General practitioners' referrals to specialist health services

Exploring elements and factors in the referral process having an impact on patients' access to specialty care

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Scientific environment

- Main scientific environment has been the Department of Global Public Health and Primary Care (IGS), University of Bergen, where I was accepted as a PhD candidate in 2013.

- The daily and inspiring working place has been at Research Department at Stavanger University Hospital.

- From 2014 PhD candidate at the Norwegian Research School in General Practice at the Institute of Health and Society, Faculty of Medicine, University of Oslo.

- Norwegian Referral Study Group / Norsk forskningsnettverk på henvisning (NORSG) www.norsg.no

- Allforsk is a network of general practitioners in Rogaland County doing research on various themes and levels, from the first scientific article to PostDoc work.

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Summary

Background

The referral process between first and second line health care is complex and multidimensional, with medical, interpersonal, logistical, legal, as well as indeterminate aspects. There is a great need to explore the various elements and factors having an impact on the referral process.

Main objectives

The objective of this thesis has been to study general practitioners´ and hospital consultants´ role in the referral process, from the moment the GP decides to refer a patient to hospital, until the hospital consultant assesses the referral and prioritizes the patient for further investigation or treatment in specialist health care. The specific aims for the three sub-studies were to identify and describe 1) general practitioners' reflections on and attitudes to the referral process and their cooperation with hospital consultants, 2) hospital consultants' reflections on and attitudes to the referral process and their cooperation with general practitioners, and 3) potential characteristics of GPs' referral practice by investigating their opinions about referring and their self-reported experiences of what they do when they refer.

Design and methods

The first two parts were qualitative studies. General practitioners and hospital consultants were interviewed and a systematic text condensation method was used for analysis. The third part was a quantitative cross-sectional study of GPs' impressions and feelings about referring and a registration of a selection of data on the work done by referring to hospital during one month, analysed by using a principal component analysis and abduction.

Results

The GPs expressed a dual responsibility towards patients and the national health system. Many experienced pressure from patients to be referred; the younger doctors especially specified this as a frequent reason for a referral. All the participants expressed a willingness to change according to guidelines, as long as such guidelines were the result of a consensus between hospital specialists and general practitioners. The hospital consultants experienced a considerable workload assessing referrals and prioritizing patients for further investigation and treatment. They emphasized the importance of precise referrals as essential for a reasonable and fair prioritization process. All focused on the importance of good communication and cooperation with the referring GPs. Good referrals were considered to make the prioritization process easier. As for the typologies, younger male GPs experienced more heavy work-load and patient pressure when they referred to hospital. The experienced female GPs referred in a more patient-centred way, completing the referrals during the consultation with the patient present.

Conclusions and implications

Many factors have an impact on the referral process and the individual referral rates. Good communication and cooperation by phone or electronically between hospital consultants and GPs are important factors to make the referral process more balanced, and the participants more like partners. More use of electronic decision support systems for the referring physicians can make this process more standardized and predictable for both partners. Educating and training GPs in professional competence and personal confidence as well as a more patient-centred way of referring, making priority decisions and completing the referrals

during the consultation may be timesaving for the actors and can be associated with less work-load.

Sammendrag

Bakgrunn

Henvisningsprosessen mellom første og andrelinjetjenesten er kompleks og multidimensjonell, med medisinske, interpersonelle, logistiske, juridiske så vel som udefinerbare aspekter. Det er stort behov for å utforske de forskjellige elementene og faktorene i denne prosessen.

Målsetting

Hovedmålsettingen for denne studien var å belyse allmenn- og sykehuslegers meninger om og opplevelse av henvisningsprosessen, fra det øyeblikk allmennlegen bestemmer seg for å sende en henvisning til sykehuslegen vurderer henvisningen og bestemmer det videre forløp og prioritering for pasienten i spesialisthelsetjenesten. De spesifikke målene for de tre delene av studien var å belyse: 1) allmennlegenes refleksjoner og holdninger til henvisningsprosessen og deres samarbeid med sykehuslegene; 2) sykehuslegenes refleksjoner og holdninger til henvisningsprosessen og deres samarbeid med allmennlegene; 3) spesielle karakteristika i måten allmennleger jobber på når de henviser til sykehus ved å se på deres meninger om det å henvise og deres selvrapporterte opplevelser når de henviste.

Design og metode

De to første delene var kvalitative studier. Allmennleger og sykehusleger ble intervjuet og systematisk tekstkondensering ble benyttet for analyse. Den tredje delen var en kvantitativ tverrsnittstudie om allmennlegers mening om henvisningsprosessen og en registrering av utvalgte data i arbeidet med henvisninger til sykehus, analysert ved hjelp av prinsipal komponent analyse og abduksjon.

Resultater

Vi fant at allmennleger føler ansvar overfor både pasienter og helsevesen. Mange opplevde press fra pasienter til å bli henvist. Spesielt yngre leger anga dette som en hyppig grunn for henvisning. Alle deltakerne var positive til forandring når det gjaldt nye anbefalinger så lenge disse var laget i samarbeid mellom allmennleger og sykehusspesialister. Sykehuslegene hadde et stort arbeidspress med å vurdere henvisninger for videre undersøkelser og behandling, og understrekte viktigheten av presise henvisninger for en riktig og rettferdig vurdering. De presiserte verdien av god kommunikasjon og samarbeid med allmennlegene. Gode henvisninger ble vurdert som nyttige for å gjøre en riktig prioritering. Yngre mannlige allmennleger opplevde en tyngre arbeidsbelastning på grunn av pasientpress for å bli henvist til sykehus. Erfarne kvinnelige allmennleger hadde en mer pasient-sentrert måte å henvise på, i samarbeid med pasienten i løpet av konsultasjonen.

Konklusjon

Mange faktorer påvirker henvisningsprosessen og henvisningsratene. God kommunikasjon og samarbeid på telefon eller elektronisk mellom fastleger og sykehusleger er viktig for å gjøre dette samarbeidet mer balansert og deltakerne mer som likeverdige partnere. Bruk av elektronisk beslutningsstøtte kan gjøre henvisningsprosessen mer standardisert og forutsigbar for begge parter. Opplæring og trening av allmennleger i profesjonell kompetanse og personlig trygghet i tillegg til en mer pasientsentrert måte å henvise på, ved at henvisning og prioritering gjøres i samarbeid med pasienten i konsultasjonen, kan gjøre henvisningsprosessen mindre tidkrevende og forbundet med mindre arbeidspress.

List of publications

I Thorsen O, Hartveit M, Baerheim A. General practitioners' reflections on referring: an asymmetric or non-dialogical process? *Scand J Prim Health Care* 2012; **30**: 241-46.

II Thorsen O, Hartveit M, Baerheim A. The consultants' role in the referring process with general practitioners: partners or adjudicators? a qualitative study. *BMC Fam Pract* 2013; **14**: 153.

III Thorsen O, Hartveit M, Johannessen JO, Fosse L, Eide GE, Schulz J, Baerheim A. Typologies in GPs referral practice. Submitted *BMC Fam Pract* 2016

Abbreviations

GP = general practitioner

CPD = continuous professional development

PCA = principal component analysis

EMR = electronic medical record

PKO = Praksiskonsulentordningen (Practice Consultant Organization)

Contents

1. Introduction

1.1 Background and preconceptions

The study of collaboration between general practitioners and hospital specialists has been an important part of my work and professional interest for many years. Being a GP and the leader for PKO (Praksiskonsulentordningen) (see Chapter 1.3) at Stavanger University Hospital was the background for my research in the referral process. It is generally known that good communication and collaboration between doctors and other health providers is important to facilitate good health for the population and the individuals (1). The referral patterns are important focal points for both politicians and health managers to control health care costs (1-3). In the Nordic, as well as in most western countries the health system consists of two levels: the primary and secondary health care. General practitioners (GPs) take care of most health problems for the population, leaving to the hospital doctors to do the more complicated medical examinations and treatment that GPs cannot perform. Even in countries without this tradition, such as China, the advantages of a referral system are of interest (4).

The referral letter, like an entrance ticket to hospital services, gives the GP a gatekeeper role, as described in other studies (5, 6). This role sometimes puts the GP in a difficult and challenging position that can explain some of the reasons for the variation in referral rates between GPs (2). GPs have various thresholds for referring a patient, which can result in both underuse and overuse of secondary care (7). Many referrals do not include sufficient and relevant information, and these insufficient referrals make it difficult for the consultants to make the right medical priority decisions (8). GPs and hospital consultants frequently disagree on the specialist's role (9). Rigorous evaluations of these processes are needed (10). A health system with restricted resources and long waiting lists for specialist

services can be challenging for patients and GPs who wish to have a second opinion or a specialist assessment for a medical problem (11). According to many hospital consultants, referrals are often found to be inappropriate or unnecessary (12, 13). A major focus for research on this theme has been on the quality of the referrals (12, 14-20). Most of such studies have been done according to standards and criteria made by hospital specialists (13, 15-17, 20-24). Until now no significant impact has been found of the quality of the referrals on the patients' clinical pathways or health. However, some studies indicate that high quality information exchange between GPs and mental health care physicians or endocrinologists may have an impact on improved patient outcomes (25). Good communication and safe and effective patient-handovers are important for ensuring good coordination and continuity of care (26). Lack of formal training and systems for patient-handover may impede good practice necessary to maintain high standards of care (14). Research on patient-handover is therefore a priority for patient safety, and is increasing rapidly (27). A more thorough presentation of this background and a literature review follows in the next sections of the Introduction chapter.

An obvious preconception for my research has been my eagerness and willingness to improve the communication and collaboration between the senders and receivers in the referral process, allowing patients to experience a better clinical course through the health care system.

1.2 The Norwegian specialty in general practice/family medicine

Since 1985 it has been possible for Norwegian GPs to specialize in general practice/family medicine (28). This specialty is not compulsory for working as a GP, as it is in countries like Denmark and the Netherlands, but gives extra economic count and advantages as reimbursement of expenses for medical courses and congresses. Approximately 60% of all Norwegian GPs are specialists in general practice/family medicine, and almost all younger GPs follow compulsory courses and training to get the specialty (28, 29). The specialist training takes five years after graduation, one year in hospital, and the rest in general practice. An important part of this training takes place in CPD group meetings, with 8-12 participants, with one or two certified supervisors and lasts for two years. In these meetings the participants discuss actual problems and difficulties in the practical situations during the consultation (29). These group discussions between colleagues help young GPs to become more confident and safe in their role as GP and specialist in family medicine (28). Every five years the GP specialists have to re-certificate by following a CME program, courses, mutual practice visits and CPD group meetings (29).

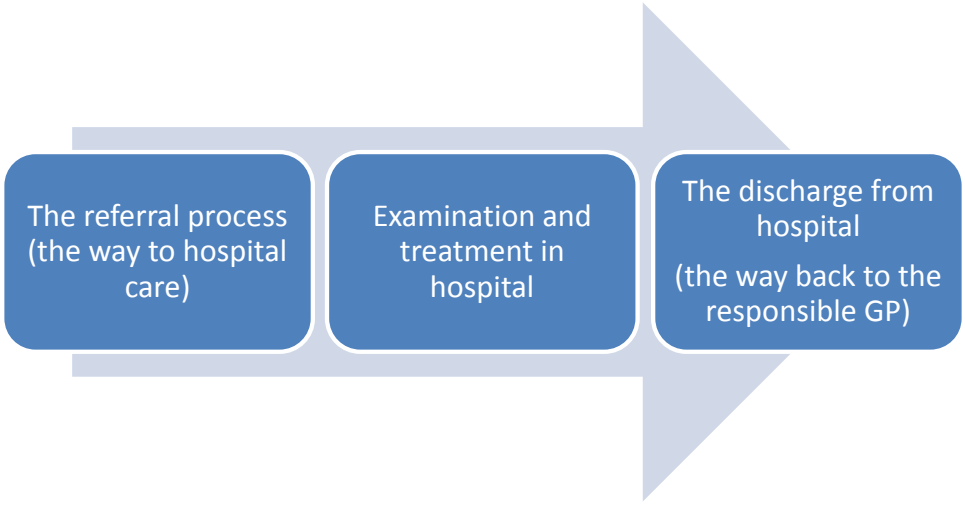
1.3 The Practice Consultant Organization (Praksiskonsulentordningen PKO)

In Norway the PKO was established in 1995 by inspiration from Denmark, where GPs were engaged as consultants in hospitals since 1992 to improve logistics and to facilitate communication and collaboration between primary health care and hospitals (30). In 2015 most Norwegian hospitals in had at least one practice consultant, GPs working part-time in hospital. Now national PKO meetings are held annually, where actual problems and challenges are discussed, to make agreements concerning clinical pathways and better patient hand-overs (31). The LEON principle (lowest effective level of care) has been a lodestar in this work, to secure better health for all at reasonable costs for the society (32). Good quality of referrals and discharge letters has been a major focus for PKO since the start. The local PKOs produce information to GPs through newsletters and e-mail. There is no national secretary, but a website: www.pko.no.

1.4 The patients' clinical course

The term *clinical pathway* describes the care steps that identify interventions, timeframes, milestones and expected outcomes for patients (33-35). An open search (All fields) on PubMed on *clinical pathways* gave 91369 hits (March 2016), whereas a search only in Title gave 466. In many of these studies the *clinical pathway* includes only the patients' clinical course in hospital, not the referral process. Modifications of the operational criteria to these studies have been introduced to include primary care (35). The studies including the referral process are mainly qualitative descriptions (36-46). In this research I chose a model and definition of the patient's clinical course which starts when the patient presents a medical problem that initiates a referral to specialist health services and ends when the examinations or treatment is finished (Figure 1), also called the *symptom pathway* (46).

Figure 1: The patient's clinical course (symptom pathway)



Research on clinical pathways elucidates the effects on patient outcomes, measured by hospital readmission rates, complications, in-hospital mortality and other major indicators (33). However, the existing outcome measures for clinical pathways have not been used for studying the impact of the referral on the quality of care (47). Instead, it has been recommended to develop indicators for sub-processes in health care, such as the referral process (48, 49).

1.5 The gatekeeper system

The GP is considered a key person in the Norwegian health system (32). Since 2001 all residents have the possibility and right to choose a regular GP or family doctor (Norwegian: *fastlege*), responsible for all necessary primary health care services for the patient (32). More than 99% of the population is connected to a GP's list (50). When a person needs special secondary care examination or treatment, the GP is responsible for sending a referral to the specialist health services, to a hospital or a private specialist, and nearly all specialist examinations and treatments start with a referral from a GP (51). The gatekeeper system has shown to be cost-efficient, and is common in countries like Denmark, Netherlands, Australia, Canada, UK, Ireland, New Zealand and Switzerland. Swiss gatekeeping plans have reported cost savings of 10%–25% compared with a fee-for-private-service based health insurance (52). In Norway, the access to secondary health care is regulated by law, and priority depends on severity, the need for specialist care, expected benefit, availability and cost-effectiveness (53). The hospital consultant's decision of whether a patient should receive specialised health care is mainly based upon the information provided in the referral letter. The patient may be given priority to see a specialist, with a legal right to receive care within a limited period seen as medical acceptable (54). The gate-keeper system has proved to be efficient and cost-effective for the society (52), and is approved and supported by both the population, the Government and the Norwegian Medical Organization (32).

