Interprofessional Collaboration between Physicians and Pharmacists in Selected Public Hospitals of Addis Ababa, Ethiopia

Sewit Timothewos

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This is to certify that the thesis prepared by Sewit Timothewos, entitled "Interprofessional Collaboration between Physicians and Pharmacists in Selected Public Hospitals of Addis Ababa, Ethiopia" and submitted in partial fulfillment of the requirements for the Degree of Master of Science (Pharmacoepidemiology and Social Pharmacy) complies with the regulations of the university and meets accepted standards with respect to originality and quality.

Signed by the Examining Committee:

Examiner (External): Dr. Ephrem Engidawork Sign. _____ Date _____

Examiner (Internal): Dr. Nisha Mary Joseph Sign. _____Date _____

Advisor : Dr, Teferi Gedif Sign. _____Date _____

Abstract

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Since recent times there has been an expansion in the horizon of pharmacy practice. To optimize the contribution of pharmacists to their extended role, pharmacist and physicians need to learn to work in a collaborative manner. Hence, assessment of current level of interaction and factors affecting their working relationships need to be investigated. To this effect, the present study employed hospital based descriptive cross sectional study design, with qualitative and quantitative data collection methods. The study was conducted from June-November 2013 in two selected public hospitals of Addis Ababa. Key informant Interview (KI) and the Pharmacist Physician Collaborative Index (PPCI) was used to measure the degree of collaboration. The study population were pharmacists and physicians working in RDMH and TASH. The study had a response rate of 76%. The mean PPCI score for the respondents were 60.4 and 67.5 for physicians in TASH and RDMH, and 62 and 70.5 for pharmacists in TASH and RDMH, respectively. The professionals jointly worked in DTC and morning sessions and wish that these activities would be further strengthened. The pharmacists were making more of an effort to collaborate than the physicians and the professionals in RDMH were getting more support from the hospital administration in favor of collaboration compared to TASH. Interprofessional collaboration in RDMH was found to be equal to (from the pharmacists perspective) or greater than (from physicians perspective) that of TASH. And it is recommended that two way and open communication between physicians and pharmacists should be facilitated so that the role each professional should play in team work would be known.

Key words; Interprofessional Collaboration, Pharmacist Physician Collaborative Index, Collaboration, pharmacist, physician, professional relationships.

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List of Abbreviations

AIDS	Acquired Immunodeficiency Syndrome
ART	Anti-Retroviral Therapy
ASHP	American Society of Health-System Pharmacists
CNO	College of Nurses of Ontario
CSA	Central Statistics Agency
CWR	Collaborative Working Relationships
DIC	Drug Information Center
DIS	Drug Information Service
DTC	Drug and Therapeutics Committee
FIP	International Pharmaceutical Federation
FMOH	Federal Ministry of Health
GP	General Practitioners
HIV	Human Immunodeficiency Virus
ICSC	Interprofessional Care Steering Committee
ICU	Intensive Care Unit
KI	Key informant Interview
OR	Operating Room
PI	Principal Investigator
PPCI	Pharmacist Physician Collaborative Index
RDMH	Ras desta Damtew Memorial Hospital
SHM	Society for Hospital Medicine
TASH	Tikur Anbessa Specialized Hospital
WHO	World Health Organization

1. Background

Patient care in a hospital setting is provided by a group of health professionals and staff that all practice within the boundaries of the hospital. As a result, nowhere is interdisciplinary team collaboration more important than in health care settings. This is because the complex nature and demands of the health care work environment requires the expertise and knowledge of differing individuals or specialists. Moreover these two should be able to work together to solve multifaceted and complex patient care problems which in theory should facilitate better communication between physicians and pharmacists (Kuziemsky *et al.*, 2009; FIP, 2011).

There seems to be a consensus among researchers in the past that communication (hence collaboration) between pharmacists and physicians is often sub-optimal. Reasons for this are complex, but the end result is a working relationship that can, in many instances, be less than satisfactory. The real danger is that an impaired working relationship between two such essential health care professionals carries with it the potential for adverse effects on patient care and patient outcome (Rubin and Sleath, 1997).

Until recently, the need for the collaboration between physicians and pharmacists in Ethiopia was obscure. Nonetheless, recently, the role of the pharmacist with regard to patient care has been expanding. This is evidenced by the introduction of concepts such as pharmaceutical care plan, clinical pharmacy service, emergency pharmacy service, drug information service, monitoring of drug use problems and the launching of the clinically oriented pharmacy curriculum by all the pharmacy schools in the country. Subsequently if the extended roles of pharmacists are to be realized, comprehensive interprofessional working relationship should be achieved (Hughes and McCann, 2003; FMOH, 2010; Odegard *et al.*, 2011).

2. Statement of the Problem

Historically, pharmacists have been primarily responsible for the dispensing of medications that have been prescribed by physicians. Since recent times the pharmacist's role and territory is expanding and sometimes even overlapping with the physician's duties. To optimize the contribution of the pharmacists to their extended role, physicians and pharmacists need to learn to work in a collaborative manner as members of an interdisciplinary team. In order to facilitate this extended role current levels of interaction between pharmacists and physicians, and factors affecting their working relationships need to be investigated (Reebye *et al.*, 1999; McDonough and Doucette, 2001; Hojat and Gonnella, 2011).

Ethiopia is a country in which infectious disease such as Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome (HIV/AIDS), malaria and tuberculosis are prevalent and chronic diseases such as hypertension, cardiovascular disease, and diabetes mellitus are becoming increasingly prevalent. This calls for the need for interprofessional collaboration between the two health care professionals more than ever for a better patient outcome (Odegard *et al.*, 2011).

Agalu *et al.* (2011) on a study on medication prescribing errors in the Intensive Care Unit (ICU) of Jimma University Specialized Hospital reported that the prevalence of medication prescribing errors was 52.5%. The researchers suggested the integration of the clinical pharmacist in the patient care team as a strategy to prevent medication errors in the hospital.

According to Engidawork *et al.* (2007) with the increasing complexity of HIV/AIDS and pharmacotherapy, the need to improve pharmaceutical services in Ethiopia to foster optimal use of these complex therapies becomes crucial. The scaling up of Anti-Retroviral Therapy (ART) requires a multidisciplinary approach in which pharmacists can play a key role. Similarly, Schelles *et al.* (2008) reported that in view of its increasing complexity, rational and tailored drug therapy cannot be implemented

in its full width when the discipline is applied only by physicians.

Interprofessional collaboration is not only beneficial to patients but also to the health professionals as well. O'Daniel and Rosenstein (2011) conducted an original research on the impact of physician and nurse disruptive behaviors and its effect on staff relationships, staff satisfaction and turnover. Many of these unwanted effects can be traced back to poor communication and collaboration, and ineffective teamwork. Absence of collaboration between physicians and pharmacists can have equally devastating effect on the patients and the working environment.

Based on research done in Addis Ababa's public Hospitals, majority (84%) of the pharmacy professionals "not at all" or "almost never" participated in ward rounds. The communication of the pharmacists with physicians and among themselves was also rated low with 50% of the respondents rating it as poor or fair. In addition, 63.8% of the patient respondents in the study rated poor when asked how they felt about the way the pharmacists work together with the physician to make sure that there medications are best for them (Eshetu, 2010).

Even though studies have reported the importance of interprofessional collaboration, very little is known about the extent of such collaboration in Ethiopia. Without assessing the status of the working relationship of these two health professionals it would be challenging to determine how much of the expanded role of pharmacists could be implemented. It would also be difficult to determine the implication the current status of collaboration might have on patient outcome.

Hence, studies such as this which aim at studying the degree of interprofesisonal collaboration between physicians and pharmacists become especially relevant at this particular point in time when our country is planning to embark in clinical pharmacy services.

3. Literature Review

Demands on the health care system are increasing. Chronic diseases such as cardiovascular disease, diabetes, respiratory disease and mental illness are on the rise, and patients and their families want to be actively engaged in managing their health conditions. Health care organizations are feeling pressured to provide more timely services, while at the same time working with finite human and financial resources. For these reasons, new ways of approaching care are needed, and different solutions will be required to meet future demands. Interprofessional care, a collaborative, team-based approach to care is one strategy that has proven to be an enabler for improving patient care and meeting the demands that health systems face (ICSC, 2007; Haire, 2010).

Drug therapy has become one of the cornerstones of modern health care delivery. Consequently, effective and rational management of increasingly complex drug therapies is now essential both to the health and welfare of patients as well as to the efficient economic performance of health care systems and organizations. Because of their knowledge and skills in drug therapy and their accessibility to patients, pharmacists with the requisite clinical training and professional education are positioned to help patients, other health care professionals, and the health care system achieve more effective and efficient drug therapy outcomes (Hammond *et al.*, 2003) .

Currently, several trends in society and health care point to the need for increased collaboration among pharmacists and physicians. These include, among others: the presence of considerable drug related morbidity and mortality, rapid advancements and innovations in medicine and pharmaceuticals, the growth of managed care which has caused the movement of patients from in patient to ambulatory setting and the need for pharmaceutical care for an aging population. While each factor calls for closer pharmacist physician collaboration, efforts to convince physicians to fully utilize pharmacists' skills to help manage patient's drug therapy have had only limited success (McDonough and Doucette, 2001).

Accordingly this literature review sets out to go into studies in areas such as the concept of interprofessional collaboration in patient care and the degree, barriers and facilitators of collaboration between pharmacists and physicians. The literature review is conducted in the hope of shedding some light on the topic and the context of the qualitative and quantitative study to be conducted in the near future.

3.1. Interprofessional Collaboration in Health Care

There are numerous ways to describe interprofessional collaboration in the provision of health care services. In the general sense of the word it is defined as working together with one or more members of a team who each make a unique contribution to achieving a common goal. Each individual contributes from within the limits of her/his scope of practice (CNO, 2008).

