Physicians' perceptions on clinical pharmacy services

A qualitative study

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Abstract

Background:
Clinical pharmacy has the potential to improve patient outcomes and protect patients from negative consequences resulting from treatment with interacting or inappropriate drug therapies. Given the role of physicians in the provision of health care, we need to understand physicians' perspectives on clinical pharmacy services. The aim of this study was to explore physicians' perceptions regarding clinical pharmacy services performed at hospitals in Västerbotten County Council.
Methods:
Semi-structured interviews were conducted with a purposive sample of nine physicians who had previously worked with pharmacists in three different wards in Northern Sweden. Data were analyzed using a constant comparison method.
Results:
Different themes emerged regarding physicians views of pharmacist's services. Pharmacy service was valued and described in a positive way by all participants. Pharmacy service was seen as an opportunity for the physician to learn more about pharmacological treatment and also an opportunity to discuss patient medication treatment in detail. Physicians considered that pharmacy services can improve patient outcomes (reduced risk for side-effects, reduced risk for interactions, better health, reduced risk for preventable hospitalization and hospital re-admissions), but some noted there is no scientific evidence to the long term benefits of clinical pharmacy services. Especially as it is unclear to them what happens once the patient is discharged. All physicians knew that the pharmacists' role is to conduct medication reviews, but most of them can only describe a few things of what this service encompasses.
Conclusion:
The findings show that all of the participants were positive about the clinical pharmacy service and the collaboration with the pharmacist. Pharmacists were seen by the participants as "drug experts" and their recommendations are perceived as clinically relevant. All of them wanted to continue working with a clinical pharmacist. The findings are therefore important for the growth and expansion of clinical pharmacy services, particularly in Northern Sweden. To our knowledge this is the first study in the north of Sweden that explores physicians' views of clinical pharmacy services.

Keywords: Clinical pharmacist · Clinical pharmacy services · Physicians' perception · Hospital · Sweden

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1. Introduction

As the population ages, treatment with multiple drug therapies has become common. The use of multiple drugs, however, has increased the complexity of their safe use (1). An issue further complicated by the continual introduction of new drug therapies (2). Medical treatment with more than one drug can result in negative consequences such as adverse drug events (ADEs) or drug interactions. Consequences of ADEs or drug interactions put patients at risk and results in increased health care costs. In 2005, approximately 4.3 million healthcare visits were caused by an ADE in the United States (3). In Sweden, approximately 12.3% of admissions to hospitals in 2003-2004 were due to an ADE, 70% of which were judged to be preventable (4).

1.1 Clinical pharmacy and clinical pharmacy services

Negative consequences resulting from treatment with multiple drug therapies is a growing problem worldwide and has catalyzed the development of clinical pharmacy and clinical pharmacy services. Clinical pharmacy has been defined by the American College of Clinical Pharmacy as "a health science discipline in which pharmacists provide patient care that optimizes medication therapy and promotes, health, wellness, and disease prevention" (5). Instead of dispensing drugs at pharmacies, the pharmacist's role has evolved allowing pharmacists to provide clinical pharmacy services in hospitals. By performing clinical pharmacy services the pharmacist can ensure that the patients do not experience drug-related problems or ADEs which can result in unwanted side-effects, hospital admissions, or negative economic implications (6). Clinical pharmacy service is a wide concept of different kinds of activities including but not limited to education, medication reconciliation and medication reviews (6, 7).

Medication review is a pharmacy service where the pharmacist evaluates a patient's medicine treatment, anamnesis and laboratory test values. By finding, solving and preventing drug-related problems and events the medical treatment can be optimized and better benefit the patient (8).

Another clinical pharmacy service is medication reconciliation. Discrepancies in the medication list can occur when a patient is moved between different care units. Without an accurate medication list ADEs can occur when new prescriptions are made. Via medication reconciliation pharmacists gather information about a patients complete medicine list, review the list and make suggested changes with a ward physician (8, 9).

1.2 Clinical pharmacy in hospital settings

Even though research has shown that medication reviews and medication reconciliation are effective methods to reduce drug-related problems (DRPs) (10-17) clinical pharmacy is not established in many countries. Systemic reviews have evaluated the efficacy of clinical pharmacy in hospital settings and have shown that pharmacists can improve the safety, quality and efficiency of patient care. Most studies have been conducted in the United States, but some have been performed in countries such as Canada, Australia, Northern Ireland, United Kingdom, Sweden and Norway (6-8, 18-22).

Some of the topics investigated include the effects of medication reviews, pharmacist effects on patient care, effects of pharmacist interventions, reduction of suboptimal prescriptions, and clinical outcomes of medication reconciliation. In general, the investigations found that medication reviews can reduce hospital costs, identify potential DRPs, improve patient outcomes and decrease hospital readmissions (10-16, 23-28). Additionally, investigations also revealed that therapeutic outcomes improved such as reductions in days with intravenous antibiotic therapy. Studies also show that occurrences of ADEs decreased when a pharmacist was included as a part of the health care team (6-9, 11, 14, 15, 18, 20, 21, 23, 25-30).

Research studies that explored the economic impact of clinical pharmacy show that clinical pharmacists can save the hospital, society and patient money (19, 25, 28, 31, 32). As clinical pharmacy services are different in every study it is difficult to make comparisons between studies and evaluate which pharmacist intervention is the most cost-effective. The economic aspects of a pharmacist intervention are for the most part, presented as secondary outcome in studies. There are few published investigations where the primary outcome is to evaluate the costs and savings of a pharmacist intervention (19, 25, 28, 31, 32).

1.3 Healthcare professionals perception regarding clinical pharmacy

Previous work has so far been limited and primarily concentrated on understanding how pharmacist collaboration within multidisciplinary healthcare teams (i.e. physician, residents, nurses, and pharmacists) can improve patient outcomes (6-9, 11, 14, 15, 18, 20, 21, 23, 25-30) and reduce negative consequences to patients (10-16, 23-28). In a Canadian study conducted using interviews with pharmacists, physicians, and nurses in an inpatient medical setting, the authors concluded that an essential component for a successful integration and collaboration was to have clear role definitions between the healthcare professionals, mutual respect, and relationships built on trust (33). Participants reported that collaboration with a pharmacist had a positive impact on the patient care but organizational barriers, such as the logistics of getting together as a group, made multidisciplinary work difficult. They also concluded that team work is a skill that can be developed (33).

A Norwegian study used focus-groups and individual interviews with physicians and nurses to ascertain their views on working with a pharmacist in case conferences at nursing homes and hospital wards. In this study the researchers found that the expectations on pharmacists' contribution were different between the nursing home and hospital ward settings. Some participants felt that collaboration with pharmacists were time consuming and that professional boundaries were a challenge although the general conclusion was that patients' medical treatment can be improved through pharmacist collaborations (34). Few other studies have been published that explore physicians' views of working with a clinical pharmacist or clinical pharmacy services in hospital settings (12, 35-37).

1.4 Clinical pharmacy in hospital settings in Sweden

Few data on clinical pharmacy are available from Sweden. Most of the published studies conducted in Sweden involve different aspects of the Lunds Integrated Medicines Management (LIMM) model used in Skåne County Council (9, 11, 12, 14, 22-24, 26, 27, 31, 32). Evaluations of the LIMM model have shown that the use of potentially inappropriate drugs has decreased and that risk for drug related hospital re-admission has been halved (22).

