THE AWARENESS OF HEALTHCARE PROFESSIONALS ON THE INFLUENCE OF CRITICAL DYNAMICS ON THE USE OF MEDICINES (MEDICATION SAFETY)

ON BEHALF OF THE GIMS FOUNDATION

Bachelor Thesis

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PREFACE

My interest in medication safety emerged after my grandfather had serious side effects from using medicines. My grandfather uses a lot of medication for his heart disease and rheumatoid arthritis. At one occasion he received wrong diuretics that caused an interaction with other medication he used. Because of this he became ill and fainted.

I became involved in this bachelor thesis when I noticed a call on the virtual learning environment of the University. I enjoyed working on this project, and during the project I became even more interested and enthusiastic concerning this topic.

I want to thank my supervisors Erik ten Hoff MSc and Richard van Slobbe PharmD for their help and guidance during this project. I had a lot of meetings with my supervisors, and the meetings were always pleasant and useful. In addition, I would like to thank dr. Aukje Mantel-Teeuwisse for the guidance from the University of Utrecht.

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INTRODUCTION

Many people are taking medicines as a daily routine for treating diseases and health improvement. Medicines can improve your health, but there are also risks associated with the use of medicines. A study in 2006 showed that 5,6% of all the acute hospitalizations in the Netherlands were medication related. 46% of these hospitalizations were potentially avoidable. That means that 2,58% of all the acute hospitalizations were medication related and potentially avoidable [1]. Worldwide, many studies have been conducted to medication related hospitalizations. The ways in which the studies have been conducted differs considerably in study design, research method, definitions and inclusion criteria. However, from all the studies significant percentages are found about potentially avoidable medication related hospitalizations [1-6]. An overview of studies is given in table 1.

Table 1: Overview of different studies to potentially avoidable medication related hospitalizations [1-6].

Study	Country	Potentially avoidable medication related hospitalizations (%)
van den Bemt *et al.* [1]	The Netherlands	2,6%
Philips *et al.* [2]	Australia	4,1%
Klein *et al.* [3]	Swiss	1,2%
Koh *et al.* [4]	Singapore	6,6%
Cooke *et al.* [5]	South Africa	4,7%
Expert Group on Safe Medication Practices [6]	Europe	0,7 – 7,3%*

* The range in which the percentages of different hospitals in Europe lie

The data above only represents the potential avoidable medication related hospitalisations. It can be assumed that not everyone is hospitalised due to the use of medicines. Therefore there must be a larger group of people who live their daily lives with unpleasant side effects, illness and inconveniences caused by the use of medicines. This varies between mild side effects till serious consequences that will dominate the daily life of people.

As can be seen in the data above, health risk through the use of medicines is a big problem. Peter Gøtsche (physician, medical researcher and author of the book: 'Deadly Medicines and Organised Crime') wrote that prescription drugs are the third leading cause of death after heart disease and cancer in Europe and the United States [7]. This led to the founding of the Global Initiative on Medication Safety Foundation (GIMS). GIMS main objective is minimizing the health risks originated by the global use of medicine. To achieve this they aim to create awareness and responsibility in the medical chain, healthcare governance and patients worldwide [8].

Medication safety is a broad term, there is not a widely accepted definition for this. Yu *et al.* did a systematic review to websites of 160 organisations that are involved in mediation safety. The websites were screened for medication safety related terms and definitions. 25 related terms were found with 120 different definitions for those terms. The terms could be grouped together in 5 different groups: adverse drug reaction (ADR), adverse drug event (ADE), medication error, medication incident and near miss [9]. The definitions for these terms can be found in the glossary in Appendix I.

The definition that is used for medication safety in this thesis is defined by the Global Initiative on Medication Safety Foundation (GIMS): “Minimize health risks originated by the use of medicines” [8].

The health risk through the use of medicines is a problem that not everyone is familiar with. Different studies on the knowledge and awareness of professionals on medication safety have been conducted. Across all those studies, a mixed image is shown on the knowledge and awareness of healthcare professionals on medication safety [10-13]. For example the study by Sewal *et al.* showed that 27,9% of the healthcare professionals in India were having a poor knowledge of the fundamentals of medication errors [11]. A study from Abdel-Latif *et al.* pointed out that there is a lack of knowledge and awareness among healthcare professionals of pharmacovigilance and ADR reporting systems [12].

Much research that has been performed on medication safety focuses largely towards the medical field. Research is focussed on chemical and biological processes or the social effects on the use of medication. For this research we step outside the medical field and research influences from outside, on medication safety.

The main goal of this research is: “Gaining insight in the degree of awareness of professionals and concerned directors (in the medical chain in different countries) regarding the health risks through the use of medicines”. The secondary goal is: “Gaining insight in the process of prescribing, dispensing and the guiding of patients with the use of medicines in the different countries”.

A number of critical dynamics are drawn to investigate the goals. Critical dynamics influence the triangle relation between patients, physicians and pharmacists. It also influences the process of prescribing, dispensing, guidance and usage of medicines. This is visualized in the flowchart in figure 1. The following critical dynamics are central in this research: culture, religion, technology, availability of medicines, reliability of medicines, level of knowledge and education, laws and regulations, contact with other healthcare professionals and stability of the country. The definitions can be found in the glossary in appendix I.

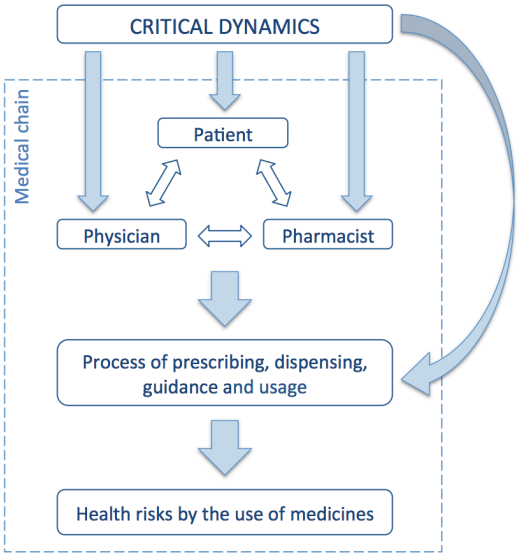

Figure 1: Flowchart how critical dynamics can lead to health risks by the use of medicines.

METHODS

For this bachelor thesis a qualitative research has been performed. Different countries have been studied through a literature study and by interviewing professionals. The results are therefore based on the information and opinions of the respondents that cooperated in this research.

The fundamental idea is to get insight in the level of knowledge and awareness of medical professionals on the influences of critical dynamics on the processes of prescribing, dispensing and guiding patients.

Progress

Prior to the research a research proposal was made, which can be found in appendix II. The research proposal contains the goals and approach of this research. An important part of the research proposal was the creation of a list of critical dynamics that might have an effect on the use of medicines. Based on these critical dynamics a questionnaire has been composed for the interviews. The critical dynamics that are used in this project are given in the introduction on page 5.

For this project we made use of a dynamic approach. This means that on the basis of new insights during the process of interviewing and researching the questionnaire has been evaluated and frequently adjusted. The reason for the dynamic approach was to reach a deeper level in the interviews. The questionnaire that has been made alongside the critical dynamics can been found in appendix III.

Interviews

Interviews were arranged with professionals in different countries. The respondents have been interviewed on the basis of a questionnaire.

Study population

The aim was to investigate 13 countries in different regions across the world. The target countries were: Argentina, Australia, Belgium, Iran, Israel, Kenya, Poland, Portugal, Rwanda, Switzerland, United Arab Emirates, United Kingdom, United States of America. In a separate bachelor thesis 13 other countries were investigated. The countries were selected in a way that different regions in the entire world were being studied.