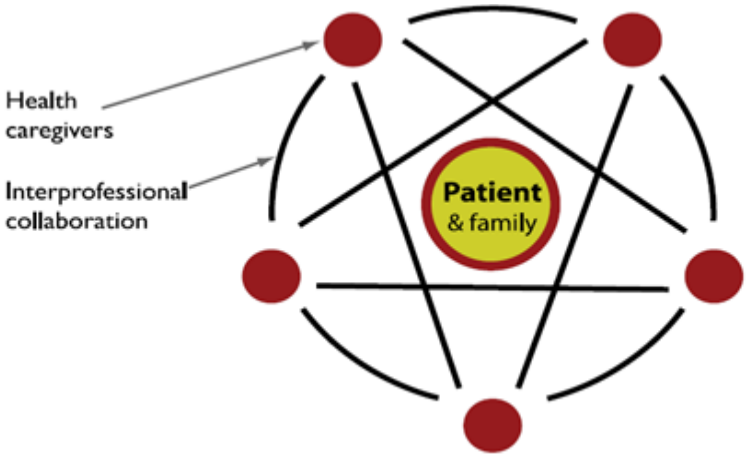

Figure 1 Components of Interprofessional Collaboration, Source; ICSC, 2007

Interprofessional collaboration when applied to health care can be defined as health care professionals assuming complementary roles and cooperatively working together, sharing responsibility for problem-solving and making decisions to formulate and carry out plans for patient care. Interprofessional collaboration between physicians, nurses, and other health care professionals increases team members' awareness of each other's type of knowledge and skills, leading to continued improvement in decision making (O'Donnell and Rosenstein, 2011).

There is mounting evidence that an interprofessional care environment may offer multiple benefits (ICSC, 2007). These include:

***Improved outcomes for people with chronic diseases*:** According to a study by Dey and his colleagues' (2011) interprofessional collaboration is a concept promoted in an attempt to improve chronic disease management. The impact of collaboration on patient outcomes has been studied in many disease states. For example, in the primary care setting, pharmacist and physician collaborations have reported successful outcomes with regards to cholesterol lowering and cardiac risk reduction, blood pressure control, diabetes management, heart-failure management, depression, pain, asthma control and palliative care.

In another study on the impact of physician-pharmacist collaboration on uncontrolled hypertension, study participants cared for by the physician-pharmacist team model were 40% more likely to achieve their goal blood pressure compared to those cared for by their physician alone (Hunt *et al.*, 2008).

Furthermore, based on a study by Mcdonough and Doucette (2011) in practice settings where pharmacists have been successfully integrated into drug therapy management process patient outcomes has improved. Similarly numerous researchers such as ASHP-SHM (2007) and Petoukhov (2011) reported improved patient outcomes when pharmacists collaborated with the health care team.

***Decreased health cost*:** Drug-related morbidity and mortality is a costly problem which cannot be resolved by one health care profession in isolation (Bryant, 2010). According to Paulino *et al.* (2010) interprofessional collaboration between physicians and pharmacists among other things results in decreases in health costs related to ineffective and unsafe medication use. Similarly, Petoukhov (2011) in his study stated that patients treated by interdisciplinary health care teams enjoy better health outcomes, shorter waiting times, and a greater degree of patient empowerment, all of which lead to an increase in patient satisfaction rates and cost savings to the health care system.

***Reduced medication errors*:** As the healthcare system is faced with the challenge of reducing medication errors and adverse drug events, one viable solution may be to increase physician-pharmacist collaboration. According to the literature, increasing physician pharmacist collaboration may result in a reduction in total drug morbidity and mortality (Sweeney, 2002). Based on ICSC (2007), interprofessional collaboration reduced medical errors lowering emergency department clinical error rates from 30.9 to 4.4%.

Increased job (practitioner) satisfaction: the benefit of interprofessional collaboration is not only felt by the patients and the health care system but also by the participating health care professionals. Health care professionals benefit from interprofessional collaboration by gaining diverse knowledge of other practitioners on the health care team. Furthermore, health care professionals benefit from the more equal distribution of workload among team members, which contributes to an increase in the practitioner satisfaction rates (Petoukhov, 2011). In addition the collaboration of the pharmacist with the physician has an added benefit of feeling more secure as a result of being able to consult with a pharmacist, both for drug information and for patient issues (Pottie *et al.*, 2008).

3.2. Model for Interprofessional Collaboration

To assist practitioners and researchers interested in pharmacist collaborations, McDonough and Doucette, (2001) have proposed a conceptual model for the development of pharmacist physicians Collaborative Working Relationships (CWR). The CWR model was synthesized from models of interpersonal relationships, business relationships, and collaborative care from nursing/physician relationships. This framework illustrates how individual, context, and exchange characteristics influence movement along a collaboration continuum, from stage 0 (professional awareness) to stage 4 (commitment to the CWR) (Zillich *et al.*, 2005; Snyder *et al.*, 2010)

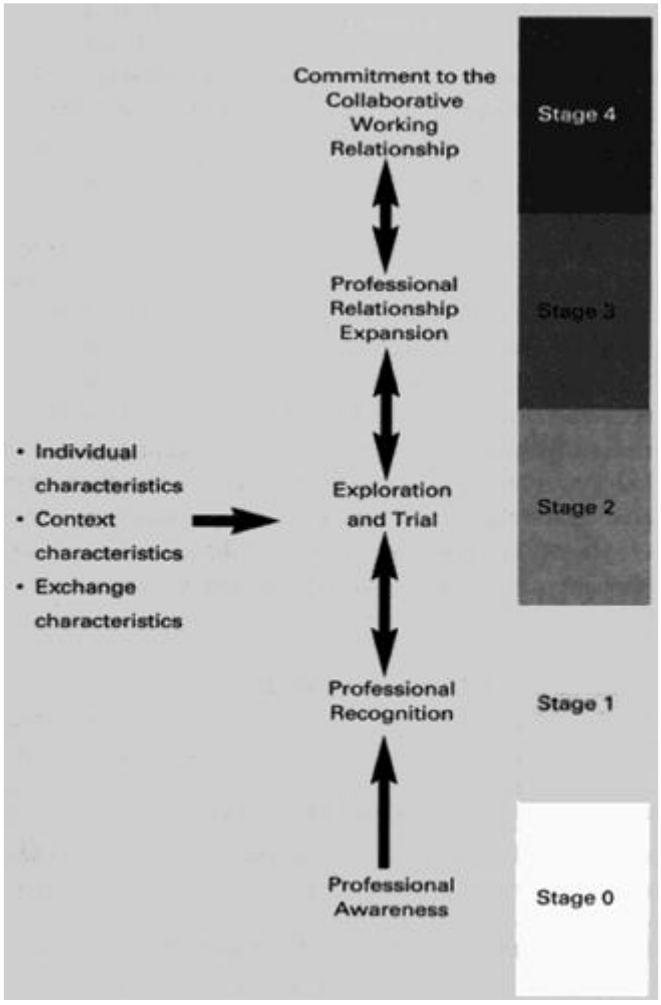

Figure 2 Staged Approach to Developing the Pharmacist-Physician Collaborative Working Relationships, Source; McDonough and Doucette, 2001

Stage 0: Professional awareness

At this stage, exchange is minimal and interactions are of a discrete nature. Examples of discrete interactions among pharmacists and physicians include pharmacists phoning in refill requests, alerting physicians to possible adverse drug reactions, or discussing a drug therapy problem identified during the dispensing process. Such interactions tend to be of short duration and conducted without much thought to developing a relationship or identifying new strategies to improve the patient care process (McDonough and Doucette, 2001).

Stage 1: Professional recognition

At stage 1, efforts to collaborate are mostly unilateral and initiated by the pharmacist. In this stage, physicians may not see the value of establishing a relationship with the pharmacist (Paulino *et al*., 2010). For example, as pharmacists develop new services, they may call on physicians to ask for referrals to their practice. At this stage, pharmacists see the relationship as necessary for the success of their new clinical service, whereas physicians may not see the value of the service or the need to establish a direct working relationship with the pharmacist (McDonough and Doucette, 2001).

Stage 2: Exploration and trial

During this stage, practitioners measure and test their compatibility, expectations, trustworthiness, and commitment to the relationship. Pharmacists continue to be the initiators as physicians consider their obligations as well as the benefits and risks of collaboration. The stakes of the exchange can affect the extent, duration, and nature of the exploration and trial stage. For example, physicians may decide to refer a patient to the pharmacy to test the pharmacists' skills and competence. The quality of care that the pharmacists give to the patient will be evaluated by the physicians to determine whether it is worthwhile to continue the relationship by referring more patients (McDonough and Doucette, 2001; Brock and Doucette, 2004).

Each exchange during the exploration and trial stage will help the practitioners refine their expectations regarding the others' behavior. This development of expectations can either increase or decrease the value physicians and pharmacists place on the working relationship. If physicians feel their patients did not receive the expected care from pharmacists or if misinformation was given, then expectations could be lowered.

Commitment is limited during this stage, thus making the relationship fragile and easily dissolved (McDonough and Doucette, 2001).

Stage 3: Professional relationship expansion

A continued increase in benefits seen during the exploration and trial stage can increase interdependence and expand the professional relationship. Communication becomes more bilateral as this stage involves fine-tuning the relationship through performance feedback. Norms of exchange are customized to the relationship (Brock and Doucette, 2004).

The exchange efforts are still unbalanced, with pharmacists needing to continually communicate the benefits previous patients have received from pharmacists' services (McDonough and Doucette, 2001).

Stage 4: commitment to the collaborative working relationship

The prominent exchange characteristics for Stage 4 are the same as those for Stage 3.

Collaboration is more likely to occur when physicians view the risk to their own practice as low and the value added as high. For commitment in a relationship to exist, at the very least, all of the following elements must be present: relatively high input levels by the parties, relatively lengthy duration, and relatively great consistency. Reaching commitment will be more likely if the exchange efforts by and relative power among members of the pharmacist-physician team is somewhat equitable. Physicians will rely on the knowledge and skill that pharmacists have displayed during the development of the CWR. Pharmacists will rely on the clinical information physicians provide to them as they help to manage patients' drug therapy. The time required to obtain commitment to collaboration can vary considerably because of participant and context characteristics (e.g., practitioner type, practice setting, professional experience). Face-to-face meetings, clinical recommendations, and feedback to physicians will help to move the relationship through the various stages (McDonough and Doucette, 2001).