Gillespie et al. (35) conducted a survey to evaluate the perceived value of ward-based pharmacists from the perspective of physicians and nurses that had been working with a ward-based pharmacist in Sweden. Questionnaires were sent to physicians, nurses, and general practitioners containing both closed- and open-ended questions. The authors found that participating physicians valued the discussions they had with the pharmacist regarding drug therapy. The opinion of participating nurses was that their own knowledge of drug therapy had improved and that pharmacist suggestions on a patients drug therapy were relevant (35). The researchers' work was a follow up to a previously performed randomized control trial study in which medication reconciliation, medication reviews, and patient discharge information were evaluated on patients 80 years or older to determine if drug-related hospital readmissions were reduced (25). Additionally, Gillespie et al. also conducted a pharmacist intervention to investigate discrepancies in medication charts of discharged patients that

have multidose drug dispensing service (38). As well as an assessment of the MAI (Medication Appropriateness Index), STOPP (Screening Tool of Older Persons' Prescriptions), and START (Screening Tool to Alert doctors to Right Treatment) screening tools were appropriate for prescription use among the 80 years and older population (30).

Another study conducted at an oncology ward at the Karolinska University Hospital in Stockholm, Sweden surveyed physicians and nurses about medication reviews conducted by a pharmacist. The study concluded that having a pharmacist in a healthcare team brings attention on patients' medication treatment problems. (15). Additionally, studies in Sweden have looked at identifying problems with pharmacotherapy, DRPs, and medication errors when patients are transferred between primary and hospital care, but these studies did not involve pharmacist interventions (4, 39-42).

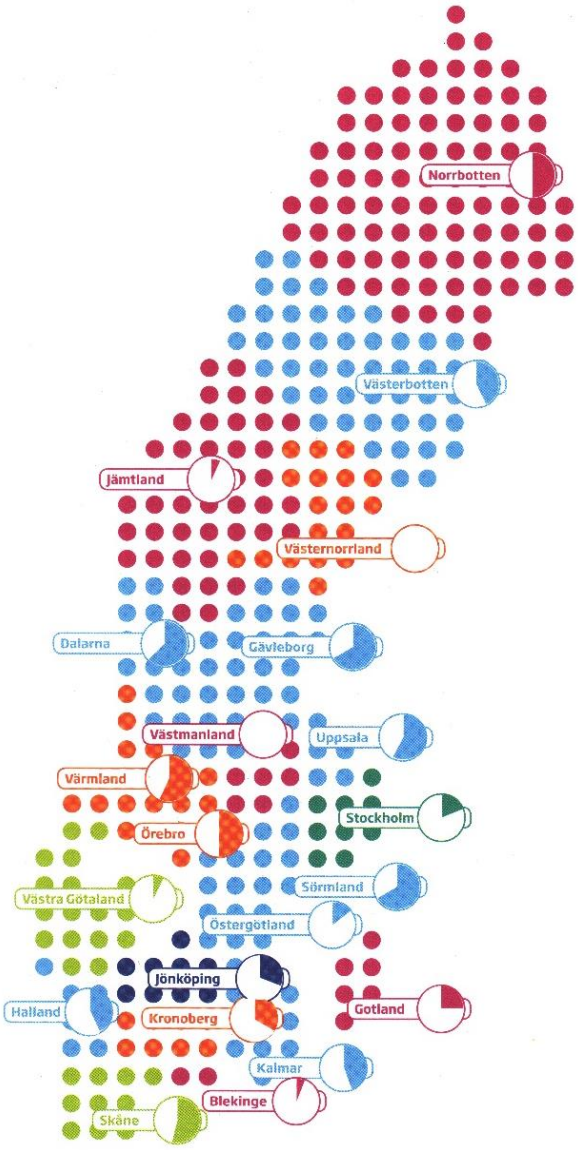
Despite the suggested benefits of clinical pharmacy and clinical pharmacy services, these are not especially common in Swedish hospitals, even though some of the first trials with clinical pharmacists began in Swedish hospitals in 1989 (15). In 2009 the employment of pharmacist increased as the County Councils could no longer hire pharmacist consultants from Apoteket AB, due to a re-regulation of the pharmacy market (43).

Before the re-regulation of the pharmacy market in 2009 Apoteket AB was the main government owned provider of service. In 2009 a policy changed was implemented, this allowed other companies to run pharmacies (44). There are no official statistics as to how many pharmacists provide clinical pharmacy services in Sweden. A Swedish pharmacy union branch paper published statistics gathered from an email enquiry made to all County Council-employed pharmacists (43). The researcher, that is a County Council employee, also received the results of the enquiry. According to the results approximately 120 clinical pharmacists are employed by County Councils, Figure 1 shows a graphical representation of the results.

Each of Sweden's 21 County Councils set their own strategies and policies for the inclusion of clinical pharmacy services. Most of the County Councils that employ clinical pharmacists are localized within southern Sweden and therefore only certain cities and hospitals have access to clinical pharmacists. Skåne County Council, which is the most southern Swedish County, employs the largest number of clinical pharmacists.

What distinguishes Skåne from other counties in Sweden is that they conducted extensive research on clinical pharmacy and then created a model, the LIMM-model (previously described) (9, 11, 12, 14, 22-24, 26, 27, 31, 32). A political decision was made to use this model for hospitals in the county. Goal levels were set in the County Council plans and financial allowance was given to wards that reached these goals. These factors have played a part in why there are over 20 employed pharmacists within the County Council (43).

As previously shown most of the County Councils have a few clinical pharmacists (43) but reports of their service have not been described in scientific papers. More work is necessary to describe their work



Number of pharmacists working for County Councils in Sweden:

3-5
Blekinge
Gotland
Jämtland
Norrbotten
Västmanland

6-10
Kronoberg
Värmland
Västernorrland
Örebro

11-20
Dalarna
Gävleborg
Halland
Kalmar
Sörmland
Uppsala
Västerbotten
Östergötland

21-40
Jönköping

41-60
Västra Götaland
Skåne

>60
Stockholm

Figure 1. Distribution of all County Council employed pharmacists in Sweden (ratio of clinical pharmacists are shown in the pie charts). Published with permission from (43).

1.5 Clinical pharmacy in Västerbotten County Council

In Västerbotten County Council (in the Northern Sweden), clinical pharmacists and clinical pharmacy services are available at only two out of three hospitals (i.e. Skellefteå and Umeå). The service initially started as a trial and then transitioned into a service. The trial started in 2002 as a collaboration project between the County Council and a pharmacy located at the hospital. The pharmacy was owned by Apoteket AB as the re-regulation of the pharmacy market had not yet occurred. The goal was to investigate if a pharmacist could improve drug therapy in the hospital by performing medication review. Clinical pharmacy service trial started in one internal medicine ward. The trial lasted for five months and due to its positive results the trial was extended to include other wards.

The service was after the extended trial permanently established in wards that had a large flow of patients with a short in-ward time. Clinical pharmacy services later spread to other wards within the hospital. Since each ward has different routines and needs the pharmacy service was tailored to these. As a results each ward using the service has been

set up differently when it comes to how often the pharmacists visits the ward, time for the visit and active participation in the rounds.