Good and efficient primary care helps prevent illness and death and is associated with a more equitable distribution of health in populations, a finding that holds in both cross-national and within-national studies (1, 9, 16, 55, 56). The ideal model implies that the patient gets the appropriate treatment on the right place or level at the right time. For patients, as well as for their GPs, timing is crucial (57). Improving the referral process between physicians is

important for facilitating timely access to specialty care (58-60). Gaps in continuity of care may represent major obstacles in healthcare (61, 62). According to Haggerty et al, the continuity in patient care can be categorized in: 1) *Informational continuity:* The use of information on events and personal circumstances to make health care appropriate for each individual; 2) *Management continuity:* The consistent and coherent approach to the management of a health condition that responds to a patient's changing needs, and 3) *Relational continuity:* The therapeutic relationship between a patient and one or more providers (63). Their conclusion is that all types of continuity can contribute to better quality of care. As for the content in the referral letter, it is critical for the understanding and action at the next level of care and should therefore cover all relevant and necessary medical and patient-centred facts and information (64).

The priority setting and wait for investigations and specialist treatment in hospitals vary widely (65-68). Different factors and conditions may give patients various unpredictable and unequal clinical pathways for the same condition and disease which is difficult to understand and accept (6). Studies have shown that these variations cannot be explained by patient morbidity alone (67, 69, 70). Individual experience and competence between GPs vary a lot, as well as local, cultural and structural settings (7). In Norway, like in many other countries, national prioritization guidelines have been developed to ensure a justifiable and fair priority setting and wait for all, regardless of geographical location, gender, ethnicity, economy and capacity in hospitals (53). However, many hospital specialists prioritize differently and individually, in spite of national guidelines and the requests of the referring physicians (2, 7, 9, 67, 71, 72). Individual considerations and local conditions, like hospital capacity, long waiting lists and personal expertise may influence the priority setting (53, 67). The Norwegian guidelines have a maximum wait for different conditions according to diagnosis, severity, expected benefits and costs. Individual circumstances, such as patient’s age, mental and social

situation as well as expected benefit should be considered (53). For life threatening conditions, like suspicion of cancer, a wait of maximum two weeks is recommended (53). This model requires good communication and mutual understanding between GPs and hospital consultants for the division of labour, shared care and responsibility. It is important, when making specifications for referrals, to consider the work load related to these. GPs are facing long waiting lists for hospital examinations and treatment, and therefore try to avoid unnecessary referrals (73). In the Nordic countries patients have a legal right to participate in the referral process (51). As a result of increased focus on patient autonomy and user involvement, the pressure from patients to be referred may also have an effect on the referral rates (65).

1.6 The referral process

The referral process, in some studies called *referral pathway* (43, 44) starts during a consultation where a physician, generally a GP, encounters a patient's medical problem that cannot be solved by the GP, and where a letter to another physician, generally a specialist is necessary. This process, being the first part of the patient's clinical course (Figure 1) is responsible for ensuring timely access to specialized care. It starts with the decision to send a referral letter and ends when the referral has been read and assessed by the receiver, who decides further investigation and treatment for the patient.

The decision to refer may be the result of certain clinical findings, a difficult medical problem which must be solved, a wish or need for a special examination or treatment that the GP cannot perform, or a request for an advice or shared care for a patient. It may also be the result of a patient's wish or demand that the GP cannot or do not want to resist. The referral is expected to give the receiver, the hospital consultant sufficient and relevant information to prioritize the patient for further examinations or treatment, or to give the sender a clinical advice. To formulate a comprehensive referral may be demanding. The GPs are not always certain about the necessary and relevant information expected by the hospital consultant or sure about the possible gain of a specialist treatment (74). In 1958 John Fry published an article where he described a survey on 288 of his patients one year after having been referred to hospital (75). He found that 53% were better, 38% were the same and 9% worse than before being referred.

Today most referrals in Norway are sent electronically to hospital, saving time and paper. Still, this process leads to a lot of work and effort for both physicians and other health workers, meaning that everything that can be done to reduce this workload, for both GPs and hospital consultants, is relevant and useful to study and evaluate. The electronic referral is sometimes used as similar to an e-mail for information or a request from GPs to hospital

about a patient, instead of making a telephone call or sending a letter. Studies have shown that the last years' development of better e-communication and more advanced electronic referral decision support systems have made the referral process more convenient and time-saving for both senders and receivers (68, 71, 76-80).

1.7 The quality of the referral

When a GP refers someone to another physician, the responsibility for the patient or the actual medical problem is transferred to the other doctor, mainly a hospital specialist (27). These handover processes are highly variable and a potentially high-risk area for patient safety (26). Information transfer is a main predictor for the overall quality of handovers. The referral letter is the main communication between GPs and hospital when a person needs specialist examination or treatment, and the quality of the referral is essential for assuring a timely access to specialist health care (27). A referral consists of at least eight elements, according to the actual medical problem and the requirements of the receiving department in hospital (58, 81-85):

- Personal identification: name, address, telephone
- Diagnosis and symptoms
- Medication and allergies
- Family and social setting: children, next of kin, working place
- Former diseases and treatments
- Actual medical problem: symptoms, disability, severity
- Clinical findings and laboratory results, ECG, x-rays etc.
- The desired examinations and treatment: specialist examinations, surgery etc.

In addition to these, a comprehensive referral should contain an assessment of necessity, costs, a suggestion for priority and wait and the potential gains and benefit for the patient (53, 86). For children, the parents' names and contact phone number is mandatory (87). Next of kin is often useful information, especially for mentally ill and demented persons (8).

Before the electronic medical record (EMR) era, which started in the early nineteen-eighties all referrals were handwritten or audiotaped by the GP, and sent as a postal letter to hospital. It could take days or weeks before the referral letter was read and assessed by a hospital consultant and until the patient finally received a letter with an appointment for a consultation or treatment in hospital. Today the EMR is mandatory in general practice in our part of the world, and practically all referrals are sent electronically to hospitals. Since 2003 almost all Norwegian GPs use a standard form or template for referrals, the so called *Good referral letter* (*Den gode henvisning*) (81, 87). This is an integrated function in all EMRs being used in Norway (CGM/WinMed, Infodoc, System-X). This referral template collects data from the EMR, like the person's identification data, address, telephone number, former diseases, actual medical problems, allergies, medication and laboratory results. The electronic transferal to hospital takes seconds, and most referrals are read and assessed during the same or next day, at least in our region. Stavanger University Hospital receives more than 80.000 referrals yearly, mainly from GPs in the southern part of Rogaland County.

Research on the quality of referrals has been performed for decades. A PubMed search on "referral" in the title gave 118.562 hits (March 2016), whereas a search on "quality" and "referral" together resulted in 157 published articles. Of these, 41 articles discussed the quality of referrals (15-17, 19, 20, 23, 82-85, 88-120). Many studies have shown poor quality in referrals from GPs. In 1991 JS Jarallah concluded: "*Important clinical information was lacking from both referral letters and feedback reports... A quantitative evaluation of the quality of letters revealed that 26% of the referrals were poor. The referral process needs tremendous improvement if the quality of patient care is to be guaranteed"* (117). In 2013 a Norwegian study on hospital specialists concluded: "*The way in which hospital physicians and general practitioners (GPs) interact has important implications for any health care system, particularly in systems relying on gatekeeping through the GPs for moderating access*

to hospital and specialist services." (13). In this study P E Martinussen investigated the role of physician - and community factors for hospital physicians' satisfaction with their interaction with GPs, while also controlling for relevant hospital characteristics (12). The results indicated that the hospital physicians were only moderately satisfied with their interaction with GPs, and that there was certainly room for improvement. Only 16 % of the hospital specialists were satisfied with the referrals they received from GPs. The study showed that the more satisfied the GPs were with their interaction with the hospital, the more satisfied were also the hospital physicians with their corresponding interaction with the GPs. Furthermore, a high GP coverage in the municipalities in the hospital catchment area was associated with a higher satisfaction among the hospital physicians. The results also suggested that face-to-face meetings with GPs are associated with a more positive evaluation of the interaction with GPs (12, 13).

Many hospital consultants use a great deal of their working time reading referrals and prioritizing patients for specialist care (121). The referrals should therefore contain the relevant and necessary information for the hospital consultant to make a fair and reasonable assessment of the patient's medical needs and to set a priority for further examination and treatment (8, 24, 58, 68, 73, 100, 109, 121-127). There are, however no official international guidelines for referrals, only national recommendations (47, 87, 103, 127-129).

In the referral, some elements are facts, like age, gender, education, profession, mental status, the duration of symptoms; others are discretionary, like severity, prognosis and degree of urgency. The information in the referral should reflect the patients' medical condition and an assessment of urgency in such a way that the hospital consultant can make his conclusions on the same basis as the referring physician. This means an accurate and comprehensive description of symptoms and severity as well as an assessment of prognosis, costs and expected benefits for the patient. An Australian study on colorectal cancer showed that GPs'

assessment prior to referral might have an impact on how cases are managed in secondary care (21). In May 2015 Hendrikson et al published an article where they had screened 3495 articles on interventions to improve the quality of the referrals. The study showed that current evidence for improving referral quality is strongest for software-based interventions and templates (130). This indicates that standardized referrals and decision support may improve the overall quality and reduce the variations in referral rates between GPs. A Norwegian study published in 2013 by Rokstad et al showed that a more structured referral with optional guidelines for specific medical problems can be useful and time-saving for the hospital consultants (79). Although some GPs may still reject the concept of standardised communication, there is a high degree of consensus about the content of the referral (24, 122, 127), meaning they are prepared to use it as a yardstick for their performance (119).

Quality indicators for the referral process have to be sensitive, valid, reliable and feasible (131). Many hospital specialists have published specifications and recommendations for the necessary and mandatory information in a comprehensive referral on various medical conditions (15, 20, 23, 27, 68, 83-85, 88, 92, 94-96, 98-101, 103, 119, 120, 126, 129, 132). In only a small part of these studies a GP participated as an active research partner or co-author (8, 19, 21, 24, 80, 84, 99, 103, 130, 133). A general conclusion in many of these studies is that the main reason for sending good and comprehensive referrals is to make it easier and more convenient for the hospital consultant to assess and prioritise the patients for further investigation and treatment in hospital, or in other words, a question of logistics (134).

In the United States, like in many European countries, numerous strategies to improve the specialty-referral process have been tried out, such as using gatekeepers and referral guidelines (5, 135, 136). Interventions including educational activities like peer review discussions and feedback to GPs have been found to improve the quality of the referrals and reduce the variation in the referral rates (137, 138). Improving the content of referral letters

within cancer care may affect hospital consultants' confidence that they make the right priority decisions (139). Reduced time used for assessing referrals for pulmonary conditions has been found when electronic templates were used compared to those not supported by a template (140).

1.8 Inappropriate and avoidable referrals

General practitioners are the gatekeepers for the majority of non-emergency access to specialist care (141). In many countries, referral rates have increased dramatically during the last decades (3, 125, 135, 136), and the consequences for the society are more use of specialist health services and larger expenses (1, 3, 9, 22, 105, 142). The reasons for this trend are many, such as better access to specialist services, cultural changes, national laws and regulations, insecurity and uncertainty among GPs, especially the youngest, and patients' requirements (2, 3, 7, 57, 58, 73, 125, 143-148). The referral patterns, including the individual GP's decision to make a referral vary greatly (28). The reasons for this may be characteristics of the patient (age, gender, social, education, occupation), pressure and expectations from patients, characteristics of the physician (age, gender, years in practice, size of practice, confidence in own knowledge, willingness to deal with uncertainty), organization of medical practice, the number of consultations and list size, access to specialists and the assessment of necessity and relevance for examinations and treatment. National laws and regulations may have imperative impacts on the referral process, waiting times and clinical pathways for patients (31). In the USA, from 1999 to 2009, the probability that an ambulatory visit to a physician would result in a referral to another physician increased by 94% from 4.8 to 9.3% (135).

Variations in referral rates have been studied since 1957, when John Fry asked: *"Is it true that the family doctor has degenerated, as some imply, into a mere "signpost" to the hospital or a "sorter" of those patients who require referral and those who can be treated at home?"* He found that in 15% of the cases the GP was stuck for a diagnosis or treatment, in 9% a special investigation was required, in 73 % a special treatment was necessary and in 3% the referral was for a variety of reasons, such as demands by patients etc. In 1958 Logan and

Cushion published a study in England where they reported a huge difference in referral rates, from 41 to 108 per 1000 patients per year (75). Since then, many studies have shown this variety in referral rates (75). These variations have been a long-standing cause for concern both nationally and locally by causing inequity in access to specialist services and inefficient use of limited healthcare resources (149, 150). Even for two-weeks-wait referrals for suspected cancer there is a vast variation in referral rates between physicians. A Scottish study reported a six fold variation between practices in referral rates for their equivalent of two-weeks-wait referrals (151). A recent study from UK showed that around 11% of patients referred urgently with suspected cancer had the disease, which means nine urgent referrals for one new case of cancer (152).

To describe the overall concept of appropriateness of referrals three attributes have been identified. These are *necessity*, *appropriateness of destination* and the *quality of the referral* (149, 153). Many studies have reported a great portion of the referrals as avoidable or inappropriate (13, 56, 88, 149, 154). Already in 1999 Donohoe et al reported as much as 30% of the referrals to hospital as possibly appropriate or inappropriate, and considered avoidable (155). They concluded that increasing procedural training and enhancing informal channels of communication between GPs and hospital specialists might result in more appropriate referrals leading to lower costs.

Many efforts have been introduced worldwide to improve the referral process and the content in the referral letters (14, 16, 22). Studies have shown that educational activities and peer review discussions as well as feedback among GPs may reduce the variation in referral rates and improve the content of referral letters (137, 138). An indicator for quality and good clinical practice is to have a high conversion rate, which is the proportion of referrals which result in a specific diagnosis (positive predictive value) together with a high detection rate, which is the proportion of this diagnosis treated having been referred (sensitivity) (144). The

last years' development of more advanced electronic referral decision support systems may raise these rates in the future (68, 79).

1.9 How to explore the referral process?

An international accepted definition of a high quality referral process is missing. In 2011, a debate article called *What do we actually know about the referral process?* was published in the British Journal of General Practice (47). In this article Davies, Pool and Smelt posed the following questions: "*Is it a good and necessary process? Does it get patients who need care to the right place for that care? Is it best thought of as a barricade or as a conduit? Are GPs a bit too keen on their gatekeeper role? Do we gate-keep too well, at the price of reduced sensitivity and a risk of diagnostic delay? Would GPs be better to think of themselves more as "system navigators"? Are there many inappropriate referrals?"* They answered by the following: "*Not very much... The truth is that sadly the important questions above are currently unanswerable. The criteria by which we could judge a referral good or bad, relevant or irrelevant, appropriate or inappropriate are not yet defined. It is not clear who should judge the merit of the referral."* Their conclusion is that this ignorance is no longer supportable and that there is a significant need for more operational research in this large area.

To study the quality of the referral process, it has been recommended to develop indicators for sub-processes (48, 49). These include themes like the cultural setting (3), the doctor-patient relationship (147), clinical guidelines (24), the severity of the medical problem and the hospital consultants´ assessment of priority and wait for hospital examinations and treatment (67) and the individual GP's decision to refer (7). Considering these themes and factors in relation to my knowledge and experience from my previous work in this field, I found three main themes which may be subjects for research:

- *The actors:* GPs, hospital consultants, patients: their experiences and reflections
- *The work being done:* the making of the referral (GP), the communication between sender and receiver, the reading and assessment of the referral (hospital consultant)

- *The outcome of the process:* for the referring GP, the hospital consultant, the patient and the society.