The aim was to interview 3 professionals for each country. To get a big picture of the awareness of medication safety we tried to interview professionals with different professions. The preference was to interview a community pharmacist, an employee from the university and an employee from the government or a professional organization.

Approach respondents

Respondents were approached in four different ways. The first way was through connections that either my supervisors or I had with professionals in the selected countries. Another way was by approaching students in the selected countries with the question if they know professionals on the field of medication safety. The third way was by approaching universities, governments and organizations whether they had professionals

that wanted to participate in this research. The last way in which respondents have been approached was by the database of community pharmacies on Google Maps.

Interview method

There are four ways how interviews took place: face-to-face, by Skype, by telephone or by email. In consultation with the respondent, the right interview method was chosen. The preference was face-to-face interviews, but this could be hard since this is a worldwide research project in different countries. Second choice were interviews by Skype because these are real time conversations and facial expression and other visual and verbal cues could be picked up. Third choice were interviews by telephone, these are also real time and verbal signals could still be picked up. Last choice were interviews by email, because these are not real time and this feels less conversational. It is also harder to ask follow-up questions. Minutes were be taken by recording the interviews on a recording device.

Neutral point of view

Culture religion and governmental power are sensitive issues. GIMS is a non-governmental, non-political and non-religious organization. GIMS adopts a neutral position at all times. Therefore it was important that a neutral stand was taken during the interviews.

Literature study

A literature study was undertaken for additional information on the interviews and critical dynamics. The aim of this literature study was to find additional and in-depth information on the results of the interviews.

The approach for the search on additional and in-depth information has been done in two ways. First by asking respondents in the interviews where more information on medication safety could be found. Secondly by searching for information on processes, laws and regulations. This was done by research on government, professional association and organization websites.

Processing interviews and literature study

The relevant outcomes of the interviews and the literature study are given in the results. The results focus on the effects of the critical dynamics on the medication safety. Other results that are less important for the research goals are given in appendix IV.

RESULTS

In this chapter only the relevant results of the influence of the critical dynamics are given. Additional information gathered during the research can be found in appendix IV: additional results.

Overview respondents

The aim was to investigate 13 countries. This goal has not been reached, 6 countries were investigated. An overview of the countries and respondents that participated in the interviews are given in table 2. Some respondents participated in a second interview based on new insights and deepening questions. The amount of interviews that were done with each respondent is shown in parenthesis in table 2.

Table 2: Overview of studied countries and the professions of the respondents. Parentheses indicate if one or two interviews have taken place with the respondents.

Country	Profession
Australia	Community pharmacist (1) Clinical pharmacist (2)
Belgium	Community pharmacist (2)
Iran	Community pharmacist (2) Senior Lecturer at the university (2)
Rwanda	Community pharmacist & professional association (2) Community pharmacist (1) Professor at the university (1)
United Kingdom	Community pharmacist (1) Senior Lecturer at the university (2)
United States	Community pharmacist (1) Hospital Pharmacist (1)

Lots of professionals were approached for this research program. However, due to limited response it did not work to arrange interviews in all the target countries. There was initial contact with professionals from Argentina, Israel and Portugal. Although they agreed to participate in the research program, the interviews never took place. Multiple attempts were made to contact them for appointments however they never replied anymore.

In Kenya and the United Arab Emirates there was also contact with professionals. These professionals referred to other professionals who knew more on the subject of medication safety. But these professionals did not react or did not want to cooperate in the project.

In Switzerland and Poland there were no professionals that wanted to participate in the interviews.

Critical dynamics

Table 3 gives an overview of the awareness of the respondents on the influences of the critical dynamics on the medication safety. The results in table 3 are explained in more detail in the rest of this chapter.

Table 3: Awareness of the respondents on the critical dynamics and the influences on the medication safety

Critical Dynamic	Australia	Belgium	Iran	Rwanda	United Kingdom	United States
Culture	○ / –	○ / –	• / –	• / –	• / + –	• / + –
Religion	○ / –	○ / –	• / –	• / □	• / □	• / –
Technology	• / +	• / +	• / □	• / □	• / +	• / + –
Availability of medicines	• / + –	• / □	• / + –	• / –	• / □	• / □
Reliability of medicines	• / +	• / +	• / + –	• / +	• / +	• / +
Level of knowledge and education	• / +	• / + –	• / –	• / + –	• / +	• / +
Laws and regulations	• / +	• / +	• / +	• / + –	• / +	• / + –
Contact with other professionals	• / + –	• / +	• / –	• / –	• / +	• / +
Stability of the country	○ / –	○ / –	• / –	• / +	○ / –	○ / –

○ No awareness if this critical dynamic influences the medication
• Awareness on the influence this critical dynamic on the medication safety
– Influences the medication safety negatively
+ Influences the medication safety positively
□ No influence on the medication safety

Culture

In Australia and Belgium the respondents were not aware if culture influences the use of medication. They expect that culture has a little impact on the use of medication. But they couldn't tell this with certainty. This leads to higher health risks because the respondents may not be aware of some influences of culture.

Culture in Iran has a negative influence on the use of medication. Patients are not aware of the medical knowledge of pharmacists. Therefore they ask their questions about medication to physicians and not to pharmacists. When a pharmacist gives an explanation on medication, people will double check this with their doctor. This leads to higher health risks because important advice from the pharmacist is in doubt by patients.

In Iran and Rwanda people in rural areas prefer parenteral drugs. This preference effects on the way of prescribing for physicians. Physicians often prescribe parenteral drugs even if there are better drugs available with another route of administration. This influences the use of medication in a negative way. The health risks are highest for parental drugs, the most medication errors are made with parenteral drugs [14].

In the United Kingdom there is a culture of believing that the doctor will prescribe antibiotics. There are big campaigns to reduce antibiotic prescribing and improve the appropriate use of antibiotics. Those campaigns are focussed on both the doctors and the public [15,16]. A high antibiotic use influences the medication safety negatively because it may result in drug resistant bacteria. The awareness on this topic positively influences the medication safety, because steps are taken to reduce the antibiotic use.

In the United States there is a culture of a high prescription drug use. The study by Zhong *et al.* showed that 68,1% of the Americans are on 1 prescription drug, and 21,2% are on 5 prescription drugs [17]. Respondents say this might be the result of Direct-to-Consumer Pharmaceutical Advertising (DTC advertising). DTC advisements are advertisements from pharmaceutical companies for prescription drugs. The advertisements are aimed at general audiences, and not to healthcare professionals [18]. This has both positive and negative effects on the medication safety. The use of more prescription drugs can improve the health of individuals, but can also result in a higher risk on the use of medicines.

Religion

The respondents from Australia and Belgium were not aware of the influence of religion on the use of medication. They expect that religion has a little impact on the use of medication, but they couldn't tell this with certainty. This leads to higher health risks.

In Iran the Islam influences some women to not use medical services when male doctors provide them, because they don't want male doctors to do their examination or operation. In addition, some Muslims don't use medicines during the daylight period of the Ramadan. The Islamic law says that sick people should not fast, but some Muslims do this anyway.

In Rwanda the influence of religion is minimal. Respondents say that people have left the traditional religion for Christianity, which doesn't have impact on the use of medication in Rwanda. There is no positive or negative influence of religion the use of medicines.

In the United Kingdom the influence of religion is also minimal. Pharmacists are allowed to opt out of selling certain products as the morning after pill, due to religious beliefs. This happens infrequently, and if it happens, the pharmacist must direct the patient to an alternative provider [19]. Therefore the influence on the medication use is minimal.