In Västerbotten County Council clinical pharmacy services performed by clinical pharmacists include: medication reconciliation and medication reviews. The word clinical pharmacy service is not commonly used in Swedish. In Västerbotten County Council the term "medication review" (läkemedelsgenomgång) is used to describe what the pharmacist does in a hospital ward. Medication reconciliation is included in the term medication review. The findings from a medication review are documented by the pharmacist and presented verbally to the treating physician either at individual meetings or during a multidisciplinary ward round. For the purpose of this study these terms (medication review, clinical pharmacy service) will be used interchangeably.

Studies show that clinical pharmacy has the potential to improve patient outcomes and protect patients from negative consequences resulting from treatment with interacting or inappropriate drug therapies (8, 20, 25). Given the role of physicians in the provision of health care and the importance effective professional relationships, we need to more fully understand physicians' perspectives on clinical pharmacy services.

2. Aim

The aim of this study was to explore physicians' perceptions regarding clinical pharmacy services performed at hospitals in Västerbotten County Council.

2.1 Research Questions

The present study investigated physicians' views on the following questions:

1) What is the role of pharmacists in hospital wards?
2) What are physicians' perceptions of clinical pharmacy services?
3) What is the perceived impact of clinical pharmacy services on patient outcomes?

3. Method

This study adheres to the consolidated criteria for reporting qualitative research (COREQ) (45).

In order to provide an in depth understanding of physicians' perception on clinical pharmacy services this study used qualitative research for data collection and analysis. Qualitative research has been used extensively in health care services and policy research. This method is appropriate when learning from individuals about the way they experience a process, their thoughts, perceptions and feelings (46).

3.1 Setting

This study took place in Västerbotten County which is situated in Norrland, the most northern region of Sweden. Norrland is the largest geographical area that covers about 59% of Sweden's total surface. The population living in the region is about 12% of Sweden's total population. Västerbotten county is one of Norrland's five counties and it had a population of 261 397 individuals at the second quarter of 2014 whereof 202 771 were living in the cities Lycksele, Skellefteå and Umeå (47).

3.2 Participant selection

For this study a purposive sample, that is, a sample that would serve the purpose of the study was used (48). Purposive sampling permits flexibility and responsiveness in data collection, and hence maximizes the insight that can be gained from the intensive work

of qualitative analysis (48). Physicians working with clinical pharmacists, in two hospitals in the North of Sweden, in five different wards and that were familiar with the type of services pharmacists provide were invited to participate.

The aim of qualitative research is not to generalize findings but to provide an in-depth understanding of a phenomena (49). Unlike quantitative studies sample size calculations are not required. Kvale suggests that "you should interview as many as you need to find out what you want to know". Kvale also states that the normal sample size for interview studies is around 15 +/ - 10 (50). In this study all physicians that have worked with clinical pharmacists more than once were invited to participate. The aim was to perform 20 interviews, or less if saturation was reached. In qualitative research thematic saturation is reached when no new views emerge during the interviews (51).

Before invitations to the study started approval from the participating wards was gained from the manager of each ward. The pharmacists who work on those wards provided a list of physicians they had interacted with. This list formed the basis of the recruitment. After ethics approval was given by the regional ethics committee in Umeå (regionala etikprövningsnämnden i Umeå) each physician on the list was contacted by e-mail and/or telephone.

3.3 Data collection

This descriptive study used semi-structured face-to-face interviews with hospital physicians that work with clinical pharmacists in the county of Västerbotten.

Descriptive studies that use open-ended interview questions are explorative, and provide an advantage over questionnaires. For example, questionnaire instruments do not allow follow-up questions to clarify a respondent's answer. Also, some of the questions used by Gillespie et al. (35) assumed a collaboration between the pharmacist and the physician. With an in-depth interview, it is possible to find out if the physician classifies the work with the pharmacist as a collaboration or not.

To ensure that the same topics were covered during the interviews an interview schedule was used as a guide. The interview schedule also included prompts to be asked if respondents gave short answers on the questions. The interview schedule (see Appendix A) allowed relevant issues to be discussed and evolved as the study progressed to allow for new emerging concepts to be included. The questions in the interview schedule were partially based on the literature (34, 35) and information received from the clinical pharmacists working in the hospital wards. A pilot test interview was conducted not only to test the questions but also to serve as a learning process for the interviewer. After the test interview questions that the respondent thought were difficult to answer were changed or reworded.

All of the interviews were performed by the author, who is a Master's of Pharmacy student. The author is also employed by Läkemedelsenheten/ Läkemedelscentrum (a department that works with economical and administrative tasks concerning drugs within Västerbotten County Council i.e. budget, follow-up, contracts, purchasing agreements etc.) During the time of the study the author worked a few hours a week with an electronic ordering system for drugs and questions regarding the County Councils supply of drugs. The author was familiar with the clinical services provided in some of the wards and had shadowed the pharmacists providing this service.

Invitation and what was required to participate in the study was sent by email to physicians (see Appendix B). Two email reminders were sent followed by a phone call. Calls were made at different times of the day. Interviews were held either at the participant's ward or the interviewer's office, the participants decided what was more

convenient for them. No other than the participant and researcher were present during the interviews and no former relationship was established prior to the commencement of the study. The interviews took place between November 2014 and January 2015 and lasted between 15 to 35 minutes. After each interview field notes were made by the researcher to describe how the interview had performed and things that needed to be investigated in coming interviews. No repeated interviews were carried out.

The interviews were digitally recorded and transcribed. The transcription was performed by external party and integrity checked by the interviewer. Participants were given the opportunity to read and comment on their transcribed interviews. Only one participant read the transcript but provided no comments. Transcriptions created a total of 68 pages and 27631 words.

3.4 Data analysis

The data analysis was completed in several stages: after each interview preliminary data analysis was performed to allow identification of issues that needed to be further investigated in the following interviews. After this first step continuous analysis of collected data was performed and a coding framework was developed (see Appendix C).

Segments (paragraph, sentences) were coded and labeled using colors and comments in Microsoft Office Word 365. Coded segments were then compared for differences and similarities of events and ideas. This process were repeated until all comments were assigned to categories (52). More than half of the interviews were coded on two separate occasions to ensure consistency with the coding. Categories were reappraised by the researcher to judge whether any data had been misplaced (negative case testing).

To verify the identification of themes the researcher and the supervisors discussed the mapping and coding framework on several occasions. One randomly chosen interview was coded by one of the supervisors. A second coder allows clear definitions of categories and further discussion of the meaning of the codes (49). Both of the coded interviews were compared, differences were discussed by the researchers and a joint decision on what coding that should be used for the segment was taken. There was 95% agreement between the coders.

To illustrate the findings quotations were selected and translated from Swedish to English by the researcher. The translations were back-translated by an experienced researcher in qualitative research that is also fluent in Swedish and English. To indicate omission of irrelevant sentences and words ellipses (…) were used. Square brackets […] include explanations to give more understanding of the quotes.

3.5 Ethics approval

This study was approved by the regional ethics committee in Umeå (regionala etikprövningsnämnden i Umeå), reference code 2014/322-31Ö. Written consent was obtained from all study participants. All transcripts were de-identified and all data were kept confidential.

