenarios on their own and return the envelope individually. A sub-group of nurses were asked to re-assess the same written scenarios four months later. Every fifth nurse from the list of 83 participating nurses from the first round was selected.

Results

The response rate in the first part of the study was 76% and the mean of total correct classifications by the nurses was 78%. Of the cases which it was possible to underestimate or overestimate the urgency (underestimation: lower priority for acute or urgent response; overestimation: higher priority for non-urgent or urgent response), 12% were underestimated and 18% overestimated according to the expert team/Index. There were significant differences between the Watchtowers with regard to total number of correct assessments, but neither profession nor work experience affected the classification.

The sub-group of nurses who re-assessed the twenty written cases exhibited good intra-rater agreement (Cohen's kappa 0.61), and a significant increase in Cohen's kappa was observed with increasing employment fraction.

The number of correct classifications in the three priority grades was approximately equal and quite high. Work experience and employment fraction did not affect triage decisions. Intra-rater agreement was good, and was about the same as that found in comparable studies in other countries. From this sample of Norwegian casualty clinics it may be inferred that the quality of decision making is high, and that the competence of nurse triage is safe for patients.

9.3 Material, methods, and results of study 3

Paper IV

Hansen EH and Hunskaar S. *Understanding of and adherence to advice after telephone counselling by nurse: A survey among callers to a primary emergency out-of-hours service in Norway. Under review.*

Material and methods

During May and April 2010, 100 callers who had received self-care advice from a nurse were interviewed by telephone about their understanding of the advice, and the patient's outcome. The first and the last telephone call from every shift which resulted in a nurse giving advice were chosen. The caller could have called on behalf of themselves or next-of-kin. Six variables from the interview were compared with the telephone record file to assess the extent to which the callers had understood the information and medical advice. In addition the callers were asked about their condition; if they had re-contacted the health services for the same problem; and, if they had, whether they had received any medical treatment.

Results

Among the 100 callers, the most frequent reasons for contact were vomiting, fever, coughs, and adverse drug reactions. More than half of the patients were ten years and younger. Of the 100 callers, 99 claimed that they in general had understood the information and the advice given by the nurse. There were some discrepancies when the six questions were compared with the telephone record. Of the callers/patients, 33 contacted their GP or re-contacted the casualty clinic after the nurse consultation. Of the 22 who contacted their GP, 5 patients received treatment for infections, and one was referred to hospital, but discharged the next day. Of the 12 who re-contacted the casualty clinic, none received medical treatment, but two patients were referred to hospital and discharged the next day without treatment. In total, 74% had confidence in the nurse, while 18% partly had confidence and 8% did not have confidence in the nurses. Five callers/patients would have preferred to talk to a doctor on the telephone. The non-Norwegians followed the information and advice to a lesser degree, and had less confidence in the nurses than the native Norwegians.

Nurse telephone consultations and counselling constitute an important part of the OOH services for which callers have high expectations. Almost all callers understood

the advice given and followed it. Two thirds of the callers who received advice from nurses had no contact with their GP, casualty clinic, or other health personnel the following week. Callers with language difficulties are a challenge to the nurse's communication skills.

9.4 Statistical analyses

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS version 15) and STATA, version 11.0.

The results in **Paper I** and **Paper II** were presented using descriptive statistics. Differences in categorical variables between Watchtowers were tested by chi-square tests. The significance level was set to $p < 0.05$.

In study 2 we evaluated intra-rater agreement. Because of the categorical nature of the level of triage (red, yellow and green), Cohen's kappa with 95% confidence interval (95% CI) was used to evaluate consistency. The value of kappa ranges from -1 to +1. Perfect agreement between two assessments of the same object would be denoted by kappa value of +1.

In study 3 the analyses comprised of two parts. First, the six variables concerning counselling were evaluated for agreement, and reported both as actual agreement and Cohen's kappa. Three main outcome variables were analysed for association with a number of potential predictive variables. Fischer's test and exact logistic regression were used due to the occurrences of small and zero-cells in cross tabulations [64-66].

9.5 Ethical considerations

Paper I and **Paper II** were based on data from the Watchtowers project, which is approved by The Privacy Ombudsman for research [67]. Data from the Watchtowers

do not include any form of personal identification. Study two involved nurses working in the Watchtowers casualty clinics. All nurses were well-informed about the study, and no-one opted out of participation. It was important to reassure the nurses that they were anonymous both internally in the clinic and to the researcher.

The third study was approved by the Privacy Ombudsman for research. The clinical patient data from the telephone record files were only accessible by the head nurse; she was the only person who listened to all the conversations. Her position demands professional secrecy, and she sat in a separate room writing down relevant information from the telephone record. Each telephone record file is kept for one year at the casualty clinic in a secure place. Only the head nurse and the medical director have access to the telephone records in accordance with strict procedures. All the nurses involved gave permission for use of their telephone record files.

10. Recent data from the Watchtowers

The established Watchtowers project has continued to register data, and 2011 is the fifth full year of this registration. I have chosen to present some basic data for the three years up until 2011 as a part of this thesis in order to assess possible changes over time. The variables presented below are some of the activity characteristics from 2007-2010.

Table 1 Contacts with the Watchtowers for the years 2007 to 2010 presented in rates per 1,000 inhabitants, distribution of mode of contact, action taken, and priority grade in percentage.

Year	2007	2008	2009	2010
Contacts for all WT	399	410	412	415
Mode of contact (%)				
By telephone	65.2	64.9	65.9	62.7
Direct attendance	25.9	25.2	23.6	25.7
Others	8.9	11.2	10.5	11.6
Action taken (%)				
Telephone consultation by doctor	9.5	9.9	10.1	8.9
Consultation by doctor	63.0	63.2	58.9	62.1
Handled by nurse	24.2	23.6	23.3	25.9
Call out doctor and ambulance	1.7	1.8	1.7	1.8
Home visit by doctor	1.6	1.6	1.5	1.4
Priority grade (%)				
Non-urgent	76.6	75.2	74.8	68.0
Urgent	21.1	22.6	22.8	29.2
Acute	2.3	2.2	2.4	2.7

The contact rates have increased steadily from 2007 to 2010 although not to any significant extent. The changes in mode of contact and action taken are obviously

random. With regard to the priority grades there is a decline in the frequency of non-urgent contacts, and a corresponding increase in urgent and acute contacts.

11. Discussion

11.1 Methodological considerations

This thesis presents three studies and four papers. The first study included the selection of participants and establishment of the Watchtowers, as well as a prospective, observational survey of the activities. The second study was an evaluation study of triage among nurses in the Watchtowers. The third study was an observational study performed with a structured questionnaire where selected answers from the patient or next-of-kin were compared to a telephone record. Methodological considerations regarding **Paper I** and **Paper II** will be described under Study I.

Validity has two different elements. Internal validity means that the result of the study is correct for the sample of people being studied. External validity refers to whether the results can be applied to other populations who were not studied [64-66]. The internal validity can threaten the external validity.

11.1.1 Study 1

Internal validity

With regard to the internal validity, four of the ten variables were pre-set in the electronic registration program (year, date, weekday, time of day). Age, gender, mode of contact, or action taken was missing in less than four per thousand. Only one variable, the priority grade, was to be assessed according to the Index. A misclassification or information bias could have been relevant for this variable. According to the Index, an urgent response could fall close to the non-urgent response, but also close to the acute response. For example, a urinary tract infection with high fever and poor general health would be close to the top of the urgent scale,

while a urinary tract infection without fever and good general health would be at the bottom of the urgent scale. Therefore, all the nurses in the Watchtowers were informed about the priority grades, and potentially unclear situations were discussed before start of the study. This only applied to a few urgent cases, because the acute and non-urgent cases were clear and quite easy to assess.

Information bias could also arise if the nurses forgot to change the Watchtowers program from one shift to another during the day when registering contacts. If this was not done the contacts could be registered at the wrong time of day. The researcher checked for this type of mistake in each file, and reported back to the contact person for the relevant clinic (for example when no cases were registered as daytime). The variable “age” was to be written manually, thus giving the potential for mistakes if the nurses were busy and the workload was heavy when the number was noted. This may represent a non-systematic error and therefore does not threaten the internal validity to any degree.

For technical reasons, computer errors occurred during one week at one clinic and during one and a half weeks at another clinic the first full year of the project. When presenting rates per 1,000, the figures were multiplied by 1.011 based on the number of average contacts per day for the two clinics. Apart from this incident, there were no systematic missing data in any of the casualty clinics. Thus the internal validity was quite good.

The Watchtowers sample and external validity

At the outset, all the municipalities in Norway were invited to participate, and after responses and application of pre-selection criteria, we made a strategic sample of municipalities who were representative for the OOH districts in Norway. For most of the demographic- and socio-economic dimensions the categories were well distributed compared with national figures. When comparing the contact rates and derived national figures against the reimbursement claims for one year we found almost

identical figures for some variables like doctor consultations [**Paper II**]. As we also register nurse consultations our total figures were a bit higher. Based on these facts the external validity seems thus quite good.

Variables included in the registration

After some consideration, we decided not to include diagnosis or ICPC codes in the Watchtowers program. Registration is done at the same time as contact, and we would therefore have had to wait for the diagnoses until after a consultation with a doctor. Another reason not to include this variable was the time spent on finding the codes. All the nurses also registered all contacts in the medical records. Due to anonymity of the patients, it has not been possible to link the patient to their medical records to get access to the diagnosis afterwards.

11.1.2 Study 2

Internal validity

Written case scenarios as a method for evaluating nurses' competence in triage is new in Norway, and cannot fully replace actual triage practice [45]. Real patients may be evaluated and assessed differently to written case scenarios because the situation can change during the consultation. In addition, all the available resources (i.e. ambulances) are known, which can also influence the choice of response in real situations. At the same time it is not possible to evaluate test-retest reliability without using standardised case scenarios. With regard to the internal validity, the scenarios were drawn up in accordance with the Index, which is not validated but is the only triage instrument available in Norway. An expert panel assessed the scenarios and found them complete and with enough information to be assessed and triaged.

We chose to distribute the priority grades differently from the results in the Watchtowers study, in which 76.6% were non-urgent, 21.1% were urgent and 2.3% were acute cases [**Paper II**]. In the written case scenarios 40% were non-urgent (8 cases), 40% urgent (8 cases) and 20% (4 cases) were acute cases. If we had used the actual distribution there would be 15 non-urgent cases, 4 urgent cases, and only one acute case to assess. Taking into consideration the fact that there are very few acute responses in practice, the nurses perhaps did not expect several red responses among the written cases. Whether this knowledge has affected their decision is unknown.

The Index has a three-level triage. Most other countries use a five-level triage system on the telephone which is considered by some to be more effective than a three-level triage [68]. This could make comparison with other studies difficult. Increasingly, EDs in Norway use a five-level triage system for face-to-face triage, while three-level triage is still used for telephone triage [**Paper III**].

A study from the Netherlands showed that the right level of care at the right place and right time is necessary, and that a uniform triage of patients contacting different emergency care settings will improve quality of care and communication between health care providers at different levels [27]. Another study compared triage decisions for the same patients with a five-level and a three-level triage scale and found that five-level triage was more effective than three-level triage [68]. This study was conducted at an ED (face-to-face) and not as telephone triage. More and more EDs in Norway are now using triage with a five-level assessment, while EMCCs and LEMCs still use a three-level triage on the telephone. The reason for continuing to use a simplified triage system in OOH services in Norway is unknown.

External validity

Altogether, 88 nurses participated in the study, and each clinic in the Watchtowers was represented. Five nurses were excluded because information on employment fraction, profession, or years working in the clinic was lacking. The response rate was

at least 75% based on the fact that the head nurse in each clinic stated that everyone had received the booklet, even though 25% of the books had not been handed out. No one refused to participate, which could have resulted in a selection bias. Nevertheless, some had left their jobs, and temporary nurses were employed during the summer vacation, thus according to the numbers of booklets distributed at least 75% participated. As the Watchtowers was regarded as a representative sample of casualty clinics in Norway, and the nurses in all clinics in the Watchtowers participated, the nurses would be representative for all nurses working in the casualty clinics in Norway. Thus the external validity would not be threatened.

11.1.3 Study 3

The third study was performed using telephone interviews with callers/patients and followed a structured questionnaire. The callers also had to tell the researcher exactly what they remembered from the information given by the nurse through answering six questions. These answers were compared to the telephone record files to determine if they had understood the information given by the nurses. Furthermore, the caller/patient were asked if they trusted the nurse, if they got worse or better after the contact, or if they contacted their GP or re-contacted the casualty clinic for the same problem. They were also asked if they contacted the GP or casualty clinic, if they got any treatment and what kind of treatment. Patients referred to hospital, were asked about the medical treatment received.

Internal validity

There are three main issues with regard to internal validity in this study. The first concerns whether the instrument used had a high validity; the second concerns the degree to which the callers were influenced by the researcher (eager-to-please) or by

recall bias; and the third concerns coding by the research assistant. There are several aspects to consider when conducting an interview study.

The six questions compared with the telephone record file were piloted by the researcher and the research assistant. Due to Norwegian regulations the researcher was not allowed access to the telephone record files. In addition to the categorical answers the callers were told to repeat exactly the information they received from the nurse for each question, except for the first one (did the caller/patient get enough time to explain their symptoms).

The second issue is the degree to which the researcher influenced the callers and whether the “eager-to- please” phenomenon came into effect. In the interview the callers were not posed questions about satisfaction, but were asked to quote what they were told and to what extent they followed the advice. Regardless of the researcher’s objectiveness, there is always a risk that the respondents could be influenced by the researcher. It was necessary to state for each caller that the answers and comments would be treated and presented anonymously. With regard to recall bias, only two callers stated once that they did not remember if they were told when, or if to contact their GP.

The research assistant coded the information from the record file for six questions for each caller who was selected to participate in the study. In order to categorise the answers into Yes, No or Partly, an assessment had to be made. The advice given by the nurses was compared to national guidelines or to consensus norms (Index) for example fever in children, earache, abdominal pain, etc. The information was written down exactly as it was given by the nurse. Ideally, two people should have assessed all the information, but this was not possible in this study due to Norwegian legislation and lack of resources.

External validity

Ideally, all Watchtowers should have participated, but only a few clinics had installed a telephone record file, or had the time to participate. The results from one single casualty clinic cannot be representative for all clinics in Norway, but are perhaps representative for similar clinics of the same size and with the same resources. Because of this, the external validity is uncertain in this study; nevertheless, some aspects of these findings may be transferrable to other casualty clinics.

When recruiting the callers from the record file we applied a systematic rule picking the first and last contact from each shift in order to avoid selection bias. This strategy worked quite well. We had information on the 15 callers who did not answer the telephone call from the researcher, and they were not significantly different from the callers who actually participated. We think that the included callers were quite representative of the callers to the clinic who had received self-care advice.

11.2 Discussion of the results

11.2.1 The Watchtowers' data

Registered data from the Watchtowers showed that Norway had a quite high contact rate compared to other countries, with the exception of Denmark [9, 12]. Several aspects of the OOH services, and different organisation and definitions may have influenced the differences. Even taking this into consideration, and disregarding the contacts rates on daytime on weekdays, Norway still had the highest contact rate with the exception of Denmark. When comparing contact rates in OOH services between countries, the validity of the studies must be questioned since very few, if any, have collected data from a representative sample for a full year, or for more than one year [10, 17, 18, 69].

The data from the Watchtowers were compared with the reimbursement claims from Helfo [6] which differed by only 2% [**Paper II**]. The contact rates and estimated figures were slightly higher in our study, which could be due to the fact that when nurses give self-care advice as a sole response it does not always entitle reimbursement. Therefore, the numbers from the Watchtowers could be considered to be valid even when comparing the latest figures from recent years.

High rate of non-urgent contacts

Norway had a high rate of non-urgent cases compared with other countries (76.6%), which poses the question as to the purpose of the service [16, 17], and as to how the OOH services should handle non-urgent cases that could wait until the next day to see their GP or handled by self-care advice [**Paper II**]. There are no regulations governing OOH services in Norway, and it is up to each clinic to define (or not

define) the content, service, and quality as long as it is safe. Many inhabitants do not know how and when to use the OOH services. If the GP is unavailable during the day, the patient will contact the casualty clinic. These facts must be regarded as possible reasons for the high frequency of non-urgent cases. In addition, the casualty clinics differ in their willingness to accept certain minor ailments that could easily wait until the next day [70]. Another fact that might influence the contact rate is that very few casualty clinics, inform the public about the kind of illness and problems they deal with, so people are confused about when to contact the OOH services.

Many of the non-urgent patients do not need to see a doctor, and as this number increases it will challenge the nurses' competencies and communication skills when giving information and self-care advice. So far this aspect has received little attention in Norway, whereas both England and the Netherlands have several studies on this topic [10, 21, 22, 51, 54, 71-73].

Do different organisational models and policy influence the activity?

There were large differences between the casualty clinics in the Watchtowers with regard to contact rates, mode of contact, and action taken. One clinic had a very high contact rate in the daytime because X-ray facilities were unavailable in the afternoon and at night, and patients with minor injuries that required X-ray at weekends had to wait until Monday morning [**Paper II**].

One clinic had a very high proportion of patients attending the clinics directly without calling first. This fact increased the proportion of consultations by doctor from 55% to 90% [**Paper II**]. One clinic in the Watchtowers had a very high rate of home visits compared to the others. These significant differences in practice, such as routines and management, resulted in major differences in services in the casualty clinics in Norway.

There were also significant differences between the Watchtowers with regard to the frequency of self-advice given by nurses as a sole response. In some clinics the nurses only refer all contacts to the on-call doctor, whereas in other clinics the tradition is to counsel depending on the competence of the nurses. Consequently, the doctor consultation rates varied between the Watchtowers [**Paper II**] [14].

Due to the partially differing organisational models, the provision of equal services and the quality of the OOH services varies considerably in Norway. The fact that there is no regulation or law governing the services makes it difficult to decide which professional level is appropriate for the inhabitants and which patients to take care of. For example, some OOH are involved in handling accidents, while others are not [74]. This fact challenges the cooperation between the primary and secondary health care levels. At the same time, the GPs' availability varies and will also affect the contact rates in the Watchtowers. Data from the Watchtowers showed that people far away from the clinics were using the services to a lesser degree than people living near the clinics [14]. Corresponding findings were reported in a study from England which showed that patients living far away from the clinic were more likely to receive telephone advice than patients living near the clinic, and patients living far from the clinics were also more likely to receive home visits [75].