In the United States there is a negative influence of religion on the medication safety. Pharmacists are allowed to refuse selling drugs that end pregnancy like morning after pills, and they don't have to direct the patient to an alternative provider. The respondents say this is a hot topic and this happens frequently. Next to that Jehova's Witnesses can't get blood transfusions based on their beliefs, which makes surgery hard.

Technology

In Australia, Belgium and the United Kingdom there are ICT systems for electronic prescribing, shared patient medical records and clinical checks. These systems help to support the pharmacists with processes in the pharmacy to improve the medication safety. Respondents say this positively influences the medication safety, because the risk on making errors is smaller. Prescriptions are more readable because they are digital and computer software highlights important interactions.

In the United States these ICT systems are also available. Respondents say there are so many different systems that not all the systems work together, especially for shared medical records. This results in the need of medical records to be exchanged by fax, paper, scanning, etc. This is time consuming and leads to a higher health risk, because the chance on errors is bigger during this process.

Respondents say that advanced ICT systems are not available in Rwanda and Iran. The presence of these systems could improve the medication safety. But because the systems are not available this doesn't have a positive or negative impact on de medication safety.

Availability of medicines

The availability of medicines in pharmacies in Australia is good. But respondents say there are issues in rural areas where patients can be very isolated and may not have easy access to a pharmacy. There are also scenarios where it may take a few days for medicines to get from a wholesaler to a pharmacy in a rural area.

The availability of medicines in Belgium, the United Kingdom and the United States is good. There are always some shortages and out of stocks, this varies over time, and by manufacturer. This does not have a big influence on the medication safety. When a medication is out-of-stock the pharmacist will ask other pharmacies or the pharmaceutical wholesaler for the medication. If that is not possible an alternative medicine is given to the patient.

Respondents say the availability of medicines in Rwanda varies a lot. Sometimes there is a good availability, and sometimes not. This varies from pharmacy to pharmacy, and it can happen that a medicine is out of stock in the whole country. It is also possible that a product is taken out of the market, and is no longer available in Rwanda. This happens random to medicines. It mostly happens to medicines from India. This negatively influences the medication safety because the medication is not always available for the patient. It is also time consuming for the pharmacist to look for medication.

In Iran the availability of medicines differs. Due to economical sanctions the availability of some medicines is poor. There are no direct sanctions that block the medication import in Iran, but sanctions still indirectly affect the availability [20]. There are Iranian pharmaceutical companies that make generic drugs of medicines that are hard to get. The availability for biopharmaceuticals depends on what the health government allows on the market. Most biopharmaceuticals are not available, but the Iranian pharmaceutical companies develop biosimilars so these medicines are also available [21].

92% of the essential medicines that the World Health Organization (WHO) designates are available in pharmacies in Iran [22]. Respondents say that patients can call the hotline 1490 when medication is not available. This hotline gives information on where the medication could be accessed. So the availability of medicines is not always good in Iran, which negatively influences the medication safety. But the steps that are taken by the government and pharmaceutical companies positively improve the availability and medication safety.

Reliability of medicines

The respondents from all the countries told that they were aware of the risks of the reliability of medicines. The actions that the respondents take are only buying medicines from pharmaceutical wholesalers or drug distributors. Some medicines are bought directly from the manufacturer. The pharmacists explain that they believe the reliability of medicines is good if medicines are obtained through this way.

In Iran there are pharmaceutical companies that develop biosimilars. Around 20 of these copied biopharmaceuticals are available on the Iranian market, but none have received international recognition following the guidelines of biosimilars [22]. It is doubtful how reliable these biosimilars are, and this might negatively influence the medication safety.

Level of knowledge and education

In Australia, the United Kingdom and the United States the respondents say the level of education is high and pharmacists have a high level of knowledge. Medication safety is a huge topic and it gets much attention in these countries. There are training programs that keep the level of knowledge of pharmacists high.

In Belgium there was not a good knowledge on medication safety, which negatively influences health risks by the use of medicines. But there recently has been an increase in the attention for this topic. The awareness of medication safety differs from pharmacist to pharmacist, but the government is trying to make people more aware on this topic. Since one year it is mandatory for pharmacists to take a number of extra trainings on different topics each year [23]. Steps are taken to improve the knowledge, which positively influences the medication safety.

The respondents from Iran say that medication safety is a new field for pharmacists in Iran and there is much improvement possible on this topic. There is almost no education on how to manage patients and how to monitor a prescription on adverse drug events. Knowledge is lacking on medication safety, negatively influences health risks by the use of medicines.

The respondents in Rwanda say that the knowledge on medication safety differs a lot from pharmacist to pharmacist.

Laws and regulations

In all the investigated countries there are laws and regulations that influences the practice of pharmacies. The government sets laws and regulations that have a huge influence on the medication safety. Each country has a national drug regulation agency that holds a tight control of what medication is available on the market. The government provides guidelines, laws and regulations on what should and must be done in a pharmacy. The countries also have pharmacist associations, which represent the interests of pharmacists. The respondents say that laws and regulations positively influence the medication safety.

In the United Kingdom there are laws and regulations that allow pharmacists to diagnose and prescribe medicines on a certain field of competence. Pharmacists need to complete an accredited course to get a licence to prescribe medicines on a specialized area [24].

In Iran the health system is under strict supervision of government. The government passes laws, monitors activities and decides about penalties. There are pharmacies that are owned by the government where some special drugs are sold.

In Rwanda there are also laws and regulations governing the pharmaceutical sector. This is for a large part still in development. For example the government adopted the creation of the Rwanda Food and Drugs Authority, but this is not operational yet. Respondents say that not all pharmacists stick to the rules. Pharmacists must to do clinical and legal checks on a prescription. But it varies from pharmacy to pharmacy if these checks actually happen. So in Rwanda the laws and regulations try to positively influence the medication safety, but when pharmacists not stick to the rules this negatively influences the medication safety.

In the United States pharmacists can get limited prescribing rights through Collaborative Drug Therapy Management (CDTM). CDTM is an agreement between a pharmacist and a physician, which allows the pharmacist to initiate, monitor, modify or discontinue a drug therapy in accordance with written protocols established and approved by a general practitioner. The CDTM legislation is regulated by states [25,26]. Next to CDTM, pharmacists can get a number of other prescribing rights. If the pharmacist completes an accredited course or training he can prescribe and administer vaccinations, emergency contraception and tobacco cessation [27].

In the United States laws also allow DTC advertising. These advertisements can cause a higher prescription drug use, which positively and negatively influences the medication safety. This has been explained previously, under culture on page 10.

Contact with other healthcare professionals

Respondents say that in hospital settings there is a good contact between pharmacists and other members of the healthcare team. This is the same in all the investigated countries. The situation for community pharmacists differs from country to country.

In Australia and the United Kingdom there are some pharmacies that are attached to GP clinics. In these clinics there is a lot of contact between doctors and pharmacists. When the pharmacy is not attached to a clinic, the contact with other healthcare professionals in Australia is limited. Limited contact can result in poor knowledge exchange, which negatively influences the medication safety.

In the United Kingdom there is mainly contact by phone when a pharmacy is not attached to a clinic. The contact between GPs and pharmacists is good. This is also a part of the education in the United Kingdom.

The communication between community pharmacists and GPs in Iran and Rwanda is mainly by phone. This contact differs a lot, but is mostly not good. There is a certain degree of pride or arrogance between these professionals, which causes that they are less open to the ideas of each other.

In Belgium there was also a degree of pride between pharmacists and GPs. But the contact is getting better. For a couple of years there are Medical Pharmaceutical Consultations (MFO) organised. These are evenings on a certain topic where the pharmacists and GPs gather together and talk about optimizing the pharmaceutical therapy. There are also pharmacies that are attached to GP clinics. This improves the contact between pharmacists and GPs too.