Because of the complexity involved with five stages and various variables, previous applications of CWR have used a simplified model that does not incorporate the five stages directly. In the simplified model collaborative care, a single construct used to measure the overall collaborative process, is influenced by individual, context, and

exchange characteristics. Individual characteristics consist of variables such as age, years in practice, or personality; context characteristics include practice setting and professional interaction; and exchange characteristics include relationship initiation, trustworthiness, and role specification (Liu and Doucette, 2011).

Using the CWR model as a guide, Zillich *et al.* (2005) demonstrated that, although Individual and contextual characteristics influenced relationship development, exchange characteristics are the principal drivers in the development of pharmacist-physician collaborations.

The Pharmacist Physician Collaborative Index (PPCI) measures these three exchange domains of a collaborative relationship: (i) *trustworthiness*, a practitioner's ability to trust another practitioner's word and expertise; (ii) *role specification,* interactions between pharmacists and physicians in which they reach agreement on roles and responsibilities for each other in caring for mutual patients; (iii) *relationship initiation*, actions of one party to determine the needs of another party thereby facilitating relationship development (Zillich *et al.*, 2006).

An initial 27-item PPCI was developed based on the CWR model to assess professional relationships using Likert scales. Zillich *et al*. (2005) concluded that the 27 item PPCI can be refined to 14 item PPCI. The study further stated that both the initial and refined PPCI were significantly positively correlated. However, the 14-item refined PPCI is preferred over the 27 item measure because it is more streamlined and less time-consuming instrument. Hence the refined 14 item PPCI was used for this particular study.

3.3. Barriers for Physician and Pharmacist Collaboration

The distance between the clinical practice and the location of the pharmacy: studies show that one of the most important factors in building cohesive team is geographic proximity between the physician's clinical practice and the pharmacy because it helps the two professionals to get to know one another and hence build trust (Brown *et al.*, 2009). In another study on the value of clinical pharmacists in the emergency

department, physician and nurse respondents reported that they tend to consult with the pharmacist more often than they would if the pharmacist were not remotely located. Furthermore, certain valued duties, such as patient education, checking orders, and attendance at resuscitations are not possible from a remote location (Fairbanks *et al.*, 2007).

Unfamiliarity with pharmacist skills and roles in patient care: when a doctor was asked the reasons for not communicating the patient's information to the pharmacist, he said that it was because it violated the patient's confidentiality. This comment is interesting, as it suggests that some physicians do not even view pharmacists as members of their patient's health care team (Laubscher *et al.*, 2009). Similarly, data analysis by Paulino *et al.* (2010) suggests a mismatch between the role pharmacists perceived for themselves and physician's perceptions.

Lack of established face to face visits with the physician: not knowing what the pharmacist looks like in person or not having any information about the pharmacist they are taking advice from creates additional hesitation on the physicians part to accept an advice from the pharmacist (Snyder *et al.*, 2011) .

"Shopkeeper image of community pharmacists": In focus group discussion made about perceived inter-professional barriers between community pharmacist and General Practitioners (GP), one of the main reasons behind the problem was stated as GP's view that pharmacists are more of "shop keepers of the community pharmacy" or "specialized retailers" rather than health care professionals who have the patients best interest at heart (Hughes and McCann, 2003).

Trustworthiness: when it comes down to it, the physician is the ultimate decision maker concerning things related to the patient's health. So when we talk about trust worthiness we are referring to the pharmacist's efforts of gaining the trust of the physician rather than the other way round. The success of these efforts will determine the involvement of the pharmacist in the decision making process related to medications. This can be accomplished by continuously providing the physician with

high quality recommendations, by establishing preexisting relationship with the physician and also by communicating with the physician on matters related to the patient (Snyder *et al.,* 2010).

Territoriality: the pharmacist's role and territory is now expanding and sometimes even overlapping with the physician's duties. This territoriality issue has caused debate within many international settings and may have led to decreased co-operation between pharmacists and physicians (Reebye *et al.*, 1999).

On a study by Dey *et al.* (2011) pharmacists identified that GPs might feel threatened by pharmacist involvement or that there might be an element of territorialism (role encroachment). Paulino *et al.* (2010) reported that territorial behavior was evident in both professions. More clinical roles were perceived as an invasion of physicians' professional practice both by physicians and community pharmacists, but the latter showed unwillingness to compromise on these newly extended roles.

***Hierarchy*:** The biggest obstacles to the implementation of interprofessional collaboration in health care have been found to stem from the hierarchic organization and administration of the health care service. The hierarchic structure of decision making prevents collaborative decision-making especially in stressful situations. Moreover, hierarchy impedes the flow of information and interaction between different professional groups and different levels of decision-making (Collin *et al.*, 2010).

Physicians are at the top of the hierarchy of the health care. Hierarchy differences can come into play and diminish the collaborative interactions necessary to ensure that the proper treatments are delivered appropriately. When hierarchy differences exist, people on the lower end of the hierarchy tend to be uncomfortable speaking up about problems or concerns. Intimidating behavior by individuals at the top of a hierarchy can hinder communication and give the impression that the individual is unapproachable (O'Donnell and Rosenstein, 2011).

According to a qualitative study conducted on perceived interprofessional barriers between community pharmacists and general practitioners, hierarchy in terms of professional standing and role in health care was reported to be a barrier between physicians and pharmacists. In the study GPs expressed concerns about pharmacists assuming roles they considered to be general practice activities and were not enthusiastic about their involvement in prescribing. Pharmacists also believed that any extension of their role would be seen as an encroachment on GP activity. Pharmacists expressed strong views about how they were perceived by GPs in terms of hierarchy, with many commenting that GPs considered them to be subordinate in professional terms (Hughes and McCann, 2003).

In addition, the attitudes or perceptions of physicians and pharmacists towards each other and towards their contribution to better medication management are another barrier to overcome (Rigby, 2010).

3.4. Facilitators for Physician Pharmacist Collaboration

Role clarity/role specification between the pharmacist and the physician: this factor addresses the interactions between pharmacists and physicians in which they reach agreement on roles and responsibilities for each other in caring for mutual patients (Zillich *et al.*, 2005). This is vital for effective teams as it enables the physician as well as the pharmacist to know what they can expect from each other (Makowsky *et al.*, 2009) which in turn solves one of the barriers of interprofessional collaboration that is crossing each other's territories.

Mutual respect and relationships built on trust. (Makowsky *et al.*, 2009)

Establishing face to face visits between the physicians and pharmacists: this is especially applicable in physicians and pharmacists (i.e. hospital pharmacists) who work in the same hospital. Since both the pharmacist and the physician work in the same hospital, face to face meetings could foster trust and relationship building which can make collaboration a lot easier.

One physician emphasized the importance of these face to face encounters on a study

done by Snyder *et al. (2010)* "… Right now in at least one of the healthcare settings in which I[the physician] work, I could not tell you the name of the clinical pharmacist that gives me advice and I would not be able to recognize them if I was four feet from them. So that to me is a bit of a problem." And a pharmacist echoed this sentiment, "You have to get the face-to-face. They (physicians) are not going to refer patients to someone they do not know or they've never met before. Even if you have all the credentialing in the world they are not going to do that. So you have to get in front of them. You have to tell them what your goals are …"

The provision of high-quality clinical recommendations that improved patient outcomes: consistent provision of high quality recommendations by the pharmacist will build the trust and confidence the physicians have on the pharmacists and also observing the positive patient outcome will reinforce them (i.e. both the physician and pharmacist to collaborate more (Snyder *et al.*, 2010).

Giving trainings about communication skills at college level to both pharmacists and physicians: communication skills are not absolute traits with which individuals are born. They can be developed and improved through awareness, training, and practice. These sorts of trainings provide opportunities for the prospective physicians as well as pharmacists to practice their communication skill and obtain feedback while they are still in college. Furthermore, effective interpersonal and written communication skills are important for interacting with physicians, nurses, and other health care providers (Planas, 2008).

Communication style of the health care professional: the message that either of the professionals are trying to get across would be transmitted more effectively if the communicator was helpful, pleasant and professional rather than being rude and condescending (Rubin and Sleath, 1997).

3.5. Interprofessional Collaboration between Physicians and Pharmacists in Ethiopia

So far in our country, the number of researches conducted on the topic in question are very small. Three studies which touched upon this area have been found to be relevant for this paper.

One was assessment of pharmacist involvement in collaborative practice with physicians and nurses in ART. This research tried to assess the role of pharmacists in the treatment of HIV, measure the level of collaborative practice and identify the gaps in collaborative practice in the hospitals under Addis Ababa city administration health bureau (Ayele, 2010). However main emphasis of the study was on collaborative practice in ART. Furthermore, the study was conducted on hospitals under Addis Ababa city administration health bureau and the degree of the collaborative practice did not use methods followed by most researchers to evaluate the collaboration among the practitioners.

The second study was on quality of pharmaceutical care in government hospitals of Addis Ababa, Ethiopia (Eshetu , 2010). This study had some input on how poor the communication of physicians and pharmacists is in our country.

Another study was on physicians' and pharmacists' perception towards Pharmacists' involvement in provision of clinical pharmacy service (Kesto and Yenet, 2012). The study's main emphasis was on the perception of the two professional's role to clinical pharmacy service than on interprofessional collaboration between physicians and pharmacists. However the physicians' perception on the extended role of the pharmacist such as the provision of clinical pharmacy service could be an indication of their willingness to collaborate.

4. Objectives of the Study

4.1. General Objective

To assess interprofessional collaboration between physicians and pharmacists working in public hospitals of Addis Ababa.

4.2. Specific Objectives

- To compare the PPCI scores of the selected hospitals
- To quantify level of collaboration using the three exchange domains; Trustworthiness, role specification and relationship initiation
- Describe factors that are affecting interprofessional collaboration in the selected hospitals.

5. Methods

5.1. Description of the Study Area and Settings

This research was conducted in Addis Ababa which is the capital city of Ethiopia. It is the largest city in Ethiopia, with a population projection of 2.98 million for the year 2011 (CSA, 2010). It has 34 hospitals, of which 5 are managed under the health bureau of the city administration, four are managed by the Federal Ministry of Health (FMOH) and one is university hospital (Tikur Anbesa Specialized Hospital (TASH) which is under Addis Ababa University) and the rest are either privately owned or owned by non-governmental and other governmental organizations (FMOH, 2007).