All these subjects are of interest, and together they represent a huge research arena. All previous research on the referral has focused on limited parts of this process: the quality of the referral letter (8, 24, 58, 68, 73, 100, 109, 121-127), the actors and the communication and relationship between them (9, 11, 13, 16, 25-27, 58, 59) or the procedures, like the reasons for sending a referral (2, 7, 65). To include all the actual factors and elements of this process in one study would require a major research organisation for a long period of time, and as such a too big project for a PhD study.

An important reason for doing research is to find better solutions or conditions for the identified problems or difficulties. In this thesis I have focused on the actors being responsible for the patients' clinical course. I have chosen the following three themes:

1. GPs' reflections on and attitudes to the referral process and their cooperation with the hospital specialists.
2. hospital consultants' reflections on and attitudes to the referral process and their cooperation with general practitioners
3. GPs' opinions about referring and their experiences of what they do when they refer.

2. Aims of the study

There is a need for more knowledge on the reasons for GPs' and hospital consultants' various referral behaviour in this process. The main aim of this thesis was to study the contextual factors having an impact on the referral process, from the moment the GPs decide to refer a patient to hospital until the hospital consultants read and assess the referral.

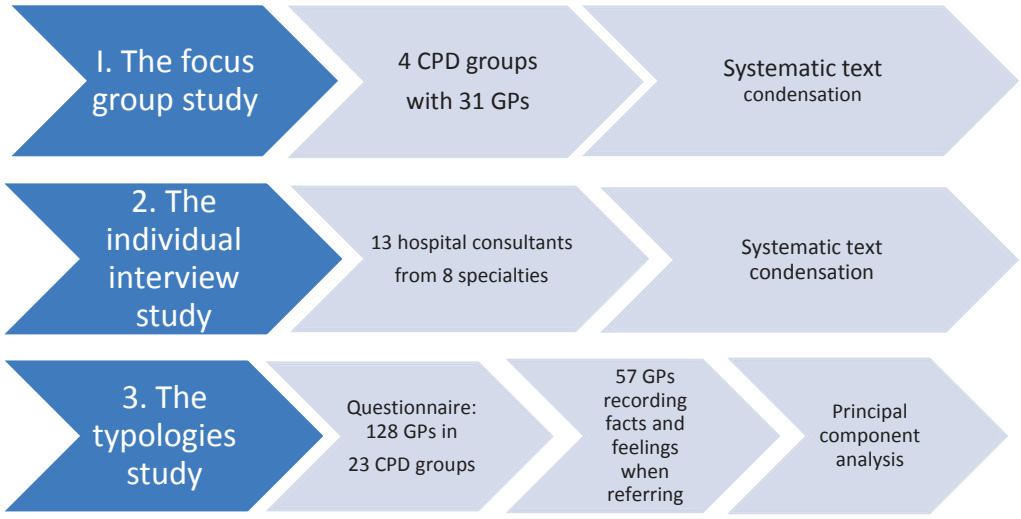
The specific aims for the three sub-studies were:

1. ***To identify and describe general practitioners' reflections on and attitudes to the referral process and the cooperation with the hospital specialists.***
2. ***To identify and describe hospital consultants' reflections on and attitudes to the referral process and cooperation with general practitioners***
3. ***To explore and describe potential characteristics of GPs' referral practice by investigating their opinions about referring and their self-reported experiences of what they do when they refer.***

3. Subjects and methods

We did two qualitative and one quantitative observational cross-sectional study of the referral process (Figure 3). In the first sub-study we used focus group interviews during CPD (continuous professional development) group meetings focusing on GPs' attitudes to and perceptions about referring. In part 2 we used individual interviews with hospital consultants to investigate the reflections on the referral process with the receivers. For these two studies we used systematic text condensation for analysis of material. In part 3 we used the results from the first two studies to design a questionnaire and statements about the referral process. We combined the results from the questionnaire to GPs with the collected data of what they do when they refer to hospital during one month. Finally we performed a principal component analysis and abduction to define typologies characterizing the referring GPs' work in this process.

Figure 3 Study design



3.1 Setting

The study took place in Southern Rogaland County, a part of Norway with 330.000 inhabitants and around 300 general practitioners mainly referring to one regional hospital (Stavanger University Hospital). All interviews and collection of data were done from November 2010 to April 2014. All Norwegian GPs who are specialists in family medicine/general practice or candidates to become a specialist must attend regular CPD meetings. These groups normally consist of four to ten members who meet once a month for three hours. In Rogaland in 2013 there were 37 CPD groups.

3.2 Study participants

In the first part a purposeful selection of four CPD groups with a total of 31 GPs (17 female and 14 male) aged 29 to 61 years from 21 different practices, who had practiced for 3 to 35 years were invited to participate. Two of the groups consisted of experienced GPs from the city of Stavanger (130.000 inhabitants), one group consisted of young GP specialty candidates from the whole region and one group had experienced general practitioners from rural practices. To obtain a range of views, we selected CPD groups with GPs from different practice types and locations (156, 157). All volunteered to participate.

In part 2 we invited hospital consultants representing the divisions receiving the highest number of referrals to participate. The participants consisted of 13 experienced hospital consultants (2 female, 11 male, age 40–63 years) representing eight different specialties at Stavanger University Hospital (three psychiatrists, one cardiologist, two orthopaedic surgeons, two gynaecologists, one paediatrician, one vascular surgeon, one gastroenterologist, and two general surgeons).

In the third sub-study all the 37 CPD groups in Southern Rogaland County were invited to receive information about the study in one of their regular meetings, and 23 groups with 128 members accepted. All the group members filled in a questionnaire about referring, and were then invited to participate in the registration or referrals during the next month. In this part a total of 57 GPs volunteered to participate, of whom 58% were male. The mean age was 49.3 years, (SD 11.2). Most of the GPs (88%) were specialists in family medicine, 70% worked in urban areas.

3.3 Methods

3.3.1 Collection of data

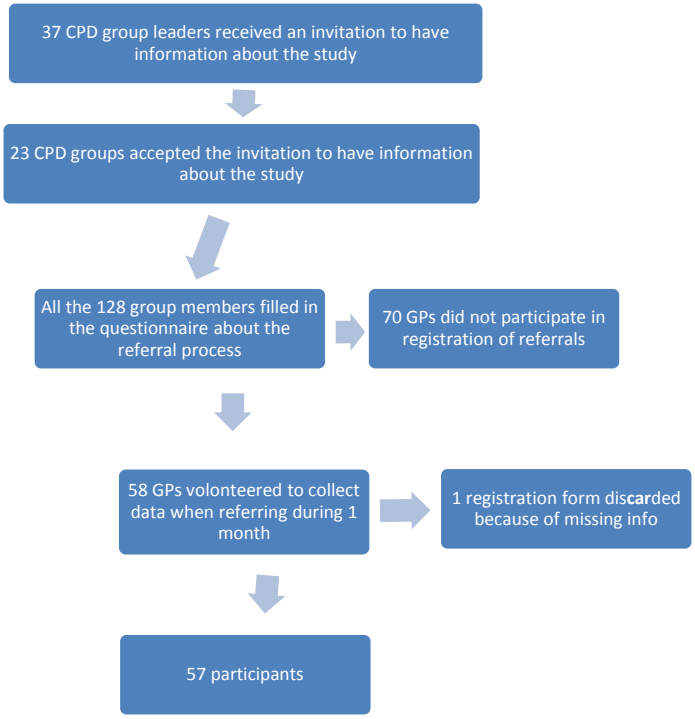
In the first sub-study all the four CPD groups who were invited accepted the invitation from OT come to one of their regular meetings. The meetings with the groups were held at different occasions and places during winter from November 2010 to February 2011. The meetings took place in the evening, as they usually do. First they were informed about the study, and invited to participate in a focus group interview about the referral process and the different aspects about referring to hospital. All group members agreed to participate, and all took part in the discussions and conversation about referring. All participants spoke openly about their personal experiences and reflections about referring without any interruptions from me. The interviews lasted from 1-2 hours, and were audio-taped and thereafter fully transcribed verbatim.

In part 2, the interviews with hospital consultants were done in their regular hospital offices during normal worktime. The interview started with an introduction of the aims of the study. All agreed to participate. Open questions about their work with the assessment of referrals from GPs and how they prioritized patients for further examinations and treatment in hospital were used. They all had personal and professional experiences and reflections about the assessment of referrals and suggestions for a better referral process. The interviews lasted for approximately one hour each, and all were audio-taped and transcribed verbatim immediately after, within the next day.

In part 3, the group leaders of the 23 CPD groups who accepted the invitation to have information about the study were asked by OT to come to one of their regular CPD meetings. The meetings started with an introduction of the aims and the objectives or the study. The 128 group members filled in a questionnaire about the referral process (Appendix 10.1) where

they rank-ordered their agreement or disagreement with a set of ten subjective statements reflecting their attitudes. They were then invited to participate in the collection of data when sending elective referrals to hospital during the next month. A written invitation (Appendix 10.2) with a referral registration form (Appendix 10.3) was sent to all the group members. Two and four weeks after, I sent an e-mail reminder to all. A total of 58 GPs chose to participate. Of these one form was dismissed because of lacking information (age, gender) (Figure 2). The 57 participants collected data from 691 referrals. When referring to hospital they assessed the perceived difficulty when referring and the patients' pressure to be referred on a Likert scale. The time used (minutes) and whether a hospital specialist was consulted by a telephone call was also registered.

Figure 2 Flowchart participants part 3 (*)



(*) Thorsen O, Hartveit M, Johannessen JO, Fosse L, Eide GE, Schulz J, Baerheim A. Typologies in GPs referral practice. Submitted *BMC Fam Pract* 2016

3.3.2 Analyses

3.3.2.1 Systematic text condensation

All the focus group and individual interviews were fully transcribed verbatim and analysed by systematic text condensation (158). At each of the four analytical steps, the three authors first analysed the data individually and then contested each other's analysis and reached a mutual basis for final consensus. The data were analysed by using Giorgi's phenomenological cross-case analysis method as modified by Malterud (158, 159). Systematic text condensation is a descriptive and explorative method for thematic cross-case analysis of different types of qualitative data, such as interview studies, observational studies, and analysis of written texts. The method represents a pragmatic approach, although inspired by phenomenological ideas, and various theoretical frameworks can be applied (156). The procedure consists of four steps (158):

1. getting an overall impression – from chaos to themes
2. identifying and sorting the meaning units and coding the relevant elements
3. condensation of the individual meaning units
4. synthesizing and summarizing the descriptions and labelling the concepts

At each of the four analytic steps we (OT, MH and AB) analysed the data individually and then contested each other's' analysis and reached a mutual basis for further analysis and final consensus about the results.

3.3.2.2 Factor analysis

In the quantitative study, data were analysed using a standard three-step approach that included generating a correlation matrix, completing factor analyses followed by varimax rotation and calculating factor scores (160). Factor analysis is used to reduce a data set from a

group of interrelated variables to a smaller set of factors, explaining the maximum amount of common variance in a correlation matrix by the use of the smallest number of explanatory constructs (161). By using factor analysis one strives to reduce an R-matrix down to the underlying dimensions, looking for variables that seem to cluster together in a meaningful way. One looks for variables that correlate highly with a group of other variables, but not with variables outside the group. The factor loadings tell us about the relative contribution that a variable makes to a factor. The factor loadings can be correlation coefficients or regression coefficients. By orthogonal rotation one assumes that the underlying factors are independent and the values of the correlation coefficients are the same as the values of the regression coefficients. When the underlying factors are assumed to be related or correlated, one uses oblique rotation (160).

We used a principal component analysis (PCA) on the 16 variables with oblique rotation (oblimin) which supports improved factor loadings and better interpretability (Article III). Bartlett's test of sphericity was applied to verify if correlations between the variables were sufficiently large for the PCA. The number of components retained was based on Kaiser's criterion of Eigenvalue greater than 1, which represents a substantial amount of variation when the number of variables is less than 30. The factor loadings with an absolute value greater than 0.4 were considered to be significant (162). All the extracted components were standardised with mean zero and standard deviation equal to 1. Eight components explained 77.1% of the total variance. The components were used as dependent variables in a multivariate multiple linear regression (MMLR) analysis. The independent variables were GP's gender, age, specialty in family medicine, location and number of referrals recorded. A significance level of 0.05 was used for all statistical tests. IBM SPSS Version 22 was used for all statistical analyses.

3.3.2.3 Abduction

The term abduction is used for abductive reasoning, abductive inference or retroduction, a form of logical inference which goes from an observation to a theory which accounts for the observation, ideally seeking to find the simplest and most likely explanation og explanatory hypothesis (163). This technique was described by Umberto Eco in *The sign of three* (164), where he named four types of abduction: a) hypothesis or over-coded abduction, which may be thought of as interpreting already known codes or rules for further elucidation; b) under-coded abduction, where one selects the most fitting description from a series of explanations provided in current knowledge or from recent results; c) creative abduction, where the explanation must be invented in novo and d) meta-abduction which consists in deciding whether the possible notions outlined by the first-level abductions fits similar notions in reality. Abductive reasoning can be seen as a creative inference, involving integration and justification of ideas to develop new knowledge. In abductive reasoning, unlike deductive reasoning, the premises do not guarantee the conclusion. Diagnostic expert systems often employ abduction (165). I used an under-coded abduction to infer the most plausible constellations from combinations of the principal components, which we in paper II called the typologies. Fitting together the principal components I used my experiences as a general practitioner, PKO leader and researcher. Subtly this led me to the meta-abduction, deciding on whether the typologies outlined fitted the spectre of working strategies of GPs when referring. The naming of the typologies was done by me with input and contribution from my supervisors. Meta-abduction is crucial for bridging between results of the primary abduction and working concepts (164).

3.4 Ethical considerations

The study did not involve or affect patient treatment or logistics in hospital. No data contained patient information. All participants were orally informed about the study and those who volunteered to participate signed a written consent. Data analysis and results are presented anonymously in order to protect personal integrity of participants. The study was approved by the Patients' Ombudsman in Rogaland County, the Data Protection Official for Research (36315) and the Regional Committee for Medical and Health Research Ethics (REK 2013/1762). The study took place in accordance with the Helsinki Declaration, adopted 1964 and revised in 1975.

4. Summary of results

We found that GPs expressed strong feelings of responsibility towards the patient as well as the national health system. They also expressed positive attitudes to the professional relationship with hospital specialists, by willingness to change. Many GPs considered the referral process as asymmetric and sometimes humiliating. They saw the benefit of using templates in the referral process, but were sceptical to the use of mandatory fixed formats. Many GPs experienced pressure from the patients to be referred, especially the younger doctors who specified this as a frequent reason for a referral. They sometimes referred just to satisfy the patient, being afraid of losing a good doctor-patient relationship. Many also expressed a fear of sending inappropriate referrals, especially when these were the result of a demanding patient. A referral paper was described by many GPs as an invitation to a hospital specialist to participate in shared care about a patient or a medical problem. They often needed an advice and someone to be involved in a difficult case. The extended use of electronic communication have facilitated the referral process by making the communication faster, but we do not know whether or how this affects the quality of the process. More use of electronic decision support systems for the referring physicians can make the process more standardized and predictable for both senders and receivers.