In some casualty clinics, including some in the Watchtowers, the doctor on-call fills out reimbursement claims even if nurses have given the medical advice and the doctor does not talk to the patient. This practice may give an incorrect picture of doctor activity as well as of the action taken in the clinics. The practice differs from one clinic to another and also from one doctor to another. In 2009, almost 1.8 million reimbursement claims were registered, while in the Watchtowers 91,069 contacts were registered, which extrapolates to more than 2 million contacts at national level. This gives a discrepancy of 300,000 contacts [5, 76].

11.2.2 The four year data set

The data from the last four years shows small changes over the years. This raises the questions as to the prospects and purpose of continuous registration.

The contact rates have increased from 399 to 415 per one thousand per year. The variables “mode of contacts” and “action taken” were all stable during the four years except for the “priority grade” where urgent and non-urgent cases have increased and decreased, respectively. This has been found for two casualty clinics and could be due to an increase in the number of urgent cases, or that one clinic has moved the LEMC and new nurses are doing the registration, or that the other has newly employed nurses who may over-triage the priority grade.

When comparing the Watchtowers data from the year 2007 up to this year there are only small changes in contact rates. One suggestion could be to register contacts every third year. However, establishing the Watchtowers intermittently could weaken the data quality because the stability and focus would change. With the present set up, we are able to follow particular epidemic situations such as the Swine flu pandemic in 2010. A special report was published on the data from that epidemic [77]. During the summer 2011 we registered all contacts regarding festival arrangements.

During the Swine flu pandemic, the Watchtowers registered all swine flu-related contacts, and showed that almost 70% of all contacts were handled by nurses [77]. Since not all contacts with the nurse are registered by Helfo [5], the figures would not correctly reflect the total workload in the casualty clinics initiated by the flu pandemic. Studies showed that people worldwide were sceptical about the feasibility and appropriateness of government recommendations for managing the H1N1 pandemic [78-80]. This may also have been the case in Norway with regard to the workload in the casualty clinics during the six months of monitoring the contacts in the Watchtowers.

11.2.3 Classification of priority grade

An assessment of the patient's situation will always be associated with some uncertainty and, when using a three-level triage system, the urgent cases could fall near not only the acute, but also the non-urgent cases. Compared to a five-level triage system, use of a three-level triage makes triage of urgent cases more difficult.

Triage in the Watchtowers can be done in three different ways: By using the Index only; by assessing the situation based on experience and knowledge of available resources; or by both. Some factors such as location of the nearest resources or distance to the on-call GP could influence a decision. Long distances, for example, could lead to upgrading an urgent priority to an acute priority to reduce the time from the patients call until the patient sees the doctor.

Our study found a quite high percentage of correct classifications at assessment of written case scenarios without use of the Index. This may indicate that the nurses are highly familiar with the criteria for responses according to the Index, but use their experience and knowledge when actually doing the triage [**Paper III**].

Studies on triage from England and the Netherlands stated that use of the same national decision tool that guides the nurses to a final decision will make assessment and triage more uniform and safe [51, 54]. Another study claims the contrary, and that triage protocols are not forms of artificial intelligence and cannot take the place of experience. The judgment of the experienced, specially trained nurse should supersede written protocol [81]. The same study stated that while nurses often deviate from protocol in certain situations, this behaviour could be desirable rather than a shortcoming. This is an aspect of the triage that has not been studied in Norway. Whether nurses should use decision tools suggesting what kind of action should be taken, or whether the nurses should have enough knowledge and experience to do the triage with only the Index as support in difficult situation is an important issue. It must be mentioned that England uses registered nurses to do the triage, while the Netherlands more often uses enrolled nurses and secretaries. Their education is quite

different as enrolled nurses have upper secondary school, while registered nurses have education at bachelor level. The fact that neither work experience nor employment fraction affected triage decisions in our study is in accordance with the findings of other studies [82, 83] which stated that there was no evidence that the clinical background of nurses (hospital or community), their length of experience in NHS Direct, the range of their experience, or their gender affected triage decisions. However, nurses with more than 20 years clinical experience were more likely to triage callers to self-care advice.

Some studies claimed that there were large differences in outcome between nurses using different software systems to triage the same calls. If the variation is primarily attributable to the software then standardising a single system will obviously eliminate this [26]. The duration of the calls using protocols was found to be significantly longer than calls not using protocols (4.6 minutes) [84]. Our third study showed that the mean length of the calls were 4.1 minutes [**Paper IV**].

11.2.4 Telephone advice by nurses

Telephone advice by nurses means that a contact from a caller is handled by the nurse as a sole response, with first triage and then counselling. Telephone advice may be self-care advice regarding minor ailments such as fever in children, diarrhoea or information about side-effects of medication. Studies from England and Sweden show that self-care advice is only given after an assessment of the caller's medical condition to secure that the symptoms are not serious and that the patient does not need to see a doctor [55, 57, 59, 85, 86]. Telephone advice by nurses requires good medical knowledge and good communication skills [41, 55, 59, 87-89] .

In our study we found a small discrepancy between the information given by the callers and the telephone records, even though 99 out of one hundred callers responded that they in general had understood all the information given.

One way to ensure that the telephone advice is understood is to ask the caller to repeat the information or self-care advice at the end of the counselling. Very few studies have emphasised this procedure as a simple and good way to ensure that the advice given is understood [90]. It is also important at the end of the conversation to ask the caller if they are satisfied with the answers. This necessitates that from the beginning the nurses have established a good relation and contact with the caller. An open attitude and respect for the caller is a prerequisite for good communication [61, 62]. Callers have differing medical knowledge. Some have tried out self-care before calling, while others do not know what to do. This fact challenges the nurse's approach to the problem they are presented with. Some callers/patients just call to confirm that they are doing the right thing, while others want to discuss possible ways to handle a situation. For example, what they must look for and/or if they can give medication for the fever, and how often.

One study from the UK stated that satisfaction with OOH services may increase adherence to clinical advice and better outcomes [91]. This finding is in concordance with the third study in this thesis where there was a significant correlation between whether the caller had confidence in the nurse and if the caller/patient followed the advice given [**Paper IV**]. One study stated that all parents understood the advice given and another that 96% of parents were satisfied with the advice [58, 60]. This fact supports the importance of good medical knowledge, respect and clear communication appropriate for each caller [61, 62]. Other studies stated that the compliance rate after the triage call (referring to other health care services) was 56% and 85% [28, 92]. One study reported that 90% had followed the advice given, while another showed 84% [56, 93]. Several studies have investigated the degree to which, several days later, the callers remember and follow the advice given, and all had a lower adherence percentage than we found in our study [85, 93-95].

We also found that non-native Norwegians had less confidence in the nurse, and that they to a lesser degree followed the advices. This fact challenges the nurse regarding several aspects of communication on the telephone. Background, culture, and experience with health care among non-native Norwegians may influence the

communication with the nurse. In addition to good medical knowledge and good communication skills, there should be more focus on ethical reflection in nurse education and training in the LEMCs and the OOH services.

11.2.5 Re-contact to casualty clinic or contact with GP

Results from the third study [**Paper IV**] revealed that 22 contacted their GP and 11 re-contacted the casualty clinic after contact with the nurse on the telephone. Most of the callers were told if and when to contact their GP. More than two thirds of the callers who received advice by a nurse did not have any subsequent contact with health personnel. One study from England showed that half of the callers re-contacted health personnel after the nurse consultation [86]. Other studies have found about the same proportions regarding re-contact or use of health care services after nurse telephone advice [28, 58, 96]. The frequency of re-contact with health personnel after a nurse contact in our study is quite low compared to these other studies. This could mean at least two things, firstly the callers did not at first intend to see a doctor, but just wanted to hear if they could wait and see. Secondly the nurses did give appropriate advice which the callers did understand and found adequate. The fact that the caller had confidence in the nurse and was given the option to call back if they became worse, could also contribute to adherence to the advices, and to ensure the caller felt safe [34, 59, 97]. Eleven patients contacted their GP. This may have been a correct decision because patients may benefit from consulting their own doctor who can follow the patient over time.

The OOH services in Norway have the responsibility to take care of the acute patients. If the time is used mostly for non-urgent patient consultations, this could undermine the emergency preparedness of the OOH services. This is a topic that is generally discussion among leaders in casualty clinics in Norway. It appears that the largest casualty clinics in Norway tend to have open accessibility, while others prefer to refer some of the non-urgent patients to their GP the next day.

11.2.6 Patient safety and risk factors

In addition to the emphasis on cost savings and reduction in GP workload generated by triage, safety and risk has been given a lot of attention [29, 51, 59, 86]. All healthcare activity by its nature carries a certain risk, and in order to reduce the risk of harm and failure in telephone triage and counselling some essential points have been highlighted [95]. Safety in organisations depends on a culture where there is awareness of risk, and an open culture which learns from mistakes. Nurses' skills and experience of triage vary from clinic to clinic, and the responsibility and role of the nurses at telephone triage and counselling have been discussed in other countries. One kind of risk is under-triage after taking the medical history and gathering information from the caller, and the information and self-care advice given by the nurse also represent certain risks [28, 72, 81].

In Norway there is no regulation of, or national training program for, triage and counselling in LEMCs. Some casualty clinics have prepared their own training program, but so far only a few clinics have used the telephone record file for evaluation and training. In fact, only 38% of the out-of-hours districts have telephone records installed in the LEMCs [11].

Triage requires taking an accurate medical history in order to be able to respond at the right level of care. Giving self-care advice requires, in addition, comprehensive medical knowledge and good communication skills. Because nurses' skills and experiences vary from LEMC to LEMC and, in addition, within each LEMC, it means that the services they provide will differ. To ensure safety and reduce risks, one could ask all callers to attend the clinic to see a GP, or one could make sure that all nurses are well-trained and continuously evaluate their calls. In addition, the use of the Index or other decision tool is important to ensure safety. However, it is also of the utmost importance that the nurse elicits the necessary information from the patient, and avoids misunderstandings. On the other hand, it is crucial that the callers have understood the information given by the nurse [**Paper IV**].

To ensure patient safety and reduce risks several factors must be considered such as training and evaluation, and an open culture with focus on patient safety and risk management [61].

12. Conclusions

Norway had a high contact rate to the OOH services and a high proportion of non-urgent cases in 2007.

Different organisational models and policies within the OOH services influence the activity and content of the services.

The nurses' classification of priority grade or triage was quite uniform and intra-rater consistency was good.

Nurse telephone triage and counselling constitute an important part of the OOH services, and the callers turned out to be quite satisfied with this service.

Callers with language difficulties challenge the nurse's communicative skills.

Laws and regulations governing the OOH services are weak, and Health authorities should clarify the role and standards for the OOH services.

13. Practical implications and suggestions

The Watchtowers data have been regarded as useful for policymakers and authorities, both locally and nationally, including the Ministry of Health. In a recently established collaboration, EurOOHnet (the European research network for out-of-hours primary health care), data from the Watchtowers have been used to compare activity in OHH services with that in other European countries [98].

Basing statistics solely on reimbursement claims does not give the whole and full picture of contacts to the casualty clinics because not every contact is entitled to a reimbursement claim. Examples include nurses giving medical advice, and referral to other levels of care [**Paper IV**].

In order to strengthen skills in triage and counselling, there must be a continuous focus on communication and skills upgrading. Setting specific qualification requirements for nurses working in LEMCs is one way to accomplish this. In addition, there must be focus on patient safety.

Health authorities should clarify the role and standards for the OOH services in Norway, both with regard to content and responsibility.

14. Recommendations for future research

Based on the four papers presented, and the development in the OOH services in Norway, there is need for more research in this field.

Valid activity data from the OOH services should have more focus both regarding how they should be collected, and the fact that these data are necessary for both research and policy makers.

The nurses have an important role in the OOH services, and there is need for more knowledge about quality and outcome for patients who contact the clinics. Based on Norwegian regulations and laws which are recently presented [99], the municipalities in the future will be in charge of new tasks and be responsible for more patients who today are taken care of by the secondary health care. This will influence the primary emergency services, and make further demands for quality and knowledge in this field. Therefore the triage and telephone counselling will be an important task for the OOH services in the future.

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Development, implementation, and pilot study of a sentinel network ("The Watchtowers") for monitoring emergency primary health care activity in Norway

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Abstract

Background: In Norway there is a shortage of valid health activity statistics from the primary care out-of-hours services and the pre-hospital emergency health care system. There is little systematic information available because data registration is lacking or is only recorded periodically, and definitions of variables are not consistent.

Method: A representative sample of Norwegian municipalities and out-of-hours districts was contracted to establish a sentinel network, "The Watchtowers", and procedures were developed for collecting continuous data from out-of-hours services. All contacts, either per telephone or direct attendance, are recorded during day and night. The variables are registered in a computer program developed by the National Centre for Emergency Primary Health Care, and sent by email in Excel-file format to the Centre on a monthly basis.

Results: The selection process yielded a group of 18 municipalities, with a fair degree of representativeness for Norwegian municipalities as a whole. The sample has 212,921 inhabitants, which constitutes 4.6% of the total Norwegian population. During a pilot period lasting three months the Watchtowers recorded all individual contacts. The procedures for registration, submitting and checking data worked satisfactorily. There was little data missing, and during the last three months of 2006 a total of 23,346 contacts were registered.

Conclusion: We have been able to establish a sentinel network with a fair degree of representativeness for Norwegian out-of-hours districts and municipalities. The data collected reflect national activities from casualty clinics in Norway. Such data are useful for both research and system improvements.

Background

In many countries primary health care activity data are scarce or unreliable due to lack of comprehensive data collection [1,2]. The need for valid empirical data from such services also is obvious for several reasons; national statis-

tics, public health or local organisational planning, for research, health care priorities, and health care policy making. Depending on their existence in a particular country or area, activity data from this part of the health care system may be obtained from several sources such as

patient registries, national morbidity and mortality registries, prescription databases, reimbursement claims, continuous and prospective activity data registration and others [2]. In many countries the denominator for rates may be difficult to obtain for studies in primary care, but it is anyhow important to define both for research and for statistical purposes [3].

In Norway, like in most other countries, there is a lack of valid health activity statistics from the primary care out-of-hours services and pre-hospital emergency health care system. There is little systematic information available because data registration is lacking or is only recorded periodically, and definitions of variables may vary. Data from this service is important, however, e.g. for national plans and emergency primary health care functions [3-7].

The Norwegian Ministry of Health and Care Services has established The National Centre for Emergency Primary Health Care [8]. The Centre is academically connected to the Department of Public Health and Primary Health Care at the University of Bergen and to the National Centre on Emergency Health Care Communication. The purpose of the Centre is to establish and disseminate knowledge of emergency primary health care through multi-disciplinary research and information dissemination activities. The Norwegian Directorate for Health and Social Affairs has emphasised the importance of comparison data in the out-of-hours services and that such data should be of relevant content and of good quality.

In lack of comprehensive national data sets usable for obtaining routine valid statistics with a uniform variable set and strict definitions, the Centre has initiated an enterprise called "The Watchtowers" which aims at including a representative sample of Norwegian municipalities. The purpose is to provide routine information over several years, based on a limited or minimal dataset, which will enable the monitoring, evaluation and comparison of the respective activities in the area of primary health care emergency services. This paper describes the organisation, variable set and sampling of the Watchtowers, and also provide results from the pilot study period during the last three months of 2006.

Methods

Organisation of emergency services in Norway

Norway has a two-level public health care system, with only a marginal private sector. The four geographically based Regional Health Authorities (RHAs) owned by the Ministry of Health and Care Services maintain the hospital sector, including all ambulance services and the National air ambulance services. The RHAs also organise and run the 20 regional Emergency Medical Communication Centres (EMCC) including maintenance of the emer-

gency call number 113. These services, including university hospitals, form the secondary and tertiary health care system.

The 431 municipalities (2007) are by law in charge of organising primary health care, including general practice, nursing homes, home care, preventive medicine for children (including prenatal care, but not deliveries), school health care, and also local emergency medical services for all inhabitants 24 hours a day. The emergency medical service is usually managed by the General Practitioners' (GPs) surgeries during the office hours and by municipality maintained out-of-hours duties by GPs during evenings, nights and weekends, often based in local casualty clinics [5]. Each municipality also has a duty to maintain one specific telephone number at a Local Emergency Medical Communication Centre (LEMCC) (usually located in the casualty clinic) for cases that are urgent but not life threatening. Both the local emergency care system (LEMCC) and the EMCCs are staffed with nurses who use telephone triage to prioritise patient treatment and/or transportation. After assessment of the patient's health problem, a decision is made about the appropriate level of action, which could include advice only, home visit by a GP, appointment with a GP in a casualty clinic, a call out for the GP on duty or an ambulance or urgent transportation to hospital by land, sea or air ambulance service [7].

Norwegian casualty clinics and GPs

In 2006 there were 262 out-of-hours districts in Norway, constituted either by one municipality alone or by inter-municipality co-operatives [5,6]. Out-of-hours emergency primary health care service is thus inter-municipality based in two thirds of Norwegian municipalities. Regular GPs participate in this service to varying degrees, although mandatory contracted to it [9]. In half of the municipalities all regular GPs take out-of-hours shifts. There are substantial variations in the annual number of phone calls per inhabitant to municipal out-of-hours services [7]. Due to Norwegian geographical factors, there are also large variations in patient transport time and the availability of ambulances [5].

Most out-of-hours services are located in a casualty clinic in the host municipality, but some use GPs' surgeries as location. A closed and nation-wide medical radio network is used for communication between doctors on call, ambulances, LEMCC and the EMCC. When an emergency situation occurs, simultaneous radio alarms will be transmitted to both the GP on call and the ambulances in the actual area. A study from 2005 showed, however, that only half of the doctors on duty were available on the medical radio network all the time, despite it being mandatory to be so [5].

Sample of municipalities participating in the Watchtower project

Participation in The Watchtower project is based on motivation and voluntary contracts. In 2005 all the 433 municipalities in Norway were invited by the Centre to participate in the project. After three invitations with repeated and a gradually increasing amount of information about the project being distributed, 44 municipalities remained for the selection process and final inclusion. In order to select a sample as representative as possible for Norwegian municipalities as a whole and also reflecting the different organisational models for emergency primary health care, these 44 municipalities were categorised through several statistical dimensions defined and managed by Statistics Norway [10].

The following variables were used in the selection process, here presented with most recent available data:

- Population size in absolute number of inhabitants and also categorised into small, medium and large. Municipalities with < 5,000 inhabitants are defined as small, those with 5,000 to 19,999 are medium, and municipalities with 20,000 or more inhabitants are large
- Change in population (%) between 2001 and 2006 (quartiles)
- Proportion of inhabitants 0–17 years of age and 67 years and over (quartiles)
- Gender distribution (quartiles)
- Degree of centralisation of population in municipality (graded from 1–7)
- Statistics Norway's compound classification for municipalities (graded 1–10)
- Distribution of employment by branches of business and industry (quartiles)
- Municipality's public economy (quartiles)
- Gross income among men (quartiles)

It was anticipated that there should be between 0.5 and 1.0 annual contact per inhabitant to the out-of-hours services. In order to obtain approximately 100,000 cases as a minimum, it was decided to include a total of between 150,000 and 250,000 inhabitants in the project.