This study was conducted two hospitals namely Rasdesta Damtew Memorial Hospital (RDMH) and TASH. RDMH is under the Addis Ababa City Administration Health Bureau. The hospital provides Inpatient, outpatient and emergency services to its patients. During the time of the survey, the hospital had 32 physicians and 11 pharmacists working under it.

RDMH provides services such as; Emergency, Dermatology, ART, Tuberculosis Clinic, Ear Neck and Throat (ENT), Surgery, Psychiatry and Ophthalmology. At the time of the study the hospital was under major renovation and only had 43 beds which were distributed between Emergency, surgery and ICU wards.

TASH is a teaching hospital of Addis Ababa University under the College of Health Sciences. Originally the hospital was built to accommodate 500 beds and currently has more than 600 beds. The hospital has more than 1700 medical and non-medical staff and offers inpatient, outpatient and emergency services in about 20 specialty clinics and units. The majority of the medical doctors/ consultants are teaching staffs of School of Medicine (DTC of TASH, 2012).

TASH serves about 250,000 patients per year in its outpatient department and about 24, 000 in the inpatient and same number in the emergency departments. The major services provided by the hospital are: Internal Medicine, Emergency Medicine,

Surgery, Gynecology and Obstetrics, Pediatrics, Oncology/chemoradiotheray, Radiology, Psychiatry and Dermatology. The pharmacy services in TASH are organized for outpatient, emergency and inpatients (DTC of TASH, 2012).

5.2. Study Design

The study was a hospital based descriptive cross-sectional study. Both qualitative and quantitative methods were employed in the data collection process.

In qualitative methods key informant interview (KI) was used as data collection instruments, while for quantitative method a questionnaire was administered to the pharmacists and physicians in TASH and RDMH.

5.3. Source and Study Population

The source population constitutes of pharmacists and physicians working in all the government hospitals in Addis Ababa. The study population includes pharmacists and physicians working in TASH and RDMH.

5.4. Sampling and Sample Size Determination

Sampling of the two professionals was conducted from two public hospitals in Addis Ababa.

Hospitals

TASH was purposively selected as one of the study settings because; it is the largest general public hospital in Addis Ababa. Consequently physicians with numerous fields of specialization are faced with patients with wide range of cases. As a result, drug treatments are expected to be more complex which in turn makes the need for interprofessional collaboration in greater demand.

Moreover, the hospital has currently started including Undergraduate pharmacy students and pharmacy practice post graduate students in ward rounds and morning sessions. This recent endeavor without interprofessional collaboration hinders the pharmacists from putting their newly extended role into practice. Hence, assessing the degree of their collaboration and determining the barriers and facilitators for interprofessional collaboration would be a great asset for future improvement of the program.

However, the launching of the pharmacy practice post-graduate program, the launching of clinical pharmacy service with in the hospital and the use of the hospital as an attachment site for undergraduate and post-graduate pharmacy students could possibly have an effect in the degree of interprofessional collaboration of the physicians and pharmacists.

To minimize the effect the pharmacy practice program might have on the result of the study, a hospital managed by the Addis Ababa City Administration was randomly selected to serve as a possible control. The randomly selected hospital was RDMH.

Pharmacists

All pharmacists working in the selected hospitals, who were willing to take part in the study and who had at least a year of experience as a hospital pharmacist in the selected hospitals were eligible.

Physicians

Different studies (Fairbanks *et al.,* 2007; Collin *et al.,* 2010 and Dey *et al.,* 2011) identified Internal Medicine, Emergency Medicine, Gynecology and Obstetrics and Pediatric Departments to benefit from collaboration of pharmacists and physicians. Thus, these departments were purposively selected. In addition, the Surgery and the Oncology Department were also included because they were also areas that were believed to benefit from the pharmacist physician collaboration.

All physicians in the selected departments, who were available and willing to participate in the study, were requested to fill out the questionnaire.

For selecting the informants for the KI, pharmacists and physicians who were generally believed to have rich information on the physician- pharmacist collaboration such as the medical directors and head pharmacists and chief residents from the selected departments and also those who had a higher experience were purposefully selected.

5.5. Data Collection and Management

5.5.1. Data Collectors

The principal investigator (PI) was responsible for conducting Key informant interviews. The questionnaires were administered with the help of additional two post graduate pharmacy practice students.

5.5.2. Data Collection Instrument

In order to measure the degree of interprofessional collaboration between physicians and pharmacists a conceptual model for the development of pharmacist physician CWR, which was developed by McDonough and Doucette, (2001) was adapted for this study (Annex I).

The extent of professional collaboration can be quantified through the administration PPCI, a 14-item Likert scale that measures collaboration within the 3 exchange domains (Annex I). Each item was scored on a 7 point Likert scale ranging from 1 (very strongly disagree) to 7 (very strongly agree). The PPCI provides a summary score from 14 to 98, with a higher score indicating a greater extent of collaboration. The score range for the three exchange domain includes 6–42 in the trustworthiness domain, 5–35 in the role specification domain, and 3–21 in the relationship initiation domain. (Zilich *et al.*, 2005; Zilich *et al.*, 2006 and Snyder *et al.*, 2010).

Questions from this instrument which were not practical for the Ethiopian hospital setting were modified to fit the hospital setting in the country. The language used in some of the questions were also modified in such a way that could facilitate easier understanding for the Ethiopian audience.

For identifying the interprofessional collaboration between pharmacists and physicians, KI was conducted (Annex II). The interview was conducted with the help of interview guide that were developed by the PI. Up on receiving permission from the study participants, the interview was tape recorded. In situations where the participants declined the request to tape record, the session was recorded by taking notes.

The KI guide comprised of questions on joint care activities, barriers for collaboration, the effect of the collaboration on patient care, encounters of communication, effort for collaboration, administrative support, effect of the philosophy of the undergraduate teaching, trustworthiness, specific reasons for collaboration, geographic proximity, means of communication and the roles the pharmacists are expected to play.

5.5.3. Data Quality Assurance

Two types of data sources were utilized to corroborate participant information. The PPCI was pre tested on pharmacists and physicians working on St. Paul Hospital and Zewditu Hospital. Based on the issues identified during the pretest with regard to socio-demographic questions, amendments were made.

The data collectors were briefed on how to administer the questionnaire. And the PI was present to make sure appropriate data collection procedures had been followed.

To ensure that all the information was obtained from the interview, almost all the sessions were tape recorded with the exception of one interview where the respondent did not give consent for recording hence detailed notes were taken.

5.5.4. Data Entry, Clean up and Analysis

Data from the PPCI was entered into and analyzed using SPSS version 16. The data were recorded as trustworthiness, role specification and relationship initiation domain. For this part of the study, descriptive statistics on sample characteristics was computed including percentage frequencies and mean and median scores. In addition independent sample t-test was used to compute the mean scores.

For the key informant interview, the data was transcribed and translated into English after the interview. The transcripts were read repeatedly, recurrent themes were identified and coded (along with supporting quotes).

5.6. Ethical Considerations

Ethical approval was obtained from the ethics review committee of the School of Pharmacy, Addis Ababa University. The study was conducted in the selected health facilities after permission from the relevant body. Participants of the study were asked for consent before participating in the study. During the consent process, they were provided with information regarding the purpose of the study, why and how they were selected to be involved in the study, and what were expected of them and that they can withdraw from the study at any time. Participants were also assured about confidentiality of the information obtained in the course of the study by not using personal identifiers and analyzing the data in aggregates.

6. Results

6.1. Scores for the Pharmacist Physician Collaborative Index

A total of 229 questionnaires were distributed to the physicians and pharmacists working in TASH and RDMH of whom 175 responded which makes a response rate of 76.4%.

From the total of 175 respondents, 133 accounted for the physicians in TASH and 15 of them were physicians in RDMH. There were also 17 and 10 pharmacist respondents from TASH and RDMH respectively.

6.1.1. Individual characteristics

Table 1 summarizes the individual characteristics of the physician respondents in TASH and RDMH. Most of the physician respondents in TASH were males and residents. While in RDMH most of the respondents were male and specialists. There were no residents in RDMH. On average, the physicians in RDMH were older and had longer years of experience than those in TASH.

Table 1 individual characteristics of physicians in TASH (n=133) and RDMH (n=15) Addis Ababa Ethiopia (2013)

Physician Characteristics	TASH	RDMH
Age in years, median(range)	29(24-68)	39(27-54)
Sex, number (%)		
Male	105(78.9)	13(86.7)
Female	28(21.1)	2(13.3)
Years of Experience, median(range)	4(1-43)	12(1-26)
Educational level		
General Practitioner (GP)	10(7.5)	6(40)
Resident	105(78.9)	0
Specialist	18 (13.5)	9(60)
Total	133	15

Tables 2 summarizes the individual characteristics of pharmacist respondents in TASH and RDMH. Taking the median age, the pharmacists in TASH and RDMH were 28 years of age. The pharmacists in RDMH had longer years of experience than those of their TASH counterparts. The current area of practice for pharmacists included, inpatient, outpatient, ART, store, oncology (only for TASH), OR (only for TASH) and DIC.

Table 2 Individual characteristics of Pharmacists in TASH (n=17) and RDMH (n=10)

Addis Ababa, Ethiopia, 2013

Pharmacy characteristics	TASH	RDMH
Age in years, median(range)	28(24-31)	28.5(22-36)
Sex, number (%)		
Male	12(70.6)	8(80)
Female	5(29.4)	2(20)
Years of Experience, median(range)	2(1-6)	5(1-10)
Current area of practice, number (%)		
Inpatient pharmacy	3(17.6)	3(30)
Outpatient pharmacy	7(41.2)	3(30)
ART pharmacy	2(11.8)	1(10)
Store	1(5.9)	2(20)
Oncology pharmacy	3(17.6)	0
Operating Room (OR) pharmacy	1(5.9)	0
Drug Information Center (DIC)	0	1(10)
Total	17	10

6.1.2. Extent of collaboration

A summary of total and domain scores of the PPCI is provided in tables 3 and 4. There was no significant difference between the mean scores of physicians and pharmacists in TASH on trustworthiness and role specification domains. However the difference between the mean scores of physicians and pharmacist for the relationship initiation domain was found to be significant. In addition the results indicated that pharmacists mean score for relationship initiation was 3.66 scores greater than that of the physicians. There was no significant difference on the total PPCI score of physicians and pharmacists in TASH.