4. Results

Twenty two physicians were invited to take part in the study and nine agreed to participate, two physicians did not have time and no response was received from eleven. The recruited physicians were 4 male and 5 females working in three different hospital wards. They had worked as a physician for average of 13 years and had been working with pharmacists for an average of 5 years. Most of the physicians had met the pharmacist more than 10 times (see Table 1).

Table 1. Description of interviewed physicians

Interviewee number	Age	Gender	Years working as physician	Years working with pharmacist	Number of meetings with pharmacist	Professional title *
P1	30-40	M	4.5	1	10-25	ST
P2	40-50	F	19	1	10-25	ÖL
P3	30-40	F	5	3	10-25	ST
P4	30-40	M	12	5	>25	ST
P5	50+	M	20	1,5	10-25	ÖL
P6	40-50	F	22	10	>10	ÖL
P7	50+	M	19	10	>25	ÖL
P8	30-40	F	8	Couple of years	10-25	ST
P9	30-40	F	7	6	10-25	ST

* ÖL= Chief physician, ST=Resident

The interviews drew out a broad range of views regarding pharmacy services in hospital wards (see Table 2).

Table 2. Major themes around clinical pharmacy services

Theme
How clinical pharmacy services is perceived by physicians
Views of pharmacists and interaction with them
Drug related problems and clinical pharmacy service
The value of pharmacists in hospital wards
Complexities with medication review
Pharmacist recommendations and patient outcome
Professional relationships
Suggestions to improve the service

4.1 How clinical pharmacy service is perceived by physicians

All of the participants used positive terms to describe the service. Some of the participants' highlighted that they especially appreciate that they have the opportunity to discuss each patient systematically with the pharmacist. However physicians' views vary, some physicians mentioned that they themselves could perform the service. But as it saves them time they are happy to leave that task to the pharmacist (i.e. substitution of tasks). However other physicians described that medication reviews not only "*saves them time*" but also is done by a professional perceived to have "*more knowledge of drugs*". This can be seen in the account by this physician: *"It takes up a good-sized space and saves me a lot of time. Actually, that somebody who knows, and has experience has gone through it in a structured way, gone through the medication lists". (P4)*

Another physician commented: *"Then I think it has been very nice, because it has been a forum for discussion. There have not been any points given or taken, so to speak, instead it has been an opportunity to talk a little about the patient". (P5)*

When participants were asked about what the pharmacist does in the ward they provided different answers. Some specified many different tasks while others did not. Tasks that were described included: the pharmacists looks at patient's medical records, shares drug knowledge, establishes a protocol for each patient, suggests things that need to be checked (i.e. laboratory values, kidney function) and highlights problems that have been found in a patient's medication treatment. If all the comments offered by the physicians

are combined this provides a close description of what a medication review is and what the pharmacist generally does in the ward.

When asking physicians about clinical pharmacy service in general or about the future of it they described that they know little about the pharmacy service work model (i.e. how the service is set up). For example they mentioned they did not know: how to contact the pharmacist, when and how often the pharmacist visits the ward or if the pharmacist still comes to the ward. Uncertainty of when the pharmacist was going to visit the ward and how often was by some participants viewed as pitfall of the clinical pharmacy service. This was highlighted by physicians that work in different wards.

Participants also mentioned that not all physicians in a ward know that a pharmacist can be present during the ward rounds. Furthermore physicians were not aware of the number of pharmacists that provide clinical pharmacy services in the hospital or what other wards receive the services. One of the participants mentioned that information about how the clinical pharmacy service works (administratively) may have been given when the service started but the participant had forgotten it or does not recall reading it.

Many of the participants mentioned that medication review is an opportunity to learn more about drugs and medication treatment. Some of the participants' commented that it has helped them become "*better physicians*".

"I believe that the work this pharmacist has done has been really good because it has become a revision and a learning process for us about, yes interactions. It could be specific drugs, how they work together with other drugs or in combination with reduced renal function and things like that, and there is always a need to learn more about this". (P2)

"We will become even better physicians and I also believe that it will become, what should we call it, a second line of safety". (P2)

4.2 Views of pharmacists and interaction with them

Participants described pharmacists indirectly as a health care professional. For example *"(the pharmacist) is more like a college that has a special interest*" or "*an expert that gives advice", "a collaboration partner" or "a colleague*".

The majority of participants mentioned that they have only interacted with pharmacists during ward rounds. Some also noted that they had interacted with pharmacists in drug and therapeutic committees (DTC) or when utilizing the services provided by the drug information center in Västerbotten County Council (ELINOR). Most of the physicians had limited knowledge about pharmacists before they started interacting with them via the clinical pharmacy services. *"Before I have always looked on the pharmacist to be working in a pharmacy". (P3)*

Physicians that had interacted with pharmacists in DTCs or ELINOR before the clinical pharmacy service was implemented in the hospital had more understanding of what knowledge pharmacists' possess. This can be seen in the account of this physician: "*I have always had a vague knowledge about what a pharmacist does, until I participated in a drug and therapeutic committee. (…) After that I got a better understanding on what a pharmacist does. (…) they have a much longer and profound training than what I had believed". (P6)*

During the interviews some of the participants reflected over why they do not use the pharmacists' knowledge more often. They mentioned that pharmacists could be contacted whenever a question arises about a patients' medication treatment, but usually

they ask other specialists in the hospital. Some of them also mentioned that pharmacists in general are underused, to what qualifications they possess.

"*I believe that pharmacists in general are underused in Sweden. Study at the university for ages and then sell medications at the pharmacy*". (P4)

Some of the participants reported different reasons as to why they do not consult with the pharmacist when they have a question about pharmacological knowledge. They are used to taking to other specialists and have not thought that the pharmacist could assist and they do not know how to get in contact with the pharmacist when they are not in the ward.

"*That is, like I said, something that I believe we do to little [call the pharmacist]*" (P3)

4.3 Drug related problems and clinical pharmacy service

The majority of the participants mentioned that clinical pharmacy services could potentially prevent DRPs and ADEs and hence improve patient safety.

"*The patient safety you can observe (…) is reduce side-effects, reduce risk for interactions and so forth*". "*The better medications are balanced for the patient, the better it is. (…) I believe it is a patient-safety issue*". (P4)

Both physicians that have been practicing medicine for a long time and those that have been practicing for a shorter time shared this view. One physician also described the clinical pharmacy service as an opportunity to perform a "*safety check*" on the patients' medication treatment.

During the interviews some of the participants share their views on why DRPs could occur. One of the participants mentioned that when a patient is moved between different wards and physicians it is common that drugs are added to the medication list. Another participant described a problem that has to do with prescribing and continuing of prescriptions. According to the participant the process to continue a prescribing or prescribe a new medication is very easy and fast due to their computer prescribing system. This may impact on their assessment of the medication treatment. "*I believe that I don't reflect as much now, as it is so easy*" (P4). When it comes to discontinuing drugs another participant mentioned "*we [physicians] have taken this position that whoever that has prescribed a medication should consider if it should be discontinued or not*". (P1)

4.4 The value of pharmacists in hospital wards

All of the participants commented that is very positive to have a pharmacist in the ward. As described by this participant: *"I believe that they [the pharmacists] have been an asset on the ward in an area that we many times, by we I mean physicians, don't have satisfactory knowledge in i.e. drugs, interactions and such things. So I believe that they have contributed in a good way to the goal"*. (P3)

Other physicians also mentioned their own pharmaceutical knowledge may be limited, but they do not believe they have inferior knowledge than anybody else. Specialist trained physicians' mentioned that they have good knowledge about drugs within their specialist area, but outside of it the knowledge is not satisfactory.