The contact between healthcare professionals in the United States is in general good. They see each other as complementary to each other, which helps optimizing the pharmaceutical therapy for patients. This improves the medication safety.

Stability of the country

The political stability is not an issue in most countries that were investigated. The respondents were not aware of the influence of this critical dynamic on medication safety. They had expectations on what the impact could be, but this is not an issue in the most countries. This leads to higher health risks because the respondents may not be aware of some influences that the stability of the country can have.

In Rwanda the respondents are aware of the importance of political stability. Respondents say that 20 years after the Rwandese genocide, Rwanda has a relative stable political situation. The result of this is huge. The stable political situation gives the government the possibility to focus on development and reconciliation. The government also focuses a lot on the development of education, healthcare, agriculture and infrastructure. In 1994 the most clinics and hospitals were destroyed, but now the most Rwandans live close a health centre. There is a public healthcare insurance (mutuelle de sante) for all Rwandese citizens. The healthcare insurance results in a situation that all Rwandans use the healthcare and that there is hardly any illegality in this field. The Rwandese healthcare system is still under development, but the relative stable political situation improves the medication safety in the country.

The respondents say that the political situation in Iran in stable, but there are tensions with other countries. This mainly is because of the nuclear program in Iran. This led to economical sanctions to Iran from other countries. This has been explained previously, under availability of medicines on page 11.

DISCUSSION

This research has led to many results. A lot of differences were found between countries and within countries. This study shows that critical dynamics have a clear impact on the processes of prescribing, dispensing, guidance and usage of medicines.

Critical dynamics

Awareness on the critical dynamics

The respondents think that they lack awareness on culture, religion and the stability of the country. Creating more awareness on these critical dynamics is important. More awareness can result in clear steps that can be taken by healthcare professionals to improve the medication safety.

The respondents think they have good awareness on the influence of technology. The question is whether professionals are aware that technology can make them dependent on ICT systems. ICT systems can result in pharmacists getting sluggish on doing clinical checks, because they believe that ICT systems will highlight these. Technology can also result in a reduce of knowledge because of the dependence on ICT systems.

The respondents all think they have a good awareness on the influence of the level of knowledge and education, availability of medicines and laws and regulations. But the respondents only explained what they understood on these critical dynamics, and what is done in pharmacies on these areas. They could not explain what the influences of these critical dynamics were on medication safety.

On the field of reliability of medicines the question is whether pharmacists are aware that there is a possibility that not all medicines at the wholesale are pharmaceutical reliable. It is possible that errors are made there too. In countries where the availability of medicines is poor you may wonder if the medicines are not relabelled after their expiry date has passed.

Respondents have awareness on the influence of the contact with other professionals. The respondents were aware that a poor contact between healthcare professionals might result in a poorer pharmaceutical therapy for patients. A poor contact may cause that professionals are not open for other ideas than the ideas of themselves.

General view

Awareness on critical dynamics is an issue that should be addressed in all countries. Even when professionals think they have awareness, there might still be a lack of awareness. Awareness is important because the critical dynamics influence the processes in and around the triangle of patient, physician and pharmacist. The safety of medication use is guaranteed in this triangle.

In addition, there is a difference between having awareness and using the knowledge of awareness to improve the medication safety. This is varies between professionals.

The healthcare professionals have a limited influence on certain critical dynamics that impact the use of medicines. The professionals cannot do a lot when religions or

governments set certain rules. But when professionals have awareness on these influences, they can advise patients on the health risks that come with it.

Strengths & Weaknesses

To broad study population

The study population (professionals and the concerned directors in the medical chain) was too broad. It would have been better if we had focussed on a smaller group of professionals, like community pharmacists in different countries in the world. Because of the broad study population, the answers of the questionnaire and the purpose of the literature study could go in a lot of different ways. With a narrower study population, the research would have been more specified.

Reliability of the research

The useable results of this research are limited. Relatively few countries have been investigated and few respondents were interviewed. The results are dependent on what the respondents have mentioned. The results can therefore not be seen as fully true, and not be extrapolated for an entire country. In addition, it is likely that there are also large differences within countries.

It is not a problem that most results cannot be validated. The purpose of the study was to gain insight in the awareness of healthcare professionals on medication. This insight has been obtained, and conclusions and future research will be given on the basis of these new insights.

Passive and active awareness

This research has shown that many healthcare professionals have awareness if a certain issue is brought to the attention. Healthcare professionals react positively and understanding in such situations. Healthcare professionals do not take direct actions on this in the daily practice, because they only have awareness when a certain issue is brought to the attention. This is defined as passive awareness. Healthcare professionals have active awareness when they are actually taking steps to reduce the influence of critical dynamics on the medication safety.

The results from this research show that a lot of the professionals have awareness of the influence on the critical dynamics on the medication safety. However, this study did not make a distinction between active and passive awareness. So no proper statement can be made about the awareness of healthcare professionals.

Further research

Because the results of this research are so respondent dependent, more research is needed. This research gives a clear image that there are big differences between and within countries. To get a better grip on the influences of critical dynamics on the triangle of patient, physician and pharmacist more specific research for each country is needed. A large study should be done in each country on the influences of critical dynamics.

In further research it is important to split awareness in active and passive awareness, to get a better grip on the degree of awareness of healthcare professionals.

CONCLUSION

The goal of this research was: “Gaining insight in the degree of awareness of professionals and concerned directors (in the medical chain in different countries) regarding the health risks through the use of medicines.”

The conclusion is that healthcare professionals who participated in this study have the idea that they have a good awareness on the health risks through the use of medicines. However there are areas in which the healthcare professionals seem to lack awareness, while they think they do have awareness in these areas. Besides, this study did not make a distinction between active and passive awareness. This calls for more research on specific countries on the influences of critical dynamics, and a better distinction between passive and active awareness.

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APPENDIX I: GLOSSARY

Medication safety: Minimize health risks originated by the use of medicines [8].

Adverse drug reaction: A response to a drug which is noxious and unintended, and which occurs at doses normally used in man for the prophylaxis, diagnosis, or therapy of disease, or for the modification of physiological function [28].

Adverse drug event: Any injury occurring during the patient's drug therapy and resulting either from appropriate care, or from unsuitable or suboptimal care. Adverse drug events include: the adverse drug reactions during normal use of the medicine, and any harm secondary to a medication error, both errors of omission or commission [29].

Medication incident: Any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the healthcare professional, patient, or consumer. Medication incidents may be related to professional practice, drug products, procedures, and systems, and include prescribing, order communication, product labelling/ packaging/ nomenclature, compounding, dispensing, distribution, administration, education, monitoring, and use [30].

Medication error: A medication error is any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the healthcare professional, patient, or consumer. Such events may be related to professional practice, healthcare products, procedures, and systems, including prescribing; order communication; product labelling, packaging, and nomenclature; compounding; dispensing; distribution; administration; education; monitoring; and use [29]

Near miss: An event or situation that could have resulted in an accident, injury or illness, but did not, either by chance or through timely intervention [31].

Culture: The general customs, thrust and beliefs of patients and professionals in the medical chain.

Religion: The belief in and worship of a god or gods, or any such system of belief and worship [32].

Technology: The use computer technology like new software systems in pharmacies.

Availability of medicines: The extent in which medicines can be bought or reached by patients and pharmacists.

Reliability of medicines: The dispensing of real medicines. Does the information on the box corresponds with the medicine, is the expiry date right?

Level of knowledge and education: Understanding of the pharmaceutical knowledge, which is necessary for running of a pharmacy that you get by experience or study.

Laws and regulations: Rules and guidelines that are set by governments, professional associations and organizations that influence the practice of pharmacies.