The selection process resulted in a specific invitation to a sample consisting of seven casualty clinics with a total of 18 municipalities from different parts of Norway. All

agreed to participate and were contracted for participation on a long term basis. Each Watchtower is paid a small amount of money based on number of inhabitants to cover administrative and other running costs. No reimbursement for workload is provided. Total costs for the project is 0.65 EUR per case registered.

Data collection

A set of ten variables was developed by expert opinion. No clinical data are recorded. For every contact or patient's request for help from the out-of-hours service the following ten variables are recorded:

- Nationality and place of residence (municipality name and number) of the patient
- Time of contact: Year, number of week in the year (x/52), number of day in the week (x/7), and time of the day (daytime 08.00–15.29, afternoon 15.30–22.59, and night 23.00–07.59)
- Gender of patient
- Age of patient, registered as attained years. A child of less than one year is registered with the value zero
- Mode of contact: Telephone contact, direct attendance to the casualty clinic, contact by health professionals, contact by EDCs or others (for example police)
- First response initiated by given categories: Telephone advice by a nurse, telephone advice by a doctor, medical examination by a doctor, medical consultation by a nurse, home visit by a doctor, acute response by ambulance and doctor, and others (e.g. sending ambulance without a doctor, referring to police or to a regular GP on daytime)
- Priority degree according to the Norwegian Index for Medical Emergency Assistance [11].

Norwegian Index for Medical Emergency Assistance is a decision tool to ensure an appropriate response to a medical emergency. The Index is used in all EMCCs and is also available in all casualty clinics in Norway, but is not mandatory in the latter. The Index is intended to regulate or standardise the quality of medical evaluation performed by nurses in the EMMC/LEMCC. Each call to or contact with a Watchtower is classified by priority degree according to the Index with colour codes "Red", "Yellow" or "Green. Red colour is defined as an "acute" response, with the highest priority. Yellow colour is defined as an "urgent" response, with a high, but lower priority. Green colour is defined as a "not urgent" response, with the lowest priority.

All contacts, both per telephone or attendance, are recorded during day and night by the attending nurses. The variables are registered in a computer program developed by the Centre, and sent in Excel-file format monthly by email to the Centre. One appointed nurse/co-ordinator at each casualty clinic is responsible for checking and sending data locally. In some of the Watchtowers, checks for completeness of registrations in order to avoid under-reporting can be made because of simultaneous registration on paper sheets or digitally for other purposes. Such checks are not part of the project's procedures, but each Watchtower is encouraged to perform them if possible. Strict procedures are followed for sending, receiving and checking data, including checking for completeness, running frequency tables, identifying missing and duplicate records, and checking for invalid variable values. All data are subsequently merged into a master database.

Data quality

We did a preliminary four week pilot study in April 2006. The aim of the pilot study was to ensure good quality of the data, evaluate procedures for transmitting data, test the registration workload, and obtain a preliminary indication of the annual number of cases. Three casualty clinics participated in the pilot study, one clinic in a small district, one clinic in a city and one large clinic consisting of seven municipalities [7]. Our conclusion was that the system was working well, that the clinics were able to comply with the procedures, and that it was possible to sustain the project over a long period of time.

During the last three months of 2006 we carried out a new pilot study with all the recently selected seven Watchtowers. The Centre arranged meetings with the respective casualty clinics, their leaders and many of the nurses before commencing the pilot study. In this pilot phase, procedures were tested and some clarifications of the variable definitions were made.

The statistical analyses were performed using Statistical Package for the Social Sciences (SPSS version 13). Standard univariate statistics were used to characterise the sample, including simple distributions and standard cross tables. The Watchtower project is approved by The Norwegian Data Inspectorate.

Results

The selected seven casualty clinics covering 18 municipalities are located from Alta in north of Norway to Arendal in the south, and they represent different sizes of out-of-hours districts, single and inter-municipality cooperatives, and a wide variety of dimensions included in the selection process (Table 1). The largest Watchtower contains ten municipalities (Arendal), the smallest is a municipality consisting of a group of islands in the western part of Norway (Austevoll, 4,391 inhabitants). The Watchtowers had a total of 212,921 inhabitants per January 1, 2006, which constituted 4.6% of the Norwegian population and covered 4.1% of the total Norwegian area.

Table 1: Characteristics of the 7 Watchtowers and the constituting 18 municipalities. Data per 01.01.2006, otherwise stated.

Watchtower	Population	Area (km ²)	Municipality	Population categories (1-3)	Change in population, 2001 to 2006 (quartiles)	Gross income, men 17 years + 2004 (quartiles)	Centralisation classification (1-7), 1994
Nes	18,022	637	Nes	2	4	3	7
Solør	20,646	2,583	Grue	2	1	2	4
			Åsnes	2	1	1	4
			Våler	1	2	1	4
Arendal	85,431	5,622	Arendal	3	3	3	6
			Fyresdal	1	3	1	1
			Risør	2	2	2	5
			Grimstad	2	4	4	7
			Nissedal	1	1	2	6
			Gjerstad	1	3	2	4
			Vegårshei	1	3	2	6
			Tvedestrand	2	2	3	6
			Froland	1	4	3	6
			Åmli	1	1	1	1
Kvam	8,306	616	Kvam	2	2	3	2
Austevoll	4,391	117	Austevoll	1	2	4	2
Tromsø	63,596	2,566	Tromsø	3	4	3	7
Alta	17,889	3,849	Alta	2	4	2	3
Norway	4,640,200	385,199					

Representativeness of the municipalities

The strategic selection process resulted in a group of municipalities with a fair representativeness for Norwegian municipalities as a whole. All population sizes are represented among the Watchtowers and the distribution is close to the national, although a large city is lacking.

For most of the demographic and socio-economical dimensions the categories are well distributed (all detailed data are not shown in text or table). The four categories for change in population between 2001 and 2006 are represented with 22–28% each. The same is found for proportions of persons 0–17 years of age. For inhabitant 67 years and older our sample of quartiles is somewhat skewed, but compared to the median national distribution, our sample has a mere 6% higher proportion of that age group. We have fewer municipalities in the highest quartile of average gross income among men. All centralisation categories are represented in our sample, but compared to Norway in general our sample has somewhat fewer municipalities with the lowest centralisation code. The number of women per 100 men in Norway is 102, while in our sample it is 99.7. Employment categories in primary, secondary and tertiary levels of trades and industries are well distributed among the participating municipalities and Watchtowers.

Pilot study: Data collection and missing data

A total of 23,346 contacts were registered during the last 3 months of 2006. The data were submitted to the Centre in accordance with established procedures. Data check revealed no missing data for the variables nationality, municipality name and municipality number. Time of contact, number of week, day and time were also complete. We found 1.5% missing registrations for mode of contact, 1.5% for first response initiated, 1.3% for gender, 2.0% for age, and 2.3% missing for priority degree. We discovered that approximately 850 cases were lost from one casualty clinic (15.2% of cases from that clinic) due to a technical mishap that could not be reversed. The number of missing cases is included when the contact rates and consultations per 1,000 inhabitants are presented. The total number of cases is therefore 24,196 in Figure 1.

Contacts to the Watchtowers in the pilot study period

There were large differences in total contact rates (89–210) and in clinical consultations (53–123) per 1,000 inhabitants (Figure 1). Daytime contact rates varied from 3 to 72 per 1,000 inhabitants (further data not shown). A total of 67.3% of all contacts were made by telephone and 23.7% by direct attendance to the clinics, while 9.0% of all contacts were made by health professionals and police. Table 2 shows age group and gender for the patients, priority degree, and actions taken for the

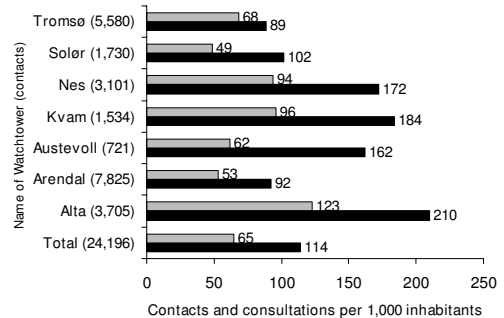


Figure 1
Contacts and consultations per 1,000 inhabitants for the out-of-hours districts the last three months of 2006.

total sample and the range between the seven Watchtowers. A large majority of the contacts were classified as lowest priority. The rate of home visits per 1,000 inhabitants was low (1 to 3) in all the casualty clinics except for one (16.5). Based on the numbers from the pilot study (disregarding any seasonal variation) it can be estimated that the out-of-hours casualty clinics in Norway have a mean of 0.45 contacts per inhabitant per year, which gives a national estimate for Norway of about 2.1 million contacts per year.

Discussion

Through the Watchtower project the National Centre for Emergency Primary Health Care has been able to establish and quality check a large and representative monitoring system for providing routine data based on a minimal data set for primary health care emergency services in Norway. This long-term enterprise will enable a monitoring, evaluation and comparison of the respective variables in the area of out-of-hours services, based on information from about 100,000 contacts a year.

Ideally, all out-of-hours districts and casualty clinics should be able to report contacts, and in addition some clinical data, by a common data sheet and by defined variables. This is not currently possible in Norway, nor will it be in the near future. Secondary, one could have established a large randomised sample of municipalities and hoped for their participation and cooperation in the project. We decided not to attempt such a strategy, as we anticipated low response rates, which would entail greater representativeness problems than the strategic selection process that was in fact chosen. The results indicate that our Watchtowers comprise a sample of municipalities and out-of-hours clinics with a satisfactory representativeness

Table 2: Distribution and range of age and gender of the patients, priority grade and action taken, for the seven Watchtowers (%).

Variable	Distribution	Range between the Watchtowers
Age group (years) (n = 22,873)		
0–17	30.9	20.9–33.2
18–66	54.1	46.4–61.3
67 and over	15.0	9.2–28.2
Gender (n = 23,032)		
Male	45.0	40.3–48.6
Female	55.0	51.4–59.7
Priority grade (n = 22,802)		
Acute	2.4	1.6–3.7
Urgent	17.7	10.8–30.8
Not urgent	79.9	65.5–87.6
Actions taken (n = 22, 994)		
Telephone advice by nurse	19.6	15.3–27.4
Telephone advice by doctor	10.3	4.1–20.7
Appointment with doctor	60.4	38.7–76.8
Consultation by nurse	1.8	1.0–5.1
Call out GP and ambulance	2.1	1.3–4.7
Home visit by doctor	1.9	0.1–16.5
Others	3.9	1.0–9.5

relative to the geographical, demographic, and socio-economical variables that were used. There is no knowledge of how contact rates may vary along with such variables nation-wide, so hopefully the size of population chosen together with the representativeness of the variables measured will secure data with adequate generalisation potential. An indirect proof of good match is the fact that on the basis on data from the Watchtowers we can estimate a total of 1.27 million consultations with a GP during out-of-hours services in Norway in 2006. Real data from the Norwegian Labour and Welfare Organisation show that 1.30 million reimbursement claims were submitted for such consultations, an almost identical figure.

We use a rather minimal data set. At an early planning stage of the project it was claimed that it would only be possible to obtain few data that could be registered simultaneously with the incident, e.g. the presentation by the patient through telephone or attendance. Therefore, there are no diagnoses or other clinical data that need to be collected from the patients' files. Reason for encounter might have been included, but this was declined for practical and methodological reasons. Also, if we wanted to include clinical data, we would have had to obtain more ethical data protection approvals. The outcome of such applications is uncertain. All data are recorded anonymously; it is thus impossible to analyse multiple contacts from the same person.

The experiences from the data collection procedures and checks for missing data are satisfactory. The discovery of lost cases shows that the pilot study was useful and that the security checks worked, and we could adjust the procedures. However, we lack validation data for two important variables. First, we have no system for finding or retrieving data due to under-reporting. During busy periods on duty or due to absent-mindedness, some contacts may be missed for registration. The project group will try to establish a validation procedure in order to obtain data on this possible problem. Second, the assessment of priority degree is carried out by a large number of nurses based on criteria that are not distinct. Differences in priority degree between the Watchtowers may therefore be due to both local real differences and differences in thresholds for grading. A study from the Netherlands showed that triage nurses may both underestimate and overestimate the level of emergency [12]. Validation projects and harmonisation efforts with regard to this topic should therefore be initiated within the Watchtower project.

To uphold motivation, avoid mistakes in definitions and avoid missing cases, the Watchtowers are subject to continuous contact with and surveillance from the Centre. Such efforts have been important, according to the literature [13].

Several models for obtaining routine data from primary health care services are reported from other countries. Examples are "Sentinel practice networks", networks of

practices or municipalities that monitor one or more specific illness problems on a regular or continuous basis, "surveillance projects" which is observation of the incidence in short term (early warning) or long term to observe trends over time and to make statistics on annual levels [2-4,8,9]. One methodological paper describes a minimal standard for primary care based surveillance networks and lists seven criteria recommendations for their structure and operation [2]. Good technical systems used to collect data may also be a challenge [13-15]. However, some countries use reimbursement data, Health Insurance Register, or patient registries/records to create national statistics [16-18]. We have found no scientific publications describing the method of obtaining continuous data from out-of-hours services in detail.

The data from the three month pilot period show that there are large differences in contact patterns and activities between out-of-hours districts in Norway. The data concerning day time contacts outside weekends obviously reflect different organisational models and access to ordinary general practice. It should therefore be considered that data only from periods outside ordinary working hours be used when Watchtower results are analysed.

Conclusion

There is a need for comparative data from the out-of-hours services in Norway. The Watchtower project is established to give data on a large scale basis about contacts to casualty clinics in Norway, and can thus be useful for national statistics, research, and also system improvements. The data are also important for reflection on and feedback from activities in the casualty clinics themselves. The pilot study shows that the procedures for collecting data and the quality of the data obtained are satisfactory. The municipalities chosen are sufficiently representative for Norway as a whole. Data from this project may give possibilities for making international comparisons.

Competing interests

The author(s) declare that they have no competing interests.

Authors' contributions

SH planned the project, EHH and SH established the project including the procedures for data collection. EHH and SH planned the analyses and EHH performed them. EHH drafted the manuscript which then was rewritten by EHH and SH. Both authors approved the final manuscript.

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Sentinel monitoring of activity of out-of-hours services in Norway in 2007: an observational study

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Abstract

Background: In Norway, no valid activity statistics from the primary health care out-of-hours services or the pre-hospital emergency health care system have previously been available.

Methods: The National Centre for Emergency Primary Health Care has initiated an enterprise called "The Watchtowers" which consists of a representative sample of seven casualty clinics covering 18 Norwegian municipalities. The purpose of the project is to provide routine information over several years, which will enable monitoring, evaluation and comparison of the activities in the out-of-hours services. This paper presents data from 2007, the first full calendar year for the Watchtowers, analyzes some differences in user patterns for the seven casualty clinics involved, and estimates national figures for the use of casualty clinics and out-of-hours services in Norway.

Results: A total of 85 288 contacts were recorded during 2007 [399 per 1 000 inhabitants] of which 64 846 contacts were considered non-urgent [76.6%]. There were 53 467 consultations by a doctor [250 per 1 000], 8 073 telephone consultations by doctor [38 per 1 000], 2 783 home visits and call-outs by doctor [13 per 1000] and 20 502 contacts managed by nurses on their own [96 per 1000]. The most common mode of contact was by telephone. Women, young children and elderly had the highest rates of contact.

Conclusion: Norway has a high rate of contacts to the out-of-hours services compared with some other countries with available data. Valid national figures and future research of these services are important both for local services and policy makers.

Background

Very few reliable national information systems and data exist regarding the demand for out-of-hours services, even though these services constitute a formal and important part of the health services as a whole, and the demand for these services is increasing [1-6]. In Norway, no valid

activity statistics from the primary health care out-of-hours services or the pre-hospital emergency health care system have been available [7]. In 2004 the National Centre for Emergency Primary Health Care was established in order to strengthen research and national monitoring in this field.

The Centre has initiated an enterprise called "The Watchtowers" which consists of a representative sample of seven casualty clinics covering 18 Norwegian municipalities [7]. The purpose of the project is to provide routine information over several years, based on a minimal dataset, which will enable monitoring, evaluation and comparison of the activities in the out-of-hours services.

Based on reimbursement claims from regular general practitioners [RGPs], the National Health Insurance has published activity data for the year 2006, showing for the first time national numbers from the out-of-hours emergency primary health care in Norway [8]. The study reported about 1.3 million consultations, 97 000 home visits and 419 000 other contacts by doctor, representing a rate of 392 contacts per 1 000 inhabitants per year, but the report did not contain data on degree of urgency, telephone advice by nurse, or actions taken.

This paper presents data from 2007, the first full calendar year for the Watchtowers, analyses differences in user patterns for the seven casualty clinics involved, and estimates national figures for the use of casualty clinics and out-of-hours services.

Methods

The 430 municipalities in Norway are by law responsible for organizing primary health care, including emergency medical services for all inhabitants 24 hours. Each municipality also has a duty to maintain one specific telephone number at a Local Emergency Medical Communication Centre [LEMC], usually located in the casualty clinic. An out-of-hours district can either exist of one or several municipalities, belonging to a LEMC and a casualty clinic. The emergency medical service is usually managed by the RGPs' practices during the office hours, while during evenings, nights and weekends, out-of-hours services are located in casualty clinics staffed with a RGP and in most places registered nurses. Some clinics also serve as a LEMC. A more detailed description of the Norwegian primary care out-of-hours services is given in a previous paper [7].

The Watchtowers are aimed at being as representative as possible for Norwegian out-of-hours districts and municipalities [7]. Shortly summarised, all municipalities were invited, and after responses to the invitation and checking pre-selection criteria 44 remained for final inclusion. These municipalities were then categorized through several statistical dimensions defined and managed by Statistics Norway [9]. Criteria that were evaluated included population size [absolute number and change] age and gender distribution, degree of centralization, employment, public economy and gross income among men. The selection process was performed in collaboration with

Norwegian Social Science Data Services [NSD]. The selection process resulted in a specific invitation to a sample consisting of seven casualty clinics with a total of 18 municipalities from different parts of Norway. All agreed to participate and were contracted for participation on a long term basis. This strategic selection process thus resulted in a group of municipalities with a fair representativeness for Norwegian municipalities as a whole. All population sizes are represented among the Watchtowers and the distribution is close to the national, although a large city is lacking. The selection process concerned the representativeness of the geography and populations. We have no reasons to believe, however, that such an approach should not also give a representative patient distribution. A detailed description of the selection process is given in a methodological paper [7]. In the Watchtowers, the attending nurses record all contacts, both contacts by telephone and contacts by attendance [7]. The Watchtowers served a total of 216 030 inhabitants per January 1, 2007, which constituted 4.6% of the Norwegian population and covered 4.1% of the total Norwegian land area [9].