Participants described pharmacists as an "*asset and a resource*". There are differences between the physicians, some see it as valuable to them, others to the patients. Physicians mentioned that pharmacists not only contribute with their pharmacological knowledge, but were also described as helpful and supportive. Physicians described them as "*helpful*"

and "*supportive*" as they assist with "substitution of tasks" and that they can help answer questions that arise about patients' medication treatment.

"Well, I believe that [the pharmacists work] can contribute something. It's so difficult to be an expert in everything, even though we of course know a lot about drugs it is still [difficult]". (P2)

Drug knowledge was often brought up by the participants during the interviews, both their own knowledge and the pharmacists. All of the participants described pharmacists as *"drug experts"* and repeatedly mentioned the pharmacists pharmaceutical knowledgeable. Especially drug interactions and problems that emerge as a result of these were mentioned by most of the participants. Knowledge was also described as complementary. In those instances participants described how pharmacists complemented their own knowledge about drugs.

"*The pharmacists beats us (the physicians) (…) in pharmaceutical knowledge*". (P5)

"Well [the pharmacist] has considerably deeper knowledge than I do about specific pharmacology, so to speak. And especially about interactions and such things that I've certainly read about some time ago but have forgotten". (P7)

4.5 Complexities with medication review

A general view voiced by physicians in this study is that medication reviews are time consuming. Some of them mentioned that they have to prioritize their work to produce what is expected of them i.e. carry the work forward so there are free beds in the ward.

"It is all about priorities and what you have time for during one day and then maybe you might take a short cut where possible". (P7)

Some of the participants mentioned that medication reviews do not get high priority as physicians have to maximize their time and therefore focus mostly on the acute problem (i.e. the reason why the patient has been admitted to the ward).

"I believe that time is the biggest reason [why medication reviews are not performed]". (P3)

"It could be that it is because of the staffing, it could be due to the workload, flow [of patients] in the ward, or that there are many other things that are given higher priority i.e. an acutely ill patient or something like that". (P2)

Some of the participants pointed out that medication review is an important task they would like to perform. As one of the physicians noted: "*All patients that needs a medication review should be able to get one*", but on the other hand they also point out difficulties. *"It's a pretty big task to do it [medication review] for every patient, and you might wish that you had the time to do it yourself, but you just can't cope with that, can you?". (P7)*

"You can't spend a whole day trying to figure out and read up on and find articles [about interactions] to help one patient". (P6)

Not only does the actual medication review takes time, one of the participants also mentioned that, it might even give the physician more work afterwards. Some of the changes may demand a follow-up to be performed on the patient.

Performing the actual medication review is by some of the participants described as difficult. Participants mentioned that sometimes medical records lack information about why drugs have been prescribed and how long treatment time should be for. If they try to find answers and ask the patients some of them do not know why they have a certain drug.

They also reported that sometimes there are discrepancies between hospital and primary care medical records and it is challenging to find out why. Searching for drug information could also produce problems as "*it takes time and sometimes the text is not written clearly*" (P1). With that the participant meant it can be difficult to find the answer you are looking for.

During the interviews one of the participants also mentioned another problem. Sometimes the physicians want to make changes in a patient's medication treatment, but it is not possible as the patient is too sick. Some of the participants mentioned that if there is no time to perform a medication review in the hospital, they can start a medication review process by sending an assignment to primary care.

"If it's about adjusting drugs, then in my world, maybe you don't do that when the patient is acutely ill with another condition. [If the patient spends longer time on the ward] then you can make some adjustments in a calmer period". (P2)

4.6 Pharmacist recommendations and patient outcome

On the question what kind of recommendations does the pharmacist give to physicians the answers included: drug interactions, dose adjustments, side-effects, inappropriate drugs to certain patient groups (i.e. elderly), drug changes, combinations of drugs, discontinuing of a drug, administration time, contra-indications, lack of indication, dose reduction and switching to drugs that are better suited for the patients' kidney- and liver function. The recommendation that was most commonly mentioned by participants was drug interactions. All physicians noted that recommendations are clinically relevant, adequate and followed most of the time.

"Usually we say "ok, good let's do that", and then we change according to her recommendation. That is the most common, as she has such sound advice. Sometimes there has been a discussion about a very important drug that has been prescribed and so on, then we discuss if there are other options to consider". (P3)

Physicians provided different reasons as to why a recommendation was not followed. For example, some mentioned that they had already consulted another specialist, others said they had already thought about the suggestion before the pharmacist mentioned it and had already decided not to do anything about it.

Most of the participants commented that they welcomed that the pharmacists had looked into a patient's medication treatment and had suggestions on it that they could discuss.

"*I really appreciate that they [the pharmacists] come and perform medication review*". (P7)

When it comes to patient outcomes all physicians perceived that clinical pharmacy service has positive outcomes for the patient. Some physicians also mentioned that while some benefits could be accrue while the patient is in the hospital the impact of medication reviews once the patient is discharged from hospital cannot be determined. Physicians were able to clearly identify benefits while the patient is in the ward but not those they cannot see when the patient has been discharged.

As reported above some participants voiced a degree of uncertainty of the actual patient outcome. When describing the uncertainty physicians mentioned that: *"patients are old and you never know what will happen to them"*, there are no studies in the area (patient outcomes after medication review), you need to perform a study to be sure of the outcome, in-ward time is to short and *"I am not used to do follow-up on patients like that (…) and check if the patient feels better or worse afterwards" (P6).* Some of the participants also mentioned that follow-up is done in primary care as the time spent on patients in the ward is limited.

"But probably I believe that paying attention to wrong dosages based on kidney- and liver functions and noting unfavorable interactions, that has to be, should be good. You would think that using the drugs as they are meant to be used, that has to be better than to use them in another way. The question is if you have enough patients or a reasonable follow-up, then you should be able to see the effect of the [outcome]". (P4)

Patient outcomes due to the service mentioned by physicians included: reduced risk for side-effects, reduced risk for interactions, better health, reduced risk for preventable hospitalization and hospital re-admission. Even though some of the participants were hesitant about the actual outcome for the patient their overall perception is that medication review does have a positive impact on patient outcomes and patient safety.

"Absolutely, yes I believe that! [pharmacists can affect patient outcome]. (…) Prognosis for the patient is effected if they get wrong combinations of drugs". (P3)

On the question "*What thoughts do you have on pharmacist contribution from a patient-safety perspective?."* Most of the participants answered "*Yes, pharmacists can increase patient safety*", but only a few mentioned how without being prompted. One participant commented: *"Yes, you can observe patient safety, as I just said, with the patient; you can ease side-effects, lessen risk for interactions and so on. Same thing with the risks that can give them more frequent admittance (to hospital) due to side-effects, so it is naturally an increase in patient safety". (P2)*

4.7 Professional relationships

In this study the pharmacists are part of a multi-disciplinary team that consists of different health care professionals. During the interviews the majority of physicians mentioned that they value the opportunity to interact with different health care professionals as they feel each one can contribute with their expertise to the patient care.