Contact with other healthcare professionals: The face-to-face and telephone communication between professionals in the primary and secondary healthcare.

Stability of the country: The political and economical status of a country.

APPENDIX II: RESEARCH PROPOSAL

INTRODUCTION

Background

The health risk through the use of medicines is a problem that not everyone is familiar with. It is not fully clear how different countries in the world think about this topic, and what they do about it. The term medication safety is a broad term, and is interpreted differently by various countries.

The Global Initiative on Medication Safety Foundation (GIMS) drafted its own definition for the term medication safety: "Minimize health risks originated by the global use of medicine".

GIMS was founded in 2014 and is supported by the board of Farmacie Mondiaal Foundation. GIMS wants to initiate and create a higher level of (awareness of) medication safety. To minimize the health risks originated by the global use of medicine, GIMS aims at creating awareness and responsibility in the medical chain, health care governance and patients worldwide. GIMS focuses on supporting responsible parties in the medical chain and health care governance to improve the level of professionalism of the processes and structures of prescribing and dispensing of medicine and guidance of patients in how to use medicine.

Problem statement

The main goal of this bachelor thesis is to gain insight in the degree of awareness of professionals and concerned directors (in the medical chain in different countries) regarding the health risks through the use of medicines (medication safety).

The secondary goal is to gain insight in the process of prescribing, dispensing and the guiding of patients with the use of medicines in the different countries. It will be studied how this process and the sub processes are structured, and how the data is processed, coupled and/or automated/digitized. We look which ICT systems are used in the medical chain. The conditions that determine the parameters are also important (economy, 3G/4G coverage, internet infrastructure, culture, religion, governments, availability of medicines)

APPROACH

Regions and countries

Two students will each work on separate bachelor theses. These theses differ from each other in the target countries that are being studied. The countries are:

- **Europe**: The Netherlands, Germany, United Kingdom, Belgium, France, Switzerland, Sweden, Poland, Portugal, Greece
- **Asia**: Afghanistan, Iran, Israel, United Arab Emirates, Laos, Japan
- **Africa**: Egypt, Ghana, Kenya, Rwanda, South Africa
- **North America**: United States of America, Canada
- **South America**: Suriname, Argentina
- **Australia**: Australia

Chuck van de Cappelle will study: United Kingdom, Belgium, Portugal, Poland, Switzerland, Iran, Israel, United Arab Emirates, Rwanda, Kenya, United States of America, Argentina, Australia

Negina Nangrahary will study: The Netherlands, Germany, France, Sweden, Greece, Afghanistan, Laos, Japan, Egypt, Ghana, South Africa, Canada, Suriname

In the African countries, it is important that in terms of medication the focus will be on HIV, malaria and tuberculosis. Since they are dominating diseases in those countries.

Literature study and interviews

Each country will be studied through a literature study and by interviewing professionals in the countries.

For each country a literature study will be done on what is already known about the health risks of using medicines in that country. Therefore, this bachelor thesis has a scientific nature. The interviews take place after the literature study is finished. The student will try to make contact with pharmacists, professional associations, insurance companies, governments and the WHO.

The professionals will be interviewed on the basis of a questionnaire. The students will do this by a dynamic approach, in which the questionnaire can be adjusted on the basis of later insights.

Neutral point of view

Culture, religion and governmental power are sensitive issues and can have a major impact on the national and/or local process of prescribing, dispensing and the use of medicines.

GIMS is a non-governmental, non-political and non-religious organization. GIMS will adopt a neutral position at all times. The students should also take a neutral stand during the whole bachelor thesis.

FINAL PRODUCT

The bachelor thesis will result in two final products: a project report and an overview of the main results of the studied countries. The project report will be a text document containing the approach, literature study, results, conclusions and advices. How the overview document will be is not clear yet.

The products will be written in English, and be published on the website of GIMS.

APPENDIX III: QUESTIONNAIRE

The professionals will be interviewed on the basis of a questionnaire. This is done by a dynamic approach, in which the questionnaire can be adjusted on the basis of later insights. It is important that the students take an open, neutral stand to the respondents. The students should not judge during the interview.

The questions are written in general. In the African countries, it is important that in terms of medication the focus will be on HIV, malaria and tuberculosis.

QUESTIONNAIRE

Diagnosis and prescribing

1. Where does a patient go when he doesn't feel well?
2. Who makes the diagnosis?
3. What happens after the patient has been diagnosed?
4. Who is allowed to prescribe medicine?
5. How are medicines prescribed?
    I. Digital or by paper?
6. What happens after a medicine is prescribed?
7. Who are allowed to sell medicine?

Processes in the pharmacy

8. What is the process from a prescription that enters the pharmacy to medication dispensing by the responsible person?
    I. What kind of ICT systems are used in this process?
    II. What are the ICT systems used for?
9. Are there any checks done on a prescription?
    I. Who does those checks?
    II. What kind of checks are done?
    III. To what extent are you familiar with the terms: drug interaction; dosage control; double medication and contraindications.
10. Are there certain medicines that need extra vigilance?
11. Do patients always need to go to the same pharmacy? Or are they going to different pharmacies?
12. Is the prescription included in a patient medical record?
    I. Is this done in a paper file or a digital file?
    II. What kind of ICT system is used for this patient medical record?
13. What happens when a medicine is dispensed to a patient for the first time?
14. To what extent is an explanation given on how the medicine should be used?
15. To what extent is the importance of patient compliance explained to the patient?
    I. How is the compliance of the patient checked afterwards?

Availability and reliability of medicines

16. What is the state of the availability of medicines in your pharmacy?
17. To what extent does the availability of medicines affect the medication safety?

18. What do you do when a patient has a prescription for a medicine that is not available in your pharmacy?
19. What is the procedure for a pharmacist to buy medicines? (Procurement of medicines)
    I. Where can pharmacists buy medicines? (Pharmaceutical companies; foundations; (aid) organizations; health insurance companies; or governments?)
    II. Does the way in which a pharmacist has to buy medicines affect the medication safety?
20. What can you tell me about the reliability of medicines you sell?
    I. How to you make sure that the medicines you sell are the real medicines, and not fake ones?
    II. How do you know if the expiration date of the medicines is the real expiration date?

Contact with other professionals

21. To what extent do you have contact with other health care professionals?
    I. What kind of contact is this?
22. What happens when the pharmacist does not agree with the prescription?
    I. Is the pharmacist allowed to change a prescription by himself or does he need approval from a doctor?
23. Do pharmacists and general practitioners have a joint system?
    I. What kind of system is this?
24. To what extent are other pharmacists in your country allowed to look into a patients medication overview?
    I. Is there a joint system between pharmacies?
    II. What kind of system is this?

The pharmacy and pharmacist

25. What education is required to become a pharmacist?
    I. Do you feel the education in your country has the right level to become a good pharmacist?
    II. What do you think of the education in your country if you compare it to other countries / the international standard?
26. Are there pharmacies that belong to a pharmacy chain?
27. Who owns the pharmacies in your country in general? The pharmacist, a pharmacy chain, a company, the government or a combination of those?

Medication safety

28. Can you explain what you think medication safety is?
29. What do you think of the level of medication safety in your pharmacy?
    I. On which field does the medication safety need improvement in your pharmacy?
    II. Do you have the opportunity to improve the medication safety in your pharmacy?
    III. To what extent do you have the will to improve the medication safety?
30. Are there certain factors that influence medication safety in your country?