Table 3 PPCI scores for Physicians (n=133) and Pharmacists (n=17) in TASH Addis Ababa, Ethiopia, 2013

	Physician (Mean ± SD)	Pharmacist (Mean ± SD)	P Value
Trustworthiness (6-42)	26.3±5.5	26.5±7.9	0.921
Role specification (5-35)	23.6±4.6	21.6±7.6	0.322
Relationship Initiation (3-21)	10.4±4.0	13.9±4.3	0.001*
Total score(14-98)	60.4±1.1	62.0±1.75	0.713

*the p value shows there is significant difference between the mean scores and mean difference was found to be 3.66.

Similarly, in RDMH, there was no significant difference between physician and pharmacist mean score for trustworthiness and role specification domain. On the other hand, significant difference was observed for the relationship initiation domain. Furthermore, pharmacists mean score was greater than the physicians by 4.067 scores.

Table 4 PPCI scores for Physicians (n=15) and Pharmacists (n=10) in RDMH Addis Ababa, Ethiopia, 2013

	Physician (Mean ± SD)	Pharmacist (Mean ± SD)	P Value
Trustworthiness (6-42)	30.4±5.0	29.8±7.2	0.807
Role specification (5-35)	24.8±4.7	24.3±5.5	0.811
Relationship Initiation (3-21)	12.3±3.4	16.4±3.1	0.006*
Overall scores (14-98)	67.5±1.02	70.5±14.3	0.55

*the p value shows there is significant difference between the mean scores and mean difference was found to be 4.067.

The table below indicates that there was no significant difference between the mean scores in role specification and relationship initiation domain for physicians in TASH and RDMH. However, there was a significant difference in trustworthiness domain. The findings indicate that there was a significant difference in the overall score of physicians in TASH and RDMH. In addition, physician mean score for RDMH was found to be greater than that of TASH.

Table 5 Comparison of mean scores for physicians in TASH (n=133) and RDMH (n=15) Addis Ababa, Ethiopia, 2013

	TASH (Mean ± SD)	RDMH (Mean ± SD)	P Value
Trustworthiness (6-42)	26.3±5.5	30.4±5.0	0.07
Role specification (5-35)	23.6±4.6	24.8±4.7	0.334
Relationship Initiation (3-21)	10.4±4.0	12.3±3.4	0.073
Overall scores (14-98)	60.4±1.1	67.5±1.02	0.019

The findings in table 6 indicate that there is no significant difference between the mean scores for the three exchange domains and the total scores for pharmacists in TASH and RDMH.

Table 6 Comparison of mean scores for pharmacists in TASH (n=17) and RDMH (n=10) Addis Ababa, Ethiopia, 2013.

	TASH (Mean ± SD)	RDMH (Mean ± SD)	P Value
Trustworthiness (6-42)	26.5±7.9	29.8±7.2	0.296
Role specification (5-35)	21.6±7.6	24.3±5.5	0.347
Relationship Initiation (3-21)	13.9±4.3	16.4±3.1	0.100
Overall scores (14-98)	62.0±1.75	70.5±14.3	0.204

6.2. Findings from the Key Informant Interview

The KI was conducted with a total of 18 physicians and pharmacists from the two hospitals. From the 18 respondents, there were 4 and 6 Physicians from RDMH and TASH respectively. As for the pharmacists, five of them were from RDMH and 3 of them were from TASH. All except two respondents were male. Four of the physicians were specialists, there was one GP and five chief residents. From the pharmacists, three completed their post graduate studies, while five of them had B pharm.

Joint care activities

When respondents were asked on the joint care activities that the two professionals performed, almost all of the physicians stated that there were no joint care activities while the rest of the respondents stated the existence of joint care activities such as DTC. Even though the DTC has presented an opportunity for joint care, respondents from RDMH stated that the DTC did not hold regular meetings and only met when there was a problem to be addressed especially with regard to drug availability.

Most respondents from RDMH also stated the attendance of the head pharmacist in the morning session as a joint care activity. However, there were recurrent remarks made by the physicians that this pharmacist frequently missed the morning sessions. When the pharmacist was asked the reason behind these absences, the explanation provided was; "*Even though we discuss on some issues, in these sessions there is not that much discussion on drugs. There would be case presentation in morning sessions but the focus is more on disease and diagnosis. Topics such as drug-drug interaction, drug food interaction, drug disease interaction and other related topics are not really up for discussions so I don't see the point of being there*"

The respondents from TASH added that in Oncology Pharmacy and ART pharmacy there were better activities that were jointly executed.

Most of the physicians indicated that they would appreciate getting advice from pharmacists on drug related matters be it through DIC or on ward rounds. They especially emphasized that it would be helpful if they could get advice on drug-drug interaction.

The respondents also added; informing the physicians on drug availability, drug side effects, conducting joint researches, public health awareness as areas where the two professionals could potentially work together.

Barriers for Collaboration

The barriers that were repeatedly pointed out in both hospitals were; the physicians didn't know the role of the pharmacist hence they didn't know what to do with the pharmacists if collaboration were to happen, and there was poor clinical knowledge of the pharmacists.

Additionally respondents from TASH mentioned that the fact that there was no system with in the hospital to facilitate collaboration, inability to communicate face to face with each other, the pharmacists work load and their number was unsuited and it wasn't a common trend with in the hospital for the physicians and pharmacists to work alongside each other all these factors were hindering collaboration with in TASH.

As for RDMH, respondents stated that pharmacists didn't assertively promote what they can contribute if collaboration was to happen, both professionals do not feel obligated to work together, pharmacist were burnout and the recommendations that the pharmacist provide to physicians wasn't getting accepted.

Effect of collaboration on patient care

Most of the pharmacists have cited an occasion where their collaboration with physicians resulted in a better patient outcome. However, none of the physicians in RDMH and only few physicians in TASH were able to recollect such kinds of occasion.

"There was this case, the patient was taking Enalapril and she came to the hospital complaining of dry cough. The physician did not consider the cause of the dry cough to be the side effect of the medication so he prescribed cough suppressant as a solution for the cough. So I went to the physician and gave him my own recommendation which was for the physician to change the drug regimen. There was also another case where an asthmatic patient was taking Timolol eye drop. They [Physicians] don't usually consider such kinds of things. Timolol acts on ***b***$_2$ *receptor which would have effect on bronchial constriction. So we went to the physician and solved the error with a discussion." Pharmacist 1*

"We showed them the study I have conducted using prescriber indicator that is prescription evaluation and they evaluated themselves based on the study and they came back to the normal track." Pharmacist 5

Both physicians and pharmacists have referred to occasions where the absence of collaboration has negatively impacted patient outcome.

"There was a patient who has been taking digoxin with spironolactone. Then a physician told her to take only digoxin. Up on receiving the prescription I contacted the physician and presented him with the side effects of prescribing digoxin alone. However, the physician did not accept my recommendation and the patient went home with the prescription for digoxin. After two weeks this patient came with major symptoms of hypokalemia due to the digoxin. Such lack of information would put patient's life in jeopardy." Pharmacist 2

Communication between physicians and pharmacists

All the respondents in RDMH agreed that the positive or negative communication between a physician and a pharmacist would depend on the way they approached each other. If there is a disagreement in relation to drug treatments, discussion based on the scientific evidence usually resulted in a positive and productive communication. According to the pharmacist respondents, if they tried to communicate with the physician in the presence of their nurse colleagues or in the presence of their patients, the communication would usually turn counterproductive as the physicians perceive

such form of approach to be disrespectful.

"When you approach physicians in relation to their prescription errors, you should be humble with your approach you shouldn't act as if you have read everything or you shouldn't be a know it all. Then the physician would open himself up to you and you would end up having a productive discussion. But if you are aggressive with your approach you would only be creating conflict." Pharmacist 2

"When you go to the physician's office either a patient or a nurse would usually be there. Hence, when you want to discuss with physicians about a possible prescription error in the presence of these people, you would immediately see it on the physician's face that they aren't pleased. They would be unhappy and they would think that we have come to embarrass them in front of their colleagues and their patients. After this even if you and the physician used to be good friends, he would stop talking to you" Pharmacist 4

On the other hand TASH respondents repeatedly mentioned that there was minimal communication between physicians and pharmacists. Hence, they weren't able to identify attributes which facilitated or hindered positive communication.

The most common means of communication between physicians and pharmacists in RDMH appears to be face to face communication, while for physicians and pharmacists in TASH mostly communicated by writing their comments at the back of the prescription and using the patient as a messenger.

There were also pharmacists in TASH who stated that they would sometimes use emails to communicate with physicians. On the other hand some pharmacists in RDMH they would on occasions communicate by writing comments at the back of the prescription.

Effort for collaboration

Almost all of the pharmacists and half of the physicians in RDMH said that the pharmacists were the ones who were making more of an effort to establish an interprofessional collaboration. There was one physician who said that the physicians

were the one showing an effort and there was another physician who mentioned that there were no efforts being shown from both sides.

According to the respondents, efforts by the pharmacists were shown in the form of establishing new service such as the Drug Information Service (DIS), approaching the physicians for discussions on drug related problems and giving drug information in the form of presentations or preparing leaflets about information on drugs. One physician even said "*The physicians distance themselves from the pharmacists. There is a weakness from their (physicians) side when it comes to getting close and having a discussion*." Physician 4

Almost all of the respondents in TASH stated that neither the physician nor the pharmacists in TASH were making effort to establish an interprofessional collaboration.

"Nobody tries to establish an interprofessional collaboration. Because as I have said before we only collaborate when we need to because there is need for it not because we want to establish an interprofessional collaboration. As I have said before we would have to meet at DTC if there are things to be done but there is nothing that we do willingly so I can say nobody makes an effort" Pharmacist 2

Administrative support for collaboration

The hospital administration in RDMH have been supporting the collaboration of these professionals by presenting them with formally recognized platforms that would potentiate collaboration. These include the DTC where the administration has allowed the inclusion of additional two pharmacists in the committee other than the DTC secretary position which is normally held by the pharmacist. Additionally the administration has enabled the attendance of morning sessions by the head pharmacist, they have provide resource and personnel support in the establishment of the DIC, and also they have included both professionals in management related meetings so that they could collaborate in issues other than those directly linked to the patient.