The hospital specialists considered the assessment of referrals and prioritization of patients as important, and they emphasized the importance of precise referrals as essential for a reasonable and fair prioritization process. They also stated the importance of good communication and cooperation with the referring GPs. The consultants reported a considerable workload concerning the assessment of referrals from GPs and prioritizing patients for specialist services. Good referrals were considered to make the prioritization

process easier. The hospital specialists expressed a deep concern about securing a fair priority of patients and a willingness to give reasonable advice back to the referring GP when rejecting a referral. Better communication, such as a telephone call to confer with a hospital specialist before referring, was wanted.

We found eight principal components which describe the different ways GPs think and work when they refer. Two typologies summarize these components: *confidence* characterizing specialists in family medicine, mainly female, who reported a more patient-centred practice, making priority decisions when they refer, who confer easily with hospital consultants and who complete the referrals during the consultation, and *uncertainty* characterizing young, mainly male non-specialists in family medicine, experiencing patients' pressure to be referred, heavy workload, being reluctant to cooperate with the patient and reporting less contact with hospital colleagues.

5. Discussion

5.01. Reflexivity and preconceptions

In all research it is important to attend systematically to the context of knowledge construction at every step of the research process (159). As researchers we are active partners in this process, and as such sources also for biases. Preconceptions are all researchers' rucksack. This includes previous personal and professional experiences, pre-study beliefs about how things are, motivation for the research subjects and perspectives and theoretical foundations related to education and interests. My background has been an obvious challenge for the design of the study and for the analysis of the results. Having worked within the intercept between general practice and hospital specialist services for many years, these were my preconceptions for doing this research. It has therefore been a major concern for me to be aware of all possible biases and to have an open mind to any new knowledge (see Chapter 1.1 Background and preconceptions). An obvious bias has been my focus on problems and difficulties in the referral process for the senders and receivers. To overcome this bias I used open questions in the qualitative studies. In the questionnaire study in sub-study 3 I focused on various aspects in the referral process, whereas in the registration of referrals I retrospectively see an over-focus on problems and difficulties when referring, like patient pressure to be referred and heavy workload. A study on the positive and good things about referring might have given other results.

5.02. Aims and research questions

The theoretical frame of reference for this study and a main objective for my work as a researcher was to trace causes for some of the problems in this field and solutions for better communication between the actors, leading to better logistics and treatment for patients. This enthusiasm and engagement has been a driving force in my research, and may have influenced the choice of research questions and the interpretation of the results. The focus on problems and difficulties in communication and cooperation between GPs and hospital consultants and my search for new and better solutions for these problems may have coloured my information to and dialogue with the participants, creating a "problem-based" bias without enough space for a "problem-free" description of reality. On the other hand, in both the interview studies and the cross-sectional study I have included all kind of citations and showing results that give a broad spectre of this process.

5.03. Role in the collection of data

During the focus group and individual interviews. I was responsible for all information to the participating GPs and hospital specialists. Being a colleague and a known person for many of the participants, and having an agenda for a better referral process, the personal factor may have had an influence on the answers given as well as a positive impact on the response rate. Ideally there should have been an extra person present as a research assistant during these interviews. A research assistant could have taken the role of a moderator and a source for critical feedback. The possible biases of being alone in these interviews for the results are unknown. Meanwhile, all the interviews being tape-recorded and transcribed verbative immediately after the interviews and being analysed together with the co-authors represent a barrier to misunderstandings or misinterpretations.

5.1 Methodological considerations

5.1.1 Concept validity and study design

Validity describes the consideration whether the differences or associations found are true (166). In quantitative research concept validity assesses the degree to which the data reflect the variables that we want to study, but cannot register directly (167). A gap between conclusions drawn and data collected may indicate poor concept validity. A variable is valid if association is strong and data are relevant to the approach. Our variables were embedded in common understanding between colleagues in the milieus from which they were extracted. We used some of the findings from the two qualitative studies to design the statements in the questionnaire and the referral registration form in sub-study 3. These findings were about GPs uncertainty in the referral process and patients' pressure to be referred. By doing this we had the opportunity to collect quantitative data on the statements and results that we found in the first two sub-studies. The results in sub-study 3 match and support some of our findings in the first two sub-studies, like GPs uncertainty when referring and patients' pressure on doctors to be referred. Thus, we consider the concept validity for this study to be acceptable.

5.1.2 Internal validity

Internal validity describes to what degree the study provides a true estimate of the participants and the actual research questions (167). Did we manage to collect the true thoughts and feelings from our participants in the two qualitative studies, and did the GPs register the real experiences and actions when they referred, in sub-study 3?

Focus-group interviews are often a convenient research method to enlighten the broad perspective of thoughts, meanings and opinions among a group of participants. Especially when groups are homogenous, as we had with GPs who knew each other well, feeling a secure and safe setting to express their opinions and feeling, this strengthens the internal validity. As a general theme and a research subject the referral process is of major interest to most Norwegian GPs. Our CPD group members were eager to participate and debate. Some expressed strong feelings about the imbalance between GPs and hospital specialists, feeling like "secretaries" or "underdogs" in the health system. This indicates a realistic description of the various emotionally challenges and problems that GPs experience in the referral process. The advantage of using focus groups in this study is obvious, by doing the interviews in a regular setting in CPD group meetings. A possible bias in this sub-study could be an over-focus on problems and difficulties in the referral process, due to my preoccupation with problems in the referral process (see 1.1 Background and preconceptions), leaving us with results mainly concentrated on negative feelings and opinions. On the other hand, the participants' possibilities to suggest new solutions for a better process when referring also gave space for positive inputs. We therefore consider the statements and comments presented to be valid for the participants.

In part 2, I started the interviews with a presentation of the study and the main objectives, assuring total anonymity for the participants in all published material. Me being a person known to most of the hospital consultants as the leader of PKO, the interview-setting

appeared to be safe and relaxed. The hospital specialists supported the aims of the study, to find solutions for a better referral process. They told openly about their experiences with the referral assessment process from their own points of view, without the need of many closed questions. Some had rather harsh feelings about GPs who sent inappropriate or avoidable referrals, whereas others expressed general satisfaction with the referrals they received. The advantage of doing the ten individual interviews with the hospital consultants alone are mostly for practical reasons. The interviews had to be done during ordinary work-time in hospital with doctors being on duty and available for calls. This was timesaving for both parts, and made the interview setting realistic and effective. Being known to most of the participants was regarded as an advantage, to have honest and true statements. The inconvenience of this setting might have been a fear of personal exposition for the participants.

We did no *member check* (168) by presenting the written report to the participants for control. Still, the openness and frankness of the conversations indicates that the statements given are true and realistic. We therefore consider the views and statements of the participants as valid for their opinions about the referral process as receivers of referrals.

In all qualitative studies the role of the interviewer may have an impact on the interviews that has to be considered. The first author's preconceptions may have coloured the analysis and interpretation of results. The transcriptions from the audio-tapes were therefore done immediately after the interviews to prevent the loss of important information. The systematic text condensation and analyses were done according to Giorgi's method as modified by Malterud by me first and thereafter cross-checked by the second and third author Professor Anders Bærheim and PhD candidate and co-author Miriam Hartveit for accuracy and validity. By their reading of the transcriptions and making their own reflective analysis they have reduced the risks for fallacies and tautologies, to secure the meanings and impressions of the participants being presented in the results.

In sub-study 3 the collection of data was anonymous to secure honest and realistic answers and comments. Feedback from the participants supported the assumption of the questions and statements to be relevant and easy to score. The first four statements in the questionnaire focused on problems and uncertainty when referring. Having a special interest in communication in the referral process, GPs' workload and patients' pressure to be referred, these elements may have had an impact on the choice of questions and statements. Whether more positive and optimistic questions and statements would have given other components and typologies describing the referral process and the participants, we cannot tell. However, the opportunity for the participants to score low on these "negative" statements assures a valid picture of their opinions.

In the referral registration part we were not able to control whether all the referrals that the GPs sent during this month were recorded and scored. If the participants recorded only the referrals that they scored as "good" or problem-less, this might have given a biased picture of the process. However, the variations that we found in this material for the variables indicate that most or all kinds of the referrals sent were scored and that the internal validity therefore was satisfactory.

5.1.3 External validity

External validity describes to what degree the results can be generalized from the study participants to other populations (169), and thereby to be useful for others. In all research the number and sampling of participants is crucial for the general validity of the results (167, 170). Potential weaknesses are sample selection bias, information bias and statistical confounding having an impact on the results not to be representative for a bigger selection. The concept of pragmatic validity (168) is often used to describe the usefulness of the results (171, 172). We focused on recruiting participants of both genders and different ages in all three studies.

In our first sub-study the participants in the four CPD groups had a variety in age, gender and professional experience, from urban and rural practices. The referral theme was highly relevant for today's GPs, and we have no reason to believe that their opinions and experiences were different from other Norwegian colleagues'.

In sub-study 2 the hospital consultants represented eight different specialties purposefully selected among experienced hospital specialists who daily assess referrals from GPs. Although we had only two female consultants among the participants, we have no reason to consider the experiences and opinions about receiving and assessing referrals of our participants to be different from consultants at other Norwegian hospitals or hospital consultants in countries with similar systems.

In the last sub-study we would have preferred to have more participants collecting data when referring. In the questionnaire part, a possible bias could be an intra-class correlation if participants came from the same primary care centre. But, as the group participants came from different practices and centres, this possible bias was not considered to be relevant in

this study. The participating GPs represented 44.5 % of the members of the 23 CPD groups who volunteered to have information meetings about the study, or 11% of all the GPs in Rogaland County. Response rates from 42-61% are common in GP research studies (7, 144, 173). In our part of the country 40% of the GPs are female, 60% are specialists in general practice/family medicine. Among the non-participants we found that the proportion of specialists was lower than among the participants, whereas mean age and gender were similar to the participants, with no significant difference between the means of the groups. Comparing the mean scores for the 10 statements on the referral process, we found similar scores for the non-participants as for the participants. We did not record the number of consultations for the participants during the month of registration of referrals. By doing this, we would have been able to specify the individual referral rates for the GPs. Retrospectively this is a weakness for the study, limiting the analyses to the registered referrals instead of the referral rates. The number of referrals for the participants was not significant in the principal component analysis. We have no reason not to consider our participants to be representative for the whole group of 128 GPs, and the results not to be valid for Norwegian GPs who refer to hospital, as well as GPs in countries with similar health care systems, like Denmark, Netherlands and New Zealand.

5.2 The analyses

In the two qualitative studies the material was analysed by systematic text condensation as described by Malterud (158, 159). This four steps method is universally accepted and commonly used in similar quantitative studies (174, 175). At each of the four analytic steps we (OT, MH and AB) analysed the data individually and then contested each other's' analysis and reached a mutual basis for further analysis and final consensus about the results. Following this procedure we can rely on the most likely complete and transparent reporting.

In sub-study 3 we applied a principal component analysis (PCA). This is a statistical procedure which attempts to identify underlying variables explaining the pattern of correlations within a set of observed variables. It is often used in data reduction to identify a small number of components that explain most of the variance observed in a much larger number of manifest variables. The obtained components were used as dependent variables in the multiple linear regression analysis. We could do this because the principal components are independent quantitative variables. These are complicated analyses to perform and interpret, so professional statistical assistance is mandatory for securing quality and reliability of results. Therefor all statistical analyses and conclusions were quality assured by professional statisticians (Jörn Schulz and Geir Egil Eide).

Abduction (176) was used on the quantitative results to identify the typologies. Abductive reasoning can be seen as a creative inference, involving integration and interpretation of ideas to develop new knowledge. In abductive reasoning the premises do not guarantee the conclusion, as they may be under-coded, but can ensure a pragmatic validity (167). I used an under-coded abduction to infer the most plausible constellations from combinations of the principal components, and we called these the typologies. It's not certain whether our typologies are the best combinations, and if they are valid requires further testing.

Fitting together the principal components I used my experiences as a general practitioner, PKO leader and researcher. Subtly this led me to the meta-abduction, deciding on whether the typologies outlined fitted the spectre of working strategies of GPs when referring. The naming of the typologies was done by me with input and contribution from my supervisors. Meta-abduction is crucial for bridging between results of the primary abduction and working concepts (161).

5.3 Discussion of results

In the first two sub-studies we found that both GPs and hospital consultants expressed a mutual responsibility towards the patient as well as the national health system. The referral process was however not balanced, but by many GPs considered as asymmetric and sometimes humiliating. Other studies have unveiled the same, showing a lack of respect for GPs by specialist colleagues, being as a challenge for family medicine (144, 177-179). The possibility of a referral to be rejected because of being poorly formulated or not justified, eventually because the specialist refuses to follow the request from the referring GP, can easily lead to a relationship described as asymmetric or top-down. The "underdog" position described in our first study has also been described by Manca, who found that GPs felt overwhelmed by the workload when specialists imposed upon them new procedures without any negotiations (180). The difference in assessment of timeliness and urgency was another area where GPs felt overrun (177). The GPs we interviewed expressed positive attitudes to the professional relationship with hospital specialists, by willingness to change. Better communication and personal relationships between GPs and hospital specialists, facilitating a more comprehensive culture has been suggested by others to improve this imbalance (10, 70, 119, 179). During the last years we have seen more use of electronic decision support systems for the referring physicians, which can make this process more standardized and predictable for both partners (68, 71, 79).

The interview study with the hospital specialists confirmed some of the findings in our first sub-study with GPs. Many referrals were regarded as unnecessary, meaning that the problem could be handled by the GP. In many other studies hospital specialists have reported inadequate and unnecessary referrals (58, 144, 181-184). Our hospital doctors shared this opinion.

Both GPs and consultants wanted an easier and smoother communication about difficult medical problems, by telephone, e-mail or personal contact, before or eventually instead of sending a referral, which supports other studies (185).

Finally, in the last sub-study, we found principal components which describe the different ways that GPs think and work when they refer. Studies on professional typologies have been done for nurses and hospital specialist (9, 186). Our two typologies contain components and factors in the referral process studied by others, supporting some of these elements (65, 69, 70, 144), without showing the whole picture (the typology) like we did. As no similar research on typologies of GPs' referral practice has been done before, further research on these components needs to be done.

6. Conclusion

Many factors have an impact on the referral process and the individual referral rates. Better communication and cooperation by phone or electronically between hospital consultants and GPs are important factors to make the referral process more balanced, and the participants more like partners. More use of electronic decision support systems for the referring physicians can make this process more standardized and predictable for both partners. More professional competence and personal confidence as well as a more patient-centred way of referring, making priority decisions and completing the referrals during the consultation may be time-sparing and associated with less work-load. Educating and training GPs in professional competence and personal confidence as well as a more patient-centred way of referring, making priority decisions and completing the referrals during the consultation may be time-sparing for the actors and can be associated with less work-load.

7. Future perspectives

This study indicates a need for more training of GPs in patient-centred methods, better cooperation with patients when referring and easier conference with hospital consultants. This may foster more self-reflection on own competences and increased levels of confidence. Better electronic communication with a possibility to transfer pictures, ECGs etc. between GPs and hospital specialists may change the landscape and communication in the referral process. More use of electronic decision support systems for referring may have a considerable impact on both the quality of the referrals and referral rates. One common electronic medical record (EMR) available for all health personnel in charge of the patient may solve many of the problems that we see today.

Since we did not include patients or explore the medical outcome of their clinical pathways, a new study, including patients, their opinions and experiences from the first meeting with the GP until they see the hospital consultant would be very interesting to perform. Exploring the impact of the quality of referrals on the patients' clinical pathways and health after being referred would be challenging, but was not possible to realize in this study.