31. To what extent does culture and religion affect medication in general in your country?
    I. To what extent does culture en religion affect the processes in your pharmacy?
    II. Do you tell your patients the importance of using medicines (and vaccines) concerning culture and religion?
32. To what extent does “higher powers” like the government affect the medication safety in your country?
    I. To what extent does the power of your government influence the processes in your pharmacy?
    II. Are there other “higher powers” that influence the processes in your pharmacy?
33. Do you know any studies that have been done on the topic of medication safety in your country?
34. Do you think medication safety is a topic that needs more attention/awareness?

<u>End of the interview</u>

35. How have you experienced the interview?
36. Is it good if I have the possibility to contact you later with new insights?
37. Do you want to have your name in the final project report?
38. Do you want to receive the final project report of this thesis when it is finished?

APPENDIX IV: ADDITIONAL RESULTS

This appendix consists of the results of the interviews that were less important for the research goals.

Diagnosis and prescribing

The results of the interviews and the literature study on the topic 'diagnosis and prescribing' are processed in table 4 and 5.

Table 4: Results of the interviews and literature study on the subject diagnosis and prescribing.

Country	Patient goes to*	Right to diagnose	Prescribing rights
Australia	General practitioner Pharmacist	Physician	Physician
Belgium	General practitioner	Physician	Physician
Iran	General practitioner	Physician	Physician
Rwanda	General practitioner Pharmacist Traditional Healer	Physician	Physician
United Kingdom	General practitioner Pharmacist	Physician Pharmacist (limited)	Physician Pharmacist (limited)
United States	General practitioner Pharmacist	Physician Pharmacist (limited)	Physician Pharmacist (limited)

* The healthcare provider where a patient goes when he has health issues

Table 5: Results of the interviews and literature study on the subject diagnosis and prescribing.

Country	Way of prescribing	Dispensing rights*
Australia	Paper required, digital possible	Pharmacist
Belgium	Paper required, digital possible	Pharmacist
Iran	Paper	Pharmacist
Rwanda	Paper	Pharmacist
United Kingdom	Paper or digital	Pharmacist
United States	Paper or digital	Pharmacist

* Dispensing rights on prescription drugs

Way of prescribing

The way of prescribing differs from country to country. In the investigated countries it is possible to prescribe medicines on a paper, in some countries it is also possible to prescribe medicines electronically.

Paper prescriptions are the legal documents in Australia and Belgium. It is still mandatory to prescribe medicines on paper, but it is possible to send a digital prescription to the pharmacy next to the paper prescription. The system that is used in Belgium is Recip-e [33]. The systems that are used in Australia are eRx Script Exchange and MediSecure ePrescription Service [34,35]. Both systems works by printing a barcode on top of a printed prescription that works as an access key. The pharmacist scans this barcode and downloads the electronic prescription to his ICT system [33-35].

In the United Kingdom there are two types of prescriptions: National Health Service (NHS) prescriptions and private prescriptions. The private prescriptions can only prescribed on paper. The NHS prescriptions are subsidised by the NHS, and can be prescribed on paper or electronically by the NHS Electronic Prescription Service (EPS). The EPS replaces a paper prescription. The patient needs to appoint a pharmacy where the prescriber can sent the electronic prescription to. It is up to the patient if he wants to use this service. The NHS prescription service is gradually replacing paper prescriptions in the United Kingdom [36-38].

In the United States prescriptions can be prescribed on paper or electronically sent to a pharmacy. It is up to the healthcare professionals what they prefer. The system that is used for electronic prescriptions is SureScripts [39].

In Rwanda and Iran there are no electronic prescriptions, all the prescriptons are on paper.

Processes in the pharmacy

The results of the interviews and the literature study on the topic 'processes in the pharmacy' are processed in table 6 and 7.

Table 6: Results of the interviews and literature study on the subject processes in the pharmacy.

Country	Prescription checks	ICT systems
Australia	Legal checks Clinical checks	Basic ICT systems PMS systems
Belgium	Legal checks Clinical checks	Basic ICT systems PMS systems
Iran	Legal checks Clinical checks	Basic ICT systems
Rwanda	Legal checks Clinical checks	Basic ICT systems
United Kingdom	Legal checks Clinical checks Accuracy checks	Basic ICT systems PMS systems
United States	Legal checks Clinical checks	Basic ICT systems PMS systems

Basic ICT systems: Basic administrative, stock monitoring and electronic ordering and paying
PMS systems: Pharmacy Management Software systems

Table 7: Results of the interviews and literature study on the subject processes in the pharmacy.

Country	Patient medical record	First time dispensing
Australia	Digital on a local and national level	Explanation is given by the pharmacist
Belgium	Digital on a local and national level	Explanation is given by the pharmacist
Iran	No	Explanation is given by the pharmacist or general practitioner
Rwanda	No	Explanation is given by the pharmacist
United Kingdom	Digital on a local and national level	Explanation is given by the pharmacist
United States	Digital on a local and national level. But not all the systems work together	Explanation is given by the pharmacist

Prescription checks

In all the target countries pharmacists must do legal and clinical checks on prescriptions. These checks can be done both by pharmacists and pharmacist technicians. In the end the pharmacist is responsible for the legal and clinical checks.

In the United Kingdom an accuracy check should be carried out by a pharmacist or an accuracy checking technician (ACT). An ACT is a technician who has had special training to check the accuracy of dispensed medication. They should not have been involved in any other part of the prescription process.

In Rwanda the rules and regulations are that the pharmacist need to do clinical and legal checks on a prescription. It varies from pharmacy to pharmacy if these checks are actually done. Not all the pharmacists stick to the rules.

ICT systems

In Australia, Belgium, the United Kingdom and the United States different ICT systems are in use in community pharmacies. Suppliers offer software packages. These Pharmacy Management Software (PMS) systems offer complete packages for Point-Of-Sale (POS), dispensing and ordering systems in the community pharmacies. Table 8 shows an overview of PMS systems that are used in Australia, Belgium, the United Kingdom and the United States [40-45].

Table 8: Overview of suppliers of PMS systems in Australia, Belgium and the United Kingdom [40-45].

Country	Supplier	PMS System
Australia	Fred IT Group	Fred
	Minfos	Minfos
	Corum Health Services	Amfac Windows Dispense; LOTS
	Simple Retail	Aquarius
	HealthSoft	PharmacyPro
	Z Software	Z Software
	Mountaintop	Mountaintop
	CDC Systems	CDC
Belgium	Farmad	TWIN
	Corilus	PharmaWin; Greenock
	NextPharm	NextPharm
	Officinall	Officinal
	Sabco	Sabco
	iPharma	iPharma
United Kingdom	AAH Pharmaceuticals Ltd	ProScript Link
	Cegedim Rx Ltd	Pharmacy Manager; Nexphase
	Helix Health	QicScript Plus; RxWeb
	EMIS Health	ProScript
United States	Many different suppliers and PMS systems	

External services for PMS systems

External services can be built into the PMS systems. Electronic prescription systems like Recip-e (Belgium), eRx Script Exchange (Australia), Medisecure ePrescription Service (Australia) and NHS EPS release 2 (United Kingdom) are all built in into PMS systems [33, 40, 41,42, 44].

DelphiCare is a Belgian medication database that can check on interaction and contra-indications. DephiCare is integrated in all the PMS systems in Belgium [46]. MIMS is a software package that delivers full product information on all the medication available in Australia. It can highlight drug interactions, contra-indications, double medication and allergies. MIMS Integrated is a software package that is built into PMS systems [47].

In the United States not all the PMS systems can communicate with each other. This is because there are a lot of different computer systems in use in pharmacies. A short search on the Internet resulted in already 50 different systems that are in use [45]. The electronic prescription service is an exception. There is one system for electronic prescribing called SureScripts. This works together with all the PMS systems [48].