The following variables were recorded for each contact [7]:

1. Year, week number, day of the week, time of day or night [daytime 08.00–15.29, afternoon 15.30–22.59, and night 23.00–07.59]
2. Gender, age and name of home municipality
3. Mode of contact: Telephone contact, direct attendance to the casualty clinic, contact by health professionals, contact by national emergency medical communication centres [EMCC] or others [for example police]
4. Priority degree. All Watchtowers use nurse triage systems. The degree of urgency is set according to the Norwegian Index for Medical Emergency Assistance [10]. Each call to, or contact with, a Watchtower is classified by priority degree with colour codes "Red", "Yellow" or "Green". Red colour is defined as an "acute" response, with the highest priority. Yellow colour is defined as an "urgent" response, with a high, but lower priority. Green colour is defined as a "non-urgent" response, with the lowest priority
5. Action taken: Telephone advice by a nurse, telephone advice by a doctor, medical examination by a doctor, consultation by a nurse, home visit by a doctor, acute response by ambulance and doctor, and others [e.g. sending ambulance without a doctor, referring to police or to a regular RGP on daytime]

In the analyses of the variable "action taken" the categories "telephone advice by a nurse", "consultation by a nurse" and "others" are merged into "handled by nurse". Diagnoses, symptoms or health problems are not recorded in the Watchtower project. The individual Watchtowers are presented as WT1-WT7 in the tables based on their names in alphabetical order.

For technical reasons some cases were lost during the first week of 2007 in WT2, and during week 10 and the first 5 days of week 11 in WT1. When presenting rates per 1 000 inhabitants the registered numbers are therefore multiplied by 1.011, a calculated number based on the number of average contacts per day for these two casualty clinics throughout the rest of the year. Correspondingly we have multiplied the rates per 1 000 inhabitants with 1,037 for WT1 and 1,017 for WT2 when presenting each WT. When we otherwise present and discuss distributions and figures, we use numbers based on the actually registered cases only [85 288].

SPSS version 15.0 was used to analyse data. Chi-squared tests were used and the statistical significance was defined as $p < 0.05$. The project was approved by the Privacy Ombudsman for Research.

Results

The Watchtowers registered a total of 85 288 contacts, and when taking the missing cases into account there was a total of 86 234 contacts during 2007. This gives a contact rate of 399 per 1 000 inhabitants, ranging from 300 to 633 among the casualty clinics. Women had 45 900 contacts [53.9%], and had the highest contact rate in all age groups except in the youngest [Table 1]. Mean age was 35.3 years [SD 26.2], 36.9 [SD 26.4] for women and 33.5 [SD 25.8] for men. Of the total number of contacts 76.7% were non-urgent and 53 467 [63%] ended in consultation by a doctor.

Age group 0–9 years had 18 006 contacts, which gives a contact rate of 660 per 1 000 inhabitants. The range among the casualty clinics was 459 to 1 068. Age group 40–59 years had the lowest contact rate in all but one clinic, the overall rate being 279 per 1 000 inhabitants. In age group 20–39 years the gender difference was 120 per 1 000. In the youngest age group boys had a higher contact rate than girls at night [difference 9 per 1 000], whereas girls in age group 10–19 years had a higher contact rate than boys at night [difference 12 per 1 000].

The distribution of all contacts through day, afternoon and night was 37.0%, 50.8% and 12.2%, respectively, but the distribution of contacts varied significantly between the casualty clinics. Only one clinic had its highest rate of contacts during daytime. The number of daytime contacts

Table 1: Contacts according to gender, age groups, time of day and Watchtowers.

Age group and time of day	Women	Men	All
0–9 years	641	678	660
Daytime	219	228	224
Afternoon	363	382	373
Night	59	68	63
10–19 years	377	295	335
Daytime	130	101	116
Afternoon	202	160	180
Night	45	33	38
20–39 years	465	348	405
Daytime	176	131	153
Afternoon	233	165	198
Night	57	53	55
40–59 years	303	255	279
Daytime	115	98	106
Afternoon	151	121	135
Night	37	34	36
60 + years	448	396	424
Daytime	179	151	166
Afternoon	214	188	202
Night	55	57	56
WT1	681	581	630
Daytime	374	316	333
Afternoon	243	204	223
Night	65	60	63
WT2	375	330	353
Daytime	149	129	139
Afternoon	179	156	167
Night	48	45	46
WT3	598	451	524
Daytime	195	146	170
Afternoon	354	266	310
Night	48	39	44
WT4	580	551	566
Daytime	229	199	214
Afternoon	327	325	326
Night	24	27	25
WT5	579	479	529
Daytime	157	124	140
Afternoon	352	289	320
Night	71	66	68
WT6	552	450	502
Daytime	186	129	158
Afternoon	302	254	279
Night	64	66	65
WT7	325	274	300
Daytime	100	86	93
Afternoon	184	147	165
Night	41	41	41
Total	430	367	399

Rates per 1 000 inhabitants for 2007.

ranged from 93 to 372 contacts per 1 000 inhabitants. Afternoon contacts ranged from 165 to 326 contacts per 1 000 inhabitants, and night contact rates varied from 25 to 68 per 1 000 inhabitants.

Saturday and Sunday had a higher number of contacts (20.4% and 19.0%) than weekdays [11.0% to 13.8%]. For weekdays the number of contacts decreased from Monday to Thursday and then increased on Friday. December had the most contacts of the year [10.6%], whereas August had the least [7.2%]. A total of 6.5% of the contacts were made by patients living outside the out-of-hours districts, ranging from 1.8% to 11.0% among the casualty clinics. Contacts made by patients from foreign countries made up 3.2%, ranging from 0.5% to 5.7% between the clinics.

Mode of contacts

Close to two thirds of the contacts were by telephone, either from the patient or the patient's family. There were significant differences in mode of contact between genders. Women more often contacted the casualty clinics by telephone than men, and health personnel contacted the casualty clinics to a higher degree on behalf of women. Table 2 presents the distribution of modes of contact, and the range among the casualty clinics, and also mode of contact according to age group in years.

The proportion of telephone contacts to the casualty clinics varied from 74.5% to 86.1%, except for one where 21.3% of contacts were by telephone and 73.5% direct attendance. Correspondingly, direct attendance ranged from 0.5% to 73.5%. Health professionals, EMCC or others [police etc.] initiated 8.9% of all contacts. Requests from EMCC and other health professionals increased with increasing age of the patients, except for age category 20–39 years. Age group 60+ had the largest share of contacts from health professionals.

Priority degree

76.6% of the cases were green cases [non-urgent], 21.1% yellow cases [urgent] and 2.3% red cases [acute]. Table 3 shows priority degree by age group, gender, time of day, day of week, mode of contact and action taken. All variables differed significantly among the casualty clinics, and the proportion of red cases increased with increasing age.

The largest share of red cases was significantly highest on weekdays, and in the afternoon. Yellow cases varied from 12.4% to 28.8% between the casualty clinics and green cases varied between 63.9% and 85.4%.

Regarding mode of contact the most prominent feature was the frequency of red contacts from EMCC, 34.1% compared to 1.4% by telephone from patients and their families. In absolute figures, however, red cases from the two sources are about the same [644 and 758]. Green cases from EMCC varied between the casualty clinics from 2.2% to 49.4%.

Call-out by doctor and ambulance increased with higher priority degree, whereas home visits, consultations by doctor and patients handled by nurse decreased by increasing degree of urgency.

Action taken

Consultation by doctor constituted 63% of all contacts [53 467] and doctors handled 73% of all contacts when telephone consultations by doctor are added. Table 4 presents actions taken for all cases by age group, priority degree and casualty clinic. There were significant differences in action taken between age groups and between men and women.

The relative number of contacts handled by nurses was higher for women than men, and women had a lower share of doctor consultations than men. The youngest age group 0–9 years had a larger share of consultations by doctor and was more often handled by nurse, while elderly had the largest share of home visits and telephone advice by doctor. For all age groups consultation by doctor was the most frequent action, and when patients attended the casualty clinic directly 91.2% of the contacts resulted in consultation by a doctor compared to 56.5% when patient or family called the clinic. When EMCC called the casualty clinic 49% resulted in a consultation by a doctor and 30.5% in call-out of ambulance and doctor.

Table 2: Distribution (%) of mode of contact with range between the casualty clinics and mode of contact according to age groups in years.

Mode of contact	Total	Range	Age group in years				
			0–9	10–19	20–39	40–59	60+
Telephone from patient or patient family	65.2	21.3–85.9	78.7	64.5	61.2	65.4	65.2
Direct attendance	25.9	0.5–73.5	20.0	30.8	34.6	27.3	16.3
Contacts from health professionals	6.0	1.3–12.8	0.6	1.8	1.6	3.7	22.1
EMCC*	2.2	1.1–3.5	0.6	1.8	1.7	2.7	4.4
Others	0.7	0.4–1.3	0.1	1.1	0.9	0.9	0.4
Total	100		100	100	100	100	100

N= 84 371 (missing 917).

* National Emergency Medical Communication Centre

Table 3: Distribution (%) of priority degree by age group, gender, time of day, day of week, mode of contact and action taken.

	Green (not urgent)	Yellow (urgent)	Red (acute)	p-value
Age group				<0.001
0-9	84.4	14.9	0.7	
10-19	77.3	21.2	1.5	
20-39	78.4	20.0	1.6	
40-59	75.5	21.8	2.7	
60+	66.6	28.5	5.0	
Gender				<0.001
Women	78.4	19.7	2.0	
Men	74.6	22.8	2.6	
Time of day				<0.001
Daytime	79.1	18.9	2.0	
Afternoon	76.8	21.2	2.0	
Night	68.3	27.4	4.3	
Day of week				<0.001
Weekdays	76.2	21.2	2.5	
Weekends	77.2	20.2	1.9	
Mode of contact				<0.001
Telephone by patient	82.0	16.6	1.4	
Direct attendance	70.4	28.3	1.3	
Health professionals	67.5	28.2	4.3	
EMCC	22.8	43.1	34.1	
Other	58.6	35.7	5.6	
Action taken				<0.001
Telephone consultation by doctor	85.2	14.4	0.4	
Consultation by doctor	71.9	26.9	1.3	
Handled by nurse	92.2	6.5	1.4	
Call out by doctor and ambulance	6.6	29.6	63.8	
Home visit by doctor	52.6	45.1	2.3	
Total	76.6	21.1	2.3	

N = 84 227 (missing | 061).

When contact was made from health professionals 26.7% resulted in consultation by doctor, 33.5% resulted in telephone advice by doctor, 22.5% were handled by nurses by phone, 12.9% resulted in home visit, and 4.4% in a call-out of doctor and ambulance. Overall, weekends had the largest share of home visits [46.6%]. There were significant differences between the Watchtowers regarding rate of home visit, ranging from 0.5 to 78 per 1 000 inhabitants. Casualty clinics in rural districts had the highest share of home visits, correspondingly urban areas and cities had the lowest.

Patient being handled by nurse was most common among the youngest patients and decreased with increasing age. This action was more common among women than among men, and most frequent in the evening. Patients handled by nurse as a sole response ranged from 13.9% to 37.9% among the casualty clinics.

Estimation of 2007 national activity level

In Table 5 we have estimated total numbers for Norway in 2007 based on all contacts registered in the Watchtower project 2007. The Norwegian population has a mean of

0.399 contacts to casualty clinics per person per year, which gives an approximate total number of 1.9 million contacts per year.

Discussion

For the first time we have representative numbers from out-of-hours services from a whole year in Norway, showing that the mean population contact rate in Norway for 2007 was 399 per 1 000 inhabitants. The most common mode of contact was by telephone, and a large proportion of the contacts were non-urgent.

Validity of our data

The Watchtowers are selected to represent Norway in miniature, and we therefore assume that the differences between the casualty clinics express real variations between Norwegian municipalities [7]. We also think that the sum and numbers are fairly valid. Welfare Organisation supports this, as 1.3 million reimbursement claims were submitted for out-of-hours consultations in 2006, almost identical to our estimation of 1.2 million consultations for Norway in 2007. The total contact rate in our study was 399 per 1000 inhabitants, as opposed to the

Table 4: Distribution of action taken (%) by age group, priority degree and casualty clinics.

		Telephone consultation by doctor	Medical consultation by doctor	Handled by nurse	Call out of doctor and ambulance	Home visit by doctor
Age group	0-9	6.3	62.1	31.1	0.3	0.3
	10-19	5.7	69.4	23.6	1.0	0.4
	20-39	7.1	69.5	22.2	0.9	0.3
	40-59	9.5	65.0	23.0	1.6	0.9
	60+	14.4	50.8	20.3	4.6	4.8
Priority degree	Green	10.6	59.2	28.9	0.1	1.1
	Yellow	6.5	80.4	7.4	2.4	3.4
	Red	1.7	34.7	14.4	47.6	1.6
Casualty clinics	WT1	3.3	57.4	37.9	1.4	0.1
	WT2	14.1	62.1	20.4	2.0	1.4
	WT3	28.1	35.1	16.9	5.2	14.7
	WT4	10.1	53.6	33.3	1.7	1.4
	WT5	9.7	57.0	30.4	0.7	2.2
	WT6	7.9	53.9	33.0	2.1	3.0
	WT7	4.1	80.3	13.9	1.4	0.2
Total		9.5	63.0	24.2	1.7	1.6

N = 84 294 (missing 994).

392 per 1 000 inhabitant reimbursement claims for 2006. The small and less than 2% discrepancy may be due to the fact that the Watchtowers registered all contacts, including contacts that nurses handled on their own, which do not always give right to reimbursement claims.

Lost cases in two casualty clinics were most likely caused by simple technical problems with computers. Loss of data has not been a problem in 2008. To validate contacts recorded in the Watchtowers we also tried to compare the number of doctor consultations registered in each Watchtower with the number of doctor consultations from the electronic records in the casualty clinic. Such a comparison was not possible, however, due to technical circumstances. In addition, some information was recorded in patient recording systems outside the casualty clinics.

In conclusion, we think that through the Watchtower project we have been able to establish and quality-check a large and representative monitoring system for providing routine data based on a minimal data set for primary health care emergency services in Norway. We have no reason to believe that the patient loads and distributions are very different from the country as a whole.

Contacts rates

Studies from the Netherlands, England, Scotland, New Zealand and Poland all showed a lower contact rate than we found in our study [1,3,11-13]. The lowest single rate in the Watchtower was four times higher than the lowest rate in Ireland, where the range was 70-370 [2]. However,

several aspects of the national health care systems and different definitions of out-of-hours services may account for these differences. In the Watchtower we have recorded all requests 24 hours a day, also on weekdays. Disregarding the contacts on daytime, weekdays, Norway still had the highest contact rate. Another reason for the high contact rate could be that patients in Norway are not allowed to attend an emergency room without consulting a casualty clinic first, while in other countries there is no selection or assessment before patients attend the emergency room. In addition, some RGP's offices have a poor accessibility and the patients have to contact a casualty clinic in the afternoon. In addition, the doctor on call also take part in many emergency situations, while in other countries the ambulance service deal with the most acute situations, without involving a doctor.

The study from New Zealand [11] recorded contacts between 17.00 and 08.30 on weekdays and all times during weekends, and the study was performed in a rural area, while our study include both rural and urban areas and office hours, weekdays.

The high contact rate among the youngest children could partly be due to the fact that children under 12 years have free medical care in Norway. But studies from England and Ireland also report that the youngest and the oldest patients were the most frequent users of the out-of-hours services in a health care system with same co-payments across ages [14-17]. The difference between reimbursement claims from Norway and the Watchtowers for the

Table 5: National figures estimated from the Watchtowers' contacts in Norway 2007.

Variables	Distribution (%)	Absolute numbers	Rates per 1000
Age group			
0–9 years	21.2	395 000	660
10–19 years	11.7	202 000	335
20–39 years	27.2	506 000	405
40–59 years	19.4	360 000	279
60+	20.5	381 000	424
Gender			
Women	53.9	1 096 000	425
Men	46.1	802 000	367
Day of week			
Weekdays	60.6	1 134 000	242
Weekends	39.4	737 000	157
Time of day			
Daytime	37.0	692 000	148
Afternoon	50.8	951 000	203
Night	12.2	228 000	49
Mode of contact			
Telephone	65.2	1 220 000	258
Direct attendance	25.9	485 000	104
Health personnel	6.0	112 000	24
Through EMCC	2.2	41 000	9
Others	0.7	13 000	3
Priority degree			
Green (not urgent)	76.6	1 433 000	304
Yellow (urgent)	21.1	395 000	84
Red (acute)	2.3	43 000	9
Action taken			
Handled by nurse	24.2	453 000	96
Telephone consultation by doctor	9.5	177 000	38
Consultation by doctor	63.0	1 179 000	250
Call out of doctor and ambulance	1.7	32 000	7
Home visit by doctor	1.6	30 000	6
Total contacts*		1 871 000	399

age group 0–9 years [500 versus 660 per 1 000 inhabitants] is most probably due to the number of contacts handled by nurses alone.

Mode of contact and action taken

When a patient attended the casualty clinic directly, the contact resulted in a doctor consultation in more than 90% of the instances. The clinic that had the largest share of direct attendances also had the largest share of consultations by doctors. This is understandable, since when a patient has already entered the clinic there is an expectancy of seeing a doctor. There seems to be a large potential for reducing workload in some of the clinics by changing the habits of patients to make contact by telephone instead of by direct attendance.

The rate of consultation by doctor at the casualty clinics was almost twice the rate in Ireland and Poland, 144 and 170 per 1 000 inhabitants, respectively [2,13]. Similar to

findings in other studies, the figures for home visits differed a lot, and it seems that the smallest out-of-hours districts in rural areas made more home visits than the large out-of-hours districts in urban areas. It thus seems that in Norway the small casualty clinics have retained the old house-doctor model and are doing a lot of home visits, while large out-of-hours districts use transportation of patients by ambulance to the clinics. This means poorer services for the inhabitants, in particular vulnerable groups, such as elderly people, patients with chronic diseases living at home, and patients in nursing homes. All out-of-hours clinics should have adequate capacity for home visits.

Studies from several countries have shown that 30% to 55% of the contacts were handled by nurses alone [3,11,15,17–20]. This is higher than the mean result from the Watchtowers. However, the Watchtowers showed large variations, from 14% to 38%. This could be due to

little delegation of responsibilities to nurses, and also a high percentage of direct attendance of patients to the clinics.