"Like on the rounds, that you sit down with a physician, and a nurse, and an assistant nurse and the pharmacist. And everyone contributes with their expertise. The assistant nurse with nursing care and the physician with a little medical knowledge, and the pharmacist who is targeted towards pharmaceutical knowledge. So all the pieces in the puzzle are there". (P3)

"That I believe is splendid [to have different professions present at ward rounds]. Yes, we have different approach angles to the patients' problems. So that other things can crop up that you have not really thought of". (P7)

When talking about collaboration some of the physicians mentioned professional traits such as: *"you have to be humble"*, "*open to other individuals perspectives so that you can get along when you have different opinions*", *"you cannot be a dictator"* and "*cannot take suggestions as criticism*". According to these physicians these characteristics are the base of good team work.

"You can't take this as some sort of critique, instead this is a really good opportunity to go through the medication lists with somebody that know this on her five fingers". (P5)

When physicians were asked to describe their experience working with pharmacists they describe them as: *"as a colleague", "part of the team", "specialist", "expert"* and *"official"* (it is unclear what the participant meant by official but in this particular case the physician only had limited contact with the pharmacist).

All of the participants pointed out that they themselves do not have any barriers about working with a pharmacist. However a couple of the younger physicians mentioned that some of their senior colleagues may have difficulties working with pharmacists. One participant mentioned that this is a new way of collaborating and *"new things are not always viewed as positive"*. Some of the participants mentioned that they have noticed tensions between their colleagues and the pharmacists based on comments they sometimes make. Some of the participants mentioned that they have not experienced tensions but believe that they could exist.

"Some physicians appreciate this too, and some physicians believe that she maybe is a little too skilled as she checks everything to do with drugs and interactions and they want to, override what she says sometimes". (P1)

Even though all participants claimed not to have barriers their comments convey a different perception "*only physicians have knowledge on how to treat patients*", only physicians know *"what works in real life"*. Some also mentioned that pharmacists only have "*theoretical knowledge*" one physician commented: *"As a physician I have much more, and also nurses and assistant nurses, we all have more experience of working with a whole patient, with a human. While I can feel that the pharmacist's point of departure is a little more of a theoretical one". (P6)*

Some physicians noted how change could be hard specially when challenging clinical autonomy - *"they don't want to be told what to do, you want to decide for yourself and others have more difficulties to take advice than others"*.

Most physicians in the study described how ultimately they make decisions on how to treat patients, or as described by this physician: "*it is I who decides the final say*". Physicians also described how they are used to managing things, make evaluations, calculate risks and value patient outcome.

4.8 Suggestions to improve the service

The majority of physicians provided suggestions on how to improve and develop the clinical pharmacy service. These included: being able to call the pharmacist during working hours, education about drugs and pharmacological treatments, increase the frequency of ward visits by the pharmacist, presentations on statistics e.g. things physicians often miss. The majority mentioned that they want the service to continue, some want the service to grow and become more common.

"I believe that it is really good when [the pharmacist] comes, and that she is a good asset and I hope that it will at least continue to be like this. That she will come, that she will be able to come more frequently". (P3)

Suggestions how to make the service better was also expressed by on participant: *"Something I believe that needs working with if this [service] is to be developed, is to find a good form for it. That is, the physicians, and all personnel, need to know that we now have a pharmacist here. So that they know it. So that I don't start to look into things first, and then suddenly there is another person there who has a lot of good*

information. The cooperation must be formalized so that you know that on certain days there is this possibility, or at this time or that". (P6)

5. Discussion

The aim of this study was to explore physicians' perceptions regarding clinical pharmacy services performed at hospitals in Västerbotten County Council. Understanding physician's perceptions of the clinical pharmacy service is important to facilitate the uptake and further implementation of the service. It also provides an in-depth description of their experience of the service, gives insight on how they perceive pharmacists and their role in hospitals wards and what impacts clinical pharmacy services has on patient outcomes.

5.1 Satisfaction, value, benefits

The results showed that physicians appear to be satisfied with the clinical pharmacy service. Other studies have also showed that health-care professionals appreciate pharmacy services and are satisfied with the interventions performed by pharmacists (14, 35).

It is interesting to note that most studies focus on the benefits clinical pharmacy services have on patient outcomes. Many studies have shown the benefits of clinical pharmacy service, which include: reduced hospital costs, improve patient outcomes and reduced DRPs (10-16, 23-28). In this study physicians also described benefits to themselves for example, how having a pharmacist in the ward allows them to perform other tasks or "learn" and improve their pharmaceutical knowledge. This may be because for physicians in this study the benefits for themselves were clear. Compared to the long term outcomes for the patients (i.e. hospital readmissions). Patients leave the wards quickly and the long term outcome of the clinical pharmacy service is not evident.

In this study improved patient outcomes were framed in different ways for example reduced risk for side-effects, reduced risk for interactions, better health, reduced risk for preventable hospitalization and hospital re-admission. This is similar to what other studies have found when investigating patient outcomes. Graabaek et al. (20) performed a minireview in 2013. They concluded that clinical pharmacy services have positive effects on medication use, health service use and costs. Some of the included studies had investigated drug related re-admission, visits to the emergency department and length of in-hospital stay.

Studies have shown that clinical pharmacy services, such as medication reviews, improve quality use of medicine (prescribing) and potential DRPs can be identified and corrected (11, 16). Preventing DRPs may also reduce drug-related readmissions as well as save costs that arise from DRPs. Other studies also support these theories: Drug-related readmissions were reduced by 80% in Sweden (11, 20, 25). A study by Ghatnekar et al in 2012 showed that investing €39 in clinical pharmacists time could save €340 in medical care by hospitals and primary care (32). A systematic review by Kabali et al (6) reported that clinical pharmacists improve drug treatment for in-ward patients, with no evidence of harm. They also concluded that pharmacists improved the quality, safety and efficiency of patient care.

A question that was raised early in the study was if there would be any differences in the responses between the participants, as they have different pharmacists that provide the service. During the analysis it was found that physicians described the pharmacists working model differently but there were no differences about the final outcome of their performed pharmacy service. It is important to note that the process involved when performing the actual medication review do not differ between Västerbotten and Skåne

County Council. However Skåne has a set model of other services that are included in clinical pharmacy services (9, 11, 12, 14, 22-24, 26, 27, 31, 32). Even though participants are unclear as to how the pharmacy service operate (times, frequency etc.) the service was considered valuable and describe in positive terms by physicians.

5.2 Collaboration

Many of the participants mentioned that they want the pharmacist to visit the ward more often. This is very positive and shows their willingness to work with pharmacists. When physicians and pharmacists work together they can improve patient safety which will in stance benefit the patients' outcome (22).

McPherson et al (53) conducted a study on collaboration between different healthcare professionals. One of the key messages in the study was that barriers have to be dealt with as they will not disappear by themselves. Vocational pride, old habits, difficulties adapting to new things and feelings of *"I know how to perform my job"* and feelings of being threatened are barriers that can make the process of working together difficult. As shown in other studies physicians might also feel questioned in their professional role when interacting with a pharmacist (35).

Ebert et al, investigated the views on collaboration between different health-care professionals (nurses, physicians' and pharmacists) (54). The study concluded that there is limited understanding of other health-care professionals roles. This instance has shown to have a negative impact on both the communication and collaboration within disciplines.