Patient medical record

In Australia, Belgium and the United Kingdom patient medical records are recorded locally in pharmacies. At the moment, national patient medical records are being rolled out. Pharmacists are only allowed to look into the patient medical records on permission of the patient. The systems are all built in into the PMS systems of the pharmacies.

The system that is used in Australia is eHealth. This is a shared patient medical record between different healthcare professionals. The eHealth system contains clinical documents like a health summary, event summary, hospital discharge summary, medication records, eReferrals and specialist letters [49,50].

The system that is used in Belgium is eHealth. This is a shared patient medical record. Pharmacists are only allowed to look into the part of the system that is shared with other pharmacists. This is part of the eHealth system is called Gedeeld Farmaceutisch Dossier (GFD). The information that is shared between pharmacists are the name, dosage and dispense date of the medication and other health care products that are sold to patients the last 12 months [51-53].

The system in the United Kingdom is the NHS Summery Care Record (SRC). This is record contains a summary of clinical information about a patient, like medication, allergies and adverse reactions. The SRC is an extract of patient data from GP records. The Health & Social Care Information Centre announced on 23th of June 2015 that the NHS SRC is going to be rolled out to community pharmacies. Community pharmacists and pharmacy technicians will be able to look into the SRCs of patients [54-56].

In the United States there are multiple systems for sharing patient medical records between healthcare professionals. There is no one nationwide program. The different systems are not always interoperable with each other. This results in the need of medical records to be exchanged by fax, paper, scanning, etc.

First time dispensing

In all the studied countries the pharmacist or pharmacist technician counsels patients on new medicines. The pharmacist explains how to use medicines, important adverse and the importance of taking the medicines on the right time. When possible the pharmacist also gives a leaflet or paper to the patient with me most important information about the medicine.

In Rwanda there are huge differences between pharmacies. Some pharmacists don't give an explanation on the medication, while other pharmacists do.

In Iran the pharmacists counsels patients on how to use medicines. But people often go back to the clinic to ask their doctor for an explanation on how to use the medicines. Patients often don't have enough trust in the pharmacist and want to double check with their doctor.

In the United Kingdom there is a new service for certain medicines that treat long-term diseases. This service is the NHS New Medicines Service (NMS). For this service the pharmacist has an initial conversation about medication and then follows up at 2 and 4 weeks to ensure compliance and try to rectify any problems the patient might be having [57].

Contact with other healthcare professionals

Change the prescription

In all the counties the pharmacist is not allowed to change the prescription. The pharmacist needs to ask the prescriber for a new prescription or permission to change the prescription.

In Belgium it is mandatory for antibiotics and antimitotics to deliver the cheapest drug to the patient, even prescriber prescribes a more expensive one. For other medicines the pharmacists needs to deliver the drug that the prescriber prescribes, even when there is a cheaper drug with the same working available. When the prescriber prescribes a substance drug name, the pharmacist can choose which product he delivers.

In Rwanda it is also mandatory to ask the doctor for permission to make a change to the prescription. Not all pharmacists in Rwanda do this, some pharmacists change prescriptions without asking the doctor.

APPENDIX V: LOGBOOK

When	What	Time
23-02-2015 16.00-17.00	Writing and handing in motivation letter and CV	1 hour
02-03-2015 12.00-16.00	Preparation interview for bachelor thesis	4 hours
02-03-2015 21.00-22.00	Interview for bachelor thesis	1 hour
16-03-2015 09.00-11.00	Preparation meeting 1	2 hours
16-03-2015 15.00-16.00	Meeting 1 with supervisors and dr. Aukje Mantel	1 hour
16-03-2015 16.00-17.30	Drawing application form bachelor thesis with Negina	1,5 hour
16-03-2015 22.30-23.30	Finishing and handing in application form bachelor thesis	1 hour
17-03-2015 09.00-10.00	Adjusting application form based on feedback	2 hours
17-03-2015 10.30-12.30	Reading into the topic medication safety.	2 hours
18-03-2015 09.00-13.00	Brainstorming and writing of the research proposal with Negina	5 hours
20-03-2015 14.00-19.00	Writing and handing in research proposal (version 1)	5 hours
21-03-2015 10.00-13.00	Reading into the topic medication safety	3 hours
24-03-2015 18.00-23.00	Adjusting and handing in research proposal (version 2) based on feedback	4 hours
26-03-2015 10.00-11.00	Preparation meeting 2	1 hour
26-03-2015 12.00-13.30	Meeting 2 with supervisors and dr. Aukje Mantel	1,5 hour
26-03-2015 17.30-19.00	Writing minutes of meeting 2 for Negina	1,5 hour
31-03-2015 9.00-16.00	Adjusting the research proposal (version 3) based on feedback	7 hours
01-04-2015 10.00-12.00	Adjusting and handing in research proposal (version 3) based on feedback	2 hours
09-04-2015 08.00-10.00	Adjusting and handing in research proposal (version 4) based on feedback	2 hours
14-04-2015 14.00-17.00	Reading into the topic medication safety	3 hours
15-04-2015 12.00-13.30	Reading into the topic medication safety	1,5 hour
20-04-2015 14.00-17.00	Preparation meeting 3	3 hours

20-04-2015 19.00-22.00	Meeting 3 with supervisors: (Startpoint for beginning with interviews and literature study)	3 hours
21-04-2015 12.00-14.00	Preparing travel to Rwanda (visa, tickets, hotel etc.)	2 hours
21-04-2015 16.00-19.00	Establishing contact with professionals in Rwanda for interviews	3 hours
22-04-2015 14.00-16.00	Establishing contact with professionals in Rwanda for interviews + reading into background Rwanda	2 hours
23-04-2015 11.00-17.00	Establishing contact with professionals in Rwanda for interviews + reading into background Rwanda	6 hours
25-04-2015 11.30-12.30	Adjusting and handing in research proposal and questionnaire (version 5) based on feedback	1 hour
26-04-2015 19.00-21.00	Establishing contact with professionals in Rwanda for interviews	2 hours
28-04-2015 10.30-19.00	Flight to Rwanda + preparing, literature and background information for interviews Rwanda	8,5 hours
29-04-2015 09.00-16.00	Interviewing professionals in Rwanda	7 hours
29-04-2015 22.00-00.00	Flight to Amsterdam + Writing minutes interviews Rwanda	2 hours
30-04-2015 00.00-01.00	Flight to Amsterdam + Writing minutes interview Rwanda	1 hours
30-04-2015 14.00-18.00	Writing minutes interviews Rwanda + literature	4 hours
01-05-2015 09.00-11.00	Establishing contact with professionals	2 hours
03-05-2015 13.00-17.00	Establishing contact with professionals	4 hours
04-05-2015 09.00-12.00	Preparing, literature and background information for interview Australia	3 hours
04-05-2015 13.00-15.00	Preparing, literature and background information for interview Belgium	2 hours
06-05-2015 12.00-13.00	Interview Belgium	1 hour
06-05-2015 14.00-15.00	Interview Australia	1 hour
06-05-2015 15.00-17.00	Writing minutes Australia + literature	2 hours
06-05-2015 19.00-22.00	Writing minutes Belgium + literature	3 hours
07-05-2015 10.00-16.00	Preparing, literature and background information for interviews Iran, US and Australia	6 hours
07-05-2015 20.00-21.00	Establishing contact with professionals	1 hour
08-05-2015 13.00-14.00	Interview Australia	1 hour