Priority degree

More than 75% of the contacts were classified as green or non-urgent. A similar study from England classified 40% of the contacts as unnecessary or could have waited to the next morning, 55% as necessary, and 5% as urgent [15]. We believe that such a high percentage of non-urgent contacts to out-of-hours services in Norway is due both to low accessibility to the RGP's during daytime and to the convenience of contacting the casualty clinics in the afternoon.

It is a bit surprising that only one third of the red [acute] contacts came from the EMCC, while almost half of them were telephone contacts directly from patients or their caregivers to the casualty clinic. It is not clear why many people contact their local services in such emergencies instead of the national emergency number [EMCC], but possible reasons include old and local traditions, uncertainty about the urgency grade or where to call, and a wish for a local person to discuss the matter with.

Conclusion

For the first time in Norway we present representative data from out-of-hours services for a whole year. The demand for these services is increasing in other countries, and Norway had a high share of non-urgent cases. Valid national figures and future research are important both for local services and policymakers.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

EHH and SH established the project including the procedures for data collection. EHH performed the analyses and drafted the manuscript which then was rewritten by EHH, EZ and SH. All authors approved the final manuscript.

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**Errata for
Monitoring activities in out-of-hours emergency
primary care in Norway**

A special emphasis on nurses telephone triage and counselling

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Thesis for the degree philosophiae doctor (PhD)
at the University of Bergen

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Errata

Paper III

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Telephone triage by nurses in primary care out-of-hours services in Norway: an evaluation study based on written case scenarios

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► An additional appendix is published online only. To view this file please visit the journal online (<http://qualitysafety.bmj.com>).

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ABSTRACT

Background: The use of nurses for telephone-based triage in out-of-hours services is increasing in several countries. No investigations have been carried out in Norway into the quality of decisions made by nurses regarding our priority degree system. There are three levels: acute, urgent and non-urgent.

Methods: Nurses working in seven casualty clinics in out-of-hours districts in Norway (The Watchtowers) were all invited to participate in a study to assess priority grade on 20 written medical scenarios validated by an expert group. 83 nurses (response rate 76%) participated in the study. A one-out-of-five sample of the nurses assessed the same written cases after 3 months ($n=18$, response rate 90%) as a test–retest assessment.

Results: Among the acute, urgent and non-urgent scenarios, 82%, 74% and 81% were correctly classified according to national guidelines. There were significant differences in the proportion of correct classifications among the casualty clinics, but neither employment percentage nor profession or work experience affected the triage decision. The mean intraobserver variability measured by the Cohen kappa was 0.61 (CI 0.52 to 0.70), and there were significant differences in kappa with employment percentage. Casualty clinics and work experience did not affect intrarater agreement.

Conclusion: Correct classification of acute and non-urgent cases among nurses was quite high. Work experience and employment percentage did not affect triage decision. The intrarater agreement was good and about the same as in previous studies performed in other countries. Kappa increased significantly with increasing employment percentage.

BACKGROUND

Nurses' triage and telephone advice have an important place in out-of-hours services in many countries. Nurses receive calls from patients, their family or others, assess the priority grade, and decide on different

actions by giving self-care advice or referring to the appropriate level of care. Several of these aspects have been reported in the literature.^{1–25} Previous studies from other countries show that nurses can both underestimate and overestimate the grade of urgency.^{3 10 16–18 22 23 25} Telephone triage is considered by many to be the most complex and vulnerable part of the out-of-hours services.^{4 6–10}

In Norway, the municipalities are responsible for the emergency primary healthcare services, and these services include casualty clinics, primary care doctor on call and local emergency medical communication centres (LEMC). LEMCs are usually staffed with registered nurses, but in some casualty clinics the triagist may also be an enrolled nurse or a medical secretary. A registered nurse has at least a bachelor degree. An enrolled nurse or a medical secretary has 3 years in upper secondary school.

LEMCs are usually located in the casualty clinics, in the same location where the doctors are situated when they are on-call. The nurses working in casualty clinics assess the patient's condition when patients are calling and when the patient attends the clinic. In addition, the nurses are trained to assist the doctor at the casualty clinic. The nurses doing the triage on the telephone will often later meet the patients with whom they had been talking on the telephone.

The emergency medical communication centre (EMCC) is a part of the hospital level and is staffed with registered nurses. The EMCC handles the 113 calls (similar to a 999 call) and administers the prehospital emergency transportations. EMCC also alarm the LEMC and the doctor on-call when needed.



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So far, no one in Norway has investigated nurses' telephone triage or the degree to which their assessments are in compliance with national guidelines.

Written case scenarios have been used in several studies to evaluate agreement with national guidelines, and they are regarded as suitable tools in the assessment of clinical competence.^{8–11}

This project evaluates decisions on degree of priority made by nurses in out-of-hours services in Norway using written case scenarios. Answers were compared with consensus-based national guidelines. The intraobserver variation for the same written cases was also evaluated in a subgroup of nurses.

METHODS

The study was performed during 2008 among nurses working in seven different casualty clinics taking part in a sentinel network.

The National Centre for Emergency Primary Health Care has initiated an enterprise called 'The Watchtowers,' which is a representative sample of Norwegian municipalities and out-of-hours districts.¹² In the Watchtowers, the attending nurses record all contacts during day and night. Among other variables, they also register the degree of priority for each contact, both from telephone calls and from patients with direct attendance. All casualty clinics in the Watchtowers were invited to the study, and all agreed to participate. Altogether 116 nurses potentially could participate, but some may not have received the envelope with the study material. Eighty-eight nurses returned the material, but five were excluded from the analysis because of missing information on employment percentage, profession or number of years working in casualty clinic. Both permanent and temporary employees participated in the study. Information about initial training and instructions at the start of working in the casualty clinic were obtained from a national register.¹³

Index

The Norwegian Index for Medical Emergency Assistance is a decision tool to ensure an appropriate response to a medical emergency call.¹⁴ The Index is available in all casualty clinics in Norway, but it is not mandatory to use it. The Index is originally intended to standardise the medical evaluation performed by nurses in EMCC. Nurses in LEMC usually know these guidelines, but they do not use them consistently for every case. This information became known by the head nurse at each WT before the study, and also told by the nurses in meetings with the researcher. Degree of priority has three designations: red colour is defined as an 'acute' response, with the highest priority; yellow colour is defined as an 'urgent' response,

with a high, but lower, priority; green colour is defined as a 'non-urgent' response, with the lowest priority.¹⁴

Written case scenarios

Twenty written case scenarios were prepared by The National Centre for Emergency Primary Health Care (see online appendix). The distribution of degree of priority was four acute cases, eight urgent cases and eight non-urgent cases. All cases were framed in the same way regarding the patient's gender, age, time of day, mode of contact, problem/symptoms and degree of priority.

An expert group of one emergency doctor, one GP specialist and two registered nurses, one working in LEMC and one working in EMCC, evaluated the cases and compared them with the Index. The expert group classified each case with a priority grade: acute, urgent or non-urgent. There was no disagreement in the expert group about the correct response to each case, but some minor uncertainties had to be settled before the written cases were finally ready to be used.

The cases were printed in a booklet where each nurse also had to fill in profession, number of years working in the casualty clinic and employment percentage. To ensure confidentiality, each nurse entered their own code in each booklet before returning it to the Centre. Each booklet was marked in advance with a code to identify the casualty clinic.

Implementation

The leader at each casualty clinic informed the nurses about the study during staff meetings and gave each nurse an envelope containing the booklet with the written case scenarios, information about the study and a return envelope. All nurses were supposed to read and assess the cases and mark each case with the appropriate degree of priority in terms of a red, yellow or green response. The nurses were not allowed to sit together or to use the Index when assessing the cases. The answers were returned to the Centre individually.

Test–retest procedure

A sample of 20 nurses (about every fifth from the list of nurses) were to receive the same booklet after 3 months. The sequence of the cases was changed to avoid recall from the previous phase. The material was again distributed by the leader of the clinic. To identify the selected nurses, each envelope had the individual's code written outside. As an extra check of identification, the person had to fill in work-related information again (profession, employment percentage and number of years in clinic).

Statistics

SPSS version 15.0 was used to analyse data. χ^2 tests were used, and the level of statistical significance was defined

as $p < 0.05$. Intraobserver variability was analysed in the sample of 18 nurses using the Cohen kappa, and agreement based on the value of κ was categorised as described by Altman.¹⁵ The precision of κ was reported as either mean and 95% CI or median and range, and differences in κ between groups were analysed by the Kruskal–Wallis test. Over- and underestimation are weighted equally by the standard software used, as it turned out that all discrepancies were of a magnitude of 1.

RESULTS

Of the 116 potential participants, 88 returned the booklets, and the data from 83 could be analysed. The response rate thus was at least 76%. Of the 83 participants, 90% were registered nurses with or without further education, and 10% were enrolled nurses, paramedics and bioengineers. The mean duration of employment in the casualty clinic was 6.3 (median 4) years, and the mean employment percentage was 49% (median 56%). The nurses had a mean of 40 h of initial training and instruction by the start of working in the casualty clinic and LEMC, ranging from 30 to 64 h.

Assessment of case scenarios according to index

The mean of total correct responses among the nurses was 78% (SD 11.5), ranging from 45% to 95%. In total,

12% of all assessments were undertriaged, and 18% were overtriaged according to Index. Among the acute cases, 82% were correctly classified, 74% of the urgent cases were correctly classified, and 17% and 9% of the latter were overtriaged and undertriaged respectively according to Index. Of the non-urgent cases, 81% were correctly classified. One of the four acute scenarios was a patient with chest pain (case 7), and only one out of 83 nurses had undertriaged the priority grade. Table 1 shows the assessment of priority grade according to Index.

In table 2, the nurses are grouped according to the percentage of correct answers (<71%, 71–80%, >80%) and their performance is shown according to Watchtower, profession, work experience in casualty clinic and employment percentage. There were no statistically significant differences among the Watchtowers or profession. Overall, there were no significant differences between experienced or less experienced nurses in assessing the written cases, but when analysing the individual written cases, we found significant differences in three of the 20 cases (case 1, case 16 and case 17). There were no systematic differences between the experienced or the less experienced group.

Only 5% of the nurses had a full-time job, and there were no significant differences between employment percentages with respect to correct classification (table 2).

Table 1 Classification of priority grade according to index

	Acute		Urgent		Non-urgent		Total %
	n	%	n	%	n	%	
Acute							
Case 1 (n=83)	53	64	29	35	1	1	100
Case 7 (n=83)	82	99	1	1	0	0	100
Case 16 (n=82)	66	81	16	20	0	0	100
Case 18 (n=82)	67	82	15	18	0	0	100
Urgent							
Case 3 (n=82)	19	23	53	65	10	12	100
Case 4 (n=83)	8	9	56	68	19	23	100
Case 5 (n=82)	28	34	53	65	1	1	100
Case 9 (n=83)	10	12	66	80	7	8	100
Case 12 (n=83)	6	7	65	78	12	14	100
Case 14 (n=82)	26	32	54	66	2	2	100
Case 19 (n=81)	11	14	65	80	5	6	100
Case 20 (n=81)	6	7	70	86	5	6	100
Non-urgent							
Case 2 (n=83)	1	1	3	4	79	95	100
Case 6 (n=82)	0	0	1	1	81	99	100
Case 8 (n=83)	0	0	32	39	51	61	100
Case 10 (n=83)	0	0	4	5	79	95	100
Case 11 (n=83)	0	0	1	1	82	99	100
Case 13 (n=82)	2	2	37	45	43	52	100
Case 15 (n=82)	0	0	21	26	61	74	100
Case 17 (n=82)	4	5	22	27	56	68	100

Results are shown as numbers and percentages. Bold numbers indicate the percentage of correct classifications.

Table 2 Correct classifications performed by nurses according to Index in percentage groups by Watchtower, work experience in casualty clinic, profession and employment

Percentage correctly classified	No of responders			p Value
	<71% (n=29)	71–80% (n=24)	>80% (n=30)	
Watchtower				0.10
WT 1	9	2	6	
WT 2	7	5	3	
WT 3	0	2	7	
WT 4	2	6	4	
WT 5	1	1	2	
WT 6	2	4	3	
WT 7	8	4	5	
Work experience				0.30
<5 years	12	15	16	
≥5 years	17	9	14	
Profession				0.26
Registered nurses	28	20	26	
Other health professionals	1	4	4	
Employment percentage in WT				0.60
<21	6	10	6	
21–55	7	5	7	
56–75	9	4	8	
76–100	7	5	9	

Table 3 shows the percentage of correct classifications of priority grade by Watchtowers, profession, work experience and employment percentage. There was a significant difference in the proportion of correct classifications in the Watchtowers ($p=0.01$), but none of the other variables showed any significant differences ($0.10 < p < 0.70$). When testing the distribution of correct

classifications according to priority grade, none of the independent variables in table 3 were significant ($0.89 < p < 0.99$). Differences in assessment between the casualty clinics were small, but in one single case of a pregnant woman with headache (case 4), nurses in one clinic had 100% correct assessment, while another clinic had only 47%. In the same case, there was a 20%

Table 3 Correct classifications by priority grade according to Index by Watchtower, work experience and employment percentage (results shown as percentages)

	Total	Priority grade		
		Acute	Urgent	Non-urgent
Watchtower				
WT 1	75	90	67	74
WT 2	76	73	70	82
WT 3	86	86	85	88
WT 4	80	75	81	81
WT 5	81	88	73	87
WT 6	74	77	70	77
WT 7	82	78	83	82
Work experience in casualty clinic				
<5 years	79	82	73	83
≥5 years	77	81	72	78
Profession				
Registered nurses	77	81	73	80
Other health professionals	83	86	79	85
Employment percentage				
<21	76	81	69	81
21–55	80	78	76	84
56–75	78	84	74	79
76–100	78	82	75	79
Total	78	82	74	81

overtriage of priority grade in one clinic, while another clinic had an undertriage of 41% of the same case.

Intraobserver variability

Of the subgroup of 20 nurses, 18 completed the retest of the case scenarios (response rate 90%). All were registered nurses, except one who was an enrolled nurse. The mean duration of work experience among the 18 nurses was 6.7 (median 5) years, while the mean employment percentage was 56% (median 60%).

The mean κ value for all responders was 0.61, or good (CI 0.52 to 0.70), and the range was 0.32–0.92.¹⁵ The weighted κ value was 0.68 (good). There were no significant differences in κ values between the casualty clinics or work-experience groups, but there was a significant increase in κ value with increased employment percentage (table 4).

Owing to the small numbers, an agreement analysis within priority grades was not possible.

DISCUSSION

Strengths and limitations of the study

The use of written case scenarios cannot fully substitute for actual triage practice, but we tried to include all of the essential information needed to decide upon the priority grade—acute, urgent or non-urgent. The strength of this method consists in the fact that the nurses assess the cases on the same basis and that the situation is consistent and unchangeable. When using simulated patients or real patients, the conditions can vary because the situation is altered during the call.

Written case scenarios have been used in studies in other countries for both nurses and paediatricians working with triage.^{8 16–21} An important limitation of using this methodology is that it is not assessed whether the nurses ask the patients the proper questions needed

to clarify the urgency because the important information is already available. Another limitation is that the interaction skills with the patient are not challenged. When using for example simulated patients, in practice one could observe both their communication skills and their ability to ask the questions needed.³ However, one cannot avoid differences in the presentations of the different complaints by standardised simulated patients. We think both methods (paper cases and simulation patients) have their strengths and limitations. However, in this study, we focused on the decision on priority grade given the information needed.

Correct classification of priority grade

Overall, the percentage of correct classifications in our study (78%) was higher than in most other studies. One study from The Netherlands showed correct assessments in about half of the calls,¹ while similar studies in Sweden and other countries^{3 16–19} showed correct classifications from 57% to 64%. Studies from The Netherlands and USA reported about the same level of correct classification but reported a higher proportion of undertriage than we found in our study.^{3 21 22}

It must be remarked that the number of priority grades used in triage varies from one country to another. Having a higher number of priority grades may lead to a lower percentage of correct classification. The fact that the nurses participating in the study both assess telephone calls and meet the patients face to face at the casualty clinic may have advantages regarding feedback of their assessment.

The underestimation of priority grades was quite low in our study. However, every error made in practice could have consequences for the patient's safety. It is therefore important that nurses obtain feedback on their priority grading to improve the accuracy.

It is commonly assumed that the Index recommends too high a priority grade in some situations (eg, sending

Table 4 Cohen kappa values, median and range by Watchtowers, duration of work experience and employment percentage

	N	Agreement	Median	Range	p Value
Watchtowers*					0.92
WT 2	5	Moderate	0.58	0.32–0.92	
WT 3	3	Moderate	0.67	0.34–0.77	
WT 4	3	Good	0.77	0.42–0.92	
WT 5	2	Good	0.62	0.47–0.77	
WT 6	5	Moderate	0.58	0.44–0.77	
Work experience					0.93
≤5 years	7	Good	0.59	0.44–0.92	
>5 years	11	Good	0.63	0.32–0.92	
Employment percentage					0.03
<34	4	Moderate	0.47	0.32–0.77	
34–70	8	Moderate	0.58	0.44–0.92	
>70	6	Good	0.77	0.67–0.92	

*Watchtowers 1 and 7 were not represented in the sample.

an ambulance when not needed). Therefore, nurses in Norway often contact the doctor on-call instead of sending an ambulance if the situation is obviously not life-threatening, thus avoiding an unnecessarily dramatic situation for the patient, and still ensuring a good and safe level of care. This may cause an undertriage according to the Index in some cases.

We found no evidence indicating that extent of work experience or nurses employment percentage affected triage decisions, which is in accordance with other studies.^{16 18–21 23–27}

Intraobserver variability

There was a strong within-nurse agreement in our study. We found few studies on telephone triage that presented intrarater agreement analysed by κ . The intraobserver variability in our study was higher than that found in one study,²¹ and lower than in another study.²⁸ We had expected to find a higher level of intrarater agreement among the most experienced nurses as we found for employment percentage, but perhaps the amount of training, in this context, is more important than long work experience.

It must be remarked that both temporary and permanent employees were participating in our study. The temporary employees are working sporadically, and we showed that in the retest situation, a high employment percentage was associated with a more consistent classification of the degrees of priority. This may indicate that the temporary employees have influenced the results in a negative way.

Based on the findings from this study, it may be suggested that the LEMCs may benefit on reducing temporary employees and engage nurses in full-time jobs. Nurses in the Watchtowers both assess patients by telephone and actually meet them face to face when they attend the casualty clinic. This way of organising the casualty clinic may contribute to an important evaluation of the nurses' assessments which is of most importance regarding feedback and learning. This aspect has been given little attention in former studies. Such an attempt may strengthen the quality on decision-making and contribute to a safer service for the patients in the out-of-hour services in other countries as well as in Norway.