In this study all of the participants provided positive comments about working with a pharmacist. None of them mentioned they had any problems with advice given by the pharmacist. During the interviews it was also revealed that older colleagues to the participants may be hesitate to follow advice provided by the pharmacist. Older physicians in this study did not note hesitation or problems working with and following advice from pharmacists, but on the other hand only physicians that work with a pharmacist were interviewed. If physicians that do not work with pharmacist had been interviewed maybe different views could have been captured regarding this issue.

As mentioned before many of the participants know very little about how the clinical pharmacy service operates (times, frequency, people in charge). Knowledge of the work model could lay ground to a good collaboration between pharmacists and physicians. This is important information that needs to be communicated to the healthcare professionals that are going to work with pharmacists in the ward. To have a common goal is another thing that could also promote a good collaboration. This has been shown in a study performed by McPherson et al (53). The question about goals was never asked during the interviews, it is something that it's worth exploring in the future.

Factors that are important for establishing a successful collaboration reported by McPherson et al (53) included: shared understanding of the goal, acceptance of others knowledge and contribution, documentation that facilitates sharing of knowledge, conflict management and effective team meetings. Some of these factors were also mentioned during the interviews on how to get a successful collaboration with the pharmacist.

5.3 Patient outcomes

While on the whole systematic reviews and individual studies have shown that hospital pharmacists can improve safety (11, 16). This is consistent with what some of the physicians in this study mentioned, some studies have also shown that patient outcomes after a medication review have not reduced cost and hospital readmissions (8). The

reason for this could be that patient outcome is difficult to measure, there are many variables and much uncertainty when performing the calculation. Is the improvement a result of the clinical pharmacy service or would it have happened anyways?

All of the positive patient outcomes that were mentioned by physicians in this study have the potential to reduce DRPs. Most of the physicians can link the service between preventing DRPs and patient safety. But some of them are hesitant to make a statement about it. Ample evidence supports how hospital pharmacists can improve safety (11, 20, 25).

5.4 Improvements

While physicians in this study could clearly articulate what a medication review is and describe how this task is performed by a pharmacist in the ward. Most of the participants have little knowledge on how the clinical pharmacy service work model is set up in their ward. As previously reported participants mentioned some shortcomings: how to contact the pharmacist, when and how often the pharmacist visits the ward or if the pharmacist still comes to the ward.

This could be to a lack in communication regarding the service with the ward turn over and new physicians coming into the ward it could be hypothesized that when physicians start working in a new ward or in the hospital they are not aware of the service.

The clinical pharmacy service is flexible adapted to the needs of each ward. Some wards have set days and times while others have not. In wards that do not have set days and times the pharmacists decide when to attend ward rounds. They participate when they have performed medication reviews on patients that have a medication treatment problems that need to be discussed. These irregular visits could be one reason why physicians lack knowledge in the work model is set up. This could also be because the information about how the pharmacist works has not been communicated to them. It is important to inform physicians and maybe even other health care professionals in the wards (nurses, assisting nurses) about the set up in stance could provide a better understanding of the service an promote collaboration between different health care professionals.

It could be hypothesized that lack of knowledge about clinical pharmacy service and clinical pharmacists is a matter of visibility as clinical pharmacists are so few. As previously shown in Figure 1 only about one third (about 120) of the County Council employed pharmacists work clinically (43). Furthermore medication reviews are only one of the tasks that a clinical pharmacist can perform in a ward. Pharmacists are for the most part not visible in the wards as they spend most of their working hours in their offices, in other parts of the hospital. It appears physicians in this study were unaware of other tasks performed by clinical pharmacists in the hospital University Hospital of Umeå (Norrlands Universitetssjukhus).

5.5 Suggestions for the future

As reported before some of the participants' suggestions was to be able to call the pharmacist, more frequent visits, statistics and educations. It is important that the suggestions given during the interviews are taken on board as they can improve and further expand clinical pharmacy service in the region. The suggestions will also make the pharmacists more visible which could make clinical pharmacy service more known.

Inter-professional learning and inter-disciplinary work may improve the understanding between different health care professions. This may be a help to eradicate barriers that might exist between different health-care professionals (53).

As described in the results physicians not only valued clinical pharmacy services but also wanted it to be expanded. Many of the suggestions provided could create awareness and facilitate the expansion of clinical pharmacy services in the hospital and also make clinical pharmacists more visible in the hospital. It could also give pharmacists new tasks and more opportunities to work with additional health care professionals.

Some of the participants expressed specifically that they wanted the service would be allowed to continue. This was interpreted by the researcher as underlying uncertainty about if and for how long the clinical pharmacy service would be provided in their wards.

Few wards within Västerbotten County Council utilize pharmacy services. Possible reason could be lack of knowledge that the service could be provided, lack of information about the service and lack of clear goals for the service. Medication reviews performed outside of hospitals within Västerbotten County Council have a set work model (Modell Västerbotten)(55). It is unclear if there are any set guidelines and polices for clinical pharmacy services performed in hospital wards in Västerbotten County Council.

Another reason could be that only three clinical pharmacists provide the service and to be able to expand the service more pharmacists need to be employed.

In Skåne Count Council clinical pharmacy services have successfully grown. This is perhaps due to its inclusion, many studies were performed before the introduction of clinical pharmacy service that lay ground to policies about how to work with pharmacy services (43). This study is important as it could make pharmacy service and pharmacists more visible. It can help transferring knowledge about the service and how physicians value it. To further increase visibility, other studies could be conducted and involve other health-care professionals (for example nurses).

In summary, to increase the visibility of clinical pharmacist and the clinical pharmacy service, there needs to be better communication strategies in place as well as opportunities to support collaborative relationships. Future studies should focus on how to expand the service to other wards in Västerbotten County Council.

5.6 Strengths and limitations of the study

Less than half of the invited physicians agreed to participate in the study. Views from physicians in two wards that have clinical pharmacy service are not represented in this study. As one of the wards decided they were too busy and approval was not granted by the ward manager for the second one. All of the interviewed physicians were positive and had similar views. It is unknown if those that chose to participate are more likely to have positive views compared to those who did not participate.

The interviews were conducted by a Master's in pharmacy student hence participants may have provided only positive views. Participants might have felt uncomfortable expressing views that could be perceived as something negative about pharmacists. However, the participants spoke freely during the interviews and no implications of participants feeling uncomfortable were perceived by the researcher.

There are challenges associated with language. The interviews were conducted in Swedish and then reported in English. Considering that the purpose of the study was to convey views expressed by the participants; this could be difficult when quotes that are supposed to support the findings have to be translated as it is easy for their meaning to be "lost in the translation" (56). However as previously mentioned quotes were also back translated to Swedish, to add validity to the translations.

One of the strengths of the study is the methodology of using interviews instead of doing a survey. The use of open-ended questions allows the participants to freely share their views and experiences.

To my knowledge this is the first study conducted in Northern Sweden that has provided important information on clinical pharmacy in hospital settings.

5.7 Implications

The findings from this study are important as it addresses a gap in knowledge that not many reports in Sweden have explored before. The findings also support the implementation of clinical pharmacy services in hospital settings. Until now little has been known about Swedish physicians' views on clinical pharmacy service in hospital settings and what they perceive are the potential benefits.