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9. Errata

10. Appendices

10.1 Samtykkeskjema

UNIVERSITETET I BERGEN
Institutt for global helse og samfunnsmedisin

Om forskningsprosjektet *«Henvisninger fra allmennleger til sykehus - holdninger, ønsker og muligheter»*

Bakgrunn og formål
Formålet med denne studien er å se på henvisningsprosessen, hvilken betydning henvisningene har for et godt pasientforløp og hvilke muligheter man har for å gjøre denne prosessen mer smidig og sømløs. Studien er en del av et doktorgradsarbeid, hvor Universitetet i Bergen og Stavanger Universitetssjukehus samarbeider. Overlege dr. med Lars Fosse, SUS er medforsker i studien.

Hva innebærer deltakelse i studien?
Deltakelse betyr at du registrerer noen data i henvisningsprosessen. Disse blir samlet inn og registrert i en lukket database, for å bli analysert av driftsansvarlig lege (OT).

Hva skjer med informasjonen om deg?
Alle personopplysninger blir behandlet konfidensielt. Kun prosjektansvarlig (OT) lege har tilgang til disse data, som blir oppbevart atskilt fra andre databaser og med egen tilgangs-nøkkel. Ingen deltakere vil kunne gjenkjennes i publikasjoner eller presentasjoner. Prosjektet skal avsluttes 31.12.14. Alle personidentifiserbare data blir slettet etter bruk.

Frivillig deltakelse
Det er frivillig å delta i studien, og du kan når som helst trekke ditt samtykke uten å oppgi noen grunn. Alle opplysninger om deg blir anonymisert. Dersom du har spørsmål til studien, ta kontakt med Olav Thorsen (OT) på mobilnummer 913 16 476 eller e-post tola@sus.no

Studien er godkjent av Personvernombudet for forskning, Norsk samfunnsvitenskapelig datatjeneste

Takk for at du vil delta!

Olav Thorsen	*Lars Fosse*	*Anders Bærheim*	*Jan Olav Johannessen*
Spes. allmennmedisin	Overlege, Dr. med	Professor, Dr. med.	Professor Dr. Phil.

Samtykke til deltakelse i studien

Jeg har mottatt informasjon om studien, og er villig til å delta

---

(Signert av prosjektdeltaker, dato)

Postadresse:
P.b. 7804
5020 Bergen

Besøksadresse:
Kalfarveien 31
5018 Bergen

UNIVERSITETET I BERGEN
Institutt for global helse og samfunnsmedisin

Siste nytt om forskningsprosjektet *«Henvisninger fra allmennleger til sykehus - holdninger, ønsker og muligheter»*

Kjære kollega

Takk for at du ville delta i registreringen av henvisninger.

Vi har nå mottatt registreringsskjema for nær halvparten av deltakerne. Det er viktig å få inn flest mulig skjema for å få korrekte data, og vi ber derfor om at du sender inn ditt dersom du ikke har gjort det allerede.

Hvis du har forlagt eller mistet ditt skjema kan jeg sende deg et nytt. Dersom du har spørsmål til studien, ta kontakt med meg på mobilnummer 913 16 476 eller e-post tola@isus.no

Studien er godkjent av Personvernombudet for forskning, Norsk samfunnsvitenskapelig datatjeneste

Takk for at du vil delta!

Olav Thorsen	***Lars Fosse***	***Anders Bærheim***	***Jan Olav Johannessen***
Spes. allmennmed	Overlege, Dr. med	Professor, Dr. med.	Professor Dr. Phil.

Postadresse:
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10.2 Spørreskjema om henvisningsprosessen på fokusgrupper i delstudie 3

Studien gjelder pasienter som henvises til sykehus, ikke øyeblikkelig hjelp.

Først noen opplysninger om deg:

Mann |_| Kvinne |_| Alder: |__|__| Spesialist i allmennmedisin Ja |_| Nei |_|

I hvilken grad kjenner du deg igjen i disse utsagnene?

(sett en et merke på streken)

1. **Jeg synes jeg ofte bruker veldig mye tid og arbeid på henvisningene.**

Helt uenig |----------| Helt enig

2. **Jeg vet ofte ikke hvilke opplysninger som forventes i en god henvisning til sykehuset.**

Helt uenig |----------| Helt enig

3. **Jeg er ofte redd for at henvisningen skal komme i retur, ikke bli godkjent.**

Helt uenig |----------| Helt enig

4. **Jeg er ofte redd for at henvisningen skal gi inntrykk av at jeg ikke er flink nok, at jeg ikke vet nok om den aktuelle problemstillingen.**

Helt uenig |----------| Helt enig

5. **Det er lett å komme i kontakt med en sykehusspesialist når jeg trenger det.**

Helt uenig |----------| Helt enig

6. **En del henvisninger kunne vært unngått dersom jeg hadde fått kontakt med en sykehusspesialist der og da, på telefonen eller på annen måte.**

Helt uenig |----------| Helt enig

Vend!

7. **Jeg gjør vanligvis henvisningen ferdig mens pasienten er til stede i konsultasjonen.**

Helt uenig |----------| Helt enig

8. **Pasientens deltakelse og meninger er viktig når jeg henviser.**

Helt uenig |----------| Helt enig

9. **Jeg mener det er viktig at pasienten får innsyn i eller kopi av henvisningen.**

Helt uenig |----------| Helt enig

10. **Jeg tror at det å gi pasienten en kopi av henvisningen høyner kvaliteten på henvisningen.**

Helt uenig |----------| Helt enig

11. **Jeg foretrekker/ønsker å kommunisere med sykehusspesialist**
(i prioritert rekkefølge fra 1-4)

|__| Per telefon

|__| Digitalt (kryptert e-post)

|__| SMS

|__| Annet (beskriv):……

Tusen takk for hjelpen!

10.3 Registreringsskjema for henvisninger til sykehus – delstudie 3

Skjema ved henvising til sykehus: Vi ber deg registrere alle henvisningene (ikke øyeblikkelig hjelp) som sendes til SUS i løpet av en måned.
Utfylt skjema (3011) sendes i returkonvolutt til Olav Thorsen, Forskningens Hus, PB 8100, 4068 Stavanger

Dato:	Pasient:			Enkel eller vanskelig henvisning å lage? (1-10) 1 = veldig enkel, lett 10 = veldig vanskelig	Hvis vanskelig, var det pga. (angi gjerne flere): K = vanskelig kommunikasjon med pasienten U=uklar tilstand F = faglig usikkerhet A = annet(skriv)	I hvilken grad følte du deg presset av pasienten til å henvise? (fra 1-10) 1 = ikke i det hele tatt 10 = i svært stor grad	Prioritering satt i henvisningen: 1=prioritert pasient 2=rett til helsehjelp 3=ikke rett til vurdering i sykehus 0=ingen angivelse	Forslag til maksimal ventetid i henvisningen (uker) 0=ingen forslag til ventetid	Konfererte eller ringte du sykehus-lege før du henviste? 1 = Ja, 2 = Nei 3 =Forsøkte, men fikk ikke kontakt	Hvor mange minutter brukte du på arbeidet med selve henvisningen?
	Fødselsår:	Kjønn: M/K	Diagnose: ICPC2							

11. Original papers

Paper I

Scandinavian Journal of Primary Health Care, 2012; Early Online: 1–6

ORIGINAL ARTICLE

General practitioners' reflections on referring: An asymmetric or non-dialogical process?

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Abstract

Objective. Identify and describe general practitioners' (GPs') reflections on and attitudes to the referral process and cooperation with hospital specialists. *Design.* Qualitative study using semi-structured focus-group interviews with GPs analysed using Giorgi's method as modified by Malterud. *Setting.* Interviews conducted over four months from November 2010 to February 2011. *Subjects.* 17 female and 14 male GPs aged 29 to 61 years from 21 different practices, who had practised for 3–35 years. *Main outcome measures.* Description of GPs' views on the referral process. *Results.* GPs wished for improved dialogue with the hospital specialists. The referral process was often considered as asymmetric and sometimes humiliating. GPs saw the benefit of using templates in the referral process, but were sceptical concerning the use of mandatory fixed formats. *Conclusions.* The referral process is essential for good patient care between general practice and specialist services. GPs consider referring as asymmetric and sometimes humiliating. The dichotomy between the wish for mutual dialogue and the convenience of using templates should be kept in mind when assuring quality of the referral process.

Key Words: *Family practice, general practice, general practitioner, Norway, qualitative research, referral process*

Introduction

In most Western countries, we have two levels of care, the primary health system with general practitioners (GPs) and hospital specialist health care. Communication from GPs to hospital takes place mostly in terms of a referral letter. This describes a wish or need for a further examination or treatment of the patient that the GP cannot give, and is the document that hospital specialists use for the assessment of necessary medical examination and to prioritize patients for treatment in hospital. In Norway, a country with five million inhabitants and four thousand general practitioners, the GPs produce approximately 1.9 million referrals per year to the specialist health care services [1]. In 2011 there were over 280 000 persons on waiting lists for assessment and treatment [2].

Research shows that referral patterns and rates vary greatly [3]. Possible reasons for this may be: characteristics of the patient (age, gender, social, education, occupation), pressure from and expectations of patients, characteristics of the physician (age, gender, years in practice, size of practice, belief in self-knowledge, willingness to deal with uncertainty), organization of medical practice, the number of consultations and list size, access to specialists and assessment of necessity and relevance for examinations and treatment. National laws and regulations may also have imperative impacts on the referral process, waiting times and clinical pathways for patients [4].

Hospital doctors have complained about the poor quality of referral letters [5], and have claimed that this, among other things, may lead to longer waiting times for investigations and treatments in hospital, with implications for the health and well-being of the patients [6]. Many hospitals have long waiting lists for examinations and treatment. Studies on the referral process have shown that there is a considerable potential for quality improvement in this area [7]. So far no definite correlation has been found between the quality of referrals and the final outcome of treatment in hospital. Training and guidance from hospital specialists are proved to have a positive influence on making general practitioners better equipped to provide medical treatment through increased confidence

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- The referral letter represents a wish or need for an examination or treatment that the GP cannot give the patient.
- GPs want improved dialogue with the hospital specialists.
- GPs see referring as asymmetric and sometimes humiliating.
- Referral templates can be useful, but not as mandatory fixed formats.

in their own knowledge [8]. Exercises in procedures and use of clinical guidelines are helpful in the referral decision [9]. The number of inappropriate referrals can be reduced through postgraduate training and the establishment of formal and informal communication channels between GPs and hospital specialists [10–12]. Continuous medical education can have a significant impact on diagnosis, treatment and referral practice. Based on this knowledge, many aspects of the referral process need to be further elucidated, as regards both sending and receiving. In our study we have focused upon the sender. The aim was to identify and describe general practitioners' (GPs') reflections on and attitudes to the referral process and cooperation with the hospital specialists.

Material and methods

We used focus-group interviews [13] to obtain data regarding views on the referral process from a strategic sample of Norwegian GPs after having received their informed consent. This was achieved after recruiting four separate groups of GPs in 2010 by e-mail to the leaders of certification and re-certification groups for the speciality of general practice in the southern part of Rogaland County in Norway. A total of 31 GPs (17 female and 14 male) aged 29 to 61 years from 21 different practices, who had practised for three to 35 years, volunteered to participate. Two of the groups consisted of experienced GPs from the city of Stavanger (130 000 inhabitants), one group consisted of young GP speciality candidates from the whole region, and one group comprised experienced general practitioners from rural practices. To obtain a range of views, GPs of different experiences, practice types, and locations were sampled until sufficient data were collected for saturation to occur [14]. The first author conducted the interviews during the period from November 2010 to February 2011. He informed participants about the study, and invited them to an open discussion regarding the referral process and different aspects of content and structure of the referral letter. The interviews lasted 1–2 hours, and were audio-recorded and fully transcribed verbatim. The data were analysed by systematic text condensation using Giorgi's phenomenological method as modified by Malterud [15]:

(1) getting an overall impression;
(2) identifying meaning units and coding relevant elements for the referring process;
(3) abstracting the individual meaning units;
(4) summarizing and labelling the GPs' views, searching the entire transcripts for accuracy.

At each of the four analytic steps, the three authors first analysed the data individually and then contested each other's analysis and reached a mutual basis for further analysis and final consensus on the results.

Results

Referring is not a simple mechanical process, but a complex interaction influenced by different factors. We found that GPs are using the referral letter for different purposes: a request or requisition for a special diagnostic assessment or medical treatment that the GP cannot perform him/herself for his/her patient, an invitation to have a second opinion on a clinical problem, and a wish for mutual responsibility for the medical handling of a patient.

GPs and responsibility in the health system

The GPs expressed a responsibility towards both the patient and the medical system. It is important when making specifications for referrals to consider the workload related to these. GPs are facing long waiting lists for hospital examinations and treatment, and therefore try to avoid unnecessary referrals. They sometimes felt squeezed between the patients' wants and the professional considerations of a clinical problem. Several GPs mentioned pressure from the patient as a reason to refer. One of the younger GPs said:

> If a patient urges me to make a referral, I do so instead of arguing with the patient. (Male, 34 years)

The younger doctors in particular mentioned this as a reason for a referral. They refer to satisfying the patient, and being afraid of losing a good doctor–patient relationship.

> You refer to satisfy the patient. Otherwise you may ruin the good doctor–patient relationship. (Female, 33 years)

The doctors who worked at a longer distance from hospital (more than 30 km or 30 minutes' drive)

experienced more often that patients prefer to have an assessment or treatment locally, rather than having to travel to a hospital specialist.

An asymmetric process

Many of the GPs expressed a feeling of an asymmetric process regarding referring. The relationship between hospital specialists and GPs was described as top-down. This appears in several of the interviews. Many felt that new clinical pathways and administrative procedures were forced upon them, and that they had not been included in the decisions concerning the necessary information in the referrals. GPs described the referral process as secretarial work for the hospital doctor. One of the experienced GPs described this as:

> There is something hierarchical about it. It seems like some hospital specialists think that the GPs are further down in the system and literally do preliminary work, to make the job easier for them. (Male, 55 years)

The fact that a referral letter can be rejected leaves the feeling that this was done pro-forma and not as genuine dialogue. Having a referral letter back with a following letter indicating low quality or missing information was regarded by many as humiliating. One of the experienced GPs said:

> You refer because you don't manage something. If you have the referral refused, you are left empty-handed. It's nice to have a proposal on what to do next. (Female, 52 years old)

There was a fear of sending inappropriate referrals, especially when these were the result of patient demands. There was also frustration concerning information in the referrals not being read, i.e. when hospital specialists ask for information that is already in the referral letter. It is considered a professional imbalance when the referring doctor expresses a need for speedy or urgent help, and the hospital specialist puts the patient on a long waiting list.

The use of templates and prompts

GPs are often uncertain about what is needed or expected in the referral letter. They confirmed that the problem concerning referrals can be addressed in clearer and more accurate ways. Templates, prompts and help guides for referrals are widely considered to be helpful. These can make the referral process easier, and are useful as checklists. Most of the GPs preferred templates presented as pop-up menus or help lists, not as mandatory forms for referrals. They can be useful reminders, to avoid the loss of important information in the referral. Such templates must be made in a mutual setting by representatives from the two groups, hospital specialists and GPs. A few GPs used non-standardized, free-form referral letters. All the GPs expressed the importance of a complete referral, along with the necessary information that allows for a good assessment by the receiver. An experienced GP expressed it like this:

> If the specialists can give us the answers to specific questions, it makes the process faster, and makes it easier to manage the investigations or treatment that the patient should have. (Male, 55 years)

Desire for a good dialogue

A referral is described by many GPs as an invitation to participate in shared care in terms of a patient or a medical problem. GPs often need advice and someone to be involved in the patient's care. The term dialogue is used by many, or descriptions such as a request for a common assessment, feedback, or viewpoint. Many referrals are a request for a second opinion or advice on further investigation or treatment in a difficult case.