Telephone triage is a complex human interaction between patient and provider, and further studies are needed to assess both the quality and consistency of this activity. Advanced methodology, preferably by using real situations or experimental designs based on actors or trained patients, should be developed and validated.

Conclusions

The amount of correct classification in the three priority grades was about equal and quite high. Work experience

and employment percentage did not affect triage decisions. The intrarater agreement was good and also about the same as that found in previous studies performed in other countries. From this sample of Norwegian casualty clinics, it may be suggested that the quality of decision-making is high and that nurse triage competence is safe for patients.

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Understanding of and adherence to advice after telephone counselling by nurse: A survey among callers to a primary emergency out-of-hours service in Norway

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Key words: triage, self-care advice, counselling by nurse, out-of-hours services

Background: To investigate how callers understand the information given by telephone by registered nurses in a casualty clinic, to what degree the advice was followed, and the final outcome of the condition for the patients.

Methods: The study was conducted at a large out-of-hours inter-municipality casualty clinic in Norway during April and May 2010.

Telephone interviews were performed with 100 callers/patients who had received information and advice by a nurse as a sole response. Six topics from the interview guide were compared with the telephone record files to check whether the caller had understood the advice. In addition, questions were asked about how the caller followed the advice provided and the patient's outcome.

Results: 99 out of 100 interviewed callers stated that they had understood the nurse's advice, but interpreted from the telephone records, the total agreement for all six topics was 82.6%. 93 callers/patients stated that they followed the advice and 11 re-contacted the casualty clinic. 22 contacted their GP for the same complaints the same week, of whom five patients received medical treatment and one was hospitalised. There were significant difference between the native-Norwegian and the non-native Norwegian regarding whether they trusted the nurse ($p=0.017$), and if they got relevant answers to their questions ($p=0.005$).

Conclusion: Callers to the out-of-hours service seem to understand the advice given by the registered nurses, and a large majority of the patients did not contact their GP or other health services again with the same complaints.

Practice Implication: Medical and communicative training must be an important part of the continuous improvement strategy within the out-of-hour services.

1. Introduction

Telephone consultation and triage by nurses constitute an important and central part of the out-of-hours services in several countries [1–7]. The consultation may be completed with medical advice given by the nurse as the sole response, or may result in a referral to another level of care if appropriate. Several studies have investigated the quality and safeness of this kind of service, and also the outcome after the nurse's advice and triage. Some previous studies indicate that advice given by nurses only delay consultation by a general practitioner [GP], while other studies claim to show that nurse advice reduce the GP's workload [8–14]. Several papers state that patients generally have a good understanding of the advice given, but very few compare the patient's answers with a telephone record file [13, 15-20].

In Norway three quarters of all contacts to casualty clinics are assessed as non-urgent [21], which means that a lot of the contacts could be handled through self-care or a visit to a GP the following day. About one fourth of the contacts to the out-of-hours services in Norway are managed by nurses giving medical advice [21], but no one has investigated the content of this service. All medical advice by nurses in Norwegian casualty clinics is recorded in electronic medical files, and in many casualty clinics all telephone conversations are also tape recorded and stored.

In this study we have investigated how callers understand the medical information and advice given to them by nurses in a casualty clinic. We

have compared the information extracted from the telephone record file with information obtained by telephone interviews with the callers some days later. In addition, we have investigated to what degree the patients followed the advice given, and the consequences of the advice.

2. Methods

2.1 Sample

The study was conducted at a large out-of-hours inter-municipality casualty clinic in Norway during April and May 2010. One hundred callers/patients were interviewed about their telephone consultation with a nurse on average nine days afterwards. The casualty clinic serves four municipalities with more than 100 000 inhabitants, and the patients can call directly to the clinic. The casualty clinic is staffed with doctors and nurses all day throughout the week.

During 2009 about 59 000 contacts were received at the casualty clinic by telephone and direct attendance, and 27% of the contacts were handled by registered nurses [RN] as a sole response (personal communication). A total of 28 RNs were employed at the casualty clinic and their tasks were to receive calls from patients, their families, or others, to assess the priority grade and decide on different possible actions by giving self-care advice or referring to another appropriate level of care. The latter could be a medical consultation by a doctor, a home visit or sending an ambulance. All telephone calls to the casualty clinic were recorded. The nurses who operated the telephones also met the patients face to face if the latter attended the clinic to see a medical doctor.

Information about the study was given to the nurses at two staff meetings, first with the head nurse and medical director and then by the researcher and head nurse. The RNs who worked in the casualty clinic agreed to participate in the study, and all nurses consented to using their telephone record logs. They were not informed about how the callers were to be recruited to the study.

2.2 Recruitment

The decision to include until 100 callers had conducted an interview was based on a trade-off between resources and an acceptable sample size. The former includes the total capacity of the staff at the actual clinic and the time available for the researcher and the research assistant; the latter comprised a subjective appraisal of the gain in precision (width of a confidence interval) obtained by increasing the sample size in the range from 50 to 200.

In order to obtain a representative sample and avoid bias, we used a recruitment strategy where two callers, the first and the last, who had received medical advice by nurse as a sole response during daytime [08.00–15.30], afternoon [15.30–22.30] and night shift [22.30–08.00], were chosen. The consultations concerned the callers themselves or someone in the callers' families, for example a child.

The head nurse served as a research assistant, and her tasks were to identify and contact the callers, inform about the study and invite them to participate. During the contact she made an appointment for a telephone interview with the researcher. If a patient did not want to participate in the study the next/former caller [depending on whether it was the first/last at the shift] was invited. After the information was given by phone, a letter of information including a consent form was sent to each caller/patient together with a return envelope. A list with ID, name, telephone number and time and day of appointment for each person recruited was sent to the researcher who carried out the interview.

2.3 Information from the telephone records

The research assistant listened to the telephone records and collected data on the reasons for contacting the casualty clinic. Age and gender of the caller and patient were registered, and the following six questions regarding the consultation, were answered as “Yes”, “Partly”, “No” or “Not relevant”. Further details were written down and compared to the information gathered in the interview:

[1] Did the caller get enough time to explain his or her complaints? This was an assessment made by the research assistant.

[2] Did the caller get understandable medical advice from the nurse? Specific advice was written down.

[3] Did the caller get understandable information about what to look for? If the caller was told to look for something this was written down.

[4] Did the caller get the option to call back, if necessary? If the caller received such information the time schedule was written down.

[5] Did the caller get information on why a patient could wait and see in that particular situation? If relevant, the reason for why they could wait and see was written down.

[6] Did the caller get information on if or when to contact their GP during daytime? If relevant, the time schedule was written down.

Due to Norwegian regulations, the researcher was not allowed to have access to the telephone records. Before the first telephone interview the research assistant and the researcher together listened to four anonymous telephone record files and filled out the questionnaire in order to reduce variability in the interpretation of the counselling.

2.4 Interviews with callers/patients

An interview form was developed, where the six questions from the telephone record form were included and classified in the same way as was done in the telephone records. (“Yes”, “Partly”, “No” or “Not relevant”). Additional details were written down and compared to the information gathered in the telephone records. Further, the callers were asked if they generally understood the information and medical advice communicated by the nurse, if the caller/patient followed the advice given and the outcome of the condition. In addition they were asked if they trusted the nurse, if they got worse or better after the contact, if they contacted their GP or re-contacted the casualty clinic. They were also asked if they had rather wanted to see a doctor. If they contacted the GP or casualty clinic, they were asked

if they got any treatment and what kind of treatment. Patients referred to hospital, were asked about the medical treatment received. The answers were registered in the same categories as the six questions which were compared to the telephone record file. The researcher was blinded for all the information from the telephone record forms when the interviews were carried out.

2.5 Data analysis

SPSS version 15.0 and STATA version 11.0 was used to analyse data. The analyses in this study comprise two parts. Firstly, the six variables concerning the counselling are evaluated for agreement, reported both as actual agreement and as Cohen's kappa.

Three main outcome variables; whether the given advice was followed and if a GP-contact or a re-contact to the casualty clinic took place, were analysed for associations with some potential predictive variables. Exact methods, Fischer's test and logistic regression, were all used due to several occurrences of small and zero-cells in cross tabulations.

The study was approved by the Privacy Ombudsman for Research.

3. Results

A total of 134 callers were contacted by the research assistant at the recruitment stage. Fifteen persons [11%] could not participate in the study for various reasons; eight persons [6%] did not want to participate; four callers [3%] were on travel abroad; one had exams; one caller was in

hospital, and one caller had a bad telephone line. 19 callers had not answered the telephone from the researcher after three attempts. These 19 callers were not significantly different from the participating callers/patients regarding age, gender, number of days between advice and interview, time of day or duration of calls.

One hundred callers/patients were interviewed about their telephone consultation with an RN at the casualty clinic. Callers mean age was 37 years [range 19-83 years] and mean age of patients was 18 years [range 0-72 years]. Most callers were women [55 %], and mean number of days between call and interview was 9 days [range 2-14 days]. 24% were interviewed within 7 days and 93% within 11 days. The distribution of the calls during the day was 37% in daytime, 42% in the afternoon and 21% at night. There were no significant differences between responders and non-responders regarding these variables.

Mean length of the 100 calls was 4 min and 1 s [range 1–12 min].

Telephone calls regarding psychiatric problems had the longest durations. There were no significant differences among responders and non-responders regarding caller's age or gender, regarding the patient's age or gender, time of day, duration of calls and/or days between the counselling and interview. Among the 100 calls the most frequent reasons for contact were fever (23%), vomiting/ diarrhoea (10%), abdominal pain (9%), question about drugs (9%), skin problems (9%), ear ache (6%) and others (34%). 88% of the 67 callers who contacted the casualty clinic on behalf of someone other than themselves called on behalf of their children under 16 years of age.

Table 1 shows the answers to the six questions from the 100 callers written down from the telephone record, and the answers to the same questions from the interviews. The categories of answers to the six questions were: “yes”, “no”, “partly” or “not-relevant”. The observed agreement and kappa values are also presented in Table 1. Before the analyses of agreement and kappa, the category “not-relevant” was re-classified to “no” when both research assistant and caller had registered “not-relevant” or when one of them had answered “not-relevant” and the other had answered “no”. Similarly the category “not-relevant” was re-classified to “yes” when one answered “yes” and the other answered “not-relevant”.

In the interview a question regarding of the overall understanding during the conversation with the nurse was posed, and all except one caller said that they understood the information and medical advice given. When comparing the answers with the telephone record the observed agreement was 82.6%.

Table 2 presents the outcomes of the telephone consultations as reported in the interviews for the variables “Followed the advice”, “Contacted GP” and “Re-contacted casualty clinic”. The analyses included the following independent variables: Gender, native Norwegian/others, time of day for consultation, whether the condition got worse after the contact with the nurse, and information concerning how the caller/patient experienced the telephone consultations with respect to whether they had enough time,

received relevant answers to questions and whether they trusted the nurse. All men and 91% of the women stated that they followed the advice ($p=0.34$ for gender difference). The variables time of day of the call, whether the caller got answer to the questions and trusted the nurse were significant predictors for following the advice.

Due to zero-cells a full multivariable analysis was impossible, but some pragmatic partial models could be explored. None of the other independent variables influenced the association with time of day of the call. This was also the case for the highly significant relations between following advice and getting answers to questions and trusting the nurse, but the two could not be analysed in the same model, again due to zero-cells. As is shown in table 2 everyone who got answers to their questions and also those who trusted the nurse followed the advice. Of the 100 callers, 22 contacted a GP afterwards, and this was significantly associated with the patient getting worse after the consultation. Re-contact to the casualty clinic was also associated with experiencing deterioration of the clinical symptoms.

The age of the callers, whether the callers were told what to look for, and why it was not necessary to see a doctor at that time, did not have statistically significant relations to any of the three dependent variables in table 2.

Callers who did speak fluent Norwegian and had Norwegian names were compared to callers who did not speak fluent Norwegian and had foreign

names. There were significant differences between the two groups regarding whether they trusted the nurse ($p=0.017$). Furthermore there were differences between the two group regarding comprehension of the medical advice and whether they followed them, but these differences did not reach significance.

Only 23 % of the callers contacted health personnel for the same problem after the advice given by the nurse. Actually 13 [36%] of the 36 callers who stated that they were told when or whether to contact their GP next day did so, and of the 62 who stated that they were not told to do so, 9 [14.5%] in fact did [$p=0.03$]. Five of the 100 callers/patients stated that they would prefer to talk to a doctor instead of the nurse on the phone. All five callers who would prefer talking to a doctor reported following the advice given by the nurse. The length of the telephone consultation or the type of complaint did not affect whether they followed the nurse's advice.

Among the eight callers who answered that they did not trust the nurse, one would rather prefer talking to a doctor. As for the 18 callers who answered that they partly trusted the nurse three would prefer a doctor. Among the callers who told that they would prefer a doctor two persons contacted their GP and none contacted the casualty clinic.

In the interview 79% stated that they got relevant answers to their questions, 15% did partly get relevant answers, while 6 % did not get relevant answers. There were significant differences among the native-Norwegian and the

non-native group, where 25% answered that they did not get relevant answers to their question in the non-native group, while in the native-Norwegian group the corresponding figure was only 2% ($p=0.005$). Figure 1 shows a follow-up chart for some more details for all callers/patient's history.

4. Discussion and conclusion

4.1 Discussion

This is the first study in Norway investigating caller's adherence to and outcomes of telephone counselling by nurses in out-of-hours primary care emergency services. Most of the callers/patients stated that they understood and followed the advice, and the observed agreement found between telephone records and interviews were satisfactory even with a disagreement of 18%. Most callers did not re-contact health personnel regarding the same complaints during the following week.

Several studies have investigated whether patients followed the advice given by a nurse. However, we found few studies that reported the use of actual telephone records to compare advice given by nurses against advice reported by caller in interviews. The use of telephone contacts in our study was in accordance with studies from US, Australia, New Zealand and Sweden [6, 8, 16, 22-24]. Parents calling on behalf of young children and the fact that women contacted the casualty clinic more often than men were also typical in other studies [15, 16, 22, 24].

Almost everybody stated that they understood the RN's medical advice on how to deal with the conditions, but there were some discrepancies when comparing the reported advice in the interviews against the record files. This corresponds to the studies from Dale et al., and Leclerc et al. [17, 19]. One way to ensure that the information is understood is to ask the caller to repeat the advices given by the nurse at the end of the telephone call, but this intervention has received little attention in studies in which nurse advice has been discussed.

A rather high proportion followed the nurse's advices in our study compared to former studies from US, UK and Canada [16, 17, 20, 22, 24, 25], and a much lower proportion of patients re-contacted the GP. In our study we have interviewed patients/callers several days later. Thus we have a much longer follow-up period than most of the other studies we found on this topic. One study from the Netherlands [9] stated that almost half of the patients in the study who contacted the GP cooperative attended their own GP during office hours within a week. These patients had been seeing a doctor but there were still a very high proportion of contacts to the patient's own GP.

The fact that the non-Norwegian group trusted the nurse to a lesser extent than the native-Norwegian group, and did not get relevant answers to the same degree, is an important result. If the caller's language skills are limited it is of utmost importance that nurses articulate themselves clearly, avoid unnecessary or difficult words, and ask the caller to repeat the advice.

Nurses should perhaps spend more time ensuring that the callers have understood the information. It must be remarked that the non-Norwegian group was not hard to understand during the interviews, and there were only minor difficulties when asking the questions.

A definite strength of our study is that we in fact compared the answers from the callers/patients by listening to telephone record files. We were also able to follow the patients until several days after the telephone contacts to check the patient outcome. Possible compliance, and callers eager to please the researcher during the interviews could constitute a weakness. We therefore stated in every interview that the researcher had no work connection to or affiliation with the casualty clinic, and that every caller/patient was ensured anonymity. It must be mentioned that the nurses might have changed their usual behaviour on the telephone, such as being more kind or pleasant at the start of the study. On the other hand the nurses did not know which telephone records we selected, and their medical skills could not have been improved during the short time of the study. Memory bias regarding the issues raised in the interviews could be a possible limitation, but when comparing the answers from callers/patients with the record file we found identical wording in most of the cases. Only two persons stated that they were unsure whether they were told if or when to contact their GP.

Even when callers answered that they did not feel quite confident regarding the advice, they followed them. This raises the question of whether nurses wield authority in a potentially dangerous way that might influence the

callers. Nurses need to be aware of the caller's vulnerability and try to build a relationship of trust quite early in the conversation [26]. Nurses who provide telephone advice and counselling must also be aware that they have a duty to and responsibility for the caller/patient. It is also of utmost importance that the nurses possess the relevant and adequate information to provide correct advice. Good medical knowledge and communication skills are necessary to meet the callers' needs, and callers'/patients' levels of knowledge vary [27, 28, 29]. These days many patients have been reading about the medical condition on the Internet before they contact the casualty clinic. This challenges the nurse's knowledge and skills, and nurses in casualty clinics should have a profound medical knowledge and a good experience base. Continuous training to improve both medical knowledge and communication skills should be carried out in all casualty clinics and telephone call centres. In addition, casualty clinics should have a policy communicated to the inhabitants to ensure that they have the relevant expectation to the service.

4.2 Conclusion

Nurse telephone consultations and counselling constitute an independent service in which callers have high expectations. A high share of the callers understood the advice and followed them. Two thirds of the callers who received advice from nurses had no contact with their GP, casualty clinic or other health personnel the following week. Non-Norwegian callers challenge the nurse's communicative skills both through language and cultural backgrounds.

4.3 Practice implication

Nurses who give self-care advice must ensure that callers are able to handle this responsibility. One way to ensure that the self-care advice is understood could be to ask the callers to repeat the information given. Medical and communicative training must be a continuous part of the improvement strategy within the out-of-hours services, with a special focus on language and culture.

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Authors' contributions

EHH established the project including the data collection. EHH performed the analysis and drafted the manuscript which was re-written by SH and EHH. Both authors approved the final manuscript.