The findings are important for the growth and expansion of clinical pharmacy services, particularly in Northern Sweden. There is a potential for clinical pharmacy service to grow there, as of now the services are only available in a few wards and hospitals. According to the ward pharmacists' clinical pharmacy service is on the move forward as it has grown the last couple of years. More pharmacists have been employed and clinical pharmacy services have been implemented in several wards. There is a demand for the service and the potential to grow is increasing.

6. Conclusion

The findings show that all of the participants were positive about the clinical pharmacy service and the collaboration with the pharmacist. Pharmacists were seen by the participants as "drug experts" and their recommendations are perceived as clinically relevant. All of them wanted to continue working with a clinical pharmacist. The findings are therefore important for the growth and expansion of clinical pharmacy services, particularly in Northern Sweden. To our knowledge this is the first study in the north of Sweden that explores physicians' views of clinical pharmacy services.

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Appendix A. Interview schedule

Pharmacist contribution in the ward

1) Can you tell me little about your experiences with pharmacists that work clinically in a hospital ward?

- When do you encounter the pharmacist at the ward?
- Does your ward perform ward rounds? How are they performed? Who is participating?
- What is your opinion about having different professionals participate in the ward rounds?
- What is your opinion about the pharmacist as a profession?
- What is your generally perspective on clinical pharmacists?

2) Can you describe what the pharmacist does in your ward?

- Can you describe how the pharmacist work in the ward? What is your view on that?
- Is there anything the pharmacist does that works well? And not that well?

3) What is your opinion about the proposals you get from the pharmacist?

- Are the proposals adequate? Can you give examples?
- What is your opinion about the clinical relevance?
- Do you experience anything negative/ positive with the proposals?

Clinical outcomes of pharmacist contribution

4) Are there any benefits to have a pharmacist in the ward? Examples?

- Are there any advantages? Are there any disadvantages?
- Can the pharmacist contribute anything to the patient care team itself, and if so how?
- Does the patient's medication use change after a medication review? Examples?
- Can a pharmacist change patient outcomes? If yes, how and in what direction?

5) What thoughts do you have on pharmacist contribution from a patient-safety perspective?

- Are there any advantages? Are there any disadvantages?
- Can the pharmacist contribution affect patient-safety? Can you give examples?
- Does it affect the patient in any way?

Future

6) How do you look upon the future of having pharmacists work clinically in hospital wards?

- What are your feelings about continuing to work with a pharmacist as you do today?
- Are there any barriers?

7) Do you have any suggestions that involves the pharmacist contribution to the hospital ward?

- Can there be any improvements?
- Should the pharmacist continue to work as they do today?
- Is there a service you would like them to perform that they don't do today?

8) Is there anything that we have not talked about so far that you wish to add?

Appendix B. Invitation letter

Läkares uppfattning om kliniska apotekares medverkan i det multiprofessionella teamet på vårdavdelning

Följande brev ger bakgrundsinformation angående den forskningsstudie som du ombeds delta i.

Studien genomförs av Charlotta Vinterflod, Umeå universitet inom ramen för ett examensarbete på masterprogrammet i farmaci. Syftet med studien är att undersöka läkares uppfattning om kliniska apotekares medverkan i det multiprofessionella teamet på vårdavdelning. För att undersöka detta kommer intervjuer med läkare att genomföras.

Om du väljer att delta i studien kommer du att intervjuas under max en timme angående dina erfarenheter av apotekares medverkan i vårdteamet. Du kommer att ges möjlighet att läsa den utskrivna versionen av intervjun och också att kommentera, ta bort eller ändra på dina svar.

Ditt deltagande i studien är helt frivilligt. Om du väljer att delta kommer du att få behålla detta informationsblad och du ombeds att signera ett samtyckesformulär. Om du väljer att delta i studien kan du ändå när som helt avbryta din medverkan utan att ange någon anledning.

Studien är godkänd av en etikprövningsnämnd. *All information som samlas in kommer att kodas och hanteras så att ingen obehörig kan ta del av materialet.*

Om du har frågor angående studien vänligen kontakta:
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Appendix C. Coding framework

Theme	Subtheme	Description
Clinical pharmacy service		
Work model (how the service is organized in the ward)	Round participants	Professional competences that participates at rounds where pharmacist is present
	Frequency	How often the pharmacist visits the ward
	Assignments	Physicians descriptions of what the pharmacist does in the ward
	Multi-disciplinary teams	Views on multi-disciplinary team work, effectiveness, how it is to work in multi-disciplinary teams
	Encounter	How they meet the pharmacist in the ward, multi-professional round/ special round/ personal meeting
	Ward needs	Different wards have different needs on how the service is organized
Future		
	Suggestions	Wanted services that are not performed today
	Improvements	How to make the service as a whole better
	Frequency	How often they want to meet the pharmacist
	Views on the future	General views expressed when talking about the future
Outcome of the performed clinical pharmacy service		
Value for the physician		
	Knowledge	The pharmacist gives me more knowledge about drugs through education and repetition
	Drug expert	The ward has access to a person that is a drug expert
	Resource	The pharmacist is a resource that we can use in the ward
	Timesaving	The pharmacist have time to performs medication review and saves me time
	Benefit	Advantages with the service that benefits the physician

Patient outcome		
	Positive	Patient benefits from the performed clinical pharmacy service, patient safety
	Negative	The patient do not benefit from the performed clinical pharmacy service
	Uncertainty	Difficult to know what the patient outcome really are
Views of the performed service		
	Positive	What they think is positive about the service
	Negative	What they think is negative about the service
Clinical pharmacy service results		
	Recommendations	Examples of recommendations the pharmacist displays at rounds
	How the recommendations are received	What happens with the recommendations, are they implemented or not and reasons why
	Aspects	General views the respondents have about the recommendations it selves
Professional relationships		
Pharmacist role		
	Underused	The full potential of pharmacists are not used in hospitals
	Experts	Pharmacists are drug experts
	Pharmacist role	Views on the pharmacist profession both before and after they started working with them
Physician role		
	Clinical knowledge	Physicians have clinical knowledge on treating patients
	Responsibilities	Physicians have responsibilities
	Power	Physicians decides what is best for the patient, what medication treatment to use
Working together		
	Barriers	Barriers between the two different professional roles
	Consulting others	Other experts are consulted about drugs instead of the pharmacists
	Tension	Feelings that are expressed that could be negative for the collaboration

	Work relationship	How they classify their work relationship
	Contribution	How the pharmacist can contribute to the patient care team itself
	Characteristics	Views on how the persons character should be to promote good relationship between the two professions
Experiences physicians express regarding patients and drug treatment		
Medication treatment		
	Prescribe	Expressed thoughts concerning prescribing of drugs
	Discontinue	Expressed thoughts concerning discontinuing of drugs
	Change	Expressed thoughts concerning changes with the medication treatment and follow-up after a change
	Combinations	Drug combinations are difficult to sort out
	Drug information literature (FASS)	Sometimes difficult to get answers from, study population is younger and healthier drug info could be wrong for older patients
	Patient	Patients that gets a medication review, can resist the suggested changes
	Drug knowledge	Knowledge of drugs can be limited to certain treatment areas, no drug experts, many drugs on the market
	Time	Takes time to look up information, physicians have to prioritize their work as they have little to spare
	Missing information	Missing information in the journals, patient don't know, discrepancies between primary and hospital care drug lists

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