On the other hand, almost all the physician respondents in TASH agreed, that there was no formal structure that have been placed by the administrative body that would

potentiate professional collaboration. However pharmacists have stated that there were formal structures such as DTC, DIC and a multidisciplinary team dedicated solely for ART. One pharmacist added that although the formal structures were there, the hospital administration was not monitoring whether they were properly getting implemented.

The RDMH administration had also made informal supports by resolving disagreements that arise between the physicians and pharmacists and by supporting the pharmacists in their effort to establish interprofessional collaboration. One encouraging thing observed during the interviews was that the respondents in RDMH felt in first-hand the support of the administration for the collaboration of the physicians and the pharmacists. On the contrary, respondents from TASH felt that there was no indication from the side of the administration to support interprofessional collaboration as evidenced by these remarks;

"There is a huge problem around the administration area. You can only imagine the effort it would take to introduce a new concept [such as physician pharmacist interprofessional collaboration]. You would be asked to fulfill a lot of criteria when you end up fulfilling all the criteria you would be told that there is no budget. In general you would have to go through a lot" pharmacist

"A system should be placed by the administrative body so that the pharmacist and the physician can work together. Right now if I decide to go and contact the pharmacist I don't know where to go and meet him. Should I go to the place where he works? Or is there a phone? When you think about it is very difficult" Physician

Effect of the philosophy of Undergraduate teaching in Collaboration

Almost all of the respondents believed that the philosophy of the undergraduate teaching has negatively affected interprofessional collaboration. According to the respondents, the undergraduate teaching of the pharmacists have negatively affected the pharmacist's ability to collaborate. This was because it was mainly product oriented hence, didn't equip students with enough clinical knowledge. In addition the theory that is taught in school and the kind of pharmacists are currently doing is

different.

As for the undergraduate teaching of the physicians, it has negatively affected collaboration since it didn't emphasize on the need to work with pharmacists or acknowledge the role of the pharmacist in patient care. Here is what a physicians had to say about the Effect of the philosophy of Undergraduate teaching in Collaboration;

"As a medical student, you wouldn't have any kind of communication with the pharmacists. Starting from third year there is practical attachment for medical students where in the wards they would work with the nurses and others. Hence starting from third year you would learn through experience the way of communicating with other professionals. But if you ask me about pharmacists, they weren't there. As a result there was no communication or training on how to communicate with pharmacists."

Trustworthiness

When it comes to trustworthiness, the issue is whether physicians trust the pharmacists to provide them with credible information with regard to drug related matters.

Most of the physicians said that they trusted the pharmacists and they would take recommendations from pharmacists with regard to drugs. There was one physician with a different take on the credibility of pharmacists; *"... Pharmacists are an outlet you wouldn't have enough to evaluate them this is because you don't know much whether the prescription that you have ordered has been properly dispensed by the pharmacist ..... But if the pharmacist makes a mistake gives the wrong advice to the patient, there is no way of knowing because the patient has gone home. Hence I can't verify to this. As a result for the question of whether we trust or not, we don't have other choice but to trust them. Even if I don't trust them I wouldn't have any other choice. But there are cases where a patient would come back to us and we would realize a gap in the pharmacists."*

Similarly, most of the pharmacist believed that the physicians trusted them as they accepted their clinical recommendations. They added that this trust was something

they have earned by giving high quality recommendations that were supported by scientific evidence.

Why the need for collaboration

According to the respondents, interprofessional collaboration is needed in RDMH and TASH so that physicians and pharmacists could discuss and resolve possible medication errors especially on drug-drug interaction. Generally speaking, interprofessional collaboration is needed to better patient outcome and provide better patient care. They also added that through collaboration drugs prescribed by the physicians could be availed in the pharmacy, physicians could receive reliable drug related information without having to go through a number of references and since both hospitals are referral hospitals they encounter complicated cases that require the specialized knowledge of both professionals.

Geographic proximity

RDMH has an intimate setting where the location of the pharmacy is in walking distance from the physician's practice area and physicians and pharmacists share lounge. According to RDMH pharmacists, this has opened an opportunity for the professionals close social proximity. Moreover, it has enabled informal discussions about drug related matters which could serve as an ice breaker for their collaboration. The physicians do not appear to believe that this has had any impact on collaboration.

As for TASH, the pharmacists stated that the fact that the outpatient pharmacy is located in a remote area has made communication with physicians difficult. Both physicians and pharmacists stated that even though the two professionals shared the same lounge, they didn't socialize with each other. On the contrary the physicians in TASH stated that the distance of the pharmacy hasn't made any impact on collaboration since there wasn't any collaboration in wards where there was an inpatient pharmacy.

Physician's Expectation of Pharmacist's Role in Patient Care

Physician respondents stated that they expected pharmacists to provide them with drug related information, they especially made recurrent remarks that they would appreciate recommendations on drug-drug interactions. They added that they expected pharmacists to make drugs prescribed available with in the hospital pharmacy, notify them about the arrival of new drugs or about drugs near their expiry date, give them feedback on prescription errors, provide ample patient counseling.

On the other hand pharmacists believed that the major expectation of physicians for pharmacists was mainly on drug availability.

"……*the pharmacist is only needed, around the physicians, when there is shortage of drugs. If drugs are always available the pharmacist might be forgotten all together. If there is full supply of drugs I am 100% sure that the physicians won't even utter the name pharmacist*."

There were also pharmacists who stated that the expectation of physician's for pharmacists mainly depended on the previous experience of the physician. Those physicians who have worked abroad have gotten used to working with pharmacists hence they were more inclined to have higher expectation for pharmacists. Furthermore pharmacists added that they were expected to inform patients on common side effects and inform physicians on possible drug-drug interaction.

7. Discussion

The study tried to quantify the interprofessional collaboration of physicians and pharmacists in TASH and RDMH by using the PPCI. It also measured the exchange characteristics between the physicians and the pharmacists based on the three domains (trustworthiness, role specification and relationship initiation) and tried to compare their mean scores using Independent Samples t-test. In addition it qualitatively described the interprofessional collaboration of the two professionals in doing so it addressed factors that were believed to have affected the collaboration of the physicians and pharmacists.

The response rate of this study was 76.4%. The reasons given for the non-responders was mainly that they were busy and they were "fed up" with filling out questionnaires. Although this response rate is low as compared to the recommended response rate to secure validity, it was found to be better than what were achieved in similar types of studies such as 26% by Snyder *et al.,* (2010) and 34% Zillich *et al.,* (2005).

The studies limitation was it did not include other health care providers who are also part of the health care team. And also, it cannot be generalized for professionals in other hospital settings.

The scores from the trustworthiness domain of this study indicate that physicians in TASH and RDMH trusted the expertise of their pharmacist colleagues and vice versa. In discussing the trust between these professionals on the KI, the conversation centered on physicians trust for the pharmacists as opposed to pharmacists trust for physicians. This may be due to the fact that they were the final decision makers with regard to patient care hence, the pharmacists need to gain the physicians trust carried more weight than physicians gaining the trust of the pharmacists. Findings from the key informant interviews supported the results obtained from the PPCI scores which is physicians trusted the expertise of the pharmacists colleagues.

The mean scores for role specification domain for TASH and RDMH were found to be higher than "neutral" in Likert scale. This indicates that physicians and

pharmacists in the two hospitals were mutually dependent on each other and they were able to negotiate on the role each practitioner will play in patient care. Results from the KI do not appear to support the scores on role specification. There was no explicit mention about negotiation of roles in patient care and mutual dependence. However the fact that physicians weren't taking part in the joint care activities, the fact that physicians weren't making an effort to establish interprofessional collaboration and physicians and pharmacists in TASH had minimal communication with each other might put the mutual dependence of the two practitioners in question.

On the relationship initiation domain, a significant difference was observed between the mean scores of physicians and pharmacists in both hospitals. Moreover, it was indicated that pharmacists scored higher than the physicians. This result shows that physicians weren't satisfied with the relationship initiation behavior of the pharmacist. The result might have been obtained because physicians under rated the relationship initiation behavior of pharmacists or pharmacists might have over rated their own relationship initiation behaviors.

Comparison of mean scores of physician in TASH and RDMH showed a significant difference. On the other hand the scores for pharmacists didn't indicate any significant difference. From this, we can conclude that from the physician's perspective the CWR in RDMH was greater than that of TASH. While from the perspective of the pharmacists, they were found to be at similar stage of collaboration. Trustworthiness appears to have been the principal driver to have caused such a significant difference in overall scores for the physicians.

Two studies were found to be relevant to make comparisons with the PPCI scores of this study. Accordingly, total scores of physicians and pharmacists in TASH and RDMH were found to be lower compared to that of Snyder *et al.* (2010) and Zillich *et al.* (2005).

As it was revealed in the qualitative study, these higher PPCI scores for physicians in RDMH might be attributed to; the joint care activities that they took part in, due to the administrative support that they were getting, the intimate setting of the hospital (the

geographic proximity) and also due to their common means of interaction was face to face.

The findings from the qualitative study suggest that physicians at TASH had lower CWR compared to RDMH because; the physicians and pharmacist in TASH didn't have as much of an administrative support or organizational structure as RDMH, the number of pharmacists was incompatible with the patients load making collaboration even more difficult, neither the pharmacist nor the physician was making an effort to establish interprofessional collaboration and the practice site for physicians was far from the pharmacy, the means of communication that they used to communicate wasn't well suited to develop collaboration

When physicians were asked about activities that they jointly performed with pharmacists, most of them answered that there were no joint care activities while few of them stated that even though there were activities they needed to be strengthened. This might have a negative impact on interprofessional collaboration because, According to O'Donnell and Rosenstein, (2011), cooperatively working together, sharing responsibility for problem-solving and making decisions to formulate and carry out plans for patient care between physicians and pharmacists increases team members' awareness of pharmacist's knowledge and skills, leading to continued improvement in decision making.