08-05-2015 14.00-17.00	Writing minutes Australia + literature	3 hours
08-05-2015 21.00-22.00	Interview United States	1 hour
09-05-2015 08.00-11.00	Writing minutes United States + literature	3 hours
09-05-2015 13.00-15.00	Establishing contact with professionals	2 hours
09-05-2015 15.00-16.00	Interview Iran (by email) part 1	1 hour
10-05-2015 20.00-22.30	Writing minutes interview Iran + interview Iran (by email) part 2	2,5 hours
11-05-2015 09.00-10.00	Writing minutes interview Iran + literature	1 hour
11-05-2015 12.00-17.00	Preparation meeting 4 with Negina	5 hours
12-05-2015 15.00-17.00	Preparation meeting 4	2 hours
12-05-2015 19.00-21.00	Meeting 4 with supervisors	2 hours
13-05-2015 09.00-14.00	Establishing contact with professionals	5 hours
17-05-2015 19.00-23.00	Preparing, literature and background information for interview United States	4 hours
18-05-2015 12.00-16.00	Establishing contact with professionals	4 hours
18-05-2015 17.00-18.00	Interview United States	1 hour
19-05-2015 12.00-14.00	Writing minutes interview United States + literature	2 hours
19-05-2015 14.00-17.00	Preparing, literature and background information for interview United Kingdom	3 hours
20-05-2015 10.00-11.00	Interview United Kingdom	1 hour
20-05-2015 11.00-13.00	Writing minutes interview United Kingdom + literature	2 hours
20-05-2015 19.00-22.00	Adjusting questionnaire, creating overview of critical dynamics and best practices.	3 hours
23-05-2015 10.00-13.00	Adjusting and handing in renewed questionnaire and overview of critical dynamics and best practices.	3 hours
23-05-2015 14.30-16.00	Giving feedback on GIMS website	1,5 hour
23-05-2015 16.00-17.30	Preparing, literature and background information for in depth interview Iran	1,5 hour
23-15-2015 17.30-18.00	Establishing contact with professionals	0,5 hour

26-05-2015 09.00-10.00	In depth interview Iran (by email) part 1	1 hour
26-05-2015 12.00-14.00	Preparing, literature and background information for in depth interview Belgium	2 hours
26-05-2015 16.00-17.00	In depth interview Belgium	1 hour
26-05-2015 17.00-18.00	Establishing contact with professionals	1 hour
27-05-2015 09.00-12.30	Writing minutes in depth interview Iran + In depth interview Iran (by email) part 2	3,5 hours
27-05-2015 19.00-20.00	Writing minutes in depth interview Iran + literature	1 hour
28-05-2015 09.00-12.00	Writing minutes in depth interview Belgium + literature	3 hours
29-05-2015 10.30-12.00	Preparation meeting with dr. Aukje Mantel	1,5 hour
29-05-2015 13.00-14.00	Meeting with dr. Aukje Mantel	1 hour
29-05-2015 14.00-15.00	Meeting with Negina	1 hour
29-05-2015 15.00-17.00	Creating table for results interviews	2 hours
01-06-2015 10.00-16.00	Creating and handing in index for the thesis. And handing in overview table for the results of the interviews.	6 hours
02-06-2015 12.00-13.30	Preparation meeting 5	1,5 hour
02-06-2015 18.00-21.30	Meeting 5 with supervisors	3,5 hours
04-06-2015 09.00-13.00	Establishing contact with professionals	4 hours
04-06-2015 15.00-17.00	Preparing, literature and background information for in depth interview Australia	2 hours
05-06-2015 13.00-14.00	In depth interview Australia	1 hour
05-06-2015 14.00-16.00	Writing minutes in depth interview Australia + literature	2 hours
05-06-2015 19.00-21.00	Establishing contact with professionals	2 hours
06-06-2015 09.00-15.00	Writing thesis	6 hours
06-06-2015 15.00-16.00	Establishing contact with professionals	1 hour
07-06-2015 09.00-15.00	Writing thesis	6 hours
09-06-2015 09.00-10.30	Preparing, literature and background information for new interview United Kingdom	1,5 hour

09-06-2015 11.30-12.30	New interview United Kingdom	1 hour
09-06-2015 12.30-15.00	Writing minutes interview United Kingdom + literature	2,5 hours
09-06-2015 19.00-22.00	Writing thesis	3 hours
10-06-2015 09.00-10.00	Preparing, literature and background information for new interview Iran	1 hour
10-06-2015 10.00-11.00	New interview Iran (by email) part 1	1 hour
10-06-2015 11.00-14.00	Writing thesis	3 hours
10-06-2015 20.00-22.30	Writing minutes interview Iran + New interview Iran (by email) part 2	2,5 hours
11-06-2015 11.00-17.00	Writing thesis	6 hours
11-06-2015 20.00-21.30	Writing minutes interview Iran + literature	1,5 hour
12-06-2015 10.00-17.00	Writing thesis	7 hours
18-06-2015 20.30-23.00	Preparing, literature and background information for in depth interview Rwanda	2,5 hours
19-06-2015 10.00-11.00	In depth interview Rwanda (by email) part 1	1 hour
19-06-2015 18.00-20.00	Writing minutes in depth interview Rwanda + In depth interview Rwanda (by email) part 2	2 hours
20-06-2015 09.00-10.00	Writing minutes in depth interview Rwanda + In depth interview Rwanda (by email) part 3	1 hours
20-06-2015 23.00-23.30	Writing minutes in depth interview Rwanda + literature	0,5 hour
01-07-2015 08.30-13.00	Writing thesis	4,5 hours
02-07-2015 10.00-14.00	Writing thesis	4 hours
03-07-2015 10.00-22.00	Writing thesis	12 hours
06-07-2015 10.00-22.00	Writing thesis	12 hours
07-07-2015 10.00-22.00	Writing thesis	12 hours
08-07-2015 10.00-22.00	Writing thesis	12 hours
09-07-2015 10.00-22.00	Writing thesis	12 hours
10-07-2015 10.00-00.00	Writing thesis	14 hours

11-07-2015 00.00-04.00	Writing thesis	4 hours
11-07-2015 08.00-09.00	Writing thesis + hand in first version of thesis to Erik ten Hoff MSc	1 hour
13-07-2015 13.00-18.00	Writing thesis	5 hours
15-07-2015 11.00-12.00	Receiving feedback from Erik ten Hoff MSc + phone call on the feedback	1 hour
16-07-2015 09.00-22.00	Writing thesis: processing the feedback	13 hours
17-07-2015 11.00-00.00	Writing thesis: processing the feedback	13 hours
18.00-2015 00.00-01.30	Writing thesis: processing the feedback	1,5 hour
18-07-2015 08.00-09.00	Writing thesis + hand in second version of thesis to Erik ten Hoff MSc	1 hour
18-07-2015 09.00-13.00	Improving thesis on English language	4 hours
20-07-2015 10.30	Hand in second version of thesis to dr. Aukje Mantel	0 hours
20-07-2015 16.00	Receiving feedback from dr. Aukje Mantel	0 hours
20-07-2015 16.00-22.00	Writing thesis: processing the feedback	7 hours
21-07-2015 09.00-11.30	Receiving first part of the feedback from Erik ten Hoff MSc + thinking about feedback	2,5 hours
21-07-2015 18.00-22.00	Writing thesis: processing the feedback	4 hours
22-07-2015 09.00-11.00	Receiving second part of the feedback from Erik ten Hoff MSc + phone call on the feedback	2 hours
22-07-2015 11.00-23.00	Writing thesis: processing the feedback	12 hours
23-07-2015 08.00-15.00	Writing thesis: processing the feedback	7 hours
23-07-2015 21.00-00.00	Writing thesis: processing the feedback	3 hours
24-07-2015 00.00-03.30	Writing thesis: processing the feedback	2,5 hours
24-07-2015 07.00-16.00	Finishing and handing in thesis	9 hours
		Total: 441,5 hours