> They can refuse a referral, but there is also a responsibility to guide me further. (Male, 49 years)

Many GPs expressed a wish for easier dialogue with the hospital specialist, electronically or by a phone call. Especially in urgent situations, the need for quick advice is highly valued. Being able to get a quick here-and-now answer or advice was said to avoid many referral letters and to reduce the number of admissions to hospital. One GP described the good referral process as mutual. There was a common agreement that when the hospital specialists need more information about a patient who is being referred, this can best be done through a phone call or an e-mail.

The GPs expressed a willingness to change, according to guidelines, as long as such guidelines are the result of consensus between the hospital specialists and the general practitioners. GPs wanted to know precisely what information is needed in the referral letter. Having specific advice for further investigation or treatment is considered a useful learning process. The hospital doctor calling the referring GP to ask for more information about a patient is perceived as desirable. It can clear up misunderstandings, and give the

patient higher priority. Electronic messaging is expected to replace many such calls. Inaccessibility by phone may be a mutual obstacle for professional dialogue. An experienced GP said:

> If I don't get a specialist on the phone, that's why I choose to refer, although this could have been solved on the phone. (Female 53 years)

Discussion

The referral process is complex and multidimensional, with medical, interpersonal, logistical, and legal, as well as indeterminate aspects. In our study the GPs expressed positive attitudes to the professional relationship with hospital specialists, by willingness to change. The referral process is often considered as asymmetric and sometimes humiliating. GPs see the benefit of using templates in the referral process, but are sceptical about the use of mandatory fixed formats. The extended use of electronic communication may facilitate the referral process by making communication faster, but we do not know whether or how this affects the quality of the process. This should be further investigated.

The referral letter, as an entrance ticket to hospital services, gives the GP a gatekeeper role, as described in many studies [16,17]. This role, similar to the role as the patient's defence attorney, sometimes puts the GP in a compromised position that can explain some of the reasons for the variations in referral rates between GPs. In a health system with restricted resources and long waiting times for specialist services, the responsibility and commitment to the community health system is strong, and may sometimes collide with the patients' and his/her own wishes to have a superior viewpoint or assessment for a medical problem.

The referral letter is the basis for the specialist's assessment of the patient's rights or needs to have an examination or treatment in hospital and for the prioritizing of the patients. It can also be a wish for a second opinion on a diagnosis or advice for treatment from a specialist in the actual field. We found that GPs expressed positive attitudes to the professional relationship with hospital specialists. They described the referring as a learning process. This interactive process should be balanced and mutual. The respect for each other's work situation is mandatory for balanced communication. In the Canadian RESPECT study [18], Manca concludes that this can be improved by creating better relationships between GPs and hospital specialists by supporting each other's roles, by enhancing the profile of family medicine in universities and teaching hospitals, and by changing negative attitudes by promoting the expertise and role of family medicine to others. In our material, the GPs focused on more use of electronic mail to facilitate an easier means of communication than the more old-fashioned sending of letters.

Several studies have unveiled a lack of respect for GPs by specialist colleagues [19–22] as a challenge for family medicine. The referral can be rejected because it is poorly formulated or justified, ultimately because the specialist refuses to follow the request from the referring GP. This can easily lead to a relationship described as asymmetric or top-down. The "underdog" position described in our study is also described by Manca [18], who found that GPs felt overwhelmed by the workload when specialists imposed upon them new procedures without any negotiations. The difference in assessment of timeliness and urgency is another area where GPs feel overrun [19]. Better communication and personal relationships between GPs and hospital specialists facilitating a more comprehensive culture can improve this imbalance [22].

GPs see help menus, prompts, and templates as practical tools in the referring process. In other studies the extended use of templates and prompts related to specific medical problems and diagnoses is recommended to improve doctors' letters and to reduce waits and delays [23,24]. Many GPs are, however sceptical about mandatory templates. The freedom to use one's own words is assessed highly. The making and implementation of new recommendations, guidelines, or templates for referring should be made in cooperation between senders and receivers of referrals [21]. This is important professional and educational work to secure the quality of the referral process and clinical pathways for patients, and it should reflect both the mutual responsibility for the patient and the most effective level of care.

The GP is often in a squeezed position between the patient with a demand for a referral to a hospital specialist, and the unease felt when sending an inappropriate or unnecessary referral letter. Younger doctors especially expressed this, being afraid of losing a good relationship with the patient or perhaps not detecting a difficult disease or diagnosis. The special work situation in general practice, often being alone with clinical problems and with little experience, makes it more convenient to refer a patient to a specialist in a hospital. Rural doctors expressed less pressure on referring, a fact shown by other studies. A Canadian study showed a more than sevenfold difference in being referred to hospital for similar case scenarios between rural and city doctors [25]. This is explained as being for both cultural and practical reasons. The shorter distance to hospital, the more demands or wishes for a specialist assessment from the patients.

Other researchers have used patients' expectations and views upon being referred as an interesting and useful dimension in the public's opinion on referring [26,27]. In this study only GPs' views and attitudes were explored. It can be argued that if we had included hospital specialists we might have got a more balanced picture of the process. This should be further investigated. Interviewing both experienced and younger GPs working in a city or in rural districts makes our results more valid. The use of open questions has revealed important concepts that may be further investigated. Other interesting subjects might be ignored in studies based on focus-group interviews. The first author has been working within this field for many years, and is known to many of the interviewed colleagues. In qualitative studies the role of the interviewer may have an impact on the focus-group interviews that has to be considered. In addition, the first author's preconceptions may have coloured the analysis and interpretation of results. The second and third authors, living in other parts of the country and not knowing the interviewed persons, have by their reading of the transcriptions and making their own reflective analysis reduced the risks for fallacies and tautologies.

Conclusions

The referral process is essential for good patient care between general practice and specialist services. GPs consider referring as asymmetric and sometimes humiliating. The dichotomy between the wish for mutual dialogue and the convenience of using templates should be kept in mind when assuring the quality of the referral process.

Ethics

According to the Regional Committee for Medical and Health Research Ethics, Western Norway, the Act does not apply to this project (2011/1120/REK vest).

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Conflicts of interests

The authors declare no conflict of interests. The authors alone are responsible for the content and writing of the paper.

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Paper II

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RESEARCH ARTICLE Open Access

The consultants' role in the referring process with general practitioners: partners or adjudicators? a qualitative study

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Abstract

Background: Within the health system, communication between the different levels of care is essential for the patients' clinical pathways and medical treatment. This includes the referral process: how and why patients are sent from the primary care level to specialist health services. We wanted to identify and describe hospital consultants' reflections on and attitudes to the referral process and cooperation with general practitioners (GPs).

Methods: A qualitative study of semi-structured interviews with 13 hospital consultants representing eight different specialties, analyzed using systematic text condensation. Interviews conducted from February 2011 to October 2012.

Results: The consultants reported a considerable workload assessing referrals from GPs and prioritizing patients for specialist services. National guidelines were used as well as individual standards and guidelines. Good referrals could make the prioritization process easier. The specialists expressed a deep concern about securing a fair priority of patients and a willingness to give reasonable advice back to the referring GP when rejecting a referral. Better communication, such as a telephone call to confer with a hospital specialist before referral, was wanted.

Conclusions: Better communication and cooperation between hospital consultants and GPs could make the referral process more balanced, and the participants more like partners.

Background

The benefits of well-functioning primary care as the basis of a health system are abundant and consistent. Countries with health services based upon general practitioners (GPs) taking care of most medical problems of the population have both more equitable distribution of and more cost-effective health services [1]. Within the health system, communication between the different levels of care is essential for the patients' clinical pathways and medical treatment. This includes the referral process: how and why patients are sent from the primary care level to specialist health services.

The referral system has a long tradition in many countries. Referral rates have been accelerating in many countries during the past decade, and the consequences are more use of specialist services and greater expenditure on health. The increasing referral rates and the reasons for these trends have been the subjects of many studies [2-7]. In the USA, from 1999 to 2009, the probability that an ambulatory visit to a physician would result in a referral to another physician increased by 94% from 4.8 to 9.3% [2]. The reasons for this situation are many, such as greater availability of specialty care, cultural changes, new national laws and regulations, more insecurity and uncertainty among GPs, especially the youngest, and patients' increasing demands for specialist health services [3]. There are no internationally accepted guidelines for referral to specialists. The referral of patients is driven primarily by physician practice patterns [5]. The use of electronic referrals and online consultations accelerates the speed of communication and facilitates the logistics. This may reduce the need for patient–consultant meetings [6].

The consultants are the gate openers to the clinical pathways in hospitals [8]. When assessing referrals from GPs, either the consultants prioritize patients for further examination or treatment in specialist health services, or

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reject the referral. The referral process is composed of different stages, based on the sequence and purpose of events and tasks: (1) the consideration and decision to refer a patient to specialist health services; (2) the submission of the referral request and the referral review by the consultant; and (3) the patient transition into specialty care. The hospital consultants assess appropriateness, timeliness and completeness; a process that sometimes requires additional information. The referral can either be accepted and the patient given a scheduled appointment, rejected, or sometimes deferred for further discussion with another consultant. Acceptance triggers a series of steps to coordinate patient transition into the specialty setting, including communication with patients to schedule appointments, eventually followed by appointment reminders. Except for urgent cases, the GP's recommendation or wish for specialist care within a certain time can be overruled by the consultant.

In 2011, we conducted a study on GPs' thoughts and feelings about referral. This showed that GPs often felt humiliated and embarrassed, and had a wish for better communication and mutual understanding about the referral process [9]. In this study our aim was to investigate and identify hospital consultants' reflections on and attitudes to the referral process and cooperation with the referring GPs.

Methods

We conducted a qualitative study, based on semi-structured interviews. The first author interviewed a purposive sample of 13 experienced hospital consultants (two female and 11 male; aged 40–63 years) representing eight different specialties at Stavanger University Hospital, which covers 350,000 inhabitants in the South-western part of Norway. The specialists (three psychiatrists, one cardiologist, two orthopedic surgeons, two gynecologists, one pediatrician, one vascular surgeon, one gastroenterologist, and two general surgeons) were among those who received most referrals from GPs. We aimed for diversity in age, sex and specialties. In three of the interviews (orthopedics, gynecology, and general surgery) two consultants participated together. The hospital specialists were recruited until saturation was reached [10]. We used open questions about their work with and thoughts about the assessment of referrals from GPs, and how they used them to prioritize patients for further examinations and treatment in hospital. The 10 interviews lasted for 1 h each, and took place from February 2011 to October 2012. The first author informed the participating consultants about the study and conducted the interviews. All interviews were fully transcribed verbatim. The transcripts were analyzed by systematic text condensation [11]: (1) obtaining an overall impression; (2) identifying and sorting meaning units; (3) condensation – from code to meaning; and (4) synthesizing – into descriptions and concepts. At each of the four analytical steps, the three authors first analyzed the data individually and then contested each other's analysis and reached a mutual basis for further analysis and final consensus.

Results

The workload of assessing referrals

All the 13 respondents stated that the workload of assessing referrals and prioritizing patients for further investigation and treatment was considerable. Some consultants required several hours per week, and sometimes a whole day. The number of referrals for assessment could rise to 150 per week. The time spent on each referral varied from 30 s to 10 min, depending on the case. Several said that they received many unnecessary referrals. All agreed on the importance of the quality of the referral on reducing the workload related to prioritizing patients.

> *"We do an immense work in assessing referrals and to prioritize patients. Anything that can make this workload easier is positive!"* (Consultant 2)

If information was incomplete, it was important to determine the purpose of the referral to secure a fair prioritization. Incomplete referrals were not an acceptable reason for rejection. To reject a referral took more time than just accepting the patient onto the waiting list.

The quality of referrals

All the respondents had specific ideas about what they wanted in a referral, and according to these, the referrals were described as good, insufficient or bad. Other descriptions of referrals were "vague" and "imprecise", and the consultants were sometimes unsure as to whether the GPs themselves were aware of what they were asking. Some said that the referrals were generally not good; that they rarely received very good referrals and that many were insufficient and missing information about previous treatments, actual life situation, an accurate description of the symptoms and the patient's motivation for treatment. It could also be difficult to discover the actual health problem and the severity of the case. Sometimes they observed a "cut and paste" from previous records, old notes and consultations that they had to scroll through to find the actual issue. Referrals should be more precise, to the point, and less cut and paste. The most important factor was to have a clear order, with symptoms and diagnoses, actual medication, and specific wishes.

> *"We receive unnecessary referrals from GPs who are clearly not updated on particular issues. Many referrals are good and complete, but some are*

incomplete, especially from young doctors and doctors with different cultural backgrounds." (Consultant 6)

Some expressed personal opinions of referring physicians. One said:

"You have a bunch of colleagues out there where you know the quality of referrals is bad, either really short or just an enumeration of the entire medical record, where you have to find out yourself. We know quite a few colleagues out there who refer very easily. We dislike that!" (Consultant 8)

Several called for special templates for referrals that would contain mandatory information. Some had made their own guidelines and forms for special problems and diagnoses. Most referrals were sent electronically, and sometimes this made the referrals better, but they could still be more precise and accurate. Many stated that the GPs should do more before referring, for example X-rays or blood tests.

The process of prioritizing

None of the consultants had any formal training in assessing referrals. It was something that they learned by themselves. The respondents said that the assessments and prioritizations could differ depending on who did it, but only the psychiatrists said that they consulted other colleagues when in doubt.

All respondents considered the assessment of referrals and prioritization of patients as important, and all emphasized the importance of precise referrals as essential for a reasonable and fair prioritization process. Many felt that the decisions meant a lot to the patients. The national guidelines for prioritization [12] should be followed. They were introduced to enable better prioritization; otherwise long waiting lists and the lack of finances and resources effectively reduced the capacity to accept all the patients who wanted a specialist assessment.

To give the patient the right priority it was important to obtain the correct interpretation of the referral. If in doubt, many of the respondents said that they rather wanted to see the patient instead of seeking supplementary information from the referring GP.

"To assess a patient's need for medical treatment is demanding, especially if you have to reject them. You have a person who you think needs help, but he does not fit the necessary criteria. So you have to reject, and this is a stressful job to do, to say no to someone. So the best thing is to get enough information." (Consultant 5)

If the consultant found that further investigation or treatment was unnecessary or contraindicated, they felt a responsibility to provide an oral or written explanation to the referring doctor. To reject a referral was not easy, and it was supposed to cause much discomfort to the patients. Not to be accepted could be embarrassing and humiliating for the patient, and this was sometimes a reason for the consultant to accept a referral that would normally be rejected. A rejection should be justified in a careful manner both to the patient and the referring GP. Several said that they owed to the patient and the GP that they did a thorough job. Some said that they always wrote a personal letter to the GP to justify the rejection of a referral, including a suggestion for further treatment or follow-up. The referring GP's suggestion or wish for a maximum waiting time was overruled by the consultants' prioritization of these patients.