McDonough and Doucette (2001) stated that when health practitioners are in the same system, as is the case in a hospital, collaboration can be facilitated or hindered depending on the organizational structure, rules and role setting. Similarly in this study, It is worth mentioning that in areas where there were officially recognized structures, rules and roles set by the administrative body such as in Oncology pharmacy and ART pharmacy better interprofessional collaboration were observed.

Physicians in TASH stated that there was minimal communication between physicians and pharmacists. This might explain why respondents made recurrent remarks that physician's not knowing the role of the pharmacists was a barrier for collaboration. According to Makowsky *et al.* (2009), role clarity between physicians and

pharmacists is vital for effective team work as it enables the physicians and pharmacists to know what they can expect from each other.

Although most of the pharmacists have cited an occasion where their collaboration with physicians resulted in a better patient outcome, none of the physicians in RDMH and only few physicians in TASH were able to recollect such occasion. This could negatively affect interprofessional collaboration because physicians may not see how much the patient could be benefiting from collaborative care. This may also explain why physicians aren't making as much of an effort as pharmacists to establish interprofessional collaboration.

During the qualitative interview it was revealed that the pharmacists in RDMH believed that the intimate setting of the hospital has positively impacted their communication with the physicians while the physicians mentioned that it has not had any impact on their collaboration. A study by Brown *et al.* (2009) appears to agree with the pharmacists' sentiment. According to this study, having an intimate setting where there is close geographic proximity between physicians clinical practice and the pharmacy helps the two professionals to get to know one another and hence build trust. Similarly, in another study on the value of clinical pharmacists in the emergency department, physician and nurse respondents reported that they tend to consult with the pharmacist more often than they would if the pharmacist were remotely located (Fairbanks *et al.*, 2007).

One of the positive things in RDMH was that most of their communication was face to face visit as opposed to TASH where they communicated by writing their comments at the back of the prescription and using the patient as a messenger. According to McDonough and Doucette (2001), the use of a communication medium such as face to face communication which allows person to person discussion on patient issues provide opportunities for pharmacists and physicians to be comfortable with one another and start to develop relationships based on trust and respect. Similarly, Snyder *et al.* (2010) stated that not knowing what the pharmacist looks like in person or not having any information about the pharmacist they are taking advice

from creates additional hesitation on the physicians part to accept an advice from the pharmacist.

Another study on communication had this to say about communication of physicians and pharmacists through written messages. When critical information is often transmitted via handwritten notes, e-mails, or text messages, all the body language tone and attitude of the communicator which accounts for 93% of the communication is lost in the words and the message that was sent is liable to all sorts of miscommunication (O'Donnell and Rosenstein, 2011).

This study also discovered that there was a mismatch between the common reasons physicians communicated with pharmacists (which was mainly on drug availability) and the role the pharmacists wanted to play (to assist physicians in decisions related to drugs). This could potentially be disheartening for the pharmacists and might negatively impact the collaboration. Such kind of mismatch was also observed on a study by Paulino *et al.* (2010). This mismatch might have occurred as a result of lack of open discussions regarding professional roles of both the pharmacist and the physician in their collaborative effort to treat the patient Snyder *et al.*, (2010). Hence, both parties are putting their own ideas of what their role should be into the collaborative practice.

8. Conclusion and Recommendations

Based on the PPCI score, it can be concluded that, interprofessional collaboration in RDMH was found to be equal to that of TASH from the perspective of the pharmacist. On the other hand CWR was found to be greater in RDMH from the perspective of the physicians.

The results from this study also show that physicians and pharmacists in the two hospitals trusted each other. Pharmacists and physicians in TASH and RDMH felt that there was mutual dependence of the two professionals and they were able to successfully negotiate their role in patient care. The physicians in TASH and RDMH felt that pharmacists weren't taking initiative for relationship development.

The professionals jointly worked in DTC and morning sessions and wish that these activities would be further strengthened. The pharmacists were making more of an effort to collaborate than the physicians and the professionals in RDMH were getting more support from the hospital administration for collaboration as compared to those in TASH. The undergraduate teaching of physicians and pharmacists has had a negative impact on collaboration. The number one means of communication for RDMH was face to face visit while for TASH, it was by writing at the back of the prescription.

Based on the findings of this study the following recommendations can be made:

- Administrative support should be there especially for TASH.
  - It is recommended that the administration should increase the number of pharmacist so that they would have enough personnel and enough time to show more initiative for interprofessional collaboration'
  - The administration should closely follow up on the officially recognized joint care activities such as the DTC, morning sessions to make sure that they were properly getting implemented.

- The administration should facilitate bidirectional and open communication between physicians and pharmacists so that the role each professional should play in patient care would be acknowledged.

- In TASH, pharmacists should be assigned at every ward so that it would be easier to make face to face communication with physicians.
- The pharmacists should show more relationship initiative behaviors such as giving quality clinical recommendations in relation to drug therapy, pharmacists should open new service areas such as the oncology pharmacy in TASH

9. Suggestions for future work

- Studies that aim to study the interprofessional collaboration of other hospitals should be conducted.
- Studies that assess interprofessional collaboration in hospitals from the perspective of the patient. So that the effect of interprofessional collaboration in patient outcome could be determined.
- As this study's emphasis was on physicians and pharmacists, assessment should also be made on the collaboration of other health care providers.

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Annex 1

Self-Administered Questionnaire for Data Collection on pharmacist physician collaboration.

Addis Ababa University

College of Health Science

School of Pharmacy

Department of Pharmaceutics and Social Pharmacy

Questionnaire on Pharmacist Physician Collaborative Index: for pharmacists

Information Sheet and Informed Consent

The purpose of this Information Sheet and Informed Consent is to provide a clear explanation of the nature of this study. The necessary procedures are described below. If, after reading this sheet, you have any questions or concerns, please discuss these with the principal investigator, Sewit Timothewos (Mobile: 0911307656; e-mail: sewithessebon@gmail.com). Please feel free to contact the principal investigator at any time prior to, during, or after your participation is completed. Once you are entirely satisfied with this explanation and freely choose to participate in the study, you may indicate your willingness to participate by giving your verbal consent to the research assistant (data collector). You are free to end your participation in the study at any time.

This study is designed to assess the degree and barriers of interprofessional collaboration between physicians and pharmacists in selected government hospitals in Addis Ababa, Ethiopia. Accordingly the questionnaire provided below is intended to determine the degree of interprofessional collaboration between pharmacists and physicians in your hospital. It will take you a maximum of 5 minutes to fill out the questionnaire. Before filling it out, please consider your working relationship with the physicians in your hospital. Think, in general, about the interactions you have had with these physicians over time. Please indicate your agreement with each of the

following statements by using the scale listed as follows. Please circle the number that represents your agreement with the item.

SCALE: 1-very strongly disagree (VSD); 2-strongly disagree (SD); 3-disagree (D); 4-neutral (N); 5-agree (A); 6-strongly agree (SA); 7-very strongly agree (VSA)

Your answers are very important and valuable to the successful completion of the study. Please be honest in filling this questionnaire, as it will be solely used for research purposes. The information you provide will be confidential, anonymous, and data will be analyzed in aggregates

I. Socio-demographic Information

1. Sex: _____
2. Age:_____
3. Years of experience as a hospital pharmacists: _____
4. Current area of practice
    A. In patient pharmacy
    B. Outpatient pharmacy
    C. Emergency pharmacy
    D. Others, please specify _____

II. Information on extent of interprofessional collaboration with physicians in the hospital setting.

* "The Physicians" for this questionnaire indicates the physicians in your hospital.

No	Items	VSD	SD	D	N	A	SA	VSA
1.	The physicians are credible	1	2	3	4	5	6	7
2.	I trust the physicians	1	2	3	4	5	6	7
3.	I can count on the physicians to do what they say	1	2	3	4	5	6	7
4.	The communication between the physicians and I is two-way	1	2	3	4	5	6	7
5.	I intend to keep working together with the physicians	1	2	3	4	5	6	7
6.	My interactions with the physician is characterized by open communication of both parties	1	2	3	4	5	6	7
7.	The physician and I negotiate to come to an agreement on my activities in managing drug therapy.	1	2	3	4	5	6	7
8.	The physicians and I are mutually dependent on each other in caring for patients with regard to drug therapy	1	2	3	4	5	6	7
9.	The physicians will work with me to overcome disagreements on my role in managing drug therapy.	1	2	3	4	5	6	7
10.	For our practices, I need this physician as much as this physician needs me.	1	2	3	4	5	6	7
11.	The physicians depend on me as much as I depend on them	1	2	3	4	5	6	7
12.	I spend time trying to learn how I can help the physicians provide better care.	1	2	3	4	5	6	7
13.	I show an interest in helping the physicians improve patient out come in the hospital	1	2	3	4	5	6	7
14.	I provide information to the physicians about specific patients.	1	2	3	4	5	6	7

Annex 2

Addis Ababa University

College of Health Science

School of Pharmacy

Department of Pharmaceutics and Social Pharmacy

Questionnaire on Pharmacist Physician Collaborative Index: for physicians

Information Sheet and Informed Consent

The purpose of this Information Sheet and Informed Consent is to provide a clear explanation of the nature of this study. The necessary procedures are described below. If, after reading this sheet, you have any questions or concerns, please discuss these with the principal investigator, Sewit Timothewos (Mobile: 0911307656; e-mail: sewithessebon@gmail.com). Please feel free to contact the principal investigator at any time prior to, during, or after your participation is completed. Once you are entirely satisfied with this explanation and freely choose to participate in the study, you may indicate your willingness to participate by giving your verbal consent to the research assistant (data collector). You are free to end your participation in the study at any time.

This study is designed to assess the degree and barriers of interprofessional collaboration between physicians and pharmacists in selected government hospitals in Addis Ababa, Ethiopia. Accordingly the questionnaire provided below is intended to determine the degree of interprofessional collaboration between physicians and pharmacists in your hospital. It will take you a maximum of 5 minutes to fill out the questionnaire. Before filling it out, please consider your working relationship with the pharmacists in your hospital. Think, in general, about the interactions you have had with these pharmacists over time. Please indicate your agreement with each of the following statements by using the scale listed as follows. Please circle the number that represents your agreement with the item.