Competing interests

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Figure1. Follow-up for all 100 callers/ patients who received advice from a nurse

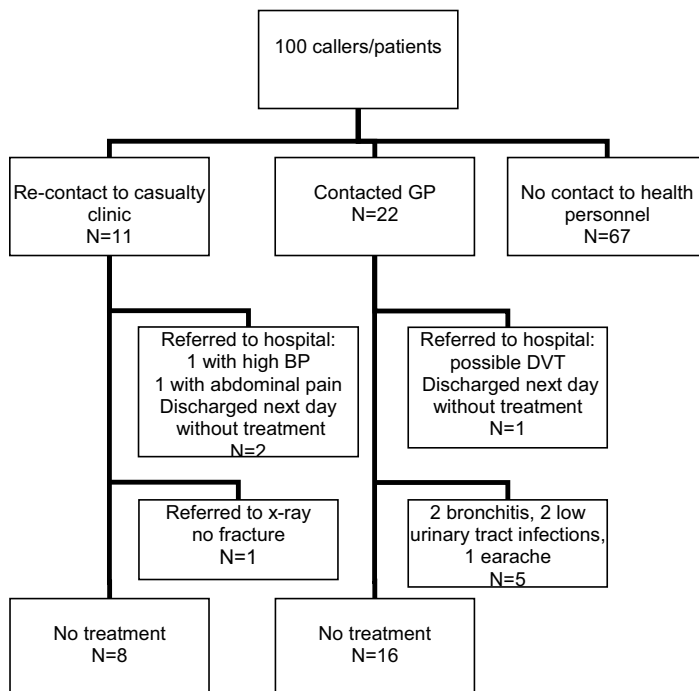


Table 1. The six variables concerning the counselling as interpreted from the telephone record and reported by the callers are evaluated for agreement, reported both as actual agreement and as Cohen's kappa

	Telephone record				Caller/Patient			Observed agreement*	Cohen's kappa*
	Yes	Partly	No	Not relevant	Yes	Partly	No		
Did caller get enough time to explain her/his complaints?	100	0	0	0	94	3	3	94	NA
Did caller get understandable medical advice from the nurse?	74	6	6	14	78	9	5	82	0.39
Did caller get understandable information about what to look for?	60	7	14	19	68	4	19	73	0.38
Did caller get the option to call back, if necessary?	63	2	25	10	79	2	9	77	0.42
Did caller get information on why a patient could wait and see in that particular situation?	65	10	6	19	74	4	12	76	0.32
Did caller get information on if or when to contact their GP during daytime?	33	1	48	18	31	1	43	82	0.63

*When Observed agreement and Cohen's kappa were analysed, "not relevant" was recorded to either "no" or "yes". The category "not-relevant" was re-classified to "no" when both research assistant and caller had registered "not-relevant" or when one of them had answered "not-relevant" and the other had answered "no". Similarly the category "not-relevant" was re-classified to "yes" when one answered "yes" and the other answered "not-relevant".

Table 2 Outcome after nurse's telephone advice, by gender and origin of caller and some characteristics regarding the consultation

	All N=100		Followed the advices		p-value	Contacted GP		p-value	Re-contact Casualty clinic		p-value
	Yes N=93	No N=7	Yes N=22	No N=78		Yes N=11	No N=89				
Origin of caller					0.08			>0.99			>0.99
Native Norwegian	84	4	19	65					10	74	
Others	16	3	3	13					1	15	
Gender of caller					0.34			>0.99			0.07
Men	22	0	5	17					5	17	
Women	78	7	17	61				0.47	6	72	
Time of day					0.009						>0.99
Daytime	37	3	9	28					4	33	
Afternoon	42	0	7	35					5	37	
Night	21	4	6	15				0.39	2	19	
Got enough time					0.06						>0.99
Yes	94	5	20	74					11	83	
No	3	1	1	2					0	3	
Partly	3	1	1	2				0.039	0	3	
Got worse					0.53						0.012
Yes	10	1	5	5					4	6	
No	90	6	17	73				0.024	7	83	
Got answers to the questions					<0.0001						>0.99
Yes	79	0	13	66					10	69	
No	6	3	2	4					0	6	
Partly	15	4	7	8				0.32	1	14	
Trusted the nurse					<0.0001						0.64
Yes	74	0	14	60					10	64	
No	8	2	3	5					0	8	
Partly	18	5	5	13					1	17	

The electronic registration program used by the Watchtowers

Vakttårn

Excel Intern Statistikk Help

Dato 04.08.2011 År: 2011 Ukenummer: 31 Ukedag: torsdag	Vakt <input type="radio"/> Dag (08:00 - 15:29) <input checked="" type="radio"/> Aften (15:30 - 22:59) <input type="radio"/> Natt (23:00 - 07:59)	Instillinger Navn på legevakt <input type="text"/> Plassering av datamaskin <input type="text"/>
Hvem <input type="radio"/> Telefon fra pasient/pårørende/omsorgsperson <input type="radio"/> Direkte oppmøte av pasient <input type="radio"/> Helsepersonell <input checked="" type="radio"/> AMK telefon eller alarm <input type="radio"/> Andre (f.eks politi, krisenter e.l.)	Kommune eller land <input type="text"/> <input type="checkbox"/> Ukjent <input type="checkbox"/> Instille knapper Skien Alta Sjiljan Nome Paraguay Kviteseid	
Kjønn <input type="radio"/> Kvinne <input type="radio"/> Mann Alder <input type="text"/>	Hastegrad <input type="radio"/> Grønn <input type="radio"/> Gul <input type="radio"/> Rød	Tiltak <input type="radio"/> Telefonkonsultasjon sykepleier <input type="radio"/> Telefonkonsultasjon lege <input type="radio"/> Konsultasjon lege <input type="radio"/> Konsultasjon andre enn lege <input type="radio"/> Utrykning lege og ambulanse <input type="radio"/> Sykebesøk ved lege <input type="radio"/> Annet
Lagre Lagre og lukk Etterregistrer Lagre og ny Lege telefon -> lege konsultasjon avslutt	Ekstra informasjon Ekstra 1 Lagre <input type="checkbox"/> Flått Ekstra 2 Lagre <input type="checkbox"/> Sykehjem Ekstra 3 Lagre <input type="checkbox"/> H1N1 influensa	

Cases for emergency nurses to determine the degree of urgency (priority grade)

CASE 1

Time: 16:15. A mother phones for her one-year-old son and says that he has had a cough for a few days and has been dyspnoeic. She wonders if she should come to casualty. After getting further information about the child, you find out that the boy has stopped coughing and is very quiet now. He does not have a temperature. He has neither eaten nor drunk today and is clearly exhausted and pale. He is lying quietly in bed now. You also learn that there is increased movement of the stomach and neck muscles when he breathes.

What is the degree of urgency?

RED

YELLOW

GREEN

CASE 2

Time: 21:00. A 50-year-old woman phones casualty and says that she suddenly noticed that the white of her left eye was bloodshot. On questioning her, you ascertain that she has no pain, but that it feels disgusting and looks awful. The woman can see normally with both eyes. There were no precipitating events or injuries. She does not suffer from any known illnesses, and she does not take any regular medication.

What is the degree of urgency?

RED

YELLOW

GREEN

CASE 3

Time: 23:00. A father phones to say that his four-year-old daughter has swallowed a Norwegian krone coin. Her throat is sore and she is coughing a lot. You also find out after you ask that this happened 15 minutes ago. His daughter is breathing normally, the colour of her face is normal, but she is obviously anxious and afraid.

What is the degree of urgency?

RED

YELLOW

GREEN

CASE 4

Time: 03:00. A 27-year-old woman phones casualty. She says that she is 32 weeks pregnant and that she has a headache. She wonders if she can take paracetamol. Based on the questions you ask her, you find out that she has some pain in her eyes/forehead, but that she does not have a cold. She has had some visual disturbance for a few hours. She is not nauseated. She had a small amount of proteinuria at her antenatal check last week, but BP was normal. She has felt a bit out-of-sorts and not in particularly good form in the last twenty-four hours.

What is the degree of urgency?

RED

YELLOW

GREEN

CASE 5

Time: 02:00. A 65-year-old woman phones casualty and says that she has pain in her back and in her stomach (around the middle) and would like to have it checked by a doctor. From the information that you get from her, you find out that she has a temperature of 39.0. She has had the pain all day since breakfast time and up to and including the time of contacting casualty. She has not vomited, but is slightly nauseated. The pain is constant and is more intense at times and has been there all day. She has also had urinary frequency, but no actual dysuria. She has taken painkillers (Paracetamol 2 tabs twice) with no effect.

What is the degree of urgency?

RED

YELLOW

GREEN

CASE 6

Time: 18:00. A mother phones casualty for her 6-year-old daughter. The mother says that her daughter has had diarrhoea and vomiting for two days and wonders if the doctor should check her. By questioning the mother, you ascertain that her daughter has had at approximately five episodes of diarrhoea per day. She vomited once yesterday and once today. She is not eating, but is keen to drink. Now, this evening, she has a temperature of 38.5. In between she is listless and only wants to lie down. She is healthy otherwise and is not on regular medication. Some of her classmates have had stomach upsets recently. Right now she is sitting and watching children's television.

What is the degree of urgency?

RED

YELLOW

GREEN

CASE 7

Time: 23:00. A woman rings for her husband who is 60 and says that he has chest pain and needs medical assistance. She says that he has lain down, as he feels dizzy and rather nauseated. You ask and ascertain that he has had pain for 15 minutes, and that he has some pain in this left arm/shoulder, but no pain radiating to this throat. The man has no history of heart disease and not on any medication. You also find out that the man feels a little short of breath. The wife says that her husband is a bit pale and that there is sweat on his forehead.

What is the degree of urgency?

RED

YELLOW

GREEN

CASE 8

Time: 19:00. A 20-year-old man phones casualty and says that he has had an accident and cut the back of his hand with a bread knife 20 minutes ago. On questioning him, you ascertain that the cut is approximately 1.5 cm long and extends approximately 3-4 mm. It is bleeding a little now.

What is the degree of urgency?

RED

YELLOW

GREEN

CASE 9

Time: 03:00. A woman rings for her husband who is 37. He has had a sore on his arm for a few days. During the course of the evening it has become much worse, and she wonders what she should do about it. You ask relevant questions and find out that he feels hot and thinks he has a temperature. The

swelling and redness have become twice as bad in the last hour. The sore is not weeping. The circumference of the area is approximately 15 cm now, it hurts a bit but it is not severe pain. There is some eczema in the area from before.

What is the degree of urgency?

RED

YELLOW

GREEN

CASE 10

Time: 02:00. A 45-year-old woman ring casualty and says that she has dysuria and urinary frequency that has gotten worse throughout the evening. After asking her some questions you ascertain that the symptoms started two days ago, and she does not have a temperature or back/loin pain. She has no vaginal discharge or urogynaecological symptoms either. She has not had this before and does not recognise these symptoms.

What is the degree of urgency?

RED

YELLOW

GREEN

CASE 11

A mother phones at 20:00 for her 8-year-old daughter and says that she came out in a rash on her upper body, arms and a little on her legs. She had a temperature of 38.0 on the same day. The rash is like mosquito bites, and it appeared two days ago. It seems that there is clear fluid in a few of them. The rash is rather itchy. The mother says that her daughter had been in school that day and, in spite of the temperature, is in good form.

What is the degree of urgency?

RED

YELLOW

GREEN

CASE 12

Time: 21:00. A 45-year-old man phones casualty and says that his arm and parts of his stomach were burned with boiling water. He is in a lot of pain. He wonders what he should do. You ask relevant questions and find out that this happened 10 minutes ago. The burn is approximately 20 x 20 cm on the forearm and the same on the stomach. Blisters have appeared on his arm, and it is also red and swollen. The burnt area of his stomach is just red, there are no blisters, and he is complaining of pain.

What is the degree of urgency?

RED

YELLOW

GREEN

CASE 13

Time: 20:00. A 50-year-old man phones casualty and says that he has back pain. He does not speak good Norwegian and from the information that you manage to glean, you understand that the pain is localised in the lumbar area and radiates down over the back of the thigh on the left side. He does not understand your question about dysuria. He has had pain for an hour and is groaning on the phone. He wants you to send an ambulance immediately.

What is the degree of urgency?

RED

YELLOW

GREEN

CASE 14

Time: 23:00. The father of a three-year-old boy phones and says that his son has become increasingly short of breath throughout the evening. The boy has had a cough for a few days (a slight gurgling sound) and has had a blocked nose. He would like the doctor to examine him. You ask relevant questions and find out that he has a temperature of 39.0 this evening. The father has given his son cough syrup that he bought at the pharmacy, but that has not helped the cough. The child's condition has become worse whereby he is now coughing more and he has become more dyspnoeic. The father says that he is alert and does not seem particularly exhausted.

What is the degree of urgency?

RED

YELLOW

GREEN

CASE 15

Time: 16:30. A 25-year-old woman phones and says that she has been stung by a wasp on her arm. She says that she is rather unwell and wonders if it is dangerous. You ask relevant questions and find out that two hours have passed since she was stung. She is not dyspnoeic, but her arm has swelled up considerably. She has no rash or itching. She has not previously reacted to wasp stings.

What is the degree of urgency?

RED

YELLOW

GREEN

CASE 16

Time: 19:00. A man phones for his wife who is 65. He says that she has vomited blood and is poorly. After asking her some questions you ascertain that the blood is fresh and red and that the amount that his wife has vomited is equal to approximately two glasses of milk. She has had rheumatoid arthritis for years and takes, among other things, anti-inflammatories and cortisone. She has been taking medication for several years. His wife is lying in bed, is exhausted, nauseated and unwell but is alert.

What is the degree of urgency?

RED

YELLOW

GREEN

CASE 17

Time: 18:00. A woman phones and says that she has gotten an electric shock from a damaged wall switch (220V). By asking her some questions you ascertain that it was 30 minutes ago that she received the electric shock, and that she feels fine and has no symptoms of any kind. No palpitations, no pain, not unwell. She says that it was unpleasant and that it hurt, and she was a bit shaky afterwards.

What is the degree of urgency?

RED

YELLOW

GREEN

CASE 18

Time: 22:00. A man phones for his wife who is aged 35 and says that she is diabetic and is having ongoing cramps that have lasted a couple of minutes. You find out on asking that she has had diabetes for several years and uses Insulin. He also says that her blood sugar levels have been unstable for some time. The husband says that she has eaten very little today, but has nevertheless take her normal dose of Insulin.

What is the degree of urgency?

RED

YELLOW

GREEN

CASE 19

Time: 17:00. A boy goes to visit a friend who is 25 years old. The boy says that his friend has cut himself on several places on his arm, but that the sores are not deep. He is able to say that his friend has been depressed and “not himself” for the last few weeks. He has told those close to him that he would like help because he is depressed and “tried of life”.

What is the degree of urgency?

RED

YELLOW

GREEN

CASE 20

Time: 17:00. A 25-year-old man phones and says that he fell on ice, stopped himself with his hand and wonders if his wrist is broken. By asking him some questions you ascertain that this happened an hour ago and that he has intense pain in his wrist. There is some swelling of the upper aspect of the wrist, and the wrist seems slightly lopsided. He cannot move the wrist or some of the fingers on that hand.

What is the degree of urgency?

RED

YELLOW

GREEN

The final and published version of paper IV

ORIGINAL RESEARCH

Open Access

Understanding of and adherence to advice after telephone counselling by nurse: a survey among callers to a primary emergency out-of-hours service in Norway

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Abstract

Background: To investigate how callers understand the information given by telephone by registered nurses in a casualty clinic, to what degree the advice was followed, and the final outcome of the condition for the patients.

Methods: The study was conducted at a large out-of-hours inter-municipality casualty clinic in Norway during April and May 2010. Telephone interviews were performed with 100 callers/patients who had received information and advice by a nurse as a sole response. Six topics from the interview guide were compared with the telephone record files to check whether the caller had understood the advice. In addition, questions were asked about how the caller followed the advice provided and the patient's outcome.

Results: 99 out of 100 interviewed callers stated that they had understood the nurse's advice, but interpreted from the telephone records, the total agreement for all six topics was 82.6%. 93 callers/patients stated that they followed the advice and 11 re-contacted the casualty clinic. 22 contacted their GP for the same complaints the same week, of whom five patients received medical treatment and one was hospitalised. There were significant difference between the native-Norwegian and the non-native Norwegian regarding whether they trusted the nurse ($p = 0.017$), and if they got relevant answers to their questions ($p = 0.005$).

Conclusion: Callers to the out-of-hours service seem to understand the advice given by the registered nurses, and a large majority of the patients did not contact their GP or other health services again with the same complaints.

Practice Implication: Medical and communicative training must be an important part of the continuous improvement strategy within the out-of-hour services.

Keywords: triage, self-care advice, counselling by nurse, out-of-hours services

1. Introduction

Telephone consultation and triage by nurses constitute an important and central part of the out-of-hours services in several countries [1-7]. The consultation may be completed with medical advice given by the nurse as the sole response, or may result in a referral to another level of care if appropriate. Several studies have investigated the quality and safeness of this kind of service, and also the outcome after the nurse's advice and triage. Some

previous studies indicate that advice given by nurses only delay consultation by a general practitioner [GP], while other studies claim to show that nurse advice reduce the GP's workload [8-14]. Several papers state that patients generally have a good understanding of the advice given, but very few compare the patient's answers with a telephone record file [13,15-20].

In Norway three quarters of all contacts to casualty clinics are assessed as non-urgent [21], which means that a lot of the contacts could be handled through self-care or a visit to a GP the following day. About one fourth of the contacts to the out-of-hours services in Norway are managed by nurses giving medical advice

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[21], but no one has investigated the content of this service. All medical advice by nurses in Norwegian casualty clinics is recorded in electronic medical files, and in many casualty clinics all telephone conversations are also tape recorded and stored.

In this study we have investigated how callers understand the medical information and advice given to them by nurses in a casualty clinic. We have compared the information extracted from the telephone record file with information obtained by telephone interviews with the callers some days later. In addition, we have investigated to what degree the patients followed the advice given, and the consequences of the advice.

2. Methods

2.1 Sample

The study was conducted at a large out-of-hours inter-municipality casualty clinic in Norway during April and May 2010. One hundred callers/patients were interviewed about their telephone consultation with a nurse on average nine days afterwards. The casualty clinic serves four municipalities with more than 100 000 inhabitants, and the patients can call directly to the clinic. The casualty clinic is staffed with doctors and nurses all day throughout the week.

During 2009 about 59 000 contacts were received at the casualty clinic by telephone and direct attendance, and 27% of the contacts were handled by registered nurses [RN] as a sole response (personal communication). A total of 28 RNs were employed at the casualty clinic and their tasks were to receive calls from patients, their families, or others, to assess the priority grade and decide on different possible actions by giving self-care advice or referring to another appropriate level of care. The latter could be a medical consultation by a doctor, a home visit or sending an ambulance. All telephone calls to the casualty clinic were recorded. The nurses who operated the telephones also met the patients face to face if the latter attended the clinic to see a medical doctor.

Information about the study was given to the nurses at two staff meetings, first with the head nurse and medical director and then by the researcher and head nurse. The RNs who worked in the casualty clinic agreed to participate in the study, and all nurses consented to using their telephone record logs. They were not informed about how the callers were to be recruited to the study.