The relationship between consultants and GPs

All the interviewed consultants expressed the importance of good communication and cooperation with the referring GPs. One said that he felt like a judge with little experience. Many said that the GP should more often make a telephone call and confer with a hospital specialist before referring a patient. This was useful, but they did not experience that the GPs did this often.

"One could avoid many referrals if the GPs called us and clarified the issues before referring." (Consultant 4)

The respondents said that they seldom contacted the GPs for additional information; mostly because this took time. It was discouraging when they were not able to get in touch with the GP on the telephone. Some were reluctant to call the referring GP if this could be interpreted as criticism. Several specified their role as consultants, and not as one taking over the total responsibility for treatment. At the same time they emphasized the GPs' responsibility for the patients during the waiting time for specialist services.

Discussion

Our findings confirm the importance of smooth and seamless cooperation in the referral process. All of the respondents reported a considerable workload assessing referrals from GPs and prioritizing patients for specialist services. This work was considered important in providing patients with a fair and reasonable waiting time for further investigations and treatment. The national guidelines were used, as well as individual standards and guidelines. Good referrals were said to make the prioritization process easier. The consultants expressed a deep concern about securing a fair priority of patients and a willingness to give reasonable advice back to the referring GP when rejecting a referral. Many referrals were regarded as unnecessary, meaning that the problem could be handled

by the GP. Better communication, such as a telephone call to confer with a hospital specialist before referring was wanted, and could possibly reduce the referral rates.

There are numerous studies on consultants' evaluation of the quality of referrals [13-18]. In most of these, the hospital specialists reported many inadequate and unnecessary referrals. Our respondents shared this opinion. The consultants' wished for specific forms or templates designed for the different medical conditions and diagnoses, and believed these would make this work easier and smoother. The Norwegian national guidelines for prioritization [12] were introduced in 2012, to help the hospital consultants to choose the right patients for specialist care, and to ensure that patients have a fair and equal assessment, regardless to which hospital they are referred. They also indicate maximum waiting times for treatment according to the different conditions and diseases. In our study, half of the respondents used these guidelines while prioritizing. Such guidelines could be used automatically to sort and prioritize patients for specialist care. According to CB Forrest, "*The absence of clarity in the specialist physician clinical role makes it unlikely that specialists are being used effectively and efficiently. We lack agreement on the core clinical functions of health care specialism, when patients should be referred to specialists, and how long specialists should be involved in a referral. This uncertainty is a likely contributor to the marked variation in the use of specialty care across the country*" [19]. In our study, the interviewed consultants expressed a deep concern making sure the process was fair and equal for the patients. When refusing a patient for medical examination or treatment, they emphasized the responsibility for explaining this to the referring GP, and eventually giving advice for alternative handling or treatment.

The respondents had extensive experience, but no formal education or training in assessing referrals. They confirmed that there was a risk of inequity and unfair prioritization, but only the psychiatrists conferred with other colleagues when in doubt. A recent study confirms this danger [20]. National guidelines for prioritizing patients may prevent some of this source of error.

The professional relationship between consultants and the referring GPs has been described in several articles [5-7,9,11]. In our study the respondents did not agree on having a judgmental role, but confirmed the quality assessment task of the referrals and the power to prioritize patients for specialist care and eventually to reject the referral. Most of the respondents expressed a willingness to see the patient when in doubt. Long waiting lists may influence this attitude, as well as personal connections and relationships, leading to injustice and inequality. The referring GPs' suggestion or wish for a maximum waiting time was overruled by the consultants' prioritization of these patients, which puts the consultant in a superior position versus the referring colleague. This confirms the GPs' feelings of an inferior role in this process [9]. The concept of shared care was not mentioned by the respondents. Both GPs and consultants want an easier and smoother communication about difficult medical problems, by telephone, e-mail or personal contact, before and eventually instead of a referral [5-7,9,10,21-23].

The referral patterns are important focal points of both politicians and health managers to control health care spending [1-3,21-25]. Even in countries without this tradition, such as China, the advantages of a referral system are of interest [26]. GPs want more shared care for their patients [9]. Both consultants and GPs express a "them and us" attitude, more than "we as a team". Legislative and structural regulations as well as personal relationship and mutual respect are important factors in developing more collaboration [5-7,9,14].

In our study the interviewer was known to the respondents as an experienced GP and a researcher on the referring process. It is uncertain whether this has biased the statements and comments of the consultants. Three of the interviews were done in 2011, before the introduction of the national guidelines for prioritization. The impact on the respondents' statements about this may be important. In the analyzing process the other two co-authors have done their own individual analyses, securing a balanced consensus of the results and conclusions. The majority of male respondents may be a possible source of error. In the citations the respondents were given a number to ensure anonymity.

Conclusions

Better communication and cooperation between hospital consultants and GPs could make the referral process more balanced, and the participants more like partners. New models for collaboration should be tried out.

Competing interests
The authors declare that they have no competing interests.

Authors' contributions
OT designed the study, led the analysis of the data and led the writing. MH analyzed the data and contributed to the writing. AB designed the study, conducted the research, analyzed the data and contributed to the writing. All authors have read and approved the final manuscript.

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Paper III

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Typologies in GPs' referral practice

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Abstract

Background: GPs' individual decisions to refer and the various ways of working when they refer are important determinants of secondary care use. The objective of this study was to explore and describe potential characteristics of GPs' referral practice by investigating their opinions about referring and their self-reported experiences of what they do when they refer.

Methods: Observational cross-sectional study using data from 128 Norwegian GPs who filled in a questionnaire with statements on how they regarded the referral process, and who were invited to collect data when they actually referred to hospital during one month. Only elective referrals were recorded. The 57 participants (44,5%) recorded data from 691 referrals. The variables were included in a principal component analysis. A multiple linear regression analysis was conducted to identify typologies with GP's age, gender, specialty in family medicine and location as independent variables.

Results: Eight principal components describe the different ways GPs think and work when they refer. Two typologies summarize these components: *confidence* characterizing specialists in family medicine, mainly female, who reported a more patient-centred practice making priority decisions when they refer, who confer easily with hospital consultants and who complete the referrals during the consultation; *uncertainty* characterizing young, mainly male non-specialists in family medicine, experiencing patients' pressure to be referred, heavy workload, having reluctance to cooperate with the patient and reporting sparse contact with hospital colleagues.

Conclusions: Training specialists in family medicine in patient-centred method, easy conference with hospital consultant and cooperation with patients while making the referral may foster both self-reflections on own competences and increased levels of confidence.

Keywords: Referral process, typologies, confidence, uncertainty

Background

In many countries there is a long tradition for general practitioners to take care of most health problems, leaving the hospital specialists to do the things that they only can perform (1). In Norway all residents are connected to a regular GP. All inpatient treatment is free. The gatekeeping system means that patients need a referral from their GP to be examined or treated in specialist health services. Except for urgent cases, such as accidents or emergency situations, the decision to refer is the start of the patient's clinical course into specialist care.

In many countries referral rates have increased dramatically during the last decades (2, 3) and the consequences for the society are more use of specialist health care and greater expenses (2, 4-7). There are many reasons for this trend, such as better access to specialist services, cultural changes, national laws and regulations and patients' requirements (8). The GPs' individual decisions to refer vary greatly and cannot be explained by patient morbidity alone (9-11). In 2011we showed that GPs regarded the referring process as asymmetric and sometimes embarrassing and wanted improved dialogue with hospital specialists (12). GPs are often in a squeezed position between a patient with a demand for a referral to a hospital specialist and the unease felt when sending an inappropriate or unnecessary referral letter. Hospital consultants request better communication, like a telephone call before referring. Many referrals are regarded as unnecessary, meaning that the problem could be handled by the GP (13). Improving the quality of the referral process is important to facilitate timely access to specialty care (14-16). Studies have shown that better e-communication between GPs and hospital consultants and more advanced electronic referral decision may facilitate this process (17, 18). Continuous professional development (CPD) groups with certified supervisors, where the participants discuss clinical problems and difficulties in the consultation room can help young GPs to become more confident and safe in their role as a GP and specialist in family practice. More knowledge is needed on the reasons for GPs' varying referral behaviours. The aim for this study was to explore and describe potential characteristics of GPs' referral practice by investigating their opinions about referring and their self-reported experiences of what they do when they refer.

Methods

Study design and participants

We did an observational cross-sectional study on GPs' attitudes to and perceptions about their usual referral process and on what they actually did when they sent elective referrals to

hospital for admission or outpatient opinion. As no identical studies had been done before, we designed the questionnaire (Appendix 1) and the referral registration form (Appendix 2) on the basis of the results from a previous study (12) in collaboration with experienced academic and non-academic GPs. We piloted the questionnaire and referral registration form in another CPD group outside the present research area, without having any suggestions for changes. In December 2013 we sent information about the study to the group leaders of all the 37 CPD groups, (around 250 GPs) in the southern part of Rogaland County in Norway, a region with 330 000 inhabitants, 300 GPs and one hospital (Stavanger University Hospital). Of these, 23 groups accepted the invitation to have a meeting about the study. The meetings were held from January to April 2014. The 128 CPD group members were informed about the study and were asked to fill in a questionnaire about the referral process. They were then invited to collect data when referring to hospital during the next month by scoring on six statements about the referral process (Figure 1). A total of 58 GPs volunteered to participate. One form was discarded because of incomplete data.

Each participant was given an identification number. I order to assess external validity we compared the participants with those who did not participate with respect to age, gender, specialty and the scores on the questionnaire. The recorded data were assembled by the first author, who did not see the referral letters, only the referrals registration forms.

The study was approved by the Patients' Ombudsman in Rogaland County, the Data Protection Official for Research (36315) and the Regional Committee for Medical and Health Research Ethics (REK 2013/1762). The study took place in accordance with the Helsinki Declaration, adopted 1964 and revised in 1975.

Measurements

In the CPD group meetings the participants scored on ten statements about their usual referring on a 10-cm visual analogue scale (Appendix 1). During the next month, when actually referring to hospital they used a 10-point Likert scale for the registration of perceived difficulty in referring and patient pressure to be referred, and they marked a priority and wait for the patient, if they had called a hospital specialist when referring and finally the time taken to make the referral. We dichotomized the priority and wait setting into either having marked (1) or not (0) (Appendix 2). GPs' gender, age, specialty in family medicine, and location (city or rural) were used to define groups. The number of consultations during the study period was not registered.

Statistical analyses

For each participant the average score (B1-B6) was calculated as a mean value (B1-2 and B5-6) or a percentage (B3-4) (Table 1). Principal component analysis (PCA) was applied on the 16 variables (A1-10 and B1-6) with oblique rotation (oblimin) which supports improved factor loadings and better interpretability. Bartlett's test of sphericity was applied to verify if correlations between the variables were sufficiently large for the PCA. The number of principal components retained was based on Kaiser's criterion of Eigenvalue greater than 1. All extracted components were standardised with mean zero and standard deviation equal to 1. The principal components were used as dependent variables in a multivariate multiple linear regression analysis. The independent variables were GPs' gender, age, specialty in family medicine and location. To access external validity we compared the questionnaire scores from the participants and non-participants using Student's unpaired t-test for means, Levene's test of variances, Pearson's exact chi-square test for proportions and the Wilcoxon-Mann-Whitney test for non-normally distributed variables. A significance level of 0.05 was used for all statistical tests.

IBM SPSS Version 22 was used for all statistical analyses.

Abduction

The identification and naming of the typologies was done by abduction, a technique described by Umberto Eco in *The sign of three* (Indiana University Press 1988). Abductive reasoning can be seen as an inference from uncertain data to the possibly best explanation (19). In this study we used abduction to inference typologies from the components.

Results

The participants, 58% males, had a mean age of 49.3, SD (standard deviation): 11.2. 88% were specialists in family medicine and 70% worked in urban areas. The participants recorded a total of 691 referrals with a mean value of 12.1 (SD: 5.9) referrals per participating GP. Mean, standard deviation, median and range are presented in Table 1. The mean number of referrals was not significantly different for gender with 11.5 (SD: 4.7) for males and 13.0 (SD: 7.2) for females. The 70 non-participants who only filled in the questionnaire in the CPD group meetings, but did not participate in the recording of data in referrals, had a mean age of 47 years, with 55% males and 61% specialists in family medicine. Levene's test for equality

of variances and independent t-test for equality of means showed no significant difference of age between non-participants and participants. Furthermore, the chi square test showed no significant difference for gender between the groups. The proportion of specialists in family medicine was significantly higher ($p<0.001$) in the participants group. By running Wilcoxon rank-sum tests no significant differences were found between the two populations for the statements A1-10.

Principal component analysis

The PCA was applied on the 16 variables (A1-10 and B1-6) with oblique rotation (oblimin). Missing values were excluded pairwise given five missing values in A8 and another missing value in A10. Bartlett's test indicated a sufficient correlation matrix ($p<0.001$). Using a Kaiser's criterion of 1, seven components explained 71.1% of the total variance (table 2). By including component 8 (Eigenvalue: 0.961) 77% of the total variance could be explained. Table 3 shows the factor loadings after rotation, with loadings over 0.4 highlighted.

Multivariate multiple linear regression analysis

The multivariate multiple linear regression analysis was performed to investigate the dependency of the eight principal components (PCs) on GPs' sex, age, specialty in family medicine, location and number of referrals sent. Table 4 shows the eight components and the estimated regression coefficients. One unit increase for a predictor variable leads to an expected change of the PC score equal to the estimated regression coefficient holding all other variables constant. GPs' gender ($p=0.019$) and specialty in family medicine ($p=0.002$) were found to be statistically significant in the combined multivariate test. GPs' age, location (urban/rural) and the number of referrals recorded were not significant.

The eight principal components describing the different ways GPs think and work when they refer (Table 4) were named:

1: Fear and uncertainty (A2, A3, A4). This component describes the fear of having the referral rejected, of not being good enough and not knowing what is expected in a good referral. Non-specialists in family medicine were significantly more insecure than specialists ($p=0.015$) (Table 4).

2: Priority decision (B3, B4). The component identifies GPs who suggested a maximum waiting time and who set a priority for the patient in the referral. Female GPs were making significantly more priority decisions when referring than male GPs ($p=0.038$).

3: Completing the referrals during the consultation (A1, A7). In this component we find GPs scoring low on spending a lot of time and effort on referrals and high on completing the referrals during the consultation.
4: Little contact with hospital specialist (B5). High score on this component describes those who seldom contacted a hospital specialist when they referred.
5: Collaboration with patients and colleagues (A5, A7, A8). This component identifies the GPs who usually complete the referrals during the consultation, who scored high on patients' participation and opinion being important when they refer and who find it easy to get in contact with a hospital specialist on the phone.
6: Heavy workload (A6, B1, B6). This component identifies GPs who used more time when they referred, who recorded more difficult referrals and who scored low on the statement that referrals could have been avoided if it was easy to get in contact with a hospital specialist.
7: Easy support, self-confidence (A5, A10). This component identifies the GPs who find it easy to get in contact with a hospital specialist and who scored low on the statement that giving the patient a copy of the referral would improve the quality.
8: Patient pressure, GP reluctance (A9, B2). In this component we have the GPs who experienced more patient pressure and who indicated reluctance to show the patients the referral or give them a copy. Male GPs scored higher than females ($p=0.012$) and non-specialists scored higher than specialists in family medicine ($p=0.003$).