SCALE: 1-very strongly disagree (VSD); 2-strongly disagree (SD); 3-disagree (D); 4-neutral (N); 5-agree (A); 6-strongly agree (SA); 7-very strongly agree (VSA)

Your answers are very important and valuable to the successful completion of the

study. Please be honest in filling this questionnaire, as it will be solely used for research purposes. The information you provide will be confidential, anonymous, and data will be analyzed in aggregates.

I. Socio-demographic Information

1. Sex: _____
2. Age in years: _____
3. Years of experience: _____
4. Educational level
    A. General practitioner
    B. Specialist, please specify _____
5. Please specify your department of practice
    A. Emergency
    B. Inpatient
    C. Outpatient
    D. Others, please specify_____

II. Information on extent of interprofessional collaboration with pharmacists in the hospital setting *"The Pharmacists" for this questionnaire indicates the pharmacists in your hospital.

No	Items	VSD	SD	D	N	A	SA	VSA
1.	The pharmacists are credible	1	2	3	4	5	6	7
2.	I trust the pharmacist's drug expertise	1	2	3	4	5	6	7
3.	I can count on the pharmacists to do what they say	1	2	3	4	5	6	7
4.	The communication between the pharmacists and I is two-way.	1	2	3	4	5	6	7
5.	I intend to keep working together with the pharmacists	1	2	3	4	5	6	7
6.	My interactions with the pharmacists is characterized by open communication of both parties	1	2	3	4	5	6	7
7.	The pharmacists and I negotiate to come to an agreement on my activities in managing drug therapy.	1	2	3	4	5	6	7
8.	The pharmacists and I are mutually dependent on each other in caring for patients with regard to drug therapy	1	2	3	4	5	6	7
9.	I will work with the pharmacists to overcome disagreements on their role in managing drug therapy.	1	2	3	4	5	6	7
10.	In providing patient care, I need the pharmacist as much as the pharmacists need me.	1	2	3	4	5	6	7
11.	The pharmacists depends on me as much as I depend on them	1	2	3	4	5	6	7
12.	The pharmacists have spent time trying to learn how they can help me provide better care.	1	2	3	4	5	6	7
13.	The pharmacists have showed an interest in helping me improve patient outcome in the hospital.	1	2	3	4	5	6	7
14.	The pharmacists have provided information to me about a specific patient.	1	2	3	4	5	6	7

Annex 3

Interview Guide on the Extent of Pharmacist Physician Collaboration: for Pharmacists

Addis Ababa University

College of Health Science

School of Pharmacy

Department of Pharmaceutics and Social Pharmacy

Interview Guide for Indicating the Extent of Pharmacist Physician Collaboration

Introduction: I want to thank you for taking the time to meet with me today. My name is Sewit Timothewos and I am the principal investigator for the study entitled "Interprofessional Collaboration between Physicians and Pharmacists in selected government hospitals in Addis Ababa, Ethiopia". And I would like to talk with you about the level of interprofessional collaboration you have with the physicians in your hospital.

Purpose of the Interview: I am interested in knowing the extent of interprofessional collaboration you have with the physicians in your hospital. The interview should take maximum of an hour. Although I will be taking some notes during the session, I can't possibly write fast enough to get it all down. Because I don't want to miss any of your comments, would it be alright if I tape recorded the session? Yes/No

If your answer is yes, because we're on tape, please be sure to speak up so that we don't miss your comments. All responses will be kept confidential. This means that your interview responses will only be shared with research team members and we will ensure that any information we include in our report does not identify you as the respondent. Remember, you don't have to talk about anything you don't want to and you may end the interview at any time.

Are you willing to participate in this interview? Yes/ No

List of topics to be asked in the interview

1. Are there any joint care activities that are performed by pharmacists and physicians in your hospital?

    a. If so please specify those activities?

2. Please specify those joint activities that can potentially be performed by the collaboration of pharmacists and physicians? E.g. Pharmacists phoning in refill requests, alerting physicians on the possible ADRs, discussing a drug therapy problem identified during the dispensing process, or physicians inquiring about the availability of drugs.

    a. Please specify the obstacles you face when trying to perform the previously aforementioned joint care activities?

3. Was there a point in time where you or a physician tried to communicate with you?

4. Have you ever come across a situation where your communication with the physicians in your hospital resulted in a better patient outcome or has there been a case where the lack of communication with them resulted in a negative patient outcome?

5. In your opinion who do you think (the pharmacists Vs. the Physicians) makes an effort to establish an interprofessional collaboration?

    a. If possible please give me examples of this efforts?

6. Are there systems (systems placed by the administrative body, formal and informal / regular and irregular) in place that potentiate the interprofessional collaboration between physicians and pharmacists?
    a. How has your collaboration with physicians been facilitated or hindered by the hospital's organizational structure, rules or role setting?
        i. Formal and sort of regular (e.g. through DIC, DTC, interprofessional morning sessions or ward rounds)
        ii. Informal and irregular Pharmacists phoning in refill requests, alerting physicians on the possible ADRs, or discussing a drug therapy problem identified during the dispensing process, physicians phoning asking for the availability of drugs.
7. How has (in a positive or negative way) your professional education affected you in collaborating with physicians?
8. How important do you feel trust is to relationship development with the physicians with whom you work?
    a. Do you trust the physicians with whom you work?

a How was this trust tainted or developed?

9. Considering the type of patients treated in your hospital how important do you think is interdisciplinary patient care?
10. How has the geographic, organizational and social proximities of the pharmacists and the physicians in your hospital (positively vs. negatively) affected your interprofessional collaboration with the physicians?
11. What are the common means of communication between the pharmacists and the physicians in your hospital? Are there any face to face visits, using the patients as messengers, by phone etc.?
12. How frequent (often) is the communication with the physicians in your hospital? I.e. how many times have you met with the physicians to have extended discussions with pharmacists about patient care?
13. What kind of roles do the physicians in the hospital expect the pharmacists to play?

    Probing questions: Do the pharmacists in the hospital monitor the drug therapies of patients?

    Do the pharmacists in the hospital make clinical recommendations to the physicians?

    If so, how well are they accepted by the physicians?

14. Is there anything more you would like to add on what we have talked about so far?
15. Do you have any question that you would like me to answer?

Thank you for your time and cooperation

Annex 4

Interview Guide on the Extent of Pharmacist Physician Collaboration: for Physicians

Addis Ababa University

College of Health Science

School of Pharmacy

Department of Pharmaceutics and Social Pharmacy

Interview Guide on the Extent of Pharmacist Physician Collaboration: for Physicians

Introduction: I want to thank you for taking the time to meet with me today. My name is Sewit Timothewos and I am the principal investigator for the study entitled "Interprofessional Collaboration between Physicians and Pharmacists in selected government hospitals in Addis Ababa, Ethiopia". And I would like to talk with you about the level of interprofessional collaboration you have with the physicians (for a pharmacists) or the pharmacists (for a physician) in your hospital.

Purpose of the Interview: I am interested in knowing the extent of interprofessional collaboration you have with the physicians (for a pharmacists) or the pharmacists (for a physician) in your hospital. The interview should take maximum of an hour. Although I will be taking some notes during the session, I can't possibly write fast enough to get it all down. Because I don't want to miss any of your comments, would it be alright if I tape recorded the session? Yes/No

If your answer is yes, because we're on tape, please be sure to speak up so that we don't miss your comments. All responses will be kept confidential. This means that your interview responses will only be shared with research team members and we will ensure that any information we include in our report does not identify you as the respondent. Remember, you don't have to talk about anything you don't want to and you may end the interview at any time.

Are you willing to participate in this interview? Yes/ No

List of topics to be asked in the interview

1. Are there any joint care activities that are performed by physicians and pharmacist in your hospital?

    aIf so please specify those activities?

2. Please specify those joint activities that can potentially be performed by the collaboration of physicians and pharmacists? E.g. Pharmacists phoning in refill requests, alerting physicians on the possible ADRs, or discussing a drug therapy problem identified during the dispensing process,

    a Please specify the obstacles you face when trying to perform the previously aforementioned joint care activities?

3. Was there a point in time where you or a pharmacists tried to communicate with you? How did that communication go about?

4. Have you ever come across a situation where your communication with the pharmacists in your hospital resulted in a better patient outcome or has there been a case where the lack of communication with the pharmacists resulted in a negative patient outcome?

5. In your opinion who do you think (the pharmacists Vs. the Physicians) makes an effort to establish an interprofessional collaboration?

    aIf possible please give me examples of this efforts?

6. Are there systems (systems placed by the administrative body, formal and informal / regular and irregular) in place that potentiate the interprofessional collaboration between physicians and pharmacists?

    aHow has your collaboration with pharmacists been facilitated or hindered by the hospital's organizational structure, rules or role setting?

        i. Formal and regular (e.g. through DIC, DTC, interprofessional morning sessions or ward rounds)

        ii. Informal and irregular Pharmacists phoning in refill requests, alerting physicians on the possible ADRs, or discussing a drug therapy problem identified during the dispensing process, physicians phoning asking for the availability of drugs.

7. How has (in a positive or negative way) your professional education affected you in collaborating with pharmacists?

8.

9. How important do you feel trust is to relationship development with the pharmacists with whom you work with?

    a. Do you trust the pharmacists with whom you work?
    b. How was this trust been tainted or developed?

10. Considering the type of patients treated in your hospital (or even in this specific department) how important do you think is interdisciplinary patient care?

11. How has the geographic, organizational and social proximities of the physicians and the pharmacists in your hospital (positively vs. negatively) affected your interprofessional collaboration with the pharmacists?

12. What are the common means of communication between the physicians and the pharmacists in your hospital? Are there any face to face visits, using the patients as messengers, by phone etc.?

13. How frequent (often) is the communication with the physicians in your hospital? i.e. how many times have you met with the pharmacists to have extended discussions with pharmacists about patient care?

14. What kind of roles do the physicians in the hospital expect the pharmacists to play?

    Probing questions: Do the pharmacists in the hospital monitor the drug therapies of patients?

    Do the pharmacists in the hospital make clinical recommendations to the physicians?

    If so, how well are they accepted by the physicians?

15. Is there anything more you would like to add on what we have talked about so far?

16. Do you have any question that you would like me to answer?

Thank you for your time and cooperation!