2.2 Recruitment

The decision to include until 100 callers had conducted an interview was based on a trade-off between resources and an acceptable sample size. The former includes the total capacity of the staff at the actual clinic and the time available for the researcher and the research assistant; the latter comprised a subjective appraisal of the gain in

precision (width of a confidence interval) obtained by increasing the sample size in the range from 50 to 200.

In order to obtain a representative sample and avoid bias, we used a recruitment strategy where two callers, the first and the last, who had received medical advice by nurse as a sole response during daytime [08.00-15.30], afternoon [15.30-22.30] and night shift [22.30-08.00], were chosen. The consultations concerned the callers themselves or someone in the callers' families, for example a child.

The head nurse served as a research assistant, and her tasks were to identify and contact the callers, inform about the study and invite them to participate. During the contact she made an appointment for a telephone interview with the researcher. If a patient did not want to participate in the study the next/former caller [depending on whether it was the first/last at the shift] was invited. After the information was given by phone, a letter of information including a consent form was sent to each caller/patient together with a return envelope. A list with ID, name, telephone number and time and day of appointment for each person recruited was sent to the researcher who carried out the interview.

2.3 Information from the telephone records

The research assistant listened to the telephone records and collected data on the reasons for contacting the casualty clinic. Age and gender of the caller and patient were registered, and the following six questions regarding the consultation, were answered as "Yes", "Partly", "No" or "Not relevant". Further details were written down and compared to the information gathered in the interview:

[1] Did the caller get enough time to explain his or her complaints? This was an assessment made by the research assistant.

[2] Did the caller get understandable medical advice from the nurse? Specific advice was written down.

[3] Did the caller get understandable information about what to look for? If the caller was told to look for something this was written down.

[4] Did the caller get the option to call back, if necessary? If the caller received such information the time schedule was written down.

[5] Did the caller get information on why a patient could wait and see in that particular situation? If relevant, the reason for why they could wait and see was written down.

[6] Did the caller get information on if or when to contact their GP during daytime? If relevant, the time schedule was written down.

Due to Norwegian regulations, the researcher was not allowed to have access to the telephone records. Before the first telephone interview the research assistant and the researcher together listened to four anonymous telephone

record files and filled out the questionnaire in order to reduce variability in the interpretation of the counselling.

2.4 Interviews with callers/patients

An interview form was developed, where the six questions from the telephone record form were included and classified in the same way as was done in the telephone records. ("Yes", "Partly", "No" or "Not relevant"). Additional details were written down and compared to the information gathered in the telephone records). Further, the callers were asked if they generally understood the information and medical advice communicated by the nurse, if the caller/patient followed the advice given and the outcome of the condition. In addition they were asked if they trusted the nurse, if they got worse or better after the contact, if they contacted their GP or re-contacted the casualty clinic. They were also asked if they had rather wanted to see a doctor. If they contacted the GP or casualty clinic, they were asked if they got any treatment and what kind of treatment. Patients referred to hospital, were asked about the medical treatment received. The answers were registered in the same categories as the six questions which were compared to the telephone record file. The researcher was blinded for all the information from the telephone record forms when the interviews were carried out.

2.5 Data analysis

SPSS version 15.0 and STATA version 11.0 was used to analyse data. The analyses in this study comprise two parts. Firstly, the six variables concerning the counselling are evaluated for agreement, reported both as actual agreement and as Cohen's kappa.

Three main outcome variables; whether the given advice was followed and if a GP-contact or a re-contact to the casualty clinic took place, were analysed for associations with some potential predictive variables. Exact methods, Fischer's test and logistic regression, were all used due to several occurrences of small and zero-cells in cross tabulations.

The study was approved by the Privacy Ombudsman for Research.

3. Results

A total of 134 callers were contacted by the research assistant at the recruitment stage. Fifteen persons [11%] could not participate in the study for various reasons; eight persons [6%] did not want to participate; four callers [3%] were on travel abroad; one had exams; one caller was in hospital, and one caller had a bad telephone line. 19 callers had not answered the telephone from the researcher after three attempts. These 19 callers were not significantly different from the participating callers/patients regarding age, gender, number of days between advice and interview, time of day or duration of calls.

One hundred callers/patients were interviewed about their telephone consultation with an RN at the casualty clinic. Callers mean age was 37 years [range 19-83 years] and mean age of patients was 18 years [range 0-72 years]. Most callers were women [55%], and mean number of days between call and interview was 9 days [range 2-14 days]. 24% were interviewed within 7 days and 93% within 11 days. The distribution of the calls during the day was 37% in daytime, 42% in the afternoon and 21% at night. There were no significant differences between responders and non-responders regarding these variables.

Mean length of the 100 calls was 4 min and 1 s [range 1-12 min]. Telephone calls regarding psychiatric problems had the longest durations. There were no significant differences among responders and non-responders regarding caller's age or gender, regarding the patient's age or gender, time of day, duration of calls and/or days between the counselling and interview.

Among the 100 calls the most frequent reasons for contact were fever (23%), vomiting/diarrhoea (10%), abdominal pain (9%), question about drugs (9%), skin problems (9%), ear ache (6%) and others (34%). 88% of the 67 callers who contacted the casualty clinic on behalf of someone other than themselves called on behalf of their children under 16 years of age.

Table 1 shows the answers to the six questions from the 100 callers written down from the telephone record, and the answers to the same questions from the interviews. The categories of answers to the six questions were: "yes", "no", "partly" or "not-relevant". The observed agreement and kappa values are also presented in Table 1. Before the analyses of agreement and kappa, the category "not-relevant" was re-classified to "no" when both research assistant and caller had registered "not-relevant" or when one of them had answered "not-relevant" and the other had answered "no". Similarly the category "not-relevant" was re-classified to "yes" when one answered "yes" and the other answered "not-relevant".

In the interview a question regarding of the overall understanding during the conversation with the nurse was posed, and all except one caller said that they understood the information and medical advice given. When comparing the answers with the telephone record the observed agreement was 82.6%.

Table 2 presents the outcomes of the telephone consultations as reported in the interviews for the variables "Followed the advice", "Contacted GP" and "Re-contacted casualty clinic". The analyses included the following independent variables: Gender, native Norwegian/others, time of day for consultation, whether the condition got worse after the contact with the nurse, and information concerning how the caller/patient experienced the telephone consultations with respect to whether they had enough

Table 1 The six variables concerning the counselling as interpreted from the telephone record and reported by the callers are evaluated for agreement, reported both as actual agreement and as Cohen's kappa

	Telephone record				Caller/Patient				Observed agreement*	Cohen's kappa*
	Yes	Partly	No	Not relevant	Yes	Partly	No	Not relevant		
Did caller get enough time to explain her/his complaints?	100	0	0	0	94	3	3	0	94	NA
Did caller get understandable medical advice from the nurse?	74	6	6	14	78	9	5	8	82	0.39
Did caller get understandable information about what to look for?	60	7	14	19	68	4	19	9	73	0.38
Did caller get the option to call back, if necessary?	63	2	25	10	79	2	9	10	77	0.42
Did caller get information on why a patient could wait and see in that particular situation?	65	10	6	19	74	4	12	10	76	0.32
Did caller get information on if or when to contact their GP during daytime?	33	1	48	18	31	1	43	25	82	0.63

*When Observed agreement and Cohen's kappa were analysed, "not relevant" was recoded to either "no" or "yes". The category "not-relevant" was re-classified to "no" when both research assistant and caller had registered "not-relevant" or when one of them had answered "not-relevant" and the other had answered "no". Similarly the category "not-relevant" was re-classified to "yes" when one answered "yes" and the other answered "not-relevant".

time, received relevant answers to questions and whether they trusted the nurse. All men and 91% of the women stated that they followed the advice ($p = 0.34$ for gender difference). The variables time of day of the call, whether

the caller got answer to the questions and trusted the nurse were significant predictors for following the advice. Due to zero-cells a full multivariable analysis was impossible, but some pragmatic partial models could be

Table 2 Outcome after nurse's telephone advice, by gender and origin of caller and some characteristics regarding the consultation

	All N = 100	Followed the advices		p-value	Contacted GP		p-value	Re-contact Casualty clinic		p-value
		Yes N = 93	No N = 7		Yes N = 22	No N = 78		Yes N = 11	No N = 89	
Origin of caller				0.08			> 0.99			> 0.99
Native Norwegian	84	80	4		19	65		10	74	
Others	16	13	3		3	13		1	15	
Gender of caller				0.34			> 0.99			0.07
Men	22	22	0		5	17		5	17	
Women	78	71	7		17	61		6	72	
Time of day				0.009			0.47			> 0.99
Daytime	37	34	3		9	28		4	33	
Afternoon	42	42	0		7	35		5	37	
Night	21	17	4		6	15		2	19	
Got enough time				0.06			0.39			> 0.99
Yes	94	89	5		20	74		11	83	
No	3	2	1		1	2		0	3	
Partly	3	2	1		1	2		0	3	
Got worse				0.53			0.039			0.012
Yes	10	9	1		5	5		4	6	
No	90	84	6		17	73		7	83	
Got answers to the questions				< 0.0001			0.024			> 0.99
Yes	79	79	0		13	66		10	69	
No	6	3	3		2	4		0	6	
Partly	15	11	4		7	8		1	14	
Trusted the nurse				< 0.0001			0.32			0.64
Yes	74	74	0		14	60		10	64	
No	8	6	2		3	5		0	8	
Partly	18	13	5		5	13		1	17	

explored. None of the other independent variables influenced the association with time of day of the call. This was also the case for the highly significant relations between following advice and getting answers to questions and trusting the nurse, but the two could not be analysed in the same model, again due to zero-cells. As is shown in table 2 everyone who got answers to their questions and also those who trusted the nurse followed the advice. Of the 100 callers, 22 contacted a GP afterwards, and this was significantly associated with the patient getting worse after the consultation. Re-contact to the casualty clinic was also associated with experiencing deterioration of the clinical symptoms.

The age of the callers, whether the callers were told what to look for, and why it was not necessary to see a doctor at that time, did not have statistically significant relations to any of the three dependent variables in table 2.

Callers who did speak fluent Norwegian and had Norwegian names were compared to callers who did not speak fluent Norwegian and had foreign names. There were significant differences between the two groups regarding whether they trusted the nurse ($p = 0.017$). Furthermore there were differences between the two groups regarding comprehension of the medical advice and whether they followed them, but these differences did not reach significance.

Only 23% of the callers contacted health personnel for the same problem after the advice given by the nurse. Actually 13 [36%] of the 36 callers who stated that they were told when or whether to contact their GP next day did so, and of the 62 who stated that they were not told to do so, 9 [14.5%] in fact did [$p = 0.03$]. Five of the 100 callers/patients stated that they would prefer to talk to a doctor instead of the nurse on the phone. All five callers who would prefer talking to a doctor reported following the advice given by the nurse. The length of the telephone consultation or the type of complaint did not affect whether they followed the nurse's advice.

Among the eight callers who answered that they did not trust the nurse, one would rather prefer talking to a doctor. As for the 18 callers who answered that they partly trusted the nurse three would prefer a doctor. Among the callers who told that they would prefer a doctor two persons contacted their GP and none contacted the casualty clinic.

In the interview 79% stated that they got relevant answers to their questions, 15% did partly get relevant answers, while 6% did not get relevant answers. There were significant differences among the native-Norwegian and the non-native group, where 25% answered that they did not get relevant answers to their question in the non-native group, while in the native-Norwegian group the corresponding figure was only 2% ($p = 0.005$).

Figure 1 shows a follow-up chart for some more details for all callers/patient's history.

4. Discussion and conclusion

4.1 Discussion

This is the first study in Norway investigating caller's adherence to and outcomes of telephone counselling by nurses in out-of-hours primary care emergency services. Most of the callers/patients stated that they understood and followed the advice, and the observed agreement found between telephone records and interviews were satisfactory even with a disagreement of 18%. Most callers did not re-contact health personnel regarding the same complaints during the following week.

Several studies have investigated whether patients followed the advice given by a nurse. However, we found few studies that reported the use of actual telephone records to compare advice given by nurses against advice reported by caller in interviews. The use of telephone contacts in our study was in accordance with studies from US, Australia, New Zealand and Sweden [6,8,16,22-24]. Parents calling on behalf of young children and the fact that women contacted the casualty clinic more often than men were also typical in other studies [15,16,22,24].

Almost everybody stated that they understood the RN's medical advice on how to deal with the conditions, but there were some discrepancies when comparing the reported advice in the interviews against the record files. This corresponds to the studies from Dale et al., and Leclerc et al. [17,19]. One way to ensure that the information is understood is to ask the caller to repeat the advices given by the nurse at the end of the telephone call, but this intervention has received little attention in studies in which nurse advice has been discussed.

A rather high proportion followed the nurse's advices in our study compared to former studies from US, UK and Canada [16,17,20,22,24,25], and a much lower proportion of patients re-contacted the GP. In our study we have interviewed patients/callers several days later. Thus we have a much longer follow-up period than most of the other studies we found on this topic. One study from the Netherlands [9] stated that almost half of the patients in the study who contacted the GP cooperative attended their own GP during office hours within a week. These patients had been seeing a doctor but there were still a very high proportion of contacts to the patient's own GP.

The fact that the non-Norwegian group trusted the nurse to a lesser extent than the native-Norwegian group, and did not get relevant answers to the same degree, is an important result. If the caller's language skills are limited it is of utmost importance that nurses articulate themselves clearly, avoid unnecessary or difficult words, and ask the

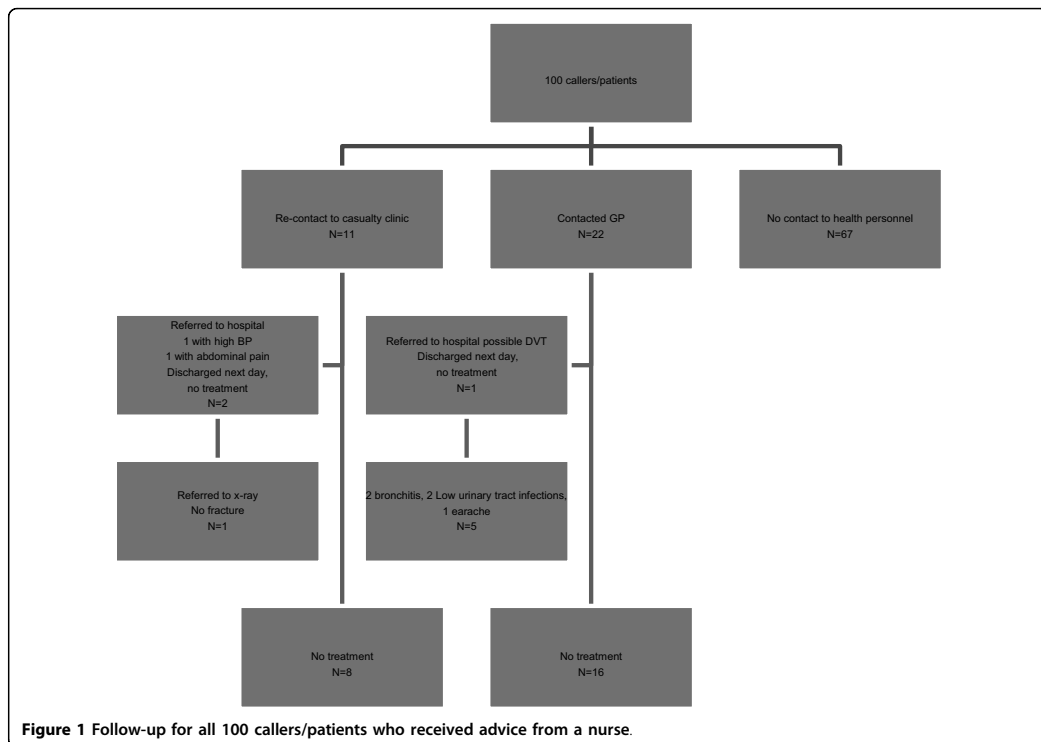


Figure 1 Follow-up for all 100 callers/patients who received advice from a nurse.

caller so repeat the advice. Nurses should perhaps spend more time ensuring that the callers have understood the information. It must be remarked that the non-Norwegian group was not hard to understand during the interviews, and there were only minor difficulties when asking the questions.

A definite strength of our study is that we in fact compared the answers from the callers/patients by listening to telephone record files. We were also able to follow the patients until several days after the telephone contacts to check the patient outcome. Possible compliance, and callers eager to please the researcher during the interviews could constitute a weakness. We therefore stated in every interview that the researcher had no work connection to or affiliation with the casualty clinic, and that every caller/patient was ensured anonymity. It must be mentioned that the nurses might have changed their usual behaviour on the telephone, such as being more kind or pleasant at the start of the study. On the other hand the nurses did not know which telephone records we selected, and their medical skills could not have been improved during the short time of the study. Memory bias regarding the issues raised in the interviews could be

a possible limitation, but when comparing the answers from callers/patients with the record file we found identical wording in most of the cases. Only two persons stated that they were unsure whether they were told if or when to contact their GP.

Even when callers answered that they did not feel quite confident regarding the advice, they followed them. This raises the question of whether nurses wield authority in a potentially dangerous way that might influence the callers. Nurses need to be aware of the caller's vulnerability and try to build a relationship of trust quite early in the conversation [26]. Nurses who provide telephone advice and counselling must also be aware that they have a duty to and responsibility for the caller/patient. It is also of utmost importance that the nurses possess the relevant and adequate information to provide correct advice. Good medical knowledge and communication skills are necessary to meet the callers' needs, and callers'/patients' levels of knowledge vary [27-29]. These days many patients have been reading about the medical condition on the Internet before they contact the casualty clinic. This challenges the nurse's knowledge and skills, and nurses in casualty clinics should have a profound medical

knowledge and a good experience base. Continuous training to improve both medical knowledge and communication skills should be carried out in all casualty clinics and telephone call centres. In addition, casualty clinics should have a policy communicated to the inhabitants to ensure that they have the relevant expectation to the service.

4.2 Conclusion

Nurse telephone consultations and counselling constitute an independent service in which callers have high expectations. A high share of the callers understood the advice and followed them. Two thirds of the callers who received advice from nurses had no contact with their GP, casualty clinic or other health personnel the following week. Non-Norwegian callers challenge the nurse's communicative skills both through language and cultural backgrounds.

4.3 Practice implication

Nurses who give self-care advice must ensure that callers are able to handle this responsibility. One way to ensure that the self-care advice is understood could be to ask the callers to repeat the information given. Medical and communicative training must be a continuous part of the improvement strategy within the out-of-hours services, with a special focus on language and culture.

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Authors' contributions

EHH established the project including the data collection. EHH performed the analysis and drafted the manuscript which was re-written by SH and EHH. Both authors approved the final manuscript.

Competing interests

The authors declare that they have no competing interests.

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