Two typologies

By abduction (23, 25) of the principal components we found two typologies which describe GPs when they refer:

1. *Confidence* (PC 2,3,5) characterizing experienced female GPs who are specialists in family medicine, who involve the patients in the referral process, making priority decisions when they refer, who confer easily with hospital consultants and who complete the referrals during the consultation, without spending too much time.
2. *Uncertainty* (PC 1,4,6,8) characterizing young, male non-specialists in family medicine, expressing fear and uncertainty when they refer, not knowing what is expected in a good referral, with sparse contact with hospital consultants, experiencing heavy workload and pressure from patients to be referred.

Discussion

Many, mainly male GPs experience heavy work-load and patient pressure when they refer to hospital. We found that a patient-centred way of referring, characterized by easy access to consult a hospital specialist, making priority decisions and completing the referrals during the consultation may be timesaving and associated with less work-load.

Strengths and limitations

The questionnaire and the referrals registration form were designed by the authors on the basis of the results from a previous study, where we found that many GPs consider referring as asymmetric and sometimes humiliating (12). The four first statements (A1-4) in the questionnaire focused on problems and uncertainty when referring. Having a special interest in communication in the referral process, GPs' workload and patients' pressure to be referred, these are elements which may have had an impact on the choice of questions and statements. Other, more positive and optimistic questions and statements might have given other components and typologies. The questionnaire and the referral registration form were designed in collaboration with experienced academic and non-academic GPs and were piloted among other GPs, without any suggestions for changes. Feedback from the participants supported the assumption that the questions and statements were relevant and easy to score.

The first author was responsible for all information to the participating GPs. Being a colleague and a known person for many of the participants, and having an agenda on a better referral process for all, this personal factor may have a positive impact on the response rate. The response rate was 44.5% (19% of all the GPs in our region) which raises the concern of a selection bias. Similar studies among GPs had response rates from 42-47% (11, 21). Among the participants a large part was specialists (88%) compared with those who didn't participate (61%). This could affect the interpretation of the results in direction of an over-focus on the *confidence* elements among the experienced specialists, whereas the younger non-specialists over-focused on the *uncertainty* elements may cause a bias which means that the differences between the two typologies are even bigger than in our conclusion. However, as no significant differences were found between participants and non-participants in the 23 CPD group meetings for the statements on the referral process we consider our results to be representative for Norwegian general practice and for countries with similar health care systems.

The questionnaires were filled in anonymously during CPD group meetings, securing each GP's confidentiality. The participants were instructed to score the referrals consecutively and immediately when or after referring, which is considered to be a strength for the study, because of minimalized recall bias. We have, however no guaranty that all referrals have been registered.

In the PCA, three of our components had two overlapping variables (A5 and 7) (Table 3) meaning components are mainly unique. A 77% cumulative variance covers most of the variations in the material, indicating an adequate description of the referral process, a considerable strength for our study.

The 57 participants registered a total of 691 referrals during the registration period. As they did not register the number of consultations during this month, we cannot calculate the actual referral rates for our participants, or know if the referral rates were different from those who did not participate. This means that we cannot tell if our participants are within the normal range of variation according to referral rates, or whether this has any impact on the results. Our components and typologies could have been different if we had included the referral rates in the variables for PCA.

By abduction of the eight principal components we found two typologies. Others could have chosen another approach. The principal components are independent quantitative variables, whereas the abductive reasoning can be seen as a creative inference, involving integration and interpretation of ideas to develop new knowledge. In abductive reasoning the premises do not guarantee the conclusion, but can ensure a pragmatic validity.

Comparison with existing literature

This is to our knowledge the first study of typologies of GPs in the referral process. Other studies on typologies in medicine have been done to explore professional identity of nurses (22) and hospital specialists (23). Our two typologies represent aspects of the referral process where most GPs will recognize themselves. Elements in the *confidence* typology are found in other studies (24). Collaboration with patients and colleagues are important elements in the referral process, often associated with better health outcomes and improved patient satisfaction (26). Already in 1992 Huygen et al found that the integrated style GP can further the health and well-being of their patients (27). Patients want to know how long they must wait and who they will see (25, 26). Little et al found that doctors' behaviour in the consultation was strongly associated with the perceived medical need of the patient, that a

minority of examining, prescribing, referrals and investigations were thought by doctors to be slightly needed or not needed at all and that the perceived patient pressure was a strong independent predictor of all doctor behaviours (27). They concluded: "*To limit unnecessary resource use and iatrogenesis, when management decisions are not thought to be medically needed, doctors need to directly ask patients about their expectations".* Ringberg et al found that the issue of the referral was introduced by the patients in 29.4% of cases (10). Our finding echoes these results and the results of Donohoe et al, who found that patients' requests influenced referral decisions in one fifth of the cases (28). Ringberg et al found that female GPs referred more often than male to reassure the patient because they experienced lack of medical knowledge and when the issue of referring was introduced (11). A low referral rate was one of the characteristics of the integrated practice style, with maximum scores on patient- and goal-oriented approaches. Low referrers were more confident about their decisions, more positive about alternatives to hospital admission and more able to resist pressure from families and carers to have someone admitted; they saw hospitals as places to be avoided and viewed their goal as preventing an admission (9).

The *uncertainty* typology matches our findings in a previous study, where we found that many GPs consider referring to be asymmetric and sometimes embarrassing (12). Other studies have shown that younger doctors are more vulnerable to patients' scepticism and criticism, and that individual uncertainty among GPs about referring has a significant impact on higher referral rates (9-11, 15). Calnan et al found that high-referring GPs were more cautious and believed that it was better to admit if in doubt (9). The high referrers in their study expressed anxiety about the consequences of a decision not to admit, both for the patient and for themselves and they held negative attitudes towards alternatives to hospital admission. The *uncertainty* typology encompasses those who seldom contacted a hospital specialist when they referred. In Berendsen et al's study 73.2% of GPs answered that a hospital specialist could easily be reached for a colleague consultation (21). Earlier studies have shown that both GPs and hospital consultants called for more contact and communication in the referral process (12, 13). *Heavy workload* describes a well-known situation for many GPs, who use much time when they refer, experiencing many difficult referrals and who do not think that referrals could have been avoided if they called a hospital specialist. In an Israeli study published in 2014 Kushnir et al found higher referral rates for diagnostic tests and specialist clinics for physicians with burnout symptoms and when objective workload increased (29).

The last years' development of better e-communication and more advanced electronic referral decision support systems have facilitated an easier referral process (17, 18), making it more convenient to complete the referrals during the consultation, which may be timesaving and associated with less work-load.

Our results support the conclusion in Calnan et al's study, which calls for educational programmes to improve GPs' judgements of their competences and to build appropriate levels of confidence (9). Our study adds that a patient-centred practice, easy access to confer with a hospital consultant and good cooperation with patients when making the referrals may be a major topic for CPD groups and vocational training for specialists in family medicine.

Conclusions

Training collaboration with patients and hospital consultants may foster both self-reflections on own competences and increased levels of confidence when referring. Our results need further research to investigate the impact on the quality of the referral process and the consequences for patients and their clinical pathways.

Competing interests

The authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare no support from additional organization for the submitted work

Authors' contributions

MH, LF, JOJ and AB contributed to study conception and design. GEE, JS and AB contributed to the statistical analyses and interpretation of data. All authors contributed to revision of the report and approved the final manuscript.

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Appendix 1

Questions about the referral process to hospital for non-urgent patients

First some information about you:

Man: |_|
Woman: |_| Age: |__|__| Specialist in general practice? Yes |_| No |_|

Mark on the line how much you agree on these statements:

12. I spend a lot of time and effort on making the referrals

Disagree |----------| Totally agree

13. I often feel that I don't know enough about what is expected to make a good referral

Disagree |----------| Totally agree

14. I am often afraid to have the referral rejected from hospital

Disagree |----------| Totally agree

15. I am often afraid that the referral gives an impression of me not knowing enough about the actual medical problem

Disagree |----------| Totally agree

16. It is easy to get in contact with a hospital consultant for an advice

Disagree |----------| Totally agree

17. Some referrals could have been avoided if I had got in contact with a hospital consultant when referring

Disagree |----------| Totally agree

18. I usually complete the referral during the consultation

Disagree |----------| Totally agree

19. Patient's participation and opinion is important to me when I refer

Disagree |----------| Totally agree

20. The patient should see the referral or have a copy before it is sent

Disagree |----------| Totally agree

21. Giving the patient a copy of the referral will improve the quality of the referral

Disagree |----------| Totally agree

Thank you for your cooperation!

Appendix 2

Referral registration form

Date	**Patient's birth year:**	**Patient's gender:** 1=male 2=female	**Easy or difficult referral to make?** (1-10) 1= very easy 10=very difficult	**Did you feel pressured by the patient to be referred? (1-10)** 1=not at all! 10= yes absolutely!	**My suggestion for priority** (1-3) according to national guidelines	**My suggestion for wait** (weeks)	**Did you call a hospital specialist when referring?** 1 = Yes, 2 = No 3 = I tried, but no contact	**How long time** (minutes) **did it take to make this referral?**

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Errata for
General practitioners' referrals to specialist health services

Exploring elements and factors in the referral process having an impact on patients' acces to specialist care

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Thesis for the degree philosophiae doctor (PhD)

at the University of Bergen

(signature of candidate) (signature of faculty)

22.10.2016

Errata

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Tables 1-4

Table 1: Norwegian general practitioners' scores on statements about their referral process (A1-10) and data collected when actually referring to hospital (B1-6) during 1 month in 2014 (n=57)

Variables	Mean	SD	Median	Min	Max
(Statements on VAS 10 cm: 0=strongly disagree, 10=strongly agree)					
A1. "I spend a lot of time and effort on referrals"	5.3	2.0	5.2	0.5	9.8
A2. "I often feel that I don't know enough about what is expected to make a good referral"	3.2	2.1	2.5	0.0	10.0
A3. "I am often afraid to have the referral rejected from hospital"	1.4	1.5	1.0	0.0	8.0
A4. "I am often afraid that the referral gives an impression of me not knowing enough about the actual medical problem"	2.9	2.2	2.0	0.0	9.5
A5. "It is easy to get in contact with a hospital specialist for advice"	4.9	2.3	5.0	1.0	9.0
A6. "Some referrals could have been avoided if I had got in contact with a hospital consultant when referring"	5.8	3.0	6.5	0.0	10.0
A7. "I usually complete the referral during the consultation"	4.6	3.3	5.0	0.0	10.0
A8. "The patient's participation and opinion is important to me when I refer"	6.2	1.9	6.3	2.0	9.5
A9. "The patient should see the referral or have a copy before it is sent"	5.0	2.8	5.0	0.3	10.0
A10 "Giving the patient a copy of the referral will improve the quality"	4.4	2.8	5.0	0.5	10.0
B1. Difficult referral to make (Likert scale 1-10)	2.6	1.0	2.7	1.0	5.6
B2. Pressure from patient to be referred (Likert scale 1-10)	2.0	0.8	1.0	1.0	4.7
B3. Suggesting a priority for the patient to be admitted to hospital (%)	39.9	39.3	26.0	0.0	100.0
B4. Suggesting a wait for the patient to be admitted to hospital (%)	28.2	33.6	17.6	0.0	100.0
B5. Telephone contact with hospital specialist when referring (%)	9.1	16.1	0.0	0.0	100.0
B6. The time used for making the referral (minutes)	8.2	3.5	7.5	2.0	17.1

Abbreviations: GP: General practitioner; SD: standard deviation; VAS: visual analogue scale; Min: minimum, Max: maximum

Table 2: Eigenvalues and cumulative variance of the first ten components in a principal component analysis of 16 variables of the referral process from 57 general practitioners in Norway during spring 2014

	Initial eigenvalues		
Component	**Total**	**% of variance**	**Cumulative %**
1	2.3	14.4	14.4
2	1.9	12.0	26.5
3	1.7	10.9	37.3
4	1.6	10.0	47.3
5	1.4	8.5	55.8
6	1.3	8.3	64.1
7	1.1	7.0	71.1
8	1.0[a]	6.0	77.1
9	0.9	5.3	82.4
10	0.8	5.1	87.5

[a] 0.961

Table 3: Rotated pattern matrix after principal component analysis [a] of 16 variables of the referral process from 57 general practitioners in Norway during spring 2014

	Components							
Variables	1	2	3	4	5	6	7	8
A3: Afraid of rejection of referral	**.872**	.052	-.056	.031	-.051	.124	.038	-.040
A4: Not being good enough	**.864**	-.131	-.114	-.066	-.055	.021	-.176	.020
A2: Unknown expectations	**.661**	-.050	.246	.015	.060	-.130	.383	-.044
B4: Suggested waiting	-.029	**.826**	.252	.150	-.264	-.066	-.074	-.071
B3: Priority in referral	-.159	**.760**	-.152	.028	.370	.157	.056	.030
A1: Using much time to refer	.043	-.148	**-.910**	.110	.108	.021	-.039	-.123
A7: Referral in consultation	-.013	-.138	**.690**	.062	**.407**	.111	-.068	-.187
B5: Conferred with consultant	.026	-.127	.103	**-.950**	.056	.097	-.078	.147
A8: Patient opinion important	-.068	.002	.085	-.040	**.841**	-.037	-.108	-.196
A5: Contact with consultant	-.023	.021	-.139	.080	**.431**	.041	**.431**	.373
B6: Time used to refer	.043	.027	-.025	-.346	.027	**.848**	.124	-.095
B1: Difficult referral	.152	.091	.083	.351	.006	**.713**	-.287	.279
A6: Referral avoided if contact	.308	.373	-.100	-.048	.333	**-.426**	-.240	.145
A10: Copy gives better quality	-.020	.020	-.009	-.027	.118	-.017	**-.873**	.038
A9: Referral copy to patient	.033	-.060	.036	.247	.213	-.022	-.007	**-.795**
B2: Patient pressure	-.004	-.343	.198	.356	.084	.004	-.095	**.601**

[a] Using an oblique (oblimin) rotation with Kaiser normalisation. Loadings larger than 0.4 are highlighted.

Table 4: Results from multivariate multiple linear regression analysis of eight principal components on referrals from 57 general practitioners (GPs) in Norway in 2014

	Dependent variables: Typological components								
Independent variables	**1** b (p-value)	**2** b (p-value)	**3** b (p-value)	**4** b (p-value)	**5** b (p-value)	**6** b (p-value)	**7** b (p-value)	**8** b (p-value)	**Multivariate p-value**
GP age	-0.01 (0.469)	0.01 (0.780)	0.01 (0.727)	0.01 (0.904)	0.01 (0.594)	0.01 (0.580)	0.02 (0.235)	-0.01 (0.791)	.965
Gender: male	-0.23 (0.412)	**-0.63 (0.038)**	0.54 (0.068)	-0.22 (0.463)	0.07 (0.815)	0.57 (0.069)	0.34 (0.254)	**0.69 (0.012)**	**.019**
Specialty: no	**1.32 (0.015)**	-0.13 (0.822)	0.79 (0.148)	0.16 (0.770)	0.08 (0.892)	0.84 (0.146)	0.83 (0.145)	**1.52 (0.003)**	**.002**
Location: urban	-0.39 (0.214)	-0.12 (0.714)	-0.16 (0.624)	0.48 (0.157)	-0.51 (0.138)	-0.45 (0.189)	-0.06 (0.860)	-0.12 (0.684)	.269
N referrals	-0.01 (0.893)	0.02 (0.346)	0.04 (0.090)	0.05 (0.049)	0.01 (0.575)	0.02 (0.519)	-0.03 (0.258)	0.05 (0.020)	.056

b: Estimated regression coefficients; p-values from